



U.S. Department of Transportation

# **BUDGET ESTIMATES FISCAL YEAR 2021**

---

**FEDERAL AVIATION  
ADMINISTRATION**

---

**SUBMITTED FOR USE OF  
THE COMMITTEE ON APPROPRIATIONS**



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**TABLE OF CONTENTS**

	<u><b>Page No.</b></u>
 <b>Section 1. -- OVERVIEW</b>	
Administrator's Overview	Overview-1
Exhibit IA: Organization Chart – FY 2020	Overview-7
Exhibit IB: Organization Chart – FY 2021	Overview-8
 <b>Section 2. -- BUDGET SUMMARY TABLES</b>	
Exhibit II-1: FY 2021 Budget Authority	Budget Summary-1
Exhibit II-2: Budgetary Resources by Appropriation Account	Budget Summary-2
Exhibit II-3: Budget Request by DOT Strategic and Organization Goals	Budget Summary-3
Exhibit II-4: FY 2021 Outlays	Budget Summary-4
Exhibit II-5: Summary Requested Funding Changes from Base Operations	Budget Summary-5
Facilities & Equipment	Budget Summary-6
Research, Engineering & Development	Budget Summary-7
Grants-in-Aid for Airports	Budget Summary-8
Exhibit II-6: Working Capital Fund	Budget Summary-9
Exhibit II-7: Staffing Summary – Full-time Equivalent Employment	Budget Summary-10
Exhibit II-8: Staffing Summary – Full-time Permanent Positions	Budget Summary-11
Exhibit II-9: Ten Year Funding Tables	Budget Summary-12
Exhibit II-10: User Fees	Budget Summary-17
 <b>Section 3. -- BUDGET BY APPROPRIATIONS ACCOUNT</b>	
 <b>3A. OPERATIONS</b>	
Appropriation Language	Operations-1
Program and Financing Schedules	Operations-3
Exhibit III-1: Summary by Program Activity	Operations-7
Exhibit III-1a: Summary Analysis of Change from FY 2020 to FY 2021	Operations-8
Operations Summary Table (Build-up)	Operations-9
Base Transfer Summary	Operations-9
FY 2021 Discretionary Increase Requests	Operations-12
<b>Air Traffic Organization (ATO)</b>	
Detailed Justification	Operations-ATO-1
Explanation of Funding Changes	Operations-ATO-11
<b>Aviation Safety (AVS)</b>	
Detailed Justification	Operations-AVS-1
Staffing Information	Operations-AVS-7
Explanation of Funding Changes	Operations-AVS-8
<b>Commercial Space Transportation (AST)</b>	

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**TABLE OF CONTENTS**

	<u><b>Page No.</b></u>
Detailed Justification	Operations-AST-1
Explanation of Funding Changes	Operations-AST-5
<b>Finance and Management (AFN)</b>	
Detailed Justification	Operations-AFN-1
Explanation of Funding Changes	Operations-AFN-12
<b>NextGen (ANG)</b>	
Detailed Justification	Operations-ANG-1
Explanation of Funding Changes	Operations-ANG-4
<b>Security and Hazardous Materials Safety (ASH)</b>	
Detailed Justification	Operations-ASH-1
Explanation of Funding Changes	Operations-ASH-8
<b>Staff Offices</b>	
Detailed Justification	Operations-Staff-1
Explanation of Funding Changes	Operations-Staff-29
 <b>3B. FACILITIES &amp; EQUIPMENT</b>	
Appropriation Language	F&E-1
Program and Financing Schedules	F&E-2
Exhibit III-1: Summary by Program Activity	F&E-6
Exhibit III-1a: Summary Analysis of Change from FY 2020 to FY 2021	F&E-8
Table of Contents by Budget Line Item	F&E-9
Executive Summary	F&E-13
Detailed Justification by Program Activity 1	F&E-19
Detailed Justification by Program Activity 2	F&E-51
Detailed Justification by Program Activity 3	F&E-185
Detailed Justification by Program Activity 4	F&E-222
Detailed Justification by Program Activity 5	F&E-242
 <b>3C. RESEARCH, ENGINEERING &amp; DEVELOPMENT</b>	
Appropriation Language	RE&D-1
Program and Financing Schedules	RE&D-2
Exhibit III-1: Summary by Program Activity	RE&D-5
Exhibit III-1a: Summary Analysis of Change from FY 2020 to FY 2021	RE&D-6
Table of Contents by Budget Line Item	RE&D-7
Detailed Justification by Program	RE&D-8
 <b>3D. GRANTS-IN-AID FOR AIRPORTS</b>	
Appropriation Language	AIP-1
Program and Financing Schedules	AIP-3
Exhibit III-1: Summary by Program Activity	AIP-6
Exhibit III-1a: Summary Analysis of Change from FY 2020 to FY 2021	AIP-7

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**TABLE OF CONTENTS**

	<u><b>Page No.</b></u>
Executive Summary	AIP-9
Grants-in-Aid for Airports	AIP-11
Personnel & Related Expenses	AIP-16
Airport Technology Research	AIP-20
Airport Cooperative Research Program	AIP-25
AIP Planned Distribution	AIP-29
 <b>3E. OTHER INFORMATION BY APPROPRIATION</b>	
Payment to Grants-In-Aid For Airports	Other Information-1
Aviation User Fees	Other Information-2
Aviation Insurance Revolving Fund	Other Information-4
Administrative Services Franchise Fund	Other Information-6
Airport and Airway Trust Fund	Other Information-9
Trust Fund Share of FAA Activities	Other Information-11
FAA Administrative Provisions – Requested	Other Information-12
 <b>Section 4. -- RESEARCH, DEVELOPMENT &amp; TECHNOLOGY</b>	
RD&T Summary of Budget Authority	RD&T-1
 <b>Section 5. -- INFORMATION TECHNOLOGY</b>	
FAA IT Budget Justification Narrative	Information Technology-1
 <b>Section 6. -- NEXTGEN</b>	
Introduction	NextGen-1
NextGen Program Summary	NextGen-2
NextGen Planned Accomplishments –	
Building on Investments	NextGen-3
NextGen Pre-Implementation	NextGen-5
UAS NAS Integration	NextGen-5
Industry Partnership and Commitments	NextGen-6
NextGen Index of Programs	NextGen-7
 <b>Section 7. -- CAPITAL INVESTMENT PLAN</b>	
Background	CIP-1
Summary	CIP-1
Strategic Goals and the CIP	CIP-1
Important Factors Affecting Planning for the Future	CIP-2
Key Considerations in Capital Planning	CIP-3
NextGen, NAS Modernization, and Sustaining Systems	

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**TABLE OF CONTENTS**

	<b><u>Page No.</u></b>
and Infrastructure	CIP-3
Conclusion	CIP-7
Estimated Funding by Budget Line Item	CIP-8
Information for Major Capital Programs	CIP-12



## **OVERVIEW**

The Federal Aviation Administration (FAA) oversees all aspects of civil aviation in the United States, operating the largest, safest, and most complex aerospace system in the world. Safety is our top priority, and the FAA delivers on this priority by guiding over 43,000 aircraft through our nation's airspace every single day.

For FY 2021, the President's Budget request of \$17.5 billion will enable the FAA to achieve its mission while making targeted investments to protect aviation safety, bring new entrants into the national airspace, operationalize NextGen, make investments in our nation's infrastructure, and more fully engage our communities on noise.

The Budget request boosts funding for aviation safety by supporting improvements to the FAA's safety oversight. The two incidents with, and the subsequent grounding of, the Boeing 737 MAX validates the FAA's dedication to aviation safety and solidifies our resolve to make the overall aviation system as safe as we possibly can. After the grounding, the Joint Authorities Technical Review (JATR), National Transportation Safety Board (NTSB), and Secretary Chao's Special Committee all conducted reviews of the FAA's certification process. This Budget will enable the FAA to begin implementing recommendations from these reviews, which are geared towards developing systemic improvements for the future. Additionally, this Budget includes funding to support a new centralized Organization Designation Authorization (ODA) office, as authorized under the FAA Reauthorization Act of 2018. ODA is a program that allows the FAA to delegate certain aircraft certification functions to qualified private entities, who are still under the oversight of FAA engineers and inspectors. This budget also provides funding to improve the systems the FAA uses to gather, analyze, and respond to safety data. These systems are important tools for how the FAA identifies and responds to safety concerns, which is one of the issues highlighted by the 737 MAX investigations.

With the growth in commercial space, the development of autonomous and unmanned aircraft systems (UAS), the development of vertical-takeoff urban air mobility aircraft, and the possibility of the return of supersonic flight, aviation in the United States is facing fundamental change. It is a new era in aviation, and the Budget request gives the FAA the resources it needs to keep pace with this innovation. In commercial space transportation, the FAA has licensed a record number of launches in recent years. In order to keep pace with a quickly expanding and innovative industry, and to allow the industry to continue its growth without regulatory burden, the FAA is streamlining and updating its requirements for launch and reentry licenses. The Budget request includes funding to continue this work, which is an important part of the Administration's effort on regulatory reform.

A strategic approach to regulation is also an essential part of the FAA's efforts to support the innovation of UAS, as well as their safe and secure integration into our national airspace. The FAA currently is enabling safe UAS operations using existing rules, but we also understand the need to focus on enabling an ever-expanding universe of UAS operations and capabilities. In order to allow for such operations to be conducted safely



and securely, the FAA has moved forward with a number of regulatory initiatives. Together with the Department of Transportation's Office of the Secretary, the FAA published a proposed new rule on the operation of small UAS over people.<sup>1</sup> The proposed rule seeks to mitigate safety risks without inhibiting technological and operational advances. The FAA also published a notice of proposed rulemaking on the remote identification of UAS.<sup>2</sup> The FAA's security partners are helping to highlight some of the important security and public safety questions that must be addressed.

Industry continues to invent new and innovative uses for unmanned aircraft systems. One of the more forward looking use cases is urban air mobility, where vertical takeoff and landing (VTOL) aircraft transport passengers in an urban environment. This Budget request includes funds for research that will evaluate wake turbulence considerations of these new types of aircraft, as well as research that looks into the demands and safety impacts of increased autonomy in these larger UAS. Finally, this Budget request increases funding for the Airport Technology Research program in order to look at the effect these electric VTOL aircraft will have on airports.

Companies in the United States and abroad are revisiting supersonic air travel. Lighter and more efficient composite materials, combined with new engine and airframe designs, may make supersonic flights economically viable for commercial passengers. Current law requires the FAA to issue new regulations to control and abate aircraft noise and sonic boom. To begin meeting these requirements, the FAA published a draft regulation that will streamline the application process for requesting the authority to fly at supersonic speeds over land for the purpose of testing and developing supersonic aircraft.<sup>3</sup> The FAA has also started to draft regulations that would address landing and takeoff noise standards for supersonic aircraft. The FAA's challenge is to fulfill our responsibility to develop regulations that protect public health and welfare but do not inhibit innovation. In addition, the FAA's standards need to be technologically practicable, economically reasonable, and appropriate for the aircraft type.

It has been thirteen years since the FAA started NextGen and undertook the responsibility for modernizing air traffic control while maintaining an aging legacy infrastructure. On January 1, 2020, the FAA passed a major NextGen milestone, as Automatic Dependent Surveillance – Broadcast (commonly referred to as ADS-B) became the preferred means of tracking aircraft in the national airspace. In comparison to radar, ADS-B provides more accurate aircraft monitoring and expanded coverage in areas, such as the Gulf of Mexico. In fact, with the majority of NextGen infrastructure programs deployed, the FAA's task now is to effectively integrate these systems so that the performance improvements envisioned for NextGen are fully realized. The President's FY 2021 Budget request supports NextGen Advisory Committee (NAC) priorities, such as the

---

<sup>1</sup> <https://www.federalregister.gov/documents/2019/02/13/2019-00732/operation-of-small-unmanned-aircraft-systems-over-people>

<sup>2</sup> <https://www.federalregister.gov/documents/2019/12/31/2019-28100/remote-identification-of-unmanned-aircraft-systems>

<sup>3</sup> <https://www.federalregister.gov/documents/2019/06/28/2019-13079/special-flight-authorizations-for-supersonic-aircraft>

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

completion of initiatives for traffic flow and metering tools. These efforts will continue the operationalization of NextGen benefits for industry stakeholders, while maintaining the agency's existing infrastructure.

The Budget request further provides funding to improve infrastructure at our nation's airports through Federal grants. Our grant funding supports continued focus on safety-related development projects at our airports, including projects that reduce the potential for runway incursions.

## **Operations**

The President's FY 2021 Budget request includes \$11 billion for Operations. This level provides targeted investments to improve aviation safety and the FAA's ability to respond to industry innovation, while providing sufficient resources for anticipated cost increases.

The Budget request includes \$58.4 million for targeted investments related to safety, industry innovations, and accountability. This includes an increase of \$36.7 million to improve aviation safety oversight. This funding will support activities that directly relate to the recent Boeing 737 MAX investigation and reviews; strengthen the FAA's ability to track employee training, qualifications and certifications; improve the systems used to gather, analyze, and respond to safety data and trends; and support the FAA's ODA office that will provide centralized oversight and consistent implementation of ODA authorities.

The Budget request includes \$2.2 million to support the FAA's expansion of efforts to engage with the many operational, security, regulatory, and communication issues raised by the integration of UAS into the national airspace. This includes the need for enhanced security to defend against clueless, careless, and criminal uses of UAS. While a wide variety of Counter-UAS systems are commercially available, sufficient testing has not been done to determine their effect on the surrounding environment. The potential impacts that some of these systems may have on avionics, air navigation services infrastructure, and compliant UAS argue for a careful, coordinated, and phased approach to using them in the NAS. The request also includes \$13 million to safeguard new and existing technologies against internal and external cyber threats. In addition, \$685,000 is included to increase staffing in the Office of Commercial Space Transportation to speed the processing of licenses and approvals, streamline regulatory requirements, and keep pace with industry demands for products and services. An increase of \$4.3 million will support the FAA's efforts to engage with communities to develop solutions to growing concerns involving noise. Finally, \$1.5 million is requested for the Science, Technology, Engineering, and Math (STEM) Aviation and Space Education Program to expose students to aviation and aerospace career options while promoting STEM learning for K-12 students.

In addition to the targeted investments, the Budget request for Operations includes \$313 million to cover anticipated cost increases such as expiring leases for regional offices and

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

increases in pay and compensation for approximately 40,000 Operations funded employees.

**Facilities & Equipment (F&E)**

The President's FY 2021 Budget request includes \$3 billion for Facilities and Equipment (F&E). Of this total, \$800.9 million supports the realization of NextGen benefits, including near-term priorities identified by the NAC. This funding fully supports ongoing programs such as Data Communications, which enables controllers to send digital instructions and clearances to pilots. This also supports key NextGen programs, such as NextGen Weather Processor, which will help reduce weather delays by delivering improved weather information to all users of the national airspace; enhancements to ADS-B, which is the FAA's satellite-based successor to radar technology; and Space Based ADS-B work in the Caribbean, which will allow users of the national airspace to take advantage of satellite-based surveillance in places that do not have ADS-B ground infrastructure.

The Budget request also supports several programs that have great potential in reducing congestion and strengthening economic competitiveness in the United States. Great efficiencies can be gained by connecting airport surface information to the en route airspace and by exchanging more information with stakeholders. The request includes \$79.1 million for the Terminal Flight Data Manager program, which will collect, distribute, and update flight information in the airspace around an airport. This program is a key ground infrastructure program for NextGen operations in the areas of flight planning; push back, taxi and departure; descent and approach; and landing, taxi and arrival. The program is supported by the NAC and will help to reduce congestion along the Northeast Corridor of the United States. In addition, \$16.3 million is included in the Budget request for Time Based Flow Management, which enables the performance-based navigation program to maximize traffic flow into and out of the busy metropolitan airspaces and corresponding airports.

The President's Budget request includes \$59.6 million to support integration of both UAS and commercial space into the national airspace. The FAA will continue development of a UAS Traffic Management system, support smart collection and dissemination of data to Unmanned Traffic System service providers and cyber security and data integrity work for UAS networks. The FAA will continue work to automate commercial space launch and reentry operations that are currently manual in nature, time consuming, and require vast sections of commercial airspace to be closed off. An automated system will safely reduce the amount of airspace that must be closed to other users and build the foundation for integrating commercial space operations into the national airspace.

The Budget request for Facilities and Equipment includes \$230 million to continue programs that protect aviation safety. This provides ongoing funding for the Airborne Collision Avoidance System to replace the existing warning system that alerts pilots and controllers when aircraft are too close to each other. This also provides funding for the Aviation Safety Analysis System, Aerospace Medicine Safety Information Systems,

## **Federal Aviation Administration FY 2021 President's Budget Submission**

---

Aviation Safety Information Analysis and Sharing, and System Approach for Safety Oversight programs, which allow the FAA's safety inspection and certification workforce to access current safety data while they are conducting oversight, investigations, and audits of airlines, manufacturers, and pilots.

The Budget also includes \$18.5 million for the Information Security Program to protect national airspace assets from cybersecurity threats. This program limits the amount of security control investment required by each individual airspace system. The program will monitor the computing environment to detect and respond to anomalous events and data flows and will remediate any system vulnerability.

Approximately \$1.81 billion of the F&E request is dedicated to the sustainment of vital NAS infrastructure. This supports work that ensures FAA's air traffic control automation systems, like En Route Automation Modernization and Standard Terminal Automation and Replacement System, continue to reliably track and process flight information. These systems provide the foundation for the air traffic control system and for the advancement of NextGen capabilities. This includes \$585.8 million to help bring FAA facilities into a state of good repair, allowing the FAA to address the backlog work that needs to be accomplished at FAA facilities. The request supports the ongoing sustainment and technology refresh of systems, ranging from radars to weather sensors/systems to navigation aids and satellite leases, necessary to support airspace services in the FY 2021 timeframe and beyond. Some of these systems must remain in place as backup for the FAA's satellite based capabilities, and it is important to ensure the services continue in a reliable manner.

### **Research, Engineering & Development (RE&D)**

The FY 2021 budget request includes \$170 million for Research, Engineering and Development. This total includes \$6 million to investigate improvements for the safe integration of commercial space operations into the national airspace, and another \$24 million for safety research related to UAS. The UAS funding will be used to study the safety implications of new UAS operational concepts and technologies and to support the new regulatory standards. The UAS research will focus on areas, such as detect and avoid, datalink aircraft control and communications with air traffic control, and emergency response requirements. Other safety-related research areas include advanced materials, aircraft icing, continued airworthiness, and information security.

### **Grants-in-Aid for Airports**

Within the \$3.35 billion request level, almost \$3.2 billion for airport grants provides the funding needed to preserve and improve critical airfield infrastructure at more than 3,300 public-use airports nationwide. This President's Budget request supports our continued focus on safety-related development projects, including projects to help reduce runway incursions and reduce the risk of wrong-surface takeoffs and landings.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

The Budget request includes \$119 million for personnel & related expenses for the FAA's Office of Airports. This level includes funding for work on noise concerns, the safe integration of UAS into the airport operating environment, and airport compliance with Federal laws and FAA regulations and policies.

The request includes \$40.6 million for the Airport Technology Research program to support the safe and efficient integration of new and innovative technologies into the airport environment. This includes an additional \$1.4 million to conduct research and develop standards related to urban air mobility, as well as new and innovative pavement materials testing. Examples of other research areas include new airfield lighting using light emitting diode or LED technology, ways to reduce or eliminate harmful chemicals in firefighting agents, safe UAS operations at airports, runway condition monitoring using radar, and new pavement materials to make airport pavement last longer. This request also includes funding to support UAS research activities that are specific to airports, and research on innovative materials testing methods.

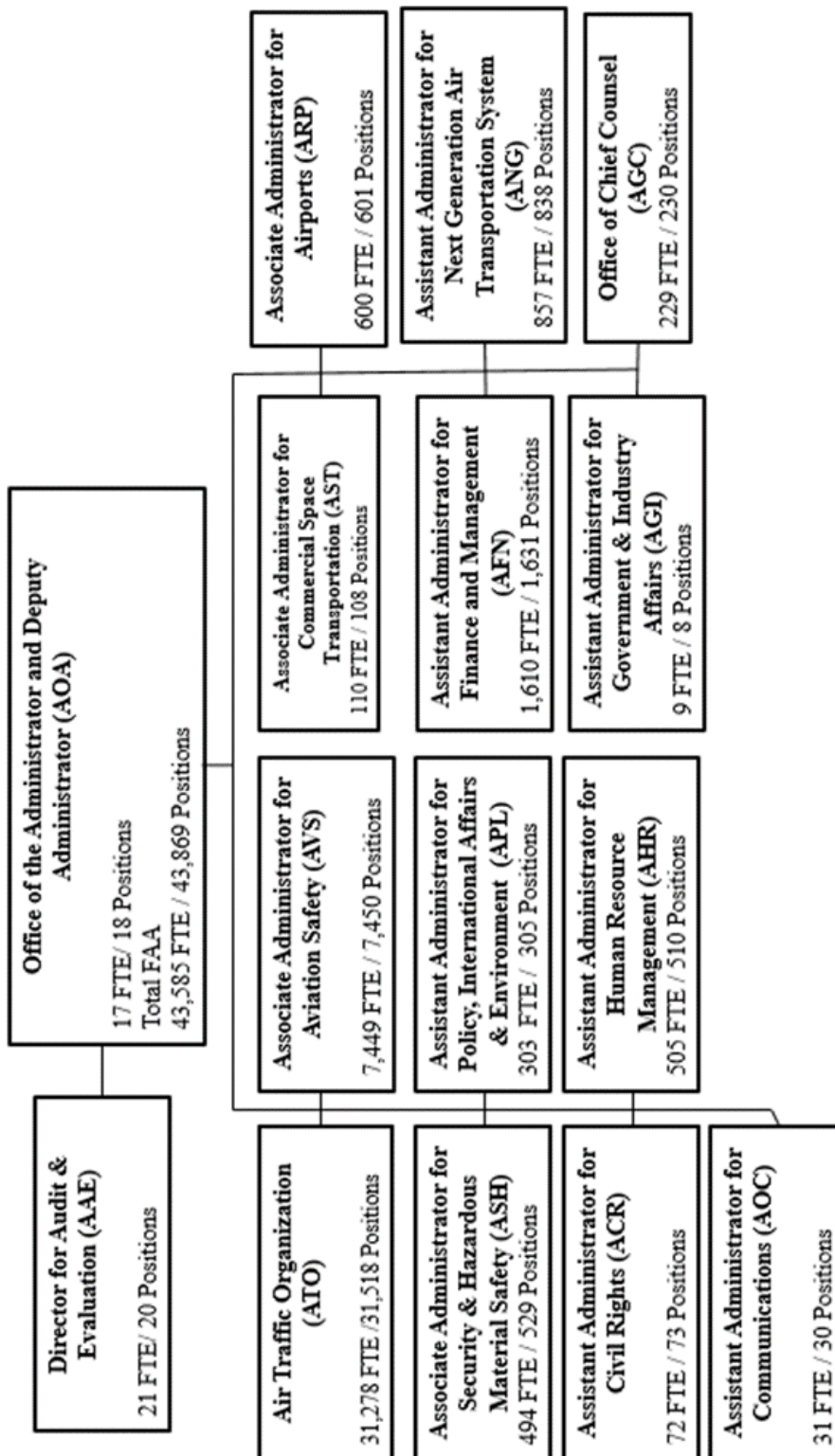
Finally, the request includes \$15 million for the Airport Cooperative Research program. The FAA provides oversight and expertise for projects in areas such as commercial space noise measurements, UAS operation at airports, safe construction practices, and emergency communications models.

## **Conclusion**

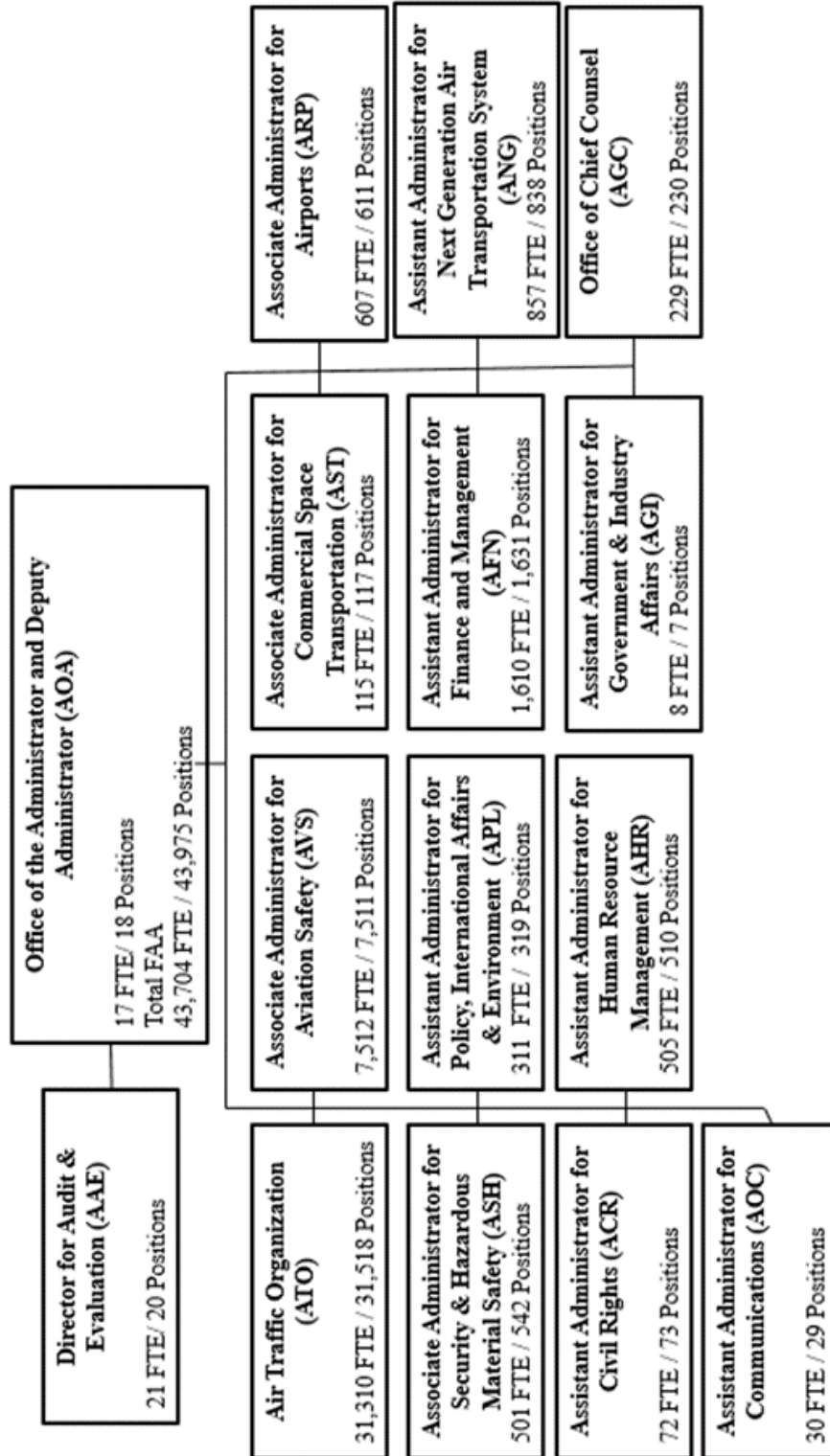
Every day, tens of thousands of commercial flights, operating from a vast network of airports spanning 3.8 million square miles in the United States alone, will take off and land safely. The vast majority of flights will leave and arrive at their gates on time. They will operate throughout their journeys under the watchful eyes of professional air traffic controllers.

The FY 2021 budget request will make critical investments that will allow the FAA to continue protecting the safety of our air transportation system, while bringing innovation to the safest and most complex aerospace system in the world.

**Exhibit I-A  
ORGANIZATION CHART  
FY 2020**



**Exhibit I-B  
ORGANIZATION CHART  
FY 2021**







**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**EXHIBIT II-1**

**FY 2021 BUDGET AUTHORITY  
FEDERAL AVIATION ADMINISTRATION  
(\$000)**

<b><u>ACCOUNT NAME</u></b>	<b><u>M/D</u></b>	<b><u>FY 2019 ACTUAL</u></b>	<b><u>FY 2020 ENACTED</u></b>	<b><u>FY 2021 REQUEST</u></b>
<b>Operations</b>		\$10,410,758	\$10,630,000	\$11,001,500
Emergency Supplemental				
Rescission				
<b>Subtotal</b>	<b>D</b>	<b>\$10,410,758</b>	<b>\$10,630,000</b>	<b>\$11,001,500</b>
<b>Facilities and Equipment</b>		\$3,000,000	\$3,045,000	\$3,000,000
Emergency Supplemental				
Rescission				
Cancellation				
<b>Subtotal</b>	<b>D</b>	<b>\$3,000,000</b>	<b>\$3,045,000</b>	<b>\$3,000,000</b>
<b>Research, Engineering and Development</b>		\$191,100	\$192,665	\$170,000
Rescission				
<b>Subtotal</b>	<b>D</b>	<b>\$191,100</b>	<b>\$192,665</b>	<b>\$170,000</b>
<b>Grants-in-Aid for Airports</b>				
Contract Authority (AATF)	<b>M</b>	\$3,350,000	\$3,350,000	\$3,350,000
General Fund Appropriation	<b>D</b>	\$500,000	\$400,000	
Rescission				
<b>Subtotal</b>		<b>\$3,850,000</b>	<b>\$3,750,000</b>	<b>\$3,350,000</b>
Obligation Limitation [Non-Add]				
Overflight Fees	<b>M</b>	\$146,197	\$149,498	\$153,236
Property Disposal or Lease Proceeds	<b>M</b>	\$1,676		
Overflight Fees (Transfer to EAS)	<b>M</b>	(\$146,197)	(\$149,498)	(\$153,236)
<b>TOTALS</b>				
Gross New Budget Authority	▼	\$17,453,534	\$17,617,665	\$17,521,500
Rescissions		\$0	\$0	\$0
Transfers		\$0	\$0	\$0
Offsets		\$0	\$0	\$0
<b>NET NEW BUDGET AUTHORITY:</b>		<b><u>\$17,453,534</u></b>	<b><u>\$17,617,665</u></b>	<b><u>\$17,521,500</u></b>
[Mandatory BA]	▼	\$3,351,676	\$3,350,000	\$3,350,000
[Discretionary BA]	▼	\$14,101,858	\$14,267,665	\$14,171,500

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**EXHIBIT II-2**

**FY 2021 TOTAL BUDGETARY RESOURCES BY APPROPRIATION ACCOUNT  
FEDERAL AVIATION ADMINISTRATION  
Appropriations, Obligation Limitations, and Exempt Obligations  
(\$000)**

	<b>M/D</b>	<b>FY 2019 <u>ACTUAL</u></b>	<b>FY 2020 <u>ENACTED</u></b>	<b>FY 2021 <u>REQUEST</u></b>
<b>Operations</b>	<b>D</b>	<b>10,410,758</b>	<b>10,630,000</b>	<b>11,001,500</b>
Air Traffic Organization (ATO)		7,841,720	7,970,734	8,210,821
Aviation Safety (AVS)		1,336,969	1,404,096	1,474,039
Commercial Space Transportation (AST)		24,949	26,040	27,555
Finance & Management (AFN)		816,398	800,443	836,141
NextGen (ANG)		61,258	61,538	62,862
Security and Hazardous Materials Safety (ASH)		114,165	118,642	124,928
Staff Offices		215,299	248,507	265,154
<b>Facilities &amp; Equipment</b>	<b>D</b>	<b>3,000,000</b>	<b>3,045,000</b>	<b>3,000,000</b>
Engineering, Development, Test and Evaluation		194,300	218,100	153,600
Air Traffic Control Facilities and Equipment		1,849,777	1,870,800	1,794,100
Non-Air Traffic Control Facilities and Equipment		204,700	203,400	264,600
Facilities and Equipment Mission Support		238,400	237,700	237,700
Personnel and Related Expenses		512,823	515,000	550,000
<b>Research, Engineering &amp; Development</b>	<b>D</b>	<b>191,100</b>	<b>192,665</b>	<b>170,000</b>
Research, Engineering & Development		191,100	192,665	170,000
<b>Grants-in-Aid for Airports</b>		<b>3,850,000</b>	<b>3,750,000</b>	<b>3,350,000</b>
Grants-in-Aid for Airports	<b>M</b>	3,176,690	3,169,276	3,174,932
Grants Supplemental	<b>D</b>	500,000	400,000	0
Personnel & Related Expenses	<b>M</b>	115,100	116,500	119,402
Airport Technology Research	<b>M</b>	33,210	39,224	40,666
Airport Cooperative Research Program	<b>M</b>	15,000	15,000	15,000
Small Community Air Service	<b>M</b>	10,000	10,000	0
<b>TOTAL BUDGETARY RESOURCES:</b>		<b>17,451,858</b>	<b>17,617,665</b>	<b>17,521,500</b>
<b>[Mandatory]</b>		<b>3,350,000</b>	<b>3,350,000</b>	<b>3,350,000</b>
<b>[Discretionary]</b>		<b>14,101,858</b>	<b>14,267,665</b>	<b>14,171,500</b>
<b>[Obligation Limitation]</b>		<b>[3,350,000]</b>	<b>[3,350,000]</b>	<b>[3,350,000]</b>

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

**EXHIBIT II-3  
FY 2021 BUDGET REQUEST BY DOT STRATEGIC AND ORGANIZATIONAL GOALS  
Appropriations, Obligation Limitation, and Exempt Obligations  
FEDERAL AVIATION ADMINISTRATION  
(\$000)**

	Safety	Infrastructure	Innovation	Accountability	Total
<b>OPERATIONS</b>	<b>\$ 6,077,179</b>	<b>\$ 3,118,082</b>	<b>\$ 153,749</b>	<b>\$ 1,652,490</b>	<b>\$ 11,001,500</b>
Air Traffic Organization (ATO)	4,611,653	3,055,220	90,339	453,608	8,210,821
Aviation Safety (AVS)	1,343,312	0	35,124	95,602	1,474,039
Commercial Space Transportation (AST)	0	0	23,562	3,993	27,555
Finance & Management (AFN)	0	0	0	836,141	836,141
NextGen (ANG)	0	62,862	0	0	62,862
Security and Hazardous Materials Safety (ASH)	122,213	0	2,715	0	124,928
Staff Offices	0	0	2,008	263,146	265,154
<b>FACILITIES &amp; EQUIPMENT</b>	<b>\$ 229,837</b>	<b>\$ 1,809,184</b>	<b>\$ 881,020</b>	<b>\$ 79,959</b>	<b>\$ 3,000,000</b>
Engineering, Development, Test and Evaluation	0	53,500	100,100	0	153,600
Air Traffic Control Facilities and Equipment	46,500	1,106,800	611,900	28,900	1,794,100
Non-Air Traffic Control Facilities and Equipment	141,200	87,000	0	36,400	264,600
Facilities and Equipment Mission Support	0	230,200	7,500	0	237,700
Personnel and Related Expenses	42,137	331,684	161,520	14,659	550,000
<b>RESEARCH, ENGINEERING &amp; DEVELOPMENT</b>	<b>\$ 114,137</b>	<b>\$ 44,920</b>	<b>\$ -</b>	<b>\$ 10,943</b>	<b>\$ 170,000</b>
Research, Engineering & Development	114,137	44,920	0	10,943	170,000
<b>GRANTS-IN-AID FOR AIRPORTS</b>	<b>\$ 1,136,291</b>	<b>\$ 2,028,500</b>	<b>\$ 55,511</b>	<b>\$ 129,698</b>	<b>\$ 3,350,000</b>
Grants-in-Aid for Airports	1,073,091	1,926,264	47,907	127,670	3,174,932
Personnel & Related Expenses	40,356	72,443	4,801	1,802	119,402
Airport Technology Research	17,774	20,692	2,200	0	40,666
Airport Cooperative Research Program	0	0	0	0	0
Small Community Air Service	5,070	9,101	603	226	15,000
<b>TOTAL</b>	<b>\$ 7,557,443</b>	<b>\$ 7,000,686</b>	<b>\$ 1,090,281</b>	<b>\$ 1,873,090</b>	<b>\$ 17,521,500</b>

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**EXHIBIT II-4**

**FY 2021 OUTLAYS  
FEDERAL AVIATION ADMINISTRATION  
(\$000)**

<b><u>ACCOUNT NAME</u></b>	<b><u>FY 2019 ACTUAL</u></b>	<b><u>FY 2020 ENACTED</u></b>	<b><u>FY 2021 REQUEST</u></b>
<b>Operations</b>	<b>\$10,264,981</b>	<b>\$11,105,000</b>	<b>\$11,056,320</b>
<b>General</b>	\$1,014,981	(\$32,000)	\$54,820
<b>AATF</b>	\$9,250,000	\$11,137,000	\$11,001,500
<b>Facilities &amp; Equipment</b>	<b>\$2,823,614</b>	<b>\$3,205,560</b>	<b>\$3,294,900</b>
<b>AATF</b>			
- Discretionary	\$2,839,544	\$3,190,560	\$3,290,900
- Mandatory	(\$15,930)	\$15,000	\$4,000
<b>Aviation Insurance</b>	<b>(\$39,674)</b>	<b>(\$36,000)</b>	<b>(\$37,000)</b>
<b>Revolving Account (M)</b>			
<b>Research, Engineering &amp; Development</b>	<b>\$150,699</b>	<b>\$167,140</b>	<b>\$214,570</b>
<b>Grants-in-Aid for Airports</b>	<b>\$3,463,983</b>	<b>\$3,473,040</b>	<b>\$3,554,920</b>
<b>Aviation User Fees (Overflight) (M)</b>	<b>\$2,608</b>	<b>\$0</b>	<b>\$0</b>
<b>Franchise Fund</b>	<b>\$3,712</b>	<b>\$16,000</b>	<b>\$20,000</b>
<b>TOTAL:</b>	<b>\$16,669,922</b>	<b>\$17,930,740</b>	<b>\$18,103,710</b>
<b>[Mandatory]</b>	(\$52,997)	(\$36,000)	(\$37,000)
<b>[Discretionary]</b>	\$16,722,919	\$17,966,740	\$18,140,710

# Federal Aviation Administration FY 2021 President's Budget Submission

## EXHIBIT II-5 SUMMARY OF REQUESTED FUNDING CHANGES FROM BASE Federal Aviation Administration Appropriations, Obligation Limitations, and Exempt Obligations (\$000)

Operations	FY 2019 Actual	FY 2020 Enacted	Annualization of FY 2020 Pay Raise	Annualization of FY 2020 FTE	FY 2021 Pay Raise	FY 2021 FERS Increase	One Less Compensable Day (261)	GSA Rent	WCF Increase/Decrease	Other FY 2021 Base Adjustments	FY 2021 Baseline Estimate	Program Increases/Decreases	FY 2021 Request
<b>PERSONNEL RESOURCES (FTE)</b>	39,046	40,140									40,140	80	40,220
Direct FTE													
<b>FINANCIAL RESOURCES</b>													
<b>ADMINISTRATIVE EXPENSES</b>													
Salaries and Benefits*	\$7,245,143	\$7,576,915	\$56,576		\$56,827	\$81,770	(\$26,231)			\$26,848	\$7,772,705	\$20,734	\$7,793,439
Travel	\$145,308	\$146,426								\$183	\$146,609	\$1,186	\$147,795
Transportation	\$21,858	\$21,858									\$21,858	\$0	\$21,858
GSA Rent	\$123,349	\$126,749									\$126,749	\$0	\$126,749
Rental Payments to Other	\$52,138	\$52,138									\$52,138	\$0	\$52,138
Communications, & Utilities	\$357,962	\$361,362									\$361,362	\$0	\$361,362
Printing	\$3,090	\$3,090									\$3,090	\$0	\$3,090
Other Services	\$2,247,440	\$2,119,943							\$489	\$116,644	\$2,237,076	\$35,774	\$2,272,850
Supplies	\$131,470	\$131,470									\$131,470	\$203	\$131,673
Equipment	\$71,155	\$71,249									\$71,249	\$497	\$71,746
Land and Structure	\$9,727	\$16,682									\$16,682	\$0	\$16,682
Grants, Claims and Subsidies	\$817	\$817									\$817	\$0	\$817
Insurance Claims and Indemnities	\$1,301	\$1,301									\$1,301	\$0	\$1,301
<b>Admin Subtotal</b>	<b>\$10,410,758</b>	<b>\$10,630,000</b>	<b>\$56,576</b>	<b>\$0</b>	<b>\$56,827</b>	<b>\$81,770</b>	<b>(\$26,231)</b>	<b>\$0</b>	<b>\$489</b>	<b>\$143,675</b>	<b>\$10,943,106</b>	<b>\$58,394</b>	<b>\$11,001,500</b>
<b>PROGRAMS</b>													
Air Traffic Organization (ATO)	\$7,841,720	\$7,970,734	\$43,666		\$43,734	\$66,270	(\$20,108)		\$302	\$90,223	\$8,194,821	\$16,000	\$8,210,821
Aviation Safety (AVS)	\$1,336,969	\$1,404,096	\$8,653		\$8,821	\$10,526	(\$4,143)		(\$15)	\$10,572	\$1,438,510	\$35,529	\$1,474,039
Commercial Space Transportation (AST)	\$24,949	\$26,040	\$133		\$141	\$176	(\$66)			\$446	\$26,870	\$685	\$27,555
Finance and Management (AFM)	\$816,398	\$800,443	\$2,036		\$1,810	\$2,388	(\$939)		(\$1,828)	\$32,231	\$836,141	\$0	\$836,141
NextGen (ANG)	\$61,258	\$61,538	\$225		\$225	\$266	(\$106)			\$714	\$62,862	\$0	\$62,862
Security and Hazardous Materials Safety (ASH)	\$114,165	\$118,642	\$923		\$623	\$744	(\$293)		(\$50)	\$2,405	\$122,663	\$2,265	\$124,928
Staff Offices	\$215,299	\$248,507	\$1,271		\$1,473	\$1,400	(\$576)		\$2,080	\$7,084	\$261,239	\$3,915	\$265,154
<b>Programs Subtotal</b>	<b>\$10,410,758</b>	<b>\$10,630,000</b>	<b>\$56,576</b>	<b>\$0</b>	<b>\$56,827</b>	<b>\$81,770</b>	<b>(\$26,231)</b>	<b>\$0</b>	<b>\$489</b>	<b>\$143,675</b>	<b>\$10,943,106</b>	<b>\$58,394</b>	<b>\$11,001,500</b>
<b>TOTAL</b>	<b>\$10,410,758</b>	<b>\$10,630,000</b>	<b>\$56,576</b>	<b>\$0</b>	<b>\$56,827</b>	<b>\$81,770</b>	<b>(\$26,231)</b>	<b>\$0</b>	<b>\$489</b>	<b>\$143,675</b>	<b>\$10,943,106</b>	<b>\$58,394</b>	<b>\$11,001,500</b>

\* Consistent with OMB Memoranda M-19-24 dated July 2019, the amount shown above for Salaries and Benefits includes an estimated increase of \$11.5m for awards spending. Additional increases shown on this line are attributable to various pay raise and FERS contribution percentage increases for FY 2020 and FY 2021 as prescribed by OPM and OMB guidance.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

**EXHIBIT II-5  
SUMMARY OF REQUESTED FUNDING CHANGES FROM BASE  
Federal Aviation Administration  
Appropriations, Obligation Limitations, and Exempt Obligations  
(\$000)**

Facilities & Equipment	FY 2019 Actual	FY 2020 Enacted	Annualization of FY 2020 Pay Raise	Annualization of FY 2020 FTE	FY 2021 Pay Raise	FY 2021 FERS Increase	Baseline Changes				FY 2021 Baseline Estimate	Program Increases/ Decreases	FY 2021 Request
							GSA Rent	WCF Increase/ Decrease	Other FY 2021 Base Adjustments	One Less Compensable Day (261 days)			
<b>PERSONNEL RESOURCES (FTE)</b>	2,586	2,628		32							2,660		2,660
Direct FTE													
<b>FINANCIAL RESOURCES</b>													
<b>ADMINISTRATIVE EXPENSES</b>													
Salaries and Benefits	484,819	484,819			3,757	5,595				(1,680)	500,794	-	500,794
Travel	11,375	11,375							652		30,365	-	30,365
Transportation	2,500	2,479							18,990		2,479	(70)	2,409
GSA Rent	-	698									698	(29)	669
Rental Payments to Others	43,768	40,682									40,682	(1)	40,681
Communications, & Utilities	44,828	47,089									47,089	(1,957)	45,132
Printing	13	30									30	(1)	29
Other Services:	2,043,783	2,080,889							34		2,080,923	(69,249)	2,011,674
-WCF	48	48						1			49	-	49
Supplies	31,178	29,676									29,676	(437)	29,239
Equipment	198,016	183,372									183,372	(445)	182,927
Land and Struc tures	136,362	160,599									160,599	(7,678)	152,921
Grants, Claims, Subsidies and Interest	3,310	3,244									3,244	(133)	3,111
<b>Admin Subtotal</b>	<b>3,000,000</b>	<b>3,045,000</b>	<b>3,757</b>	<b>5,595</b>	<b>3,636</b>	<b>4,015</b>		<b>1</b>	<b>19,676</b>	<b>(1,680)</b>	<b>3,080,000</b>	<b>(80,000)</b>	<b>3,000,000</b>
<b>PROGRAMS</b>													
Engineering, Development, Test and Evaluation	194,300	218,100									218,100	(64,500)	153,600
Air Traffic Control Facilities and Equipment	1,849,777	1,870,800									1,870,800	(76,700)	1,794,100
Non-Air Traffic Control Facilities and Equipment	204,700	203,400									203,400	61,200	264,600
Facilities and Equipment Mission Support	238,400	237,700									237,700	-	237,700
Personnel & Related Expenses	512,823	515,000			3,757	5,595		1	19,676	(1,680)	550,000	-	550,000
<b>Programs Subtotal</b>	<b>3,000,000</b>	<b>3,045,000</b>	<b>3,757</b>	<b>5,595</b>	<b>3,636</b>	<b>4,015</b>		<b>1</b>	<b>19,676</b>	<b>(1,680)</b>	<b>3,080,000</b>	<b>(80,000)</b>	<b>3,000,000</b>
<b>TOTAL</b>	<b>3,000,000</b>	<b>3,045,000</b>	<b>3,757</b>	<b>5,595</b>	<b>3,636</b>	<b>4,015</b>		<b>1</b>	<b>19,676</b>	<b>(1,680)</b>	<b>3,080,000</b>	<b>(80,000)</b>	<b>3,000,000</b>

\* Consistent with OMB Memoranda M-19-24 dated July 2019, the amount shown above for Salaries and Benefits includes an estimated increase of \$652K for awards spending. Additional increases shown on this line are attributable to various pay raise and FERS contribution percentage increases for FY 2020 and FY 2021 as prescribed by OPM and OMB guidance.

## Budget Summary Tables

\* Consistent with OMB Memoranda M-19-24 dated July 2019, the amount shown above for Salaries and Benefits includes an estimated increase of \$99.6K for awards spending. Additional increases shown on this line are attributable to various pay raise and FERS contribution percentage increases for FY 2020 and FY 2021 as prescribed by OPM and OMB guidance.

## 8

\* Consistent with OMB Memoranda M-19-24, dated July 2019, the amount shown above for Salaries and Benefits includes an estimated increase of \$163K for awards spending. Additional increases shown on this line are attributable to various pay raise and EERS contribution percentage increases for FY 2020 and FY 2021 as prescribed by OPM and OMB guidance.



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**EXHIBIT II-6  
WORKING CAPITAL FUND  
FEDERAL AVIATION ADMINISTRATION  
(\$000)**

	<b><u>FY 2019 ENACTED</u></b>	<b><u>FY 2020 PRES. BUD.</u></b>	<b><u>FY 2021 *REQUEST</u></b>
<b>DIRECT:</b>			
<b>Facilities &amp; Equipment</b>	50	48	49
<b>Grants-in-Aid for Airports</b>	128	107	202
<b>Operations</b>	55,110	53,016	53,505
<b>TOTAL</b>	<b><u>\$ 55,288</u></b>	<b><u>\$ 53,171</u></b>	<b><u>\$ 53,755</u></b>

**Footnote:**

1) F&E and Grants-in-Aid for Airports funding only support E-gov Initiatives

\* Totals may not add due to rounding

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**EXHIBIT II-7  
FEDERAL AVIATION ADMINISTRATION  
PERSONNEL RESOURCE -- SUMMARY  
TOTAL FULL-TIME EQUIVALENTS**

	<b>FY 2019 ACTUAL</b>	<b>FY 2020 ENACTED</b>	<b>FY 2021 REQUEST</b>
<b><u>DIRECT FUNDED BY APPROPRIATION</u></b>			
Operations	39,046	40,140	40,220
Facilities & Equipment	2,586	2,628	2,660
Research, Engineering & Development	219	217	217
Grants-in-Aid for Airports	556	600	607
SUBTOTAL, DIRECT FUNDED	42,407	43,585	43,704
<b><u>REIMBURSEMENTS / ALLOCATIONS / OTHER</u></b>			
Reimbursements and 'Other'			
Operations	178	178	178
Aviation Insurance Revolving Fund	2	4	4
Facilities & Equipment	50	50	50
Grants-in-Aid for Airports	3	1	1
Administrative Services Franchise Fund	1,463	1,607	1,559
Allocations from other Organizations			
SUBTOTAL, REIMBURSE./ALLOC./OTH.	1,696	1,840	1,792
<b>TOTAL FTEs</b>	<b>44,103</b>	<b>45,425</b>	<b>45,496</b>

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**EXHIBIT II-8  
FEDERAL AVIATION ADMINISTRATION  
RESOURCE SUMMARY – STAFFING  
FULL-TIME PERMANENT POSITIONS**

	<b><u>FY 2019 ACTUAL</u></b>	<b><u>FY 2020 ENACTED</u></b>	<b><u>FY 2021 REQUEST</u></b>
<b><u>DIRECT FUNDED BY APPROPRIATION</u></b>			
Operations	38,750	40,178	40,274
Facilities & Equipment	2,796	2,869	2,869
Research, Engineering & Development	220	221	221
Grants-in-Aid for Airports	548	601	611
<b>SUBTOTAL, DIRECT FUNDED</b>	<b>42,314</b>	<b>43,869</b>	<b>43,975</b>
<b><u>REIMBURSEMENTS / ALLOCATIONS / OTHER</u></b>			
Reimbursements and 'Other'			
Operations	110	110	110
Aviation Insurance Revolving Fund	2	4	4
Facilities & Equipment	-	-	-
Grants-in-Aid for Airports	1	1	1
Administrative Services Franchise Fund	1,433	1,536	1,515
Allocations from other Organizations			
<b>SUBTOTAL, REIMBURSE./ALLOC./OTH.</b>	<b>1,546</b>	<b>1,651</b>	<b>1,630</b>
<b>TOTAL POSITIONS</b>	<b>43,860</b>	<b>45,520</b>	<b>45,605</b>

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**EXHIBIT II-9  
TEN YEAR FUNDING TABLES**

**OPERATIONS**

ESTIMATES	APPROPRIATIONS
2011..... <sup>1</sup> 9,793,000,000	2011 ..... <sup>2</sup> 9,516,172,000
2012..... <sup>3</sup> 9,823,000,000	2012 ..... <sup>4</sup> 9,653,395,000
2013..... <sup>5</sup> 9,517,948,000	2013 ..... <sup>6</sup> 9,653,395,000
	2013 Sequester (P.L. 112-240) ..... <sup>7</sup> 485,623,489
	2013 Rescission (P.L. 113-6) ..... <sup>8</sup> 19,307,790
2014..... <sup>9</sup> 9,707,000,000	2014 ..... <sup>10</sup> 9,651,422,000
2015..... <sup>11</sup> 9,750,000,000	2015 ..... <sup>12</sup> 9,740,700,000
2016..... <sup>13</sup> 9,915,000,000	2016 ..... <sup>14</sup> 9,909,724,000
2017..... <sup>15</sup> 9,994,352,000	2017 ..... <sup>16</sup> 10,025,852,000
2018..... <sup>17</sup> 9,890,886,000	2018 ..... <sup>18</sup> 10,211,754,000
	2018 Supplemental (P.L. 115-123)... <sup>19</sup> 35,000,000
2019..... <sup>20</sup> 9,931,312,000	2019 ..... <sup>21</sup> 10,410,758,000
2020..... <sup>22</sup> 10,340,000,000	2020 ..... <sup>23</sup> 10,630,000,000
2021..... <sup>24</sup> 11,001,500,000	

<sup>1</sup> Includes \$6,064,000,000 from the Airport and Airway Trust Fund

<sup>2</sup> Reflects a rescission of \$19,066,000 per P.L. 112-55. Includes \$4,549,882,000 from Airport and Airway Trust Fund. Also includes \$2.3 million transfer from the U.S. Department of State

<sup>3</sup> Includes \$4,958,000,000 from the Airport and Airway Trust Fund

<sup>4</sup> Includes \$5,060,694,000 from the Airport and Airway Trust Fund

<sup>5</sup> Includes \$6,721,000,000 from the Airport and Airway Trust Fund

<sup>6</sup> Reflects funding at the FY 2012 funding level pursuant to P.L. 113-6, Consolidated and Further Continuing Appropriations Act, 2013.

<sup>7</sup> FY 2013 funds sequestered pursuant to the Budget Control Act of 2011 as Amended by The American Taxpayer Relief Act of 2012 (P.L. 112-240).

<sup>8</sup> Reflects a 0.20 percent across-the-board rescission per P.L. 113-6.

<sup>9</sup> Includes \$6,484,000,000 from the Airport and Airway Trust Fund

<sup>10</sup> Includes \$6,495,208,000 from the Airport and Airway Trust Fund.

<sup>11</sup> Includes \$9,040,850,000 from the Airport and Airway Trust Fund.

<sup>12</sup> Includes \$8,595,000,000 from the Airport and Airway Trust Fund.

<sup>13</sup> Includes \$8,547,000,000 from the Airport and Airway Trust Fund.

<sup>14</sup> Includes \$7,922,000,000 from the Airport and Airway Trust Fund.

<sup>15</sup> Includes \$7,608,000,000 from the Airport and Airway Trust Fund.

<sup>16</sup> Includes \$9,173,000,000 from the Airport and Airway Trust Fund.

<sup>17</sup> Includes \$8,100,000,000 from the Airport and Airway Trust Fund

<sup>18</sup> Includes \$8,886,000,000 from the Airport and Airway Trust Fund

<sup>19</sup> Supplemental funding from the Further Additional Supplemental Appropriations for Disaster Relief Requirements Act, 2018 (P.L. 115-123)

<sup>20</sup> Includes \$8,632,721,000 from the Airport and Airway Trust Fund

<sup>21</sup> Includes \$9,833,400,000 from the Airport and Airway Trust Fund

<sup>22</sup> Includes \$9,364,085,000 from the Airport and Airway Trust Fund.

<sup>23</sup> Includes \$10,519,000 from the Airport and Airway Trust Fund.

<sup>24</sup> Includes \$11,001,500 from the Airport and Airway Trust Fund.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

FACILITIES AND EQUIPMENT (AIRPORT AND AIRWAY TRUST FUND)

ESTIMATES	APPROPRIATIONS
2011..... 2,970,000,000	2011 ..... <sup>1</sup> 2,730,731,000
2012..... <sup>2</sup> 3,120,000,000	2012 ..... 2,730,731,074
2013..... 2,850,000,000	2013 ..... <sup>3</sup> 2,730,731,074
	2013 Supplemental (P.L. 113-2) ..... <sup>4</sup> 30,000,000
	2013 Sequester (P.L. 11-240) ..... <sup>5</sup> -141,642,505
	2013 Rescission (P.L. 113-6) ..... <sup>6</sup> -5,461,462
2014..... 2,777,798,000	2014 ..... 2,600,000,000
2015..... 2,603,700,000	2015 ..... 2,600,000,000
2016..... 2,855,000,000	2016 ..... 2,855,000,000
2017..... 2,838,000,000	2017 ..... 2,855,000,000
2018..... 2,766,200,000	2018 ..... 3,250,000,000
	2018 Supplemental (P.L. 115-123) .... <sup>7</sup> 79,600,000
2019..... 2,766,572,000	2019 ..... 3,000,000,000
2020..... 3,295,000,000	2020 ..... 3,045,000,000
2021..... 3,000,000,000	

---

<sup>1</sup> Reflects a rescission of \$5,472,000 per P.L. 112-55.

<sup>2</sup> Includes \$250,000,000 of mandatory General Fund from the Administration's Infrastructure proposal.

<sup>3</sup> Reflects funding at the FY 2012 funding level pursuant to P.L. 113-6, Consolidated and Further Continuing Appropriations Act, 2013.

<sup>4</sup> Hurricane Sandy Emergency Supplemental, P.L. 113-2

<sup>5</sup> FY 2013 funds sequestered pursuant to the Budget Control Act of 2011 as Amended by The American Taxpayer Relief Act of 2012 (P.L. 112-240). Includes \$2,770,000 in offsetting collections.

<sup>6</sup> Reflects a 0.20 percent across-the-board rescission per P.L. 113-6.

<sup>7</sup> Supplemental funding from the Further Additional Supplemental Appropriations for Disaster Relief Requirements Act, 2018 (P.L. 115-123)

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

RESEARCH, ENGINEERING, AND DEVELOPMENT (AIRPORT AND AIRWAY TRUST FUND)

ESTIMATES	APPROPRIATIONS
2010..... 180,000,000	2010 ..... 190,500,000
2011..... 190,000,000	2011 ..... <sup>1</sup> 169,660,000
2012..... 190,000,000	2012 ..... 167,556,000
2013..... 180,000,000	2013 ..... <sup>2</sup> 167,556,000
	2013 Sequester (P.L. 112-240) ..... <sup>3</sup> -8,429,072
	2013 Rescission (P.L. 113-6)..... <sup>4</sup> -335,112
2014..... 166,000,000	2014 ..... 158,792,000
	2014 Rescission ..... <sup>5</sup> -26,183,998
2015..... 156,750,000	2015 ..... 156,750,000
2016..... 166,000,000	2016 ..... 166,000,000
2017..... 167,500,000	2017 ..... 176,500,000
2018..... 150,000,000	2018 ..... 188,926,000
2019..... 74,406,000	2019 ..... 191,100,000
2020..... 120,000,000	2020 ..... 192,665,000
2021..... 170,000,000	

---

<sup>1</sup> Reflects a \$340,000 rescission per P.L. 112-55.

<sup>4</sup> Reflects funding at the FY 2012 funding level pursuant to P.L. 113-6, Consolidated and Further Continuing Appropriations Act, 2013.

<sup>5</sup> FY 2013 funds sequestered pursuant to the Budget Control Act of 2011 as Amended by The American Taxpayer Relief Act of 2012 (P.L. 112-240).

<sup>6</sup> Reflects a 0.20 percent across-the-board rescission per P.L. 113-6.

<sup>7</sup> Reflects a \$26,183,998 rescission, per P.L. 113-76.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

GRANTS-IN-AID FOR AIRPORTS  
(LIQUIDATION OF CONTRACT AUTHORIZATION)  
(AIRPORT AND AIRWAY TRUST FUND)

ESTIMATES	APPROPRIATIONS
2010..... 3,000,000,000	2010 ..... 3,000,000,000
2011..... 3,550,000,000	2011 ..... 3,550,000,000
2012..... 3,600,000,000	2012 ..... 3,435,000,000
2013..... 3,400,000,000	2013 ..... 3,435,000,000
2014..... 3,200,000,000	2014 ..... 3,200,000,000
2015..... 3,200,000,000	2015 ..... 3,200,000,000
2016..... 3,500,000,000	2016 ..... 3,600,000,000
2017..... 3,500,000,000	2017 ..... 3,750,000,000
2018..... 3,000,000,000	2018 ..... 3,000,000,000
	2018 Supplemental ..... <sup>1</sup> 1,000,000,000
2019..... 3,000,000,000	2019 ..... 3,000,000,000
	2019 Supplemental ..... <sup>2</sup> 500,000,000
2020..... 3,000,000,000	2020 ..... 3,000,000,000
	2020 Supplemental ..... <sup>3</sup> 400,000,000
2021..... 3,350,000,000	

---

<sup>1</sup> FY 2018 Consolidated Appropriations Act (P.L. 115-141) from the General Fund.

<sup>2</sup> FY 2019 Consolidated Appropriations Act (P.L. 116-6) from the General Fund.

<sup>3</sup> FY 2020 Consolidated Appropriations Act (P.L.116-94) from the General Fund.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

GRANTS-IN-AID FOR AIRPORTS  
LIMITATION ON OBLIGATIONS  
(AIRPORT AND AIRWAY TRUST FUND)

ESTIMATES	APPROPRIATIONS
2010.....(3,515,000,000)	2010 ..... (3,515,000,000)
2011.....(3,515,000,000)	2011 ..... (3,515,000,000)
2012.....(2,424,000,000)	2012 ..... (3,350,000,000)
2013.....(2,424,000,000)	2013 ..... <sup>1</sup> (3,343,300,000)
2014.....(2,900,000,000)	2014 ..... (3,350,000,000)
2015.....(2,900,000,000)	2015 ..... (3,350,000,000)
2016.....(2,900,000,000)	2016 ..... (3,350,000,000)
2017.....(2,900,000,000)	2017 ..... (3,350,000,000)
2018.....(3,350,000,000)	2018 ..... (3,350,000,000)
2019.....(3,350,000,000)	2019 ..... (3,350,000,000)
2020.....(3,350,000,000)	2020 ..... (3,350,000,000)
2021.....(3,350,000,000)	

---

<sup>1</sup> Reflects funding at the FY 2012 funding level pursuant to P.L. 113-6, Consolidated and Further Continuing Appropriations Act, 2013, minus the 0.20% across-the-board rescission.



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**EXHIBIT II-10  
FEDERAL AVIATION ADMINISTRATION  
USER FEES  
(\$000)**

	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
	<b><u>ACTUAL</u></b>	<b><u>ESTIMATE</u></b>	<b><u>ESTIMATE</u></b>
<b><u>USER FEE</u></b>			
Civil Aviation Registry Fees	1,296	1,322	1,348
Foreign Repair Station/Certification Fees	10,725	10,940	11,159
Aeronautical Charting Fees	50	51	46
Overflight Fees	146,197	149,498	153,236
Unmanned Aircraft Systems Registry Fees	1,251	1,276	1,302
<b>Total User Fees</b>	<b><u>159,519</u></b>	<b><u>163,087</u></b>	<b><u>167,091</u></b>

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

(This page intentionally left blank)





**OPERATIONS**

**(AIRPORT AND AIRWAY TRUST FUND)**

For necessary expenses of the Federal Aviation Administration, not otherwise provided for, including operations and research activities related to commercial space transportation, administrative expenses for research and development, establishment of air navigation facilities, the operation (including leasing) and maintenance of aircraft, subsidizing the cost of aeronautical charts and maps sold to the public, the lease or purchase of passenger motor vehicles for replacement only, [\$10,630,000,000]\$11,001,500,000, to remain available until September 30, [2021]2022, of which [\$10,519,000,000]\$11,001,500,000 shall be derived from the Airport and Airway Trust Fund: *Provided*, [That of the sums appropriated under this heading—]

[ (1) not less than \$1,404,096,000 shall be available for aviation safety activities;]

[ (2) \$7,970,734,000 shall be available for air traffic organization activities;]

[ (3) \$26,040,000 shall be available for commercial space transportation activities;]

[ (4) \$800,646,000 shall be available for finance and management activities;]

[ (5) \$61,538,000 shall be available for NextGen and operations planning activities;]

[ (6) \$118,642,000 shall be available for security and hazardous materials safety; and]

[ (7) \$248,304,000 shall be available for staff offices:]

[*Provided further*, That not to exceed 5 percent of any budget activity, except for aviation safety budget activity, may be transferred to any budget activity under this heading: *Provided further*, That no transfer may increase or decrease any appropriation by more than 5 percent: *Provided further*, That any transfer in excess of 5 percent shall be treated as a reprogramming of funds under section 405 of this Act and shall not be available for obligation or expenditure except in compliance with the procedures set forth in that section: *Provided further*,] That not later than 60 days after the submission of the budget request, the Administrator of the Federal Aviation Administration shall transmit to Congress an annual update to the report submitted to Congress in December 2004 pursuant to section 221 of Public Law 108–176: [*Provided further*, That the amount herein appropriated shall be reduced by \$100,000 for each day after the date that is 60 days after the submission of the budget request that such report has not been submitted to the Congress:] *Provided further*, That not later than 60 days after the submission of the budget request, the Administrator shall transmit to Congress a companion report that describes a comprehensive strategy for staffing, hiring, and training flight standards and aircraft certification staff in a format similar to the one utilized for the controller staffing plan, including stated attrition estimates and numerical hiring goals by fiscal year: [*Provided further*, That the amount herein appropriated shall be reduced by \$100,000 per day for each day after the date that is 60 days after the submission of the budget request that such report has not been submitted to Congress:] *Provided further*, That funds may be used to enter into a grant agreement with a nonprofit standard setting organization to assist in the development of aviation safety standards: *Provided further*, That none of the funds in this Act shall be available for new applicants for the second career training program: [*Provided further*, That none of the funds in this Act shall be available for the Federal Aviation Administration to finalize or implement any regulation that would promulgate new aviation user fees not specifically authorized by law after the date of the enactment of this Act:] *Provided further*, That there may be credited to this appropriation, as

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

offsetting collections, funds received from States, counties, municipalities, foreign authorities, other public authorities, and private sources for expenses incurred in the provision of agency services, including receipts for the maintenance and operation of air navigation facilities, and for issuance, renewal or modification of certificates, including airman, aircraft, and repair station certificates, or for tests related thereto, or for processing major repair or alteration forms[: *Provided further*, That of the funds appropriated under this heading, not less than \$170,000,000 shall be used to fund direct operations of the current air traffic control towers in the contract tower program, including the contract tower cost share program, and any airport that is currently qualified or that will qualify for the program during the fiscal year: *Provided further*, That none of the funds in this Act for aeronautical charting and cartography are available for activities conducted by, or coordinated through, the Working Capital Fund: *Provided further*, That none of the funds appropriated or otherwise made available by this Act or any other Act may be used to eliminate the Contract Weather Observers program at any airport].

*(Department of Transportation Appropriations Act, 2020.)*

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

**Program and Financing (in millions of dollars)**

		FY 2019	FY 2020	FY 2021
Identification code: 69-1301-0-1-402		Actual	Estimate	Estimate
<b>Obligations by program activity:</b>				
0001	Air Traffic Organization (ATO) .....	7,833	8028	8,213
0002	NextGen .....	60	63	63
0003	Finance & Management .....	822	826	840
0004	Regulation & Certification .....	1,333	1,446	1,485
0005	Commercial Space Transportation.....	25	28	28
0006	Security & Hazardous Materials Safety.....	117	123	125
0007	Staff Offices .....	214	254	265
0008	2017 Hurricanes / 2018 Supplemental .....	3	.....	.....
0100	Direct Program Activities Subtotal .....	10,407	10,768	11,019
0799	Total Direct Obligations .....	10,407	10,768	11,019
0801	Operations (Reimbursable) .....	150	150	150
0900	Total new obligations, unexpired accounts .....	10,557	10,918	11,169
<b>Budget resources:</b>				
1000	Unobligated balance brought forward, Oct. 1.....	179	225	96
1021	Recoveries of prior year unpaid obligations .....	38	.....	.....
1050	Unobligated balance (total) .....	217	225	96
<b>Budget authority:</b>				
Appropriations, discretionary:				
1100	Appropriation .....	577	111	.....
Spending authority from offsetting collections, discretionary,				
1700	Collected .....	9,408	11,296	11,161
1701	Change in uncollected payments, Federal sources .....	591	-618	.....
1750	Spending auth from offsetting collections, disc (total).....	9,999	10,678	11,161
1900	Budget authority (total) .....	10,576	10,789	11,161
1930	Total budgetary resources available .....	10,793	11,014	11,257
Memorandum (non-add) entries:				
1940	Unobligated balance expiring.....	-11	.....	.....
<b>Memorandum (non-add) entries:</b>				
1941	Unexpired unobligated balance, end of year .....	225	96	88
<b>Change in obligated balance:</b>				
Unpaid obligations:				
3000	Unpaid obligations, brought forward, Oct. 1 .....	1,622	1,663	1,317
3001	Adjustments to unpaid obligations, brought forward, Oct 1...	1	.....	.....
3010	New Obligations, unexpired accounts .....	10,557	10,918	11,169
3011	Obligations ("upward adjustments"), expired accounts .....	10	.....	.....
3020	Outlays (gross) .....	-10,461	-11,264	-11,216

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

		FY 2019	FY 2020	FY 2021
Identification code: 69-1301-0-1-402		Actual	Estimate	Estimate
3040	Recoveries of prior year unpaid obligations, unexpired .....	-38	.....	.....
3041	Recoveries of prior year unpaid obligations, expired .....	-28	.....	.....
3050	Unpaid obligations, end of year .....	1,663	1,317	1,270
<b>Uncollected payments:</b>				
3060	Uncollected pymts, Fed sources, brought forward, Oct 1 .....	-170	-732	-114
3061	Adjustments to uncollected pymts, Fed sources, brought forward, Oct 1 .....	-1	.....	.....
3070	Change in uncollected pymts, Fed sources, unexpired .....	-591	618	.....
3071	Change in uncollected pymts, Fed sources, expired .....	30	.....	.....
3090	Uncollected pymts, Fed sources, end of year .....	-732	-114	-114
Memorandum (non-add) entries:				
3100	Obligated balance, start of year .....	1,452	931	1,203
3200	Obligated balance, end of year .....	931	1,203	1,156
<b>Budget authority and outlays, net:</b>				
Discretionary:				
4000	Budget authority, gross .....	10,576	10,789	11,161
Outlays, gross:				
4010	Outlays from new discretionary authority .....	8,997	9,514	9,841
4011	Outlays from discretionary balances .....	1,464	1,750	1,375
4020	Outlays, gross (total) .....	10,461	11,264	11,216
<b>Offsets against gross budget authority and outlays:</b>				
Offsetting collections (collected) from:				
4030	Federal sources.....	-9,403	-11,271	-11,136
4033	Non-Federal sources .....	-42	-24	-24
4034	Offsetting governmental collections .....	-1	-1	-1
4040	Offsets against gross budget authority and outlays (total) .....	-9,446	-11,296	-11,161
<b>Additional offsets against gross budget authority only:</b>				
4050	Change in uncollected pymts, Federal sources, unexpired .....	-591	618	.....
4052	Offsetting collections credited to expired accounts .....	38	.....	.....
4060	Additional offsets against budget authority only (total) .....	-553	-618	.....
4070	Budget authority, net (discretionary) .....	577	111	.....
4080	Outlays, net (discretionary) .....	1,015	-32	55
4180	Budget authority, net (total) .....	577	111	.....



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

	FY 2019	FY 2020	FY 2021
Identification code: 69-1301-0-1-402	Actual	Estimate	Estimate
4190 Outlays, net (total) .....	1,015	-32	55

The 2021 Budget requests \$11.002 billion for Federal Aviation Administration (FAA) operations. These funds will be used to continue to promote aviation safety and efficiency. The Budget provides funding for the Air Traffic Organization (ATO) which is responsible for managing the air traffic control system. As a performance-based organization, the ATO is designed to provide cost-effective, efficient, and, above all, safe air traffic services. The Budget also funds the Aviation Safety Organization which ensures the safe operations of the airlines and certifies new aviation products. In addition, the request also funds regulation of the commercial space transportation industry, as well as FAA policy oversight and overall management functions.

**Object Classification (in millions of dollars)**

	FY 2019	FY 2020	FY 2021
Identification code: 69-1301-0-1-402	Actual	Estimate	Estimate
Direct obligations:			
Personnel compensation:			
11.1 Full-time permanent.....	4,666	4,828	4,913
11.3 Other than full-time permanent.....	31	32	33
11.5 Other personnel compensation.....	500	512	535
11.9 Total personnel compensation .....	5,197	5,372	5,481
12.1 Civilian personnel benefits .....	2,059	2,200	2,308
13.0 Benefits for former personnel .....	4	5	5
21.0 Travel and transportation of persons.....	154	147	148
22.0 Transportation of things .....	22	22	22
23.1 Rental payments to GSA.....	123	127	127
23.2 Rental payments to others.....	54	52	52
23.3 Communications, utilities, and miscellaneous charges .....	357	361	361
24.0 Printing and reproduction .....	3	3	3
25.1 Advisory and assistance services .....	665	668	700
25.2 Other services from non-Federal sources .....	1,548	1,589	1,589
26.0 Supplies and materials .....	132	131	131
31.0 Equipment.....	77	72	73
32.0 Land and structures.....	10	17	17
.....			
41.0 Grants, subsidies, and contributions .....	1	1	1
42.0 Insurance claims and indemnities .....	1	1	1
99.0 Direct obligations.....	10,407	10,768	11,019
99.0 Reimbursable obligations.....	150	150	150
99.9 Total new obligations .....	10,557	10,918	11,169

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Employment Summary**

		FY 2019	FY 2020	FY 2021
Identification code: 69-1301-0-1-402		Actual	Estimate	Estimate
1001	Direct civilian full-time equivalent employment ..	39,046	40,140	40,220
2001	Reimbursable civilian full-time equivalent employment .....	178	178	178

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**EXHIBIT III-1  
OPERATIONS**

**Summary by Program Activity  
Appropriations, Obligation Limitations, and Exempt Obligations  
(\$000)**

	<b>FY 2019 ENACTED</b>	<b>FY 2020 ENACTED</b>	<b>FY 2021 REQUEST</b>
Air Traffic Organization (ATO)	\$ 7,841,720	\$ 7,970,734	\$ 8,210,821
Aviation Safety (AVS)	\$ 1,336,969	\$ 1,404,096	\$ 1,474,039
Commercial Space (AST)	\$ 24,949	\$ 26,040	\$ 27,555
Finance & Management (AFN)	\$ 816,398	\$ 800,443	\$ 836,141
NextGen (ANG)	\$ 61,258	\$ 61,538	\$ 62,862
Security and Hazardous Materials Safety (ASH)	\$ 114,165	\$ 118,642	\$ 124,928
Staff Offices	\$ 215,299	\$ 248,507	\$ 265,154
<b>TOTAL</b>	<b>\$ 10,410,758</b>	<b>\$ 10,630,000</b>	<b>\$ 11,001,500</b>

**FTEs**

Direct Funded	39,046	40,140	40,220
Reimbursable, allocated, other	178	178	178

**Program and Performance Statement**

This account provides funds for the operation, maintenance, communications and logistical support of the air traffic control and air navigation systems. It also covers administrative and managerial costs for the FAA's regulatory, international, medical, engineering and development programs as well as policy oversight and overall management functions. The operations account includes the following major activities:

- (1) operation on a 24-hour daily basis of a national air traffic system;
- (2) establishment and maintenance of a national system of aids to navigation;
- (3) establishment and surveillance of civil air regulations to assure safety in aviation;
- (4) development of standards, rules and regulations governing the physical fitness of airmen as well as the administration of an aviation medical research program;
- (5) regulation of the commercial space transportation industry;
- (6) administration of acquisition programs; and
- (7) headquarters, administration and other staff offices.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**EXHIBIT III-1a**

**OPERATIONS  
SUMMARY ANALYSIS OF CHANGE FROM FY 2020 TO FY 2021  
Appropriations, Obligations, Limitations, and Exempt Obligations  
(\$000)**

	<b><u>\$000</u></b>	<b><u>FTE</u></b>
<b>FY 2020 PRESIDENT'S BUDGET</b>	-\$10,630,000	-40,140
<b>ADJUSTMENTS TO BASE:</b>		
Annualization of FY 2020 Pay Raise 3.1%	56,576	
FY 2021 Pay Raise 1.0%	56,827	
FY 2021 Cash Awards Increase 1.0%	11,548	
FY 2021 FERS Increase	81,770	
One Less Compensable Day 261	-26,231	
Working Capital Fund	489	
Regional Projects and Facility Optimization	25,464	
Restoration of Cuts Resulting from FY 2020 Pay Raise	106,663	
<b>SUBTOTAL, ADJUSTMENTS TO BASE</b>	<b>313,106</b>	<b>0</b>
<b>DISCRETIONARY ADJUSTMENTS</b>		
Improving Aviation Safety Oversight	36,679	63
Cybersecurity	13,000	
UAS	2,230	8
AST Staffing	685	5
Community Noise Engagement	4,300	2
STEM AVSED Program	1,500	4
<b>SUBTOTAL, DISCRETIONARY ADJUSTMENTS</b>	<b>58,394</b>	<b>82</b>
<b>BASE TRANSFERS</b>		
Staffing Reassignment FAA to OST	0	-2
<b>SUBTOTAL, BASE TRANSFERS</b>	<b>0</b>	<b>-2</b>
<b>FY 2021 REQUEST</b>	<b>11,001,500</b>	<b>40,220</b>

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

**Operations Summary  
(\$000)**

	Dollars (in Thousands)	FTP	OTFTP	FTE
<b>FY 2020 Enacted</b>	<b>\$10,630,000</b>	<b>40,178</b>	<b>765</b>	<b>40,140</b>
<b>Adjustments to Base</b>	<b>\$313,106</b>	<b>-</b>	<b>-</b>	<b>-</b>
Annualization of FY 2020 Pay Raise 3.1%	56,576	-	-	-
FY 2021 Pay Raise 1.0%	56,827	-	-	-
FY 2021 Cash Awards Increase 1.0%	11,548	-	-	-
FY 2021 FERS Increase	81,770	-	-	-
One Less Compensable Day 261	-26,231	-	-	-
Working Capital Fund	489	-	-	-
Regional Projects and Facility Optimization	25,464	-	-	-
Restoration of Cuts Resulting from FY 2020 Pay Raise	106,663	-	-	-
<b>Discretionary Adjustments</b>	<b>\$58,394</b>	<b>98</b>	<b>-</b>	<b>82</b>
Improving Aviation Safety Oversight 63 FTP/63 FTE	36,679	63	-	63
Cybersecurity	13,000	-	-	-
UAS 15 FTP/8 FTE	2,230	15	-	8
AST Staffing 9 FTP/5 FTE	685	9	-	5
Community Noise Engagement 3 FTP/2 FTE	4,300	3	-	2
STEM AVSED Program 8 FTP/4 FTE	1,500	8	-	4
<b>Base Transfers</b>	<b>\$0</b>	<b>-2</b>	<b>-</b>	<b>-2</b>
Staffing Reassignment FAA to OST 2 FTP/2 FTE	-	-2	-	-2
<b>FY 2021 Request</b>	<b>\$11,001,500</b>	<b>40,274</b>	<b>765</b>	<b>40,220</b>

**Base Transfer Summary  
(\$000)**

	LOB/SO	FTE	FTP	Funding		LOB/SO	FTE	FTP	Funding
Staffing Reassignment from FAA to OST	AGI	-1	-1	\$-		OST	1	1	\$0
Staffing Reassignment from FAA to OST	AOC	-1	-1	\$-		OST	1	1	\$0
<b>Total</b>		<b>-2</b>	<b>-2</b>	<b>\$-</b>			<b>2</b>	<b>2</b>	<b>\$0</b>

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Staffing Summary -- FY 2019 - FY 2021					
		Type	FY 2019 ACTUAL	FY 2019 ENACTED	FY 2021 REQUEST
Air Traffic Organization	ATO	FTP	28,516	29,375	29,375
		OTFTP	391	689	689
		FTE	28,802	29,401	29,401
Associate Administrator for Aviation Safety	AVS	FTP	7,017	7,318	7,381
		OTFTP	48	31	31
		FTE	7,016	7,318	7,381
Associate Administrator for Commercial Space Transportation	AST	FTP	96	108	117
		OTFTP	-	1	1
		FTE	97	110	115
Assistant Administrator for Finance and Management	AFN	FTP	1,506	1,483	1,483
		OTFTP	14	17	17
		FTE	1,519	1,459	1,459
Assistant Administrator for Next Generation Air Transportation System	ANG	FTP	174	186	186
		OTFTP	3	4	4
		FTE	174	186	186
Associate Administrator for Security and Hazardous Materials Safety	ASH	FTP	492	529	542
		OTFTP	3	1	1
		FTE	486	494	501
Staff Offices	Assistant Administrator for Human Resource Management	FTP	487	510	510
		OTFTP	7	3	3
		FTE	485	505	505
	Office of the Administrator and Deputy	FTP	14	18	18
		OTFTP	1	4	4
		FTE	14	17	17
	Assistant Administrator for Audit and Evaluation	FTP	18	20	20
		OTFTP	2	1	1
		FTE	20	21	21
	Assistant Administrator for Civil Rights	FTP	61	73	73
		OTFTP	2	1	1
		FTE	65	72	72
	Asst. Administrator for Government and Industry Affairs	FTP	8	8	7
		OTFTP	3	1	1
		FTE	10	9	8
	Assistant Administrator for Communications	FTP	26	30	29
		OTFTP	1	1	1
		FTE	28	31	30
	Office of Chief Counsel	FTP	213	230	230
		OTFTP	9	8	8
		FTE	215	229	229
	Asst. Administrator for Policy, International Affairs and Environment	FTP	122	290	303
		OTFTP	1	3	3
		FTE	115	288	295
Total		FTP	38,750	40,178	40,274
		OTFTP	485	765	765
		FTE	39,046	40,140	40,220

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

**Resource Summary -- FY 2019 - FY 2021 (\$000)**

			FY 2019 ACTUAL	FY 2020 ENACTED	FY 2021 REQUEST	
Air Traffic Organization (ATO)		pcb	\$ 5,594,049	\$ 5,831,291	\$ 5,971,917	
		o/o	\$ 2,247,671	\$ 2,139,443	\$ 2,238,904	
ATO Total			\$ 7,841,720	\$ 7,970,734	\$ 8,210,821	
Associate Administrator for Aviation Safety (AVS)		pcb	\$ 1,110,416	\$ 1,175,908	\$ 1,220,124	
		o/o	\$ 226,553	\$ 228,188	\$ 253,915	
AVS Total			\$ 1,336,969	\$ 1,404,096	\$ 1,474,039	
Associate Administrator for Commercial Space Transportation (AST)		pcb	\$ 17,188	\$ 18,949	\$ 20,446	
		o/o	\$ 7,761	\$ 7,091	\$ 7,109	
AST Total			\$ 24,949	\$ 26,040	\$ 27,555	
Assistant Administrator for Finance and Management (AFN)		pcb	\$ 254,314	\$ 241,039	\$ 253,101	
		o/o	\$ 562,084	\$ 559,404	\$ 583,040	
AFN Total			\$ 816,398	\$ 800,443	\$ 836,141	
Assistant Administrator for NextGen Air Transportation System (ANG)		pcb	\$ 28,570	\$ 29,972	\$ 31,296	
		o/o	\$ 32,688	\$ 31,566	\$ 31,566	
ANG Total			\$ 61,258	\$ 61,538	\$ 62,862	
Associate Administrator for Security and Hazardous Materials Safety (ASH)		pcb	\$ 79,400	\$ 82,983	\$ 88,059	
		o/o	\$ 34,765	\$ 35,659	\$ 36,869	
ASH Total			\$ 114,165	\$ 118,642	\$ 124,928	
Staff Offices	Assistant Administrator for Human Resource Management (AHR)		pcb	\$ 72,715	\$ 76,265	\$ 81,141
			o/o	\$ 32,840	\$ 28,596	\$ 31,452
	AHR Total			\$ 105,555	\$ 104,861	\$ 112,593
	Office of the Administrator and Deputy (AOA)		pcb	\$ 2,505	\$ 2,640	\$ 3,306
			o/o	\$ 1,698	\$ 733	\$ 733
	AOA Total			\$ 4,203	\$ 3,373	\$ 4,039
	Assistant Administrator for Audit and Evaluation (AAE)		pcb	\$ 3,386	\$ 3,748	\$ 3,838
			o/o	\$ 35	\$ 352	\$ 752
	AAE Total			\$ 3,421	\$ 4,100	\$ 4,590
	Assistant Administrator for Civil Rights (ACR)		pcb	\$ 9,685	\$ 10,189	\$ 10,934
			o/o	\$ 2,846	\$ 2,073	\$ 2,073
	ACR Total			\$ 12,531	\$ 12,262	\$ 13,007
	Assistant Administrator for Government and Industry Affairs (AGI)		pcb	\$ 1,566	\$ 1,636	\$ 1,684
			o/o	\$ 38	\$ 182	\$ 182
	AGI Total			\$ 1,604	\$ 1,818	\$ 1,866
	Assistant Administrator for Communications (AOC)		pcb	\$ 6,071	\$ 6,506	\$ 6,939
			o/o	\$ 520	\$ 215	\$ 715
	AOC Total			\$ 6,591	\$ 6,721	\$ 7,654
	Office of the Chief Council (AGC)		pcb	\$ 39,661	\$ 42,127	\$ 44,734
			o/o	\$ 6,714	\$ 3,608	\$ 3,605
	AGC Total			\$ 46,375	\$ 45,735	\$ 48,339
	Assistant Administrator for Policy, International Affairs and Environment (APL)		pcb	\$ 25,617	\$ 53,662	\$ 55,920
			o/o	\$ 9,402	\$ 15,975	\$ 17,146
	APL Total			\$ 35,019	\$ 69,637	\$ 73,066
Grand Total			\$ 10,410,758	\$ 10,630,000	\$ 11,001,500	

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**FY 2021 Discretionary Increase Request:  
Improving Aviation Safety and Oversight  
\$36.679 Million**

**Aviation Safety (AVS), Security and Hazardous Materials Safety (ASH) & Audit and  
Evaluation (AAE)**

**1. Describe the problem or circumstance that prompted the need for this additional funding.**

The Federal Aviation Administration (FAA) is continuously looking at ways to improve its safety oversight. The recent crashes of two Boeing 737 MAX aircraft have brought the FAA's role in overseeing aviation safety to the forefront, making investments in the FAA's safety oversight especially timely.

**2. Describe the strategy and the proposed solution you are using to address the situation.**

The FAA has identified seven key areas for improving our safety oversight. The budget request will address the recent Boeing 737 MAX investigations, support the creation of an AVS Organization Designation Authorization Office (ODA), and improve the systems that the FAA uses to gather, analyze, and respond to safety data.

- Directly Related to the 737 MAX Investigations:
  - Investigation Responses: In addition to work conducted by National Transportation Safety Board (NTSB), the following reviews and investigations are currently being conducted related to the 737 MAX: the Office of Inspector General (OIG) audit of FAA certification, the Department of Transportation (DOT) Special Committee to Review FAA's Aircraft Certification Process, and the Joint Authorities' Technical Review. FAA will review and cross-walk the recommendations of the various reports. Once all of the reviews are completed and FAA has a collective, de-conflicted set of recommendations, FAA will determine what changes may be appropriate and how and when those changes would be executed.

Based on the progress to date, some key themes are emerging regarding aircraft certification processes not only in the US, but around the world. Although corrective actions are not yet defined, these themes will be addressed and include:

- moving toward a more holistic versus transactional, item-by-item approach to aircraft certification;
- integrating human factors considerations more effectively throughout the design process, as aircraft become more automated and systems more complex; and
- ensuring coordinated and flexible information flow during the oversight process.



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

In the first phase of a larger effort to hire an additional 236 staffing, 50 safety personnel are requested along with providing more competitive compensation packages to better compete in recruiting employees with technical expertise.

- Investigation Repository/Cyber Analysis Virtual Environment Suite (CAVE):  
The FAA issued an emergency prohibition order grounding the Boeing 737 MAX aircraft until further investigation, and has received several records/document inquiries related to the October 2018 and March 2019 737 MAX aircraft accidents.

This request is for the continued development and maintenance of the Cyber Analysis Virtual Environment (CAVE), including an investigation repository capability. Environment (CAVE) is an investigative system used to perform analysis and review of evidentiary data to support investigations, inquiries, FOIAs, and other matters in a cloud environment. The CAVE allows ASH to collaborate with agency partners to perform early case assessment to establish search criteria and provide sample search results. ASH uses the CAVE to cull through the data so that only responsive data remains for review.

The CAVE currently holds over 49 terabytes of collected FAA data supporting the Boeing 737 Max Congressional inquiries allowing legal counsel and reviewers to search, review, and produce responsive data to current and future requests. It will enable the agency to promptly and consistently respond to inquiries, as well as process and report on the data.

- Organization Designation Authorization Office (ODA):
  - AVS ODA Office: The FAA Reauthorization Act of 2018, H.R. 4 Sec. 212 directed the FAA Administrator to identify an Organization Designation Authorization Office (ODA) within the FAA Office of Aviation Safety (AVS). Currently, AVS has 78 approved ODAs and expects that number to grow in the number and types of organizations holding these authorizations over the next 10 years. The ODA program has been in place since 2009 and while significant improvements have been achieved during this time, the absence of a single office to oversee this authorization has resulted in inconsistencies and inefficiencies. The purpose of the AVS ODA Office is to provide oversight and ensure the consistency of the FAA's audit functions under the ODA program across AVS.

The FAA's strategy will provide a system-level focus in multiple areas, including ODA utilization, establishment of ODA limitations, ODA oversight, and performance of ODAs. By looking at ODA systematically, this office will support standardized outcomes and improvements across the ODA program that will resolve many of the concerns raised by both the FAA and industry, and directly respond to the requirements of the Act. The office will promote

standardized development, implementation, and application of coordinated national ODA program policy. It will focus ODA oversight on high-risk areas and support appropriate expansion of the ODA program, both in scope and utilization, in consideration of the rapidly changing aviation industry. Additionally, a major area of focus for the AVS ODA Office will be consistent implementation plans and a means to confirm the effectiveness of these efforts.

- **FAA Safety Oversight System Improvements:**
  - Aviation Safety Information Analysis and Sharing (ASIAS) is a shared government/industry initiative to discover systemic safety concerns before incidents occur. The program is a collaborative effort that provides safety analyses based on aggregated safety reports, airline proprietary safety data, FAA data, manufacturers' data, and other information from multiple aviation organizations for analysis and data sharing. While the platform has been an essential safety oversight tool there are areas FAA has identified that need improvement. New advancements in data gathering allow us to create a 360-degree view of individual flights. With this request FAA will produce additional major studies, medium-fidelity analyses, and "quick look" studies utilizing the ASIAS 2.0 platform, which fuses together surveillance radar data, aggregate airline/proprietary digital flight data, and text-based safety reports from pilots/air traffic controllers and others.
  - The Aviation Safety Reporting Program (ASRP) supports voluntary confidential reporting. Through an interagency agreement, NASA administers the Aviation Safety Reporting System (ASRS) that allows pilots and other aircraft crew members to confidentially report near misses and close calls in the interest of improving air safety. The number of submitted reports has doubled in the past five years and the processing tool, Analyst Workbench, requires significant upgrades and ongoing maintenance. Without ongoing improvements to the current capability and error-free access to the secure data submission of reports, electronic information sharing, automated text search, and data management analysis software tools (e.g. Analyst Workbench), ASRS may be less able to receive, evaluate, de-identify, and upload these voluntary safety reports.
  - FAA Hotline Information System (FHIS) / Whistleblower Protection Program (WBPP) serves as the FAA's central repository for all types of complaints filed by FAA employees, the aviation industry, and the public related to internal FAA staff or programs and the safety of the national airspace. This program was developed from incorporating multiple smaller systems into one that is centrally controlled and managed. It will enhance our ability to collect and review data essential to safety oversight of the national airspace. This request will enable us to maintain the program and make continued improvements.
  - Enterprise-wide tracking system will provide information regarding employee training, qualifications, certifications and currency in order to better assess employees ability to execute work within the safety oversight process.

**3. How much are you requesting? Provide a detailed justification for the increase.**

The budget requests a total of \$36,679,000.

- **Investigation Responses:** For the Aviation Safety organization, the FAA is requesting \$10.0 million for the staffing needed to operationalize the recommendations and ensure successful execution of the changes. As the specifics will not be known until a collective, de-conflicted set of recommendations is adopted, a conservative estimate of the need includes a projected increase of 236 in staffing of safety critical and safety technical positions. This request is for 50 additional hires, which are expected to be only the first phase of the larger hiring effort. \$5 million is requested for AVS to provide better compensation packages in order to more successfully compete in hiring employees with technical expertise. Also requested is \$4.285 million for the Aviation Safety organization to implement recommendations following the 737 MAX investigations and reviews. This funding will be focused on establishing the infrastructure for the recommendations.
- **Investigation Repository/Cyber Analysis Virtual Environment (CAVE):** This funding request of \$750,000 is for the continued development and maintenance of the CAVE, including an investigation repository capability. It will enable the agency to promptly and consistently respond to inquiries, as well as process and report on the data.
- **Organization Designation Authorization Office (ODA):** The budget requests an increase of \$7 million for an ODA Office for FY 2021 including 13 FTPs/13 FTEs. The request is approximately \$3 million in salary and \$4 million for travel, equipment, supplies, training, and contracts.
- **Aviation Safety Information Analysis and Sharing (ASIAS):** The budget requests \$3.594 million for the Aviation Safety organization to address major growth in ASIAS participation by air carriers, corporate operators and private pilots, as well as increased production of ASIAS safety analyses. This includes major studies that address systemic aviation safety issues, and medium-fidelity and “quick look” analytical efforts related to specific aviation hazards. This funding will be used for the existing and new operator participation agreements/ governance outreach and legal documentation required to ingest proprietary operator data for use in safety analyses. The funding will also provide direct analytic support for all additional and ongoing safety analyses, and the capabilities and tools that detect anomalies to support the analyses.
- **Aviation Safety Reporting Program (ASRP):** The budget requests \$650,000 for the Aviation Safety organization to modernize and enhance the reporting systems. These improvements are necessary in order to make the ASRS appropriately accessible and integrated with other safety resources within the aviation domain.
- **FAA Hotline Information System (FHIS) / Whistleblower Protection Program (WBPP):** The budget requests \$400,000 for the Office of Audit and Evaluation. This program was

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

developed from incorporating multiple smaller systems into one that is centrally controlled and managed, and this funding will allow the FAA to maintain the program and make continued improvements. The funding will cover the cost of the annual license fee, managed services with remote monitoring and technical and user support, continued development and minor enhancements, database support, web form support, and security assessment fees.

- Enterprise-wide tracking for employee training, qualifications, certifications and currency: The budget requests \$5 million for the initial design and development of an AVS-wide system that would enable real-time integration of data for the assessment of an employee's ability to execute work in the oversight process. This system will integrate across several disparate systems currently requiring manual, labor intensive efforts to create a holistic view of currency.

**FY 2021 Discretionary Increase Request:**

**Cyber Security**

**\$13.0 Million**

**Air Traffic (ATO)**

The cybersecurity request will address vulnerabilities in systems, field security risk assessment, and data disposal that require funding to ensure secure and efficient air traffic control services. These activities will strengthen the air traffic network, and make it more resilient to outside threats. The request includes \$13.0 million for the following:

- System Vulnerability Remediation (\$8.84M)
- Field Security Risk Assessments (\$3.02M)
- Data Disposal (\$1.14M)

**System Vulnerability Remediation (\$8.84M)**

**1. Describe the problem or circumstance that prompted the need for this additional funding?**

The FAA has a backlog of known cyber vulnerabilities. In addition transitioning our infrastructure over to a shared system utilizing internet protocol services increases the entry points for potential cybersecurity attacks. Currently there are over 9,000 active plans of action and milestones (POAMs) for air traffic control systems. The risk to national airspace operations continues to increase as it becomes a highly integrated enterprise system-of-systems that utilizes shared messaging, data, and network infrastructure.

**2. Describe the strategy and the proposed solution you are using to address the situation.**

Our strategy is to consolidate segregated ATO system cybersecurity funding needs and define investments that align with ATO risk mitigation priorities. This approach will be utilized to reduce the backlog of POAMs for ATO systems. Funding will be allocated to ATO system owners to mitigate prioritized risk based on the likelihood and impact of cybersecurity vulnerabilities.

**3. How much are you requesting?**

The FAA is requesting \$8.84 million to implement required and defined corrective actions that are captured in security Plans of Action and Milestones (POAMs). This funding will also allow the FAA the flexibility to allocate funding to immediately address emergent threats and the necessary requirements for remediation.

**Field Security Risk Assessments (\$3.02M)**

**1. Describe the problem or circumstance that prompted the need for this additional funding?**

The OIG and GAO have recommended the FAA expand site assessments to include operational facility locations. Performance of site assessment functions is required to support the Federal Information Security Modernization Act (FISMA) security testing mandates in accordance with National Institute Standards and Technology (NIST) guidance. Due to the critical nature of the national airspace operational systems, the FAA conducts annual risk assessments in the test environment.

**2. Describe the strategy and the proposed solution you are using to address the situation.**

The FAA would develop national airspace operational site assessment test plans and conduct system-level field security risk assessments. This will include extracting and conducting analysis on system configuration files and audit logs and assessing the implementation of site personnel security procedures. These actions will ensure system to system interfaces and interconnections are in agreement with the System Characterization Document and that site security responsibilities are being fulfilled.

**3. How much are you requesting?**

The Budget requests \$3.02 million to support additional contractor resources to perform the site assessments and data analysis, tools required to conduct assessments, and travel costs to access the operational site systems. FAA targets FY 2021 to begin conducting operational field site assessments.

**Data Disposal (\$1.14M)**

**1. Describe the problem or circumstance that prompted the need for this additional funding?**

The FAA does not currently have a standardized disposal procedure for storage devices with data on them. The Air Traffic Organization (ATO) generates large amounts of sensitive data and stores it on multiple types of devices that require secure cleaning and disposal. The FAA keeps these materials in field facilities which puts the operational environment at potential risk.

**2. Describe the strategy and the proposed solution you are using to address the situation.**

The FAA intends to develop standards and requirements, support the acquisition and testing of commercial services, and deploy to field facilities to allow for safe, secure disposal methods.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**3. How much are you requesting?**

The President's Budget requests \$1.14 million for the procurement of optical shredders and media sanitization destruction devices in order to appropriately and securely dispose of equipment and media in the operational field environment.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**FY 2021 Discretionary Increase Request:  
Unmanned Aircraft Systems (UAS)  
\$2.2 Million**

**Security and Hazardous Materials Safety, (ASH)  
Policy, International Affairs, and Environment, (APL) and  
Office of Communications, (AOC)**

**1. Describe the problem or circumstance that prompted the need for this additional funding.**

The integration of Unmanned Aircraft Systems (UAS) into the national and international airspace has created a growing concern around the criminal use of UAS as delivery vehicles for small munitions or illegal contraband, as well as use for surveillance, counterintelligence collections, and cyber-attacks. UAS are also capable of disrupting air traffic flow, and forcing complete airport shutdowns, as evidenced by the incident at London's Gatwick Airport in December 2018. With the increased vulnerability created by UAS, the need for enhanced security to defend against UAS threats has spawned a growth in Counter-UAS (C-UAS) authorities and capabilities deployment in the National and International airspace systems. The uncoordinated proliferation of C-UAS equipment can create hazardous conditions for legitimate manned and unmanned operations, as well as air navigation services. The potential for these hazards will increase, as technology improves and the use of UAS continues to expand exponentially. The Office of Security and Hazardous Materials Safety (ASH) is the FAA's C-UAS integration office, responsible for tracking, facilitating and coordinating internal FAA efforts on C-UAS and UAS security, as well as the primary conduit for external communication and outreach.

The development and proliferation of C-UAS systems must be carefully implemented throughout national and international airspace to prevent unnecessary restrictions to legitimate UAS use. It is important to note that none of the alleged non-federal use of C-UAS equipment has been coordinated with the FAA. With UAS utilization increasing in scope and complexity ensuring there are clear rules and methods to counter illicit use is essential to a properly functioning and safe airspace.

**2. Describe the strategy and the proposed solution you are using to address the situation.**

FAA's agency-wide strategy is to collaborate with stakeholders to develop standardized procedures for C-UAS deployment and operation while ensuring a coordinated and consistent effort in implementing these procedures. A detailed review of this strategy follows:

(1) Work with federal security partners on development and implementation of processes for use of C-UAS equipment, monitor ongoing test activities, and facilitate the development of a compendium of C-UAS equipment. This enables us to perform statistical analysis that supports risk-based decision-making.



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

- (2) Increase awareness of the dangers of improper use of C-UAS equipment introduced into national and international airspace.
- (3) Expand engagement with federal, state and local law enforcement in support of national security special events and special event assessment rating activities.
- (4) Provide dedicated engagement with international partners affected by UAS disruption to air traffic flow, and/or UAS targeting or attacking ground-based personnel and infrastructure.
- (5) Develop standard operating procedures and explore technical solutions to support the national integration of C-UAS equipment as well as database consolidation and maturation of collection and analysis of UAS sightings nationwide. Development of test plans and repeatable test methodology across all the security partner agencies to ensure FAA receives the data necessary to analyze impacts on onboard aviation systems and air navigation services infrastructure and services.
- (6) Coordinate with security partners to ensure future unmanned traffic management research efforts have taken into account the appropriate security requirements.
- (7) Integrate C-UAS into FAA and DOT strategic and policy activities. The critical importance of addressing C-UAS challenges requires a well-coordinated Administration approach that is supported by regular and ongoing dialogue within the FAA and DOT, with Federal partners, and with Congress when necessary.

**3. How much are you requesting? Provide a detailed justification for the increase.**

The request includes \$1.515 million for ASH in support of 13 FTPs/7 FTEs, contract support, travel, training, space and equipment. This funding will allow ASH to increase support to, and engagement with, federal, state, and local law enforcement partners, as well as the private sector and international partners, in order to evaluate and address implications of integrating and employing C-UAS capabilities and the impacts on the national airspace and aviation-related assets. ASH will provide special agents to support the numerous national special security events, and other requests by local law enforcement and critical infrastructure owners, for education on, and support in, responding to UAS incursions. ASH serves as the primary Line of Business for coordination and facilitation of work associated with UAS security issues and C-UAS systems and capabilities. ASH resources support the Unmanned Aircraft Systems Integration Office (AUS) roles and responsibilities for UAS integration actions, such as its involvement with the IPP, as well as other UAS work conducted in almost every line of business.

Within this request, \$500,000 for the Office of Communications (AOC) will be used to inform the public and stakeholders on UAS information and updates using social media and live engagements at events, trade shows, and online chats.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

The budget request also includes \$215,000 for the Office of Policy, International Affairs and Environment (APL) for 2 FTPs/1 FTE, to support UAS policy alignment with other FAA strategic and policy objectives and any legislative activity to further FAA objectives regarding UAS.

**FY 2021 Discretionary Increase Request:  
Commercial Space Transportation Staffing  
\$685 Thousand  
Commercial Space Transportation, (AST)**

**1. Describe the problem or circumstance that prompted the need for this additional funding.**

The FAA continues to face rapid growth of the commercial space industry and emergence of new and unique launch and reentry technologies and operations. With current staffing levels, AST will be challenged to support the projected volume of applications for licensing authorization of sites and operations. In addition to challenges meeting industry demands for evaluations for commercial space transportation licensing, permits or safety approvals, AST has a critical need for staff with experience in areas such as propulsion, structures, human factors, systems safety, and flight safety systems. These positions require very specialized skill sets and extensive training time is needed for new employees to become proficient in each area.

**2. Describe the strategy and the proposed solution you are using to address the situation.**

AST's strategy is to address the rapid growth of the commercial space industry by increasing staffing at key areas across the organization – licensing and evaluation, regulations and analysis, safety inspections and mission support services. This requested staffing increase will also provide enhanced support of AST's ongoing effort to transform the Commercial Space Transportation launch and re-entry licensing process to a performance based, single license regime for all types of launch and re-entry vehicle operations.

Lastly, additional staffing is required to grow and enhance AST's mission support services to include the development of an automated licensing process and adoption of new technologies and procedures to more effectively integrate commercial space operations into the national airspace.

**4. How much are you requesting? Provide a detailed justification for the increase.**

The budget request includes \$685,000 for AST in support of 9 FTPs/5 FTEs. This allows for 6 additional operational staff to support licensing, evaluation, regulatory work, and safety inspections; and 3 mission support staff.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**FY 2021 Discretionary Increase Request:  
Community Noise Engagement  
\$4.3 Million**

**Air Traffic Organization, (ATO) and  
Policy, International Affairs, and Environment, (APL)**

**1. Describe the problem or circumstance that prompted the need for this additional funding.**

Implementing the performance based navigation program is amplifying public concern about aircraft noise levels. This program is modernizing aircraft tracking in the national airspace by leveraging satellite systems to provide shorter flights, reduced aircraft emissions, and decreased flight delays. While performance based navigation has improved our ability to maximize airspace use it has also rerouted air traffic to areas unaccustomed to it.

**2. Describe the strategy and the proposed solution you are using to address the situation.**

The FAA's strategy is to utilize locally held community roundtables composed of stakeholders from the community, airport management, government officials, and industry to develop solutions to growing concerns. Each new roundtable formed requires regular engagement with extensive research to evaluate concerns, impacts to the national airspace, and environmental reviews. The FAA's initial trial of roundtables was successful and results show a significant number of new communities seeking to establish roundtables to address their concerns with performance based navigation.

**3. How much are you requesting? Provide a detailed justification for the increase.**

The budget request includes \$4.3 million and 3 FTPs/2 FTEs. This request will provide funding for:

- \$3 million for contractor services support to develop community engagement tool kits tailored to address the specific concerns of individual community roundtables, prepare historical traffic analyses, evaluate the feasibility of roundtable-proposed changes to performance based navigation procedures, and conduct required environmental reviews of feasible proposals;
- \$1 million for contractor services to develop, deploy and maintain a public, web-accessible system providing real-time visualization and analysis of aircraft positions, including noise data, and altitudes relative to the user's geographical location to support Community Engagement; and
- \$300,000 for 3 FTPs/2 FTEs to increase and enhance routine engagement with roundtables by Regional Administrator Offices.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**FY 2021 Discretionary Increase Request:  
Science, Technology, Engineering, and Math Aviation and  
Space Education (STEM AVSED) Program  
\$1.5 Million  
Policy, International Affairs, and Environment, (APL) and  
Office of Human Resources, (AHR)**

**1. Describe the problem or circumstance that prompted the need for this additional funding.**

The shortage of airline pilots, maintenance technicians, and UAS professionals is being exacerbated by a decline in new entrants to the industry. This problem will only increase as economic projections show a growing demand for qualified aviation and aeronautical professionals over the next twenty years.

**2. Describe the strategy and the proposed solution you are using to address the situation.**

Our strategy is to increase support for the Science, Technology, Engineering, and Math Aviation and Space Education program (STEM AVSED). The program exposes students to aviation and aerospace career options while promoting STEM learning. The Office of Human Resources (AHR) and the Office of Policy, International Affairs, and Environment (APL) will lead the STEM AVSED support effort.

AHR will oversee administrative support of the nearly 1,000 outreach representatives and the materials, reporting tools, informational briefing materials, communications packages and support required to sustain this force of FAA volunteers. The Office of National Engagement and Regional Administration augments this volunteer force with FAA professionals who are dispersed throughout the regions to meet and execute the strategic plans for the STEM AVSED program with the communities and educational facilities (elementary, middle, high school and two-year colleges) across the nation.

Currently, many of the STEM AVSED efforts are performed as collateral duties by employees with other technical responsibilities. APL proposes to hire employees dedicated solely to STEM AVSED outreach efforts. The dedicated employees will be embedded in the FAA regional offices and will engage prospective students across the country. This program will conduct routine STEM AVSED related activities, projects, events, and programs to inform K-12 students about jobs available in the aerospace industry and the education required for those jobs.

**3. How much are you requesting? Provide a detailed justification for the increase.**

The Budget requests \$556,000 and 8 FTPs/4 FTEs and \$556,000 to re-establish a robust STEM/AVSED outreach program to address the future shortage of aviation technical professionals.

The Budget requests \$184,000 for contract funding needed to provide event support and other support for FAA's STEM AVSED program.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

The Budget requests \$760,000 to support the development of materials and routine educational supplies. The events listed all reflect the STEM AVSED Program's effort to address and align with the Reauthorization Act of 2018.

	<b>Region</b>	<b>Regional Support</b>
Supplies for Regional Offices	All	\$ 165,000
Commercial Space Outreach Support	AWP	\$ 30,000
Team America Rocketry Challenge	All	\$ 20,000
Global Leadership Initiative/ICAO	AAL	\$ 30,000
Walk In My Boots Job Shadow	All	\$ 10,000
EAA KidVenture	AGL	\$ 40,000
Sun N Fun	ASW	\$ 40,000
Aviation Ambassador Program	ACE	\$ 40,000
Drone 2020 Challenges	ASO	\$ 20,000
Senior Consulting	All	\$ 120,000
AOPA High School Initiative	All	\$ 10,000
National Coalition of Certification Centers	All	\$ 15,000
Women In Aviation	All	\$ 10,000
2 day training for Regional AVSED Reps.	All	\$ 30,000
1 day training for employees	All	\$ 30,000
Website Design and Support	All	\$ 150,000
<b>Total</b>		<b>\$ 760,000</b>



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for the Air Traffic Organization (ATO)**

---

**FY 2021 - Air Traffic Organization Budget Request  
(\$000)**

<b>Program Activity</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Salaries and Expenses	5,594,049	5,831,291	5,971,917
Program Costs	2,247,671	2,139,443	2,238,904
<b>Total</b>	<b>\$7,841,720</b>	<b>\$7,970,734</b>	<b>\$8,210,821</b>
<b>FTE</b>	<b>28,802</b>	<b>29,401</b>	<b>29,401</b>

**Funding details for ATO's eight service units:**

<b>Program Activity</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Air Traffic Services (AJT)	4,169,924	4,316,110	4,423,662
Technical Operations (AJW)	1,672,895	1,642,848	1,703,552
System Operations (AJR)	278,401	266,235	275,171
Safety and Technical Training	198,222	180,493	186,206
Mission Support Services	280,100	289,708	301,017
Management Services (AJG)	209,910	239,604	247,327
Program Management (AJM)	928,417	935,019	969,774
Flight Programs (AJF)	103,851	100,717	104,112
<b>Total</b>	<b>\$7,841,720</b>	<b>\$7,970,734</b>	<b>\$8,210,821</b>

**What is this program and what does this funding level support?**

---

The Air Traffic Organization (ATO) operates the most complex and technically advanced air traffic control system in the world. In FY 2021, ATO is required to sustain and improve effective and efficient air traffic control throughout U.S. airspace. The funding requested will enable ATO to train FAA's highly-skilled workforce, provide information and updates to the flying public to ensure safe air travel, maintain critical infrastructure necessary to operate the National Airspace System (NAS), review and update navigational information to promote more efficient air



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

transportation, and effectively control air traffic, which is a major contributor to the national economy.

While the system is already exceedingly safe, ATO is making it safer by moving to a proactive safety culture in which every individual in ATO is committed to assessing and mitigating risks. While safety is paramount, ATO is also taking steps to enable growth and changes in aviation.

ATO is a Performance-Based Organization providing safe, secure, and cost-effective air traffic control services to commercial, private aviation and the military. ATO is comprised of more than 29,401 Operations-funded professional employees committed to providing safe and efficient air traffic control services. Many ATO employees, including approximately 14,500 air traffic controllers, 5,000 air traffic supervisors and air traffic managers, 1,800 engineers, and 6,000 maintenance technicians, directly serve FAA's customers. The remaining employees work in a wide variety of professions to sustain the smooth operations of ATO. They research, plan, and build air traffic control equipment and programs; manage payroll and benefits programs; maintain productive relationships with the aviation industry and the general public; and ensure that the environment and ATO employees are protected.

ATO provides air traffic services for the Nation and is fully committed to the agency's mission. ATO handles over 27,000 scheduled passenger flights per day at U.S. airports and helps transport over 743 million passengers per year, a vital part of the Nation's economy. In total, the ATO handles over 43,000 Instrument Flight Rules (IFR) flights per day, and manages over 137,000 operations (including departures, arrivals and over-flights) per day at FAA and contract towers. FAA data shows that civil aviation accounted for over \$1.6 trillion in total economic activity, supporting 5.1 percent of U.S. Gross Domestic Product. Approximately 10.6 million people are employed in aviation-related fields, and earn over \$446.8 billion a year.

ATO's eight service organizations include:

**Air Traffic Services (AJT):** Air Traffic Services provides air traffic control operations from enroute, terminal, and combined control facilities in the United States, Puerto Rico, and Guam. Air Traffic Services also controls more than 29 million square miles of airspace, representing more than 17 percent of world's airspace, including all of the United States and large portions of the Atlantic and Pacific Oceans and Gulf of Mexico. Every day FAA ensures that thousands of positively-controlled aircraft are directed to the safest, most efficient pathway to their destinations.

The enroute domain provides air traffic control services at 21 air route traffic control centers, commonly known as ARTCCs and four combined control facilities, which interface with more than 18 air navigation service providers. Terminal air traffic control (ATC) services include both airport surface operations and terminal area operations. Airport surface operations are conducted by controllers at 263 federal and 256 contract towers located at the Nation's airports.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

Terminal area operations are conducted by controllers at 158 stand-alone and combined terminal radar approach control (TRACON) facilities, which routinely handle aircraft within 40 miles of an airport.

Air Traffic Services is divided into three geographical service areas (Eastern, Central, and Western) to better manage the delivery of ATC services. The primary function of each service area is to oversee ATC operations within its geographical area and to ensure that quality standards established for safety, capacity, and organizational excellence are met.

**Technical Operations (AJW):** The NAS is composed of a mix of hardware and software systems that enable controllers to monitor and communicate with pilots and other ATC facilities. NAS system capabilities include automation, communications, surveillance and navigation. Failure at any point in the system can cause capacity reductions and potentially compromise safety. Reductions in capacity cause delays with costs to users and the flying public. Technical Operations ensures that terminal and enroute controllers have all critical parts of the NAS infrastructure available for the safe and efficient delivery of air traffic services.

The mission of the Technical Operations Service Unit is to:

- Ensure efficient delivery of all NAS services for all stakeholders;
- Increase NAS capacity for all users through changes in technology;
- Maintain optimal NAS services for all users by strategically investing in the current infrastructure and providing operational oversight of leased NAS services;
- Improve situational awareness for pilots, controllers and airfield operators by providing them with real-time information concerning potential conflicts and offering possible resolutions; and
- Provide a safe and healthful workplace for all FAA employees through an active Occupational Safety and Health Administration program.

Technical Operations supports the delivery of safe and efficient flight services to customers through responsive and cost effective maintenance of NAS facilities, systems, and equipment, and by providing operational oversight of leased services. The work consists of:

- NAS system design, development, acquisition, installation, maintenance, restoration, modification, certification and oversight of vendor-supplied NAS services and vendor maintenance programs;
- Facilities maintenance; and
- Engineering and assignment of aeronautical frequency spectrum.

Core work is performed by personnel at System Support and Technical Operations Control Centers. The Centers focus on optimizing NAS performance through prioritization of response

based on multiple factors, including the importance of the airport or ATC facility that is directly or indirectly affected by the equipment or service outage. Technical Operations leads the day-to-day defense and protection of the NAS by providing governance and requirements to enhance cybersecurity. Technical Operations coordinates threat information sharing and inter-agency collaboration and tailors cybersecurity business and acquisition strategies to support the rapid delivery of tools, applications, and other capabilities to defend the critical infrastructure from the evolving threat.

**System Operations (AJR):** The System Operations Service Unit or AJR consists of several directorates that perform essential functions in the daily operation of the NAS. AJR provides a broad range of operational services as part of the ATO, which affects all aspects of FAA Air Traffic Control operations. All national air traffic flow management initiatives are provided by AJR along with policy and concept development for FAA's new airport surface flow management programs. AJR is the focal for stakeholder interaction through formal Collaborative Decision Making venues and serves as FAA's Customer Advocate. AJR provides all national flight service functions, and policy and guidance to maintain data integrity and ensure timely dissemination of Notices to Airmen. AJR provides the ATO, its customers and stakeholders with system performance analysis, trending and forecasting, as well as develops strategies and plans to ensure a viable future for air transportation.

AJR also provides air traffic operational contingency oversight to ensure NAS operations continue efficiently and safely if there are planned or unplanned impacts on the NAS. AJR protects the United States Air Domain from threats and other major incidents by working to mitigate the impact of threats and associated response measures on the safety and efficiency of the nation's aviation system.

**Safety and Technical Training (AJI):** Provides safety, technical training, policy and performance, and standardization expertise necessary to help enable air traffic controllers, technicians, engineers and support personnel's daily efforts to keep aircraft safe, separated, and on time.

AJI safety programs are responsible for ensuring the safety of the NAS through reporting, mitigating, and monitoring risks. This strategy includes gathering input from front line employees, deploying technology to gather data, improving analysis to identify risk and implementing corrective actions to mitigate identified hazards. AJI ensures that national safety management policies are clearly defined, communicated, and adhered to; conducts audits and operational assessments of NAS changes and new technologies; and provides safety analysis and data management and integration capability. AJI manages safety policy development, reduces fatigue risks through a comprehensive fatigue risk management system, facilitates an ongoing ATO safety culture transformation that leads to improved safety performance, and is the focal point for reducing the risk of runway collisions and excursions in the NAS.

AJI is the organization within ATO that provides technical training to controllers, technicians, and engineers. AJI provides a national training program to ensure the technical competency (knowledge and skills) of the workforce, and ensures that AJI certifies enough of the right

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

workers to meet operational needs. AJI develops and delivers technical training programs for a workforce of approximately 14,500 air traffic controllers, 6,000 Airway Transportation Systems Specialists, and 1,800 engineers. This includes developing the design standards, acquiring services and products for delivering technical training at over 500 facilities nationwide, maintaining the technical training curricula, and adopting innovative technology that improves knowledge and skill transfer.

**Mission Support Services (AJV):** The Mission Support Services mission is to provide policy, technical expertise and analyses, critical support services, and regulatory guidance across a broad range of activities directly related to the safe and efficient operation of the NAS. The areas of work are in the following Directorates:

The Strategy directorate ensures that Mission Support Services facilitates achieving operationally sound and well-timed ATO enterprise priorities, by understanding and aligning need, opportunity and recommendations from its stakeholders. This directorate provides strategic leadership and planning, configuration control, and management for airspace modernization.

The Policy directorate develops regulatory policy and provides Air Traffic Control (ATC) procedural support to users throughout the NAS. This includes providing guidance on matters involving ATC standards and procedures and creating rules, policies, and standards for the use of navigable airspace.

The ATO International Office represents the ATO and delivers consistent, well-coordinated leadership in support of Global Leadership Initiatives to achieve collaborative international harmonization and operational priorities.

The Aeronautical Information Services directorate is the authoritative government source for collecting, validating, storing, maintaining, and disseminating aeronautical data for the U. S. and its territories. This directorate develops and maintains all public instrument flight procedures and airways. It also serves as the FAA's aeronautical charting authority for the development, publication, and dissemination of aeronautical charts and products to support aviation and to meet demand for increased capacity, efficiency, and predictability in the airspace, routes, and airports of the NAS.

The three Service Center directorates provide shared services support in a matrix environment to support the Directors of Operations for Air Traffic Services, Technical Operations, and System Operations and their respective field facilities. The Service Centers also service HQ service units and other lines of business in the broad functional areas of airspace modernization and procedures development, quality control, planning and requirements, equipment installation, budget, staffing, and administration.

**Management Services (AJG):** The Management Services organization provides leadership and guidance in the areas of financial management, people services, business planning, technical labor relations, employee development, customer service, and employee engagement for the ATO. This shared services model was designed to decrease the administrative burden on ATO's operating service units and improve the overall efficiency and effectiveness of the ATO.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

Management Services strives to maximize economies of scale by promoting standardization of processes, providing budget formulation and execution, overseeing ATO administrative policy, providing personnel actions and technical labor advice and leading ATO-specific employee development and succession planning efforts on behalf of FAA's customers, who collectively operate and maintain the NAS.

Management Services directly supports the workforce by providing technical requirements, forecasting, and onboarding, along with the personnel and organizational policies that meet the needs of ATO's highly skilled workforce. AJG ensures performance stays on track by providing the framework to integrate ATO's plans, programs, and activities. AJG serves as a centralized point of contact for other FAA partners to develop strategies for implementing solutions within ATO.

**Program Management Organization (AJM):** The Program Management Organization provides full life-cycle program management capability across all of ATO from initial definition, through design, development, and effective deployment of both NAS sustainment and NextGen modernization systems.

**Flight Program Operations (AJF):** Flight Program Operations is responsible for all aspects of flight program operations, training, maintenance, safety, administration, and policy. AJF is structured around four directorates: Aircraft Operations, Aircraft Maintenance, Flight Program Safety, and Flight Program Administration.

The service unit's core business is safe flight operations in support of four primary missions.

- **Aviation Safety Training:** Provide training and currency/proficiency services to Office of Aviation Safety personnel, including aviation safety inspectors and flight test personnel.
- **Flight Inspection:** Ensure the integrity of instrument approaches and airway procedures that constitute the NAS infrastructure and the agency's international commitments, including airborne inspection of all space- and ground- based instrument flight procedures and the validation of electronic signals in space transmitted from ground navigation systems. Flight procedures and surveillance systems are evaluated for accuracy, aeronautical data, human factors flyability, and obstacle clearance. Flight Program Operations also performs inspections of Department of Defense navigational facilities.
- **Research, Development, Test & Evaluation Support:** Conduct flights directly related to research development, test, and evaluation of new electronic aids, air traffic procedures, and aircraft improvement, under established agency projects.
- **Critical Event Response/Transportation:** Provide transportation required to accomplish official FAA responsibilities in times of emergency or disaster such as hurricane response, as well as support the National Transportation Safety Board in carrying out its duties.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

Flight Program Operations operates 44 agency aircrafts at 8 facilities across the country. Flight Program Operations also has implemented a single safety management system, established standards equivalent to industry and Title 14 of the Code of Federal Regulations, and integrated all missions under the same flight control system.

**Program Increase:**

The FY 2021 President's Budget request for ATO includes additional funding for the following programmatic initiatives.

<b>Discretionary Adjustments</b>	<b>Amount (\$000)</b>	<b>FTP</b>	<b>FTE</b>
Community Noise Engagement	3,000	-	-
Cyber Security	13,000		
<b>ATO Total</b>	<b>\$16,000</b>	-	-

**Community Noise Engagement:** The FY 2021 request of \$3 million is needed to execute the Concept of Operations (CONOPS) for FAA Community Engagement training. This effort will develop and maintain engagement toolkits used to enhance the outreach for each geographic area to meet targeted, regional community needs. Instead of the tactical communications approach used to triage current issues, this will establish a strategic long-term engagement approach to mitigate noise complaints from past projects and to prepare for those anticipated from new emerging technologies (e.g., UAS, Commercial Space, etc.) in the NAS. In addition, part of the requested funding will go towards the National Environmental Policy Act and FAA Order 1050.1F, which requires the FAA to evaluate impacts on the environment from federal actions.

**Cyber Security:** The cybersecurity request will address vulnerabilities in systems, field security risk assessment, and data disposal that require funding to ensure secure and efficient air traffic control services. These activities will strengthen the air traffic network, and make it more resilient to outside threats. The Air Traffic Organization (ATO) has centralized key cybersecurity functions to ensure consistent application and implementation of cybersecurity requirements across the NAS and provide an enterprise view for cybersecurity risk management. However, within the Office of Financial Services (AFN), in the Information Technology (AIT) there is a group that oversees cybersecurity across the FAA enterprise including air traffic control and mission support enterprise systems.

This ATO Budget request includes \$13.0 million for the following:

- System Vulnerability Remediation (\$8.84 million)
- Field Security Risk Assessments (\$3.02 million)
- Optical Shredders and Media Sanitization (\$1.14 million)

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

(See also "Operations Summary" for a detailed description of the Program Increase request.)

**FY 2021 Anticipated Accomplishments:**

<b>Function/Office</b>	<b>FY 2021 Anticipated Accomplishments</b>
<b>Air Traffic Organization</b>	<ul style="list-style-type: none"><li>• Maintain and sustain core infrastructure in support of NAS operations for key automation, decision support, surveillance, and communications systems at our nation's core airports.</li><li>• Improve the safety management system to ensure the safe and efficient flow of air traffic across the NAS.</li><li>• Continue to seek cost savings in Time Division Multiplexing – Internet Protocol implementation, FAA Enterprise Network Services, and Flight Services through competition and technological innovation.</li><li>• Continue to implement NextGen technologies that drive industry benefits, including Data Communications, Terminal Flight Data Manager, Time-Based Flow Management, and SWIM.</li><li>• Continue to prepare the NAS for new entrants, including Unmanned Aircraft Systems (UAS) and Commercial Space.</li><li>• Reduce runway incursions, excursions, and other airport surface safety events through use of the Surface Safety Risk Index.</li><li>• Provide continuous NAS information to external aviation partners.</li><li>• Provide Performance-Based Navigation flight procedures and guidance in support of the FAA's transition to initial Trajectory-based Operations.</li><li>• Optimize the process for delivering possible vehicle/pedestrian deviations by moving the entire process nationally to the Comprehensive Electronic Data Analysis and Reporting platform.</li><li>• Foster an environment to improve NAS safety, operational efficiency and modernization by increasing organizational effectiveness and shared service delivery skills, broadening employee engagement, and ensuring ATO goals and strategies stay on track.</li><li>• Increase focused efforts around Air Traffic Control Specialist training, resulting in increased Certified Professional Controllers at over 313 facilities.</li></ul>

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

The ATO is committed to the American public to provide the safest aviation system in the world by preventing collisions between aircraft operating in the NAS, by providing an organized and expeditious flow of air traffic, and by providing support for National Security and Homeland Defense. The ATO relies on numerous programs to maintain the safety and efficiency of the current system.

The ATO provides strategic and tactical NAS oversight, and regulates real-time air traffic when constraints such as weather, runway closures, equipment outages, security issues or other impacting conditions affect the NAS. By developing and coordinating FAA operational metrics, system operations develop recommendations for improving NAS capacity and system efficiency to reduce delays at specific airports and in high volume corridors. The flying public benefits directly by minimizing NAS delays and congestion, which delivers an efficient and safe mode of transportation to travelers. It will also lead to efficiencies that will save fuel and provide a better flying experience to the public.

The ATO's responsibilities also include environmental assessments and policies to manage effective airspace use, and complete regulatory development for UAS operations over urban areas. This will expand the use of unmanned aircraft while deliberation on UAS rulemaking actions are completed.

The ATO creates standardization and provides synergy and efficiencies across the operations missions. The organization supports various programs and projects, and contributes to the user benefits of safety and flight efficiency to ensure the existing NAS infrastructure remains within established specifications.

The safety of American aviation is unparalleled. Since 2003, FAA has coordinated more than 135 million successful flights on commercial aircraft, transporting over 7 billion passengers safely to their destinations. This outstanding record is attributable to FAA's efforts at reducing fatal accident rates, deploying systems and procedures to reduce serious runway incursions, and conducting training programs aimed at reducing operational errors.



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Controller Workforce: FY 1992 - FY 2019 End of Year Actuals**  
(FY 2020 - FY 2021 Forecasts from the 2020 Controller Workforce Plan)

FY 1992 Actual	15,147	FY 2000 Actual	15,153	FY 2008 Actual	15,381	FY 2016 Actual	14,449
FY 1993 Actual	14,970	FY 2001 Actual	15,233	FY 2009 Actual	15,770	FY 2017 Actual	14,481
FY 1994 Actual	14,953	FY 2002 Actual	15,478	FY 2010 Actual	15,696	FY 2018 Actual	14,695
FY 1995 Actual	14,614	FY 2003 Actual	15,691	FY 2011 Actual	15,418	FY 2019 Actual	14,375
FY 1996 Actual	14,360	FY 2004 Actual	14,934	FY 2012 Actual	15,211	FY 2020 Forecast	14,095
FY 1997 Actual	14,588	FY 2005 Actual	14,540	FY 2013 Actual	14,463	FY 2021 Forecast	14,004
FY 1998 Actual	14,966	FY 2006 Actual	14,618	FY 2014 Actual	14,330		
FY 1999 Actual	15,061	FY 2007 Actual	14,874	FY 2015 Actual	14,143		

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

**Air Traffic Organization (ATO)  
(\$000)**

	Dollars (in Thousands)	FTP	OTFTP	FTE
<b>FY 2020 Enacted</b>	<b>\$7,970,734</b>	<b>29,375</b>	<b>689</b>	<b>29,401</b>
<b>Adjustments to Base</b>	<b>\$224,087</b>	-	-	-
Annualization of FY 2020 Pay Raise 3.1%	43,666	-	-	-
FY 2021 Pay Raise 1.0%	43,734	-	-	-
FY 2021 Cash Awards Increase 1.0%	7,064	-	-	-
FY 2021 FERS Increase	66,270	-	-	-
One Less Compensable Day 261	-20,108	-	-	-
Working Capital Fund	302	-	-	-
Restoration of Cuts Resulting from FY 2020 Pay Raise	83,159	-	-	-
<b>Discretionary Adjustments</b>	<b>\$16,000</b>	-	-	-
Cybersecurity	13,000	-	-	-
Community Noise Engagement 3 FTP/2 FTE	3,000	-	-	-
<b>FY 2021 Request</b>	<b>\$8,210,821</b>	<b>29,375</b>	<b>689</b>	<b>29,401</b>

**Annualization of FY 2020 Pay Raise:** This increase is required to provide for costs associated with base salary increases (October - December) resulting from the government-wide pay raise. The factor used is 0.25 of 3.1 percent.

**FY 2021 Pay Raise:** This increase is required to provide for costs associated with base salary increases resulting from the proposed government-wide pay raise of 1.0 percent.

**FY 2021 Cash Awards Increase 1.0%:** This increase is required for costs associated with an Administration proposal to increase pay for performance in FY 2021.

**FY 2021 FERS Increase:** This increase is required to provide for costs associated with the agency's contribution rates to the Federal Employees Retirement System (FERS). The agency FERS contribution increased for both Air Traffic Controllers and regular agency employees.

**One Less Compensable Day (261 days):** There are 261 Compensable days in FY 2021 vs. 262 days in FY 2020.

**Working Capital Fund:** This cost adjustment funds the Department of Transportation's Working Capital Fund estimates for the FAA.

**Restoration of Cuts Resulting from FY 2020 Pay Raise:** This adjustment to base restores one-time FY 2020 budget cuts that were necessary to absorb the FY 2020 pay raise.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Cybersecurity:** This request supports activities to enhance the cybersecurity posture of the systems that provide critical Air Traffic Control (ATC) services. Funding will address system vulnerabilities, field security risk assessments, and data disposal to strengthen the air traffic network and make it more resilient to outside threats.

**Community Noise Engagement:** This will establish a strategic long-term Community Engagement approach to mitigate noise complaints from past projects and to prepare for those anticipated from new emerging technologies (e.g., UAS, Commercial Space, etc.) in the NAS.



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for the Aviation Safety Organization (AVS)**

---

**FY 2021 - Aviation Safety Organization Budget Request  
(\$000)**

<b>Program Activity</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Salaries and Expenses	1,110,416	1,175,908	1,220,124
Program Costs	226,553	228,188	253,915
<b>Total</b>	<b>\$1,336,969</b>	<b>\$1,404,096</b>	<b>\$1,474,039</b>
<b>FTE</b>	<b>7,016</b>	<b>7,318</b>	<b>7,381</b>

**Funding details for AVS' services and offices:**

<b>Program Activity</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Flight Standards Service	861,354	907,185	930,146
Aircraft Certification Service	247,033	261,210	280,227
Office of Aerospace Medicine	68,268	72,372	74,062
Office of Rulemaking	7,233	7,865	7,994
Air Traffic Safety Oversight Service	27,561	32,581	33,286
Office of Accident Investigation and Prevention	34,178	30,718	33,945
Office of Unmanned Aircraft Systems Integration	30,776	33,614	34,607
Office of Quality, Integration and Executive Services	60,566	58,551	72,772
Organization Designation Authorization (ODA) Office	-	-	7,000
<b>Total</b>	<b>\$1,336,969</b>	<b>\$1,404,096</b>	<b>\$1,474,039</b>

**What is this program and what does this funding level support?**

---

The request allows Aviation Safety (AVS) to provide core services for certification, production approval, and continued airworthiness of aircraft as well as the certification of pilots, mechanics,

**Federal Aviation Administration**  
**FY 2021 President's Budget Submission**

---

and others in safety-related positions; continue unmanned aircraft system (UAS) integration into the National Airspace System (NAS); and maintain essential safety data reporting capabilities.

AVS is responsible for setting the safety standards for every product, person, and organization that manufactures and operates aircraft in the NAS. Through its approximately 7,300 employees, AVS provides the following services:

- Surveillance and oversight of existing certificate holders.
- Development and establishment of safety and certification standards for the civil aviation industry.
- Surveillance and oversight of air carriers, general aviation operators, repair stations, manufacturers and airmen.
- Issuance or denial of certifications.
- Ongoing and wide-ranging transformation of the NAS encompassed by NextGen.

AVS services and offices include:

**Flight Standards (AFS):** Flight Standards Service promotes safe air transportation by setting the standards, providing certification, and conducting oversight of airmen, air operators, air agencies, and designees.

**Aircraft Certification (AIR):** Aircraft Certification Service develops and administers safety standards and procedures governing the design, production and airworthiness of civil aeronautical products. Certification staff oversee design, production, and airworthiness certification programs to ensure compliance with prescribed safety standards. AIR includes approximately 1,300 employees in five Divisions and an Executive Support Staff that develop safety standards, policies, and guidance that govern the design, production, and airworthiness of aircraft, engines, and propellers. AIR also issues approvals and provides oversight of approval holders, designees, and delegated organizations.

**Aerospace Medicine (AAM):** Office of Aerospace Medicine oversees a broad range of medical programs and services for both the domestic and international aviation communities. AAM performs medical certification/qualification of airmen and other persons associated with safety in flight, inspects and oversees aviation industry drug and alcohol testing programs, manages the FAA employee substance abuse testing programs, and performs aerospace medicine and human factors research.

**Rulemaking (ARM):** Office of Rulemaking manages FAA's rulemaking program, processes, and timelines; develops proposed and final rules; manages responses to petitions for rulemaking and for exemption from regulatory requirements; and oversees rulemaking advisory committees that provide advice and recommendations on aviation-related issues.

**Air Traffic Safety Oversight (AOV):** Air Traffic Safety Oversight Service conducts independent safety oversight of the ATO's air traffic services, using risk-based, data-supported surveillance methods. Surveillance approaches include audits, inspections, investigations, compliance, and approvals, acceptances, and concurrences. Information Management Tools will be developed that will support data driven decisions in support of

**Federal Aviation Administration**  
**FY 2021 President's Budget Submission**

---

AOV's mission. AOV staff monitors local air traffic services, processes, and procedures using safety risk standards, SMS principles, and certification/credentialing programs. AOV approves the Air Traffic Organization's SMS, monitors the ATO for compliance with its approved SMS, and reviews and approves the ATO's safety implementation actions and risk management strategies.

**Accident Investigation and Prevention (AVP):** The Office of Accident Investigation and Prevention manages the NAS safety risk portfolio by investigating aviation accidents and incidents and collecting, analyzing, and sharing safety information with U.S. and international stakeholders. AVP leads the implementation and evolution of safety management at both the FAA and AVS levels, develops research planning needs, and manages the agency's National Transportation Safety Board and FAA safety recommendations programs.

**Unmanned Aircraft Systems Integration (AUS):** Office of Unmanned Aircraft Systems Integration is responsible for facilitating the safe, efficient, and timely integration of UAS into the NAS. AUS manages and coordinates international activities for UAS within FAA, aligning UAS international activities with foreign civil aviation authorities. Its functions include:

- Facilitating development of operating concepts, policies, requirements, criteria and procedures for new system evaluations, integration and implementation of emerging UAS technologies
- Overseeing all FAA UAS research and development initiatives
- Managing special programs including the UAS Integration Pilot Program (IPP), the UAS Partnership for Safety Plan (PSP) Program and UAS Test Site Program, and rulemaking efforts
- Facilitating the development and implementation of FAA's UAS Strategic Plan, and
- Advancing education and outreach to UAS stakeholders and the public to enhance operational safety and public awareness, including managing the FAA's UAS Support Center

In FY 2018, at the direction of the President of the United States and the Secretary of Transportation, AUS stood up the Unmanned Aircraft System Integration Pilot Program, creating an opportunity for state, local, and tribal governments to partner with private sector entities, such as UAS operators or manufacturers, to accelerate safe UAS integration. In FY 2021, the FAA will build upon the successes of the IPP, which will sunset on November 2020, to continue enabling complex UAS operations in the NAS.

**Quality, Integration, and Executive Services (AQS):** The Office of Quality, Integration, and Executive Services provides executive oversight and direction of consolidated management support services for all of AVS. AQS manages all phases of planning, financial management, Information Technology (IT) liaison services, and administrative activities for the immediate office of the Associate Administrator.

**Organization Designation Authorizations (ODA):** The Organization Designation Authorizations (ODA) Office will promote standardized development, implementation, and application of coordinated national ODA program policy. While the ODA program has

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

been in place since 2009, the creation of a single office supports standardized outcomes and improvements across the ODA program.

**Program Increases:**

The FY 2021 budget request for AVS includes additional funding for the following programmatic initiatives.

<b>Discretionary Adjustments</b>	<b>Amount (\$000)</b>	<b>FTP</b>	<b>FTE</b>
<b>Improving Aviation Safety Oversight:</b> Addition of 50 Technical Employees	10,000	50	50
<b>Improving Aviation Safety Oversight:</b> Improve Hiring of Employees with Technical Expertise	5,000		
<b>Improving Aviation Safety Oversight:</b> Enterprise-wide tracking system	5,000		
<b>Improving Aviation Safety Oversight:</b> 737 Safety Panel Findings	4,285	-	-
<b>Improving Aviation Safety Oversight:</b> Aviation Safety Information Analysis and Sharing (ASIAS)	3,594	-	-
<b>Improving Aviation Safety Oversight:</b> Aviation Safety Reporting Program (ASRP)	650	-	-
<b>Improving Aviation Safety Oversight:</b> Organization Designation Authorization (ODA) Office	7,000	13	13
<b>AVS Total</b>	<b>\$35,529</b>	<b>63</b>	<b>63</b>

**Improving Aviation Safety Oversight (includes 6 components):**

**1) Addition of 50 Technical Employees: \$10 million**

Request for the staffing within the Aviation Safety organization needed to operationalize the recommendations and ensure successful execution of the changes. As the specifics will not be known until a collective, de-conflicted set of recommendations is adopted, a conservative estimate of the need includes a projected increase of 236 in staffing of safety critical and safety technical positions. This request is for 50 additional hires, which are expected to be only the first phase of the larger hiring effort.



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**2) Improve Hiring of Employees with Technical Expertise: \$5 million**

Request for AVS to provide better compensation packages in order to more successfully compete in hiring employees with technical expertise.

**3) Enterprise-wide tracking system: \$5 million**

Request supports the establishment of an enterprise-wide employee tracking system to track Aviation Safety organization's employee training, qualifications, certifications and currency.

**4) 737 Safety Panel Findings: \$4.285 million**

Request for the Aviation Safety organization to implement recommendations following the 737 MAX investigations and reviews. This funding will be focused on establishing the infrastructure for the recommendations, to enable the FAA to mitigate findings and examine and implement the recommendations concerning FAA certification or delegation processes that are provided from the 737 MAX Investigation and reviews. These reviews include DOT OIG Audit of FAA Certification, DOT Special Committee to Review FAA's Aircraft Certification Process, and Joint Authorities Technical Review. Specific activities associated with agency responses to recommendations include accident investigations, corrective actions (writing and completion of Airworthiness Directives), international and domestic outreach, hotline/whistleblower investigations, training and travel.

**5) Aviation Safety Information Analysis and Sharing (ASIAS): \$3.594 million**

Request supports ASIAS 2.0. It is the only system of its type in the world, fusing together surveillance radar data, aggregate airline/proprietary digital flight data, and text-based safety reports from pilots/air traffic controllers and others, to provide enhanced analyses for the aviation community. ASIAS 2.0 allows AVS to capture a 360-degree view of an individual flight for improved directed studies and quick-look analyses, as well as analytic cells to support government/industry safety teams.

**6) Aviation Safety Reporting Program (ASRP): \$650 thousand**

Request supports the modernization and enhancement of the reporting systems that are necessary in order to make the Aviation Safety Reporting System (ASRS) appropriately accessible and integrated with other safety resources within the aviation domain.

**7) Organization Designation Authorization (ODA) Office: \$7 million**

The purpose of creating the Organization Designation Authorization (ODA) office is to provide centralized oversight and ensure the consistency of the FAA's audit functions under the ODA program across aviation safety. It will address the specific objectives of the FAA Reauthorization Act of 2018, H.R. Sec.212 Act, which relate to ODA utilization and limitations, consistent oversight, and standardized interpretation and application of the ODA program requirements. This office will provide a means to consistently implement, oversee, correct, and expand the AVS ODA program.

(See also "Operations Summary" for a detailed description of the Program Increase requests.)

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**FY 2021 Anticipated Accomplishments:**

<b>Function/Office</b>	<b>FY 2021 Anticipated Accomplishments</b>
Aviation Safety	<ul style="list-style-type: none"><li>• Develop policies, procedures, and approval processes to enable expanded UAS operations to include reducing the processing time of part 107 operational waivers.</li><li>• Conduct targeted outreach and engagement activities that inform current and potential UAS operators about safety, operational readiness, and enabling pathways.</li><li>• Leverage operational data from the UAS Integration Pilot Program to assist in the development of policy, procedures, and standards that enable more routine, complex UAS operations.</li><li>• Continuing to develop policy, procedural guidance, and certificate management programs for the emerging technologies needed to transition and operate in the NextGen environment.</li><li>• Facilitate government/industry safety teams to identify emerging system risk and to implement risk mitigation strategies utilizing the ASIAs and System Safety Management Transformation programs that provide data-driven safety analysis to reduce aviation risk in the NAS worldwide.</li><li>• Champion the evolving rulemaking efforts to modernize regulations in order to incorporate safety management principles into design and manufacturing environments.</li><li>• Implement the FAA and Industry Certification Process Guide in a consistent and sustainable manner to educate all stakeholders about needs/expectations in the certification process, reinforce that education through follow-up activities, and measure the effectiveness of application.</li><li>• Establish an organization and process Innovation Center for early engagement to facilitate the development of new standards and guidance to promote the safe and efficient adoption of emerging technology and processes for aviation applicants.</li><li>• Establish baseline and ongoing levels of confidence in foreign Civil Aviation Authorities based on equivalency/compatibility of standards, policies and procedures and technical competency of each authority.</li><li>• The Organization Designation Authorizations (ODA) Office will promote standardized development, implementation, and application of coordinated national ODA program policy. It will focus ODA oversight on high-risk areas and support appropriate expansion of the ODA program, both in scope and utilization, in consideration of the rapidly changing aviation industry.</li></ul>

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

**What benefits will be provided to the American public through this request and why is this program necessary?**

AVS will provide the American public safety and economic benefits by maintaining oversight of the NAS through data analysis techniques used for audits, surveillance, and certification of aircraft operators and production manufacturers, pilots, mechanics, and, other safety related positions. AVS will provide certification and integration services for newly designed and manufactured aviation products associated with UAS. The engineer and inspector resources will provide manufacturing and operational approvals of UAS technologies while maintaining safety oversight services within the NAS.

**Staffing Information**

	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
<b>Direct Full Time Equivalents (FTE)</b>	<b>7,016</b>	<b>7,318</b>	<b>7,381</b>
Flight Standards Service	4,938	5,121	5,139
Aircraft Certification Service	1,311	1,384	1,421
Office of Aerospace Medicine	380	410	412
Office of Rulemaking	36	40	40
Air Traffic Safety Oversight Service	131	131	130
Office of Accident Investigation and Prevention	68	80	80
Office of Unmanned Aircraft Systems Integration	80	80	80
Office of Quality, Integration & Executive Services	72	72	66
Organization Designation Authorization (ODA) Office	-	-	13
<b>Full Time Permanent Employment (FTP)</b>	<b>7,017</b>	<b>7,318</b>	<b>7,381</b>
Flight Standards Service	4,970	5,133	5,144
Aircraft Certification Service	1,293	1,384	1,421
Office of Aerospace Medicine	387	410	412
Office of Rulemaking	35	40	40
Air Traffic Safety Oversight Service	126	130	130
Office of Accident Investigation and Prevention	71	80	80
Office of Unmanned Aircraft Systems Integration	69	75	75
Office of Quality, Integration & Executive Services	66	66	66
Organization Designation Authorization (ODA) Office	-	-	13

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

**Aviation Safety Organization (AVS)  
(\$000)**

	Dollars (in Thousands)	FTP	OTFTP	FTE
<b>FY 2020 Enacted</b>	<b>\$1,404,096</b>	<b>7,318</b>	<b>31</b>	<b>7,318</b>
<b>Adjustments to Base</b>	<b>\$34,414</b>	<b>-</b>	<b>-</b>	<b>-</b>
Annualization of FY 2020 Pay Raise 3.1%	8,653	-	-	-
FY 2021 Pay Raise 1.0%	8,821	-	-	-
FY 2021 Cash Awards Increase 1.0%	2,368	-	-	-
FY 2021 FERS Increase	10,526	-	-	-
One Less Compensable Day 261	-4,143	-	-	-
Working Capital Fund	-15	-	-	-
Restoration of Cuts Resulting from FY 2020 Pay Raise	8,204	-	-	-
<b>Discretionary Adjustments</b>	<b>\$35,529</b>	<b>63</b>	<b>-</b>	<b>63</b>
Improving Aviation Safety Oversight 63 FTP/63 FTE	35,529	63	-	63
<b>FY 2021 Request</b>	<b>\$1,474,039</b>	<b>7,381</b>	<b>31</b>	<b>7,381</b>

**Annualization of FY 2020 Pay Raise:** This increase is required to provide for costs associated with base salary increases (October - December) resulting from the government-wide pay raise. The factor used is 0.25 of 3.1 percent.

**FY 2021 Pay Raise:** This increase is required to provide for costs associated with base salary increases resulting from the proposed government-wide pay raise of 1.0 percent.

**FY 2021 Cash Awards Increase 1.0%:** This increase is required for costs associated with an Administration proposal to increase pay for performance in FY 2021.

**FY 2021 FERS Increase:** This increase is required to provide for costs associated with the agency's contribution rates to the Federal Employees Retirement System (FERS). The agency FERS contribution increased for both Air Traffic Controllers and regular agency employees.

**One Less Compensable Day (261 days):** There are 261 Compensable days in FY 2021 vs. 262 days in FY 2020.

**Working Capital Fund:** This cost adjustment funds the Department of Transportation's Working Capital Fund estimates for the FAA.

**Restoration of Cuts Resulting from FY 2020 Pay Raise:** This adjustment to base restores one-time FY 2020 budget cuts that were necessary to absorb the FY 2020 pay raise.

**Improving Aviation Safety Oversight:** Funding to improve the FAA's safety oversight. The funding will enable the FAA to hire employees with aviation safety technical expertise and

**Federal Aviation Administration**  
**FY 2021 President's Budget Submission**

---

address any recommendations identified through the 737 MAX Investigation and reviews. Funding for Aviation Safety Information will provide a central investigation repository and allow the FAA to meet standard reporting requirements and promptly and consistently reply to congressional and Office of the Inspector General (OIG) inquiries as well as process and report on data as it pertains to whistleblower notifications. This request supports a new Organization Designation Authorization (ODA) Office which will provide oversight and ensure the consistency of the FAA's audit functions under the ODA program across AVS.

**Federal Aviation Administration**  
**FY 2021 President's Budget Submission**

---

(This page intentionally left blank)



**Federal Aviation Administration**  
**FY 2021 President's Budget Submission**

---

**Detailed Justification for the Office of Commercial Space (AST)**

---

**FY 2021 – Office of Commercial Space Transportation Budget Request  
(\$000)**

<b>Program Activity</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Salaries and Expenses	17,188	18,949	20,446
Program Costs	7,761	7,091	7,109
<b>Total</b>	<b>\$24,949</b>	<b>\$26,040</b>	<b>\$27,555</b>
<b>FTE</b>	<b>97</b>	<b>110</b>	<b>115</b>

**What is this program and what does this funding level support?**

---

The Commercial Space Launch Act authorized the Department of Transportation (DOT) to license and monitor the safety of commercial space launches and to promote the industry. Executive Order 12465 designated DOT as the lead Federal agency for enabling private-sector launch capability. The Office of Commercial Space Transportation (AST) was originally within the Office of the Secretary of Transportation. AST was transferred to the FAA in 1995.

AST's mission is to ensure protection of the public, property, and the national security and foreign policy interests of the United States during commercial launch or reentry activities, and to encourage, facilitate, and promote U.S. commercial space transportation. Recent years have witnessed dramatic growth in both the number of commercial space transportation companies and operations. From FY 2017-FY 2018 alone, AST witnessed a 60 percent increase in launch activities. In addition, both the National Space Policy of 2010 and the National Space Transportation Policy of 2013 reflect a greater reliance by the Federal Government on the commercial space industry to accomplish national objectives. As a result, AST continues to see significant increases in the activities required to achieve its mission.

In FY 2018, AST developed a proposal to streamline launch and re-entry licensing requirements, that would fundamentally change how the FAA licenses launches and reentries in 14 CFR Chapter III. This action would primarily consolidate and revise parts 415, 417, 431, and 435 into a single regulatory part that states safety objectives to be achieved for the launch of suborbital and orbital expendable and reusable launch vehicles, and the reentry of reentry vehicles. This streamlining effort, which is ongoing, will transform the Commercial Space Transportation launch and reentry process to a performance based, single license regime for all types of launch and re-entry vehicle operations. Additionally, this effort will significantly simplify licensing of launch and reentry operations and assist the Office of Commercial Space



**Federal Aviation Administration**  
**FY 2021 President's Budget Submission**

---

Transportation in keeping up with the demands of a rapidly growing commercial space industry.

The streamlining effort will be accompanied by a body of Advisory Circulars or standards that collectively provide at least one acceptable means of compliance for all performance-based regulations in the new and revised part. This action would also enable flexible timeframes, remove unnecessary ground safety regulations, redefine when launch begins to allow specified pre-flight operations prior to license approval, and allow applicants to seek a license to launch from multiple sites.

AST accomplishes its safety mission through the execution of its licensing, permitting, and safety inspection functions. Key focus areas include:

- **Safety oversight:** AST primarily through on-site inspections ensures license and permit holders adhere to regulatory requirements. At least one inspection of launch operations is required at time of flight, but inspection also encompasses sending safety inspectors to launch and reentry operations to ensure an operator's compliance with regulations and the representations made in its application. Additionally, key activities, including dress rehearsals and the testing and installation of flight termination systems, are also inspected. Additionally, each year, AST conducts inspections of all licensed launch sites.
- **License and Permits:** AST has 180 days to evaluate a license application or 120 days to evaluate a permit application. These evaluations are complex in nature, and require an in-depth safety evaluation, which also includes a policy review, interagency review, and a computation of maximum probable loss for determining an applicant's financial responsibility.
- **Pre-application Consultation:** AST conducts pre-application consultation with every company or entity that approaches the FAA for a license or permit. This consultation process can last months or even years, as it serves to educate these proponents on the applicable regulations and assist them in identifying potential issues as they develop and shape their plans. Currently, there are eight launch sites in pre-application consultation with AST.
- **Spaceports:** AST is responsible for licensing the following operation of launch sites or "spaceports":
  - California Spaceport at Vandenberg Air Force Base, California
  - Spaceport Florida at Cape Canaveral Air Force Station, Florida
  - Mid-Atlantic Regional Spaceport at Wallops Flight Facility, Virginia
  - Mojave Air and Space Port, California
  - Kodiak Launch Complex on Kodiak Island, Alaska
  - Oklahoma Spaceport in Burns Flat, Oklahoma
  - Spaceport America near Las Cruces, New Mexico
  - Cecil Field in Jacksonville, Florida
  - Houston Airport System Spaceport at Ellington Airport, Texas
  - Midland International Airport in Midland, Texas
  - Colorado Air and Spaceport in Watkins, Colorado

**Federal Aviation Administration**  
**FY 2021 President's Budget Submission**

---

**Program Increases:**

The FY 2021 budget request for AST includes additional funding for the following programmatic initiatives.

Discretionary Adjustments	Amount (\$000)	FTP	FTE
AST Staffing	685	9	5
<b>AST Total</b>	<b>\$685</b>	<b>9</b>	<b>5</b>

**AST Staffing:** The \$685,000 increase will allow for operational and mission support staff, which is required to keep pace with a rapidly increasing demand for AST products and services and to support the safe and efficient space launch and reentry integration into the NAS.

(See also “Operations Summary” for a detailed description of the Program Increase request.)

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

Since AST's transfer to the FAA in 1995, through May 2019, the Office has licensed or permitted 377 commercial space launches and reentries. The continued rapid pace of growth in commercial space transportation brings challenges beyond increasing launch rates. New types of space vehicles, such as balloons and a variety of winged launch and reentry vehicles, increase the complexity of licensing and operations, as do new ventures like small-satellites, cube-satellites, and commercial orbital servicing and commercial space stations, as well as the dawn of commercial human spaceflight operations.

Additionally, the National Aeronautics and Space Administration is increasingly relying on the commercial sector to provide cargo services for the International Space Station, and someday, astronauts and spaceflight participants. Finally, with the unanimous recommendation and support of the National Space Council, the current administration signed the \*<sup>1</sup>WHITE House National Space Policy Directive 1.

This Directive provides for an integrated government-led program, working with private sector partners, for a return to the Moon, and possibly follow-on missions to Mars. The Office of Commercial Space Transportation will play a vital role in assuring the successful

---

<sup>1</sup> Footnote: Presidential Memorandum on Reinvigorating America's Human Space Exploration Program, Issued Dec 11, 2017; <https://www.whitehouse.gov/presidential-actions/presidential-memorandum-reinvigorating-americas-human-space-exploration-program/>

**Federal Aviation Administration**  
**FY 2021 President's Budget Submission**

---

implementation of such a directive.

There also continues to be a growing need to ensure the safe integration of space and air traffic, both domestically and internationally. Recognizing these needs, the FAA is developing and implementing a strategy to ensure the efficient integration of commercial space into the NAS. This work is being performed in partnership with the Air Traffic Organization and other FAA organizations. This request will allow AST to keep pace with the rapidly increasing tempo of commercial space operations anticipated in the next few years and effectively evaluate complex vehicles, systems, and operations.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

**Office of Commercial Space Transportation  
(\$000)**

	Dollars (in Thousands)	FTP	OTFTP	FTE
<b>FY 2020 Enacted</b>	<b>\$26,040</b>	<b>108</b>	<b>1</b>	<b>110</b>
<b>Adjustments to Base</b>	<b>\$830</b>	-	-	-
Annualization of FY 2020 Pay Raise 3.1%	133	-	-	-
FY 2021 Pay Raise 1.0%	141	-	-	-
FY 2021 Cash Awards Increase 1.0%	31	-	-	-
FY 2021 FERS Increase	176	-	-	-
One Less Compensable Day 261	-66	-	-	-
Restoration of Cuts Resulting from FY 2020 Pay Raise	415	-	-	-
<b>Discretionary Adjustments</b>	<b>\$685</b>	<b>9</b>	-	<b>5</b>
AST Staffing 9 FTP/5 FTE	685	9	-	5
<b>FY 2021 Request</b>	<b>\$27,555</b>	<b>117</b>	<b>1</b>	<b>115</b>

**Annualization of FY 2020 Pay Raise:** This increase is required to provide for costs associated with base salary increases (October - December) resulting from the government-wide pay raise. The factor used is 0.25 of 3.1 percent.

**FY 2021 Pay Raise:** This increase is required to provide for costs associated with base salary increases resulting from the proposed government-wide pay raise of 1.0 percent.

**FY 2021 Cash Awards Increase 1.0%:** This increase is required for costs associated with an Administration proposal to increase pay for performance in FY 2021.

**FY 2021 FERS Increase:** This increase is required to provide for costs associated with the agency's contribution rates to the Federal Employees Retirement System (FERS). The agency FERS contribution increased for both Air Traffic Controllers and regular agency employees.

**One Less Compensable Day (261 days):** There are 261 Compensable days in FY 2021 vs. 262 days in FY 2020.

**Restoration of Cuts Resulting from FY 2020 Pay Raise:** This adjustment to base restores one-time FY 2020 budget cuts that were necessary to absorb the FY 2020 pay raise.

**AST Staffing:** Additional operational and mission support staff is required to keep pace with a rapidly increasing demand for AST products and services and to support the safe and efficient space launch and reentry integration into the NAS.

**Federal Aviation Administration**  
**FY 2021 President's Budget Submission**

---

(This page intentionally left blank)



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for the Office of Finance and Management (AFN)**

---

**FY 2021 – Office of Finance and Management – Budget Request  
(\$000)**

<b>Program Activity</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Salaries and Expenses	254,314	241,039	253,101
Program Costs	562,084	559,404	583,040
<b>Total</b>	<b>\$816,398</b>	<b>800,443</b>	<b>\$836,141</b>
<b>FTE</b>	<b>1,519</b>	<b>1,459</b>	<b>1,459</b>

**What is this program and what does this funding level support?**

---

The Office of Finance and Management (AFN) is the FAA's shared services operating entity responsible for providing and streamlining the agency's common business services through a consolidated, integrated approach. AFN oversees the delivery of financial operations, acquisition services, information technology, property management, and technical training to internal and external customers across the agency.

AFN manages the FAA's enacted budget and plans for future budget requirements, handles more than 27,000 contract actions for more than \$4.5 billion in goods and services annually, and supports some 56,000- technology users. AFN leads the FAA's efforts to identify cost savings, leverage technology, and optimize resources in order to position the agency to achieve the aviation safety mission while maintaining the flexibility to accommodate changing requirements in the most effective and efficient manner.

Each year, AFN averts cyber incidents by detecting and prioritizing over 100 million cyber alerts for the National Airspace System (NAS) and non-NAS systems throughout the FAA and the DOT and provides critical crisis response capability for all cyber incidents.

In addition, AFN manages leases and real property assets that house 21,600 personnel in approximately 7.4 million square feet of office space and provides management and oversight for over \$7 billion in personal property assets.

AFN's four service organizations include:

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Financial Services (ABA)**

The Office of Financial Services enables the FAA to meet its aviation safety mission by formulating, justifying, executing, and managing budgets for each of the agency's lines of business and staff offices. ABA ensures that funding is available to meet each organization's mission essential needs and ensures that critical Aviation Safety, Air Traffic, and NextGen personnel, programs, and initiatives are top priority in assuring the uninterrupted and improved efficiency and safety of the NAS. ABA serves as the agency's Chief Financial Officer, leads the FAA in identifying cost savings, providing responsible financial management of budget appropriations, and managing the agency's workforce planning.

ABA manages three core services:

**Budget and Programming** ensures the agency identifies and defines budgetary needs and uses funds and other resources effectively while incorporating performance and budget plans to meet agency goals. This organization tracks the status of major projects, while monitoring agency spending, to ensure compliance with appropriations and federal laws. It also serves as the liaison to Congress for funding and appropriation matters.

**Financial Management** develops and maintains corporate FAA-wide management systems and manages the capitalization of FAA's NAS and other capital assets. The agency also implements accounting and financial management policy for the agency and assures the adequacy of internal controls for compliance with laws, regulations, and policies.

**Financial Analysis** facilitates the agency's cost reductions effort and implements cost control initiatives; develops agency policy and oversees financial guidance and advisory services for agency contracts; ensures business decisions are sound by analyzing the financial impact of proposed agency labor contracts; develops agency policy for spending and authorization controls; and develops the controller and aviation safety workforce plans.

**ABA FY 2021 Anticipated Accomplishments:**

Function	FY 2021 Anticipated Accomplishments
<b>Budget and Programming</b>	<ul style="list-style-type: none"><li>▪ Ensure that required funding needs for agency programs are available through effective resource oversight.</li><li>▪ Ensure agency funds and resources are utilized effectively and that FAA maintains compliance with the Anti-Deficiency Act.</li></ul>



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

<b>Function</b>	<b>FY 2021 Anticipated Accomplishments</b>
<b>Financial Management</b>	<ul style="list-style-type: none"> <li>▪ Lead the agency on all accounting operations and provide financial oversight and information to assist FAA organizations with making business decisions.</li> <li>▪ Ensure an unmodified audit opinion on agency FY 2021 financial statements.</li> </ul>
<b>Financial Analysis</b>	<ul style="list-style-type: none"> <li>▪ Employ business case discipline to any cost/contract reviews for large investments as the agency investment analysis process stewards.</li> </ul>

**Acquisitions and Business Services (ACQ)**

ACQ provides contracting expertise, acquisition lifecycle support, and property management that enables the FAA to achieve its aviation safety mission by procuring goods and services that leverage emerging technologies and industry best practices. Procurements are negotiated at best value providing significant cost savings. In FY 2019, ACQ contracted for more than \$4.5 billion in goods and services and generated \$32 million in cost savings through its SAVES program.

ACQ develops the FAA's Acquisition Workforce Profile, which serves as the FAA's blueprint for developing and sustaining a high-performing acquisition workforce consisting of critical positions. This includes Contracting Officers/Specialists, Real Estate Contracting Officers, Program/Project Managers, Contracting Officer Representatives, Researchers, Engineers/System Engineers, Test and Evaluation Specialists, Financial Specialists, and other professionals providing specialized support. ACQ maintains the competency models for core acquisition disciplines.

ACQ manages certification programs that provide acquisition professionals opportunities throughout the acquisition lifecycle to achieve and maintain professional development and certifications. Because of the commitment to maintaining a strong framework for the agency's acquisition workforce, ACQ is consistently one of the top performers among its peer group and across the government.

ACQ oversees and manages real and personal property for the agency. Real property includes management of administrative space at FAA Headquarters and other facilities in the National Capital Region; the space needs of more than 28,700 personnel from every FAA line of business and staff office housed in over 7.4 million square feet of leased FAA properties across the NAS.

ACQ manages five core services:

**Procurement:** ACQ advises, plans, negotiates and awards FAA organizations' cost-effective, best value contracts, purchase orders, delivery orders, agreements, and aviation research grants for FAA headquarters, William J. Hughes Technical Center, Mike

**Federal Aviation Administration**  
**FY 2021 President's Budget Submission**

---

Monroney Aeronautical Center (MMAC), and the Service Areas.

**Acquisition Workforce Planning and Development:** ACQ updates the FAA's Acquisition Workforce Profile and provides a comprehensive program of career development guidance and competency-based training and certification programs for acquisition personnel.

**Acquisition Policy and Oversight:** ACQ develops and maintains agency-wide lifecycle acquisition policy, guidance, and tools that comprise and support the FAA's Acquisition Management System (AMS). ACQ also analyzes acquisition data to formulate trends and traceable metrics that identify areas for improvement to leverage government-leading practices, recommends improvements regarding agency policies and processes based on lessons learned, potential deficiencies, and best practices.

**Real Property Management:** ACQ maintains the agency-wide inventory of real property and the data and performance measures associated with more than 51,900 buildings, structures, and land parcels which include administrative offices, structures, and land leases for National Airspace System operational sites. ACQ oversees administrative space leases within each of the regions and field facilities for the agency's Aviation Safety (AVS) and Security and Hazardous Materials Safety (ASH) organizations. In addition, the agency is exercising its independent leasing authority in planning future administrative space leases.

**Personal Property Management and Oversight:** ACQ provides support in leading and integrating logistics initiatives within the FAA and DOT. As part of ACQ's personal property responsibilities, ACQ establishes and oversees the agency's property management system for the management and physical control of over 254,700 assets valued at \$9 billion in global agency assets throughout the NAS and international facilities. Types of agency assets include IT and NAS equipment, phones/communications radios, test equipment, and FAA owned vehicles.

**ACQ Adjustments to Base:**

<b>Programs</b>	<b>Amount (\$000)</b>	<b>FTP</b>	<b>FTE</b>
Regional Projects and Facility Optimization	\$25,464	-	-
<b>Total</b>	<b>\$25,464</b>	<b>-</b>	<b>-</b>

**Regional Projects and Facility Optimization:** FAA has four regional offices with leases that will expire in FY 2020 and FY 2021: Great Lakes Regional Office in Des Plaines, Illinois; Central Regional Office in Kansas City, Missouri; Eastern Regional Office in Jamaica, New York, and the New England Regional Office in Burlington, Massachusetts. The budget requests a total of \$25.464 million to cover the cost for replacement leases for these facilities. The amount requested will fund various project and facility efforts such as, but not limited to; construction, tenant improvements, building specific amortized capital

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

(BSAC), architecture and engineering (A&E), IT, safety, security, and furniture requirements as it relates to regional optimization. The new leases will allow FAA to reduce its footprint consistent with the \*<sup>1</sup>Office of Management and Budget "Freeze the Footprint" and \*<sup>2</sup>Public Buildings Savings and Reform Act initiatives.

**ACQ FY 2021 Anticipated Accomplishments:**

<b>Function</b>	<b>FY 2021 Anticipated Accomplishments</b>
<b>Procurement Actions</b>	<ul style="list-style-type: none"><li>▪ Ensure contractor performance is in accordance with contract terms and conditions, issue contract modifications, and monitor contract deliverables.</li><li>▪ Develop and implement best practices in acquisition to deliver best value for the taxpayer and increase efficiency and effectiveness of procurement methods.</li><li>▪ Conduct internal and external small business outreach/training and target at least 25 percent of total direct procurement dollars as Small Business awards.</li></ul>
<b>Acquisition Training and Certification</b>	<ul style="list-style-type: none"><li>▪ Manage training and certification programs for acquisition personnel, including program/project managers, contracting officers/specialists, contracting officer's representatives, systems engineers, test and evaluation specialists, and logistics specialist.</li></ul>

---

<sup>1</sup> Footnote: OMB Memorandum No. 2015-01 issued the Reduce The Footprint (RTF) policy. The [RTF](#) policy requires the Chief Financial Officers (CFO) Act agencies to submit annual Real Property Efficiency Plans (Plan) to OMB that:

(1) set annual square foot (SF) reduction targets for federal domestic buildings over a rolling five-year period;

(2) adopt an office space design standard to optimize federal domestic office space usage; and,

(3) maintain agencies' office and warehouse portfolios below their fiscal year (FY) 2015 RTF baselines. Under the RTF policy, OMB has established government-wide policy to use property as efficiently as possible and to reduce agency portfolios through annual reduction targets. The policy is an impetus for real property management transformation that will provide value to the taxpayer.

<sup>2</sup> Footnote: H.R. 4487 – Public Buildings Reform and Savings Act of 2016 - (Sec. 2) This bill: (1) directs the General Services Administration (GSA) to establish and conduct a pilot program through 2021 to execute lease agreements using alternative procedures to reduce costs of leased space and significantly reduce or eliminate the backlog of expiring leases over the next five years, and (2) authorizes the GSA to submit consolidated prospectuses for leases and projects to Congress for approval. (See also sections 3-6, 8-17.)

**Federal Aviation Administration  
FY 2021 President’s Budget Submission**

<b>Acquisition Oversight</b>	<ul style="list-style-type: none"> <li>Manage audits of cost reimbursable, time &amp; material, and labor hour contracts with an estimated value of \$100 million or more and perform audits for at least 15 percent of these contracts with estimated values below \$100 million.</li> <li>Conduct Integrated Baseline Reviews on investment programs along with validations of contractor Earned Value Management Systems.</li> <li>Conduct investment program post-implementation reviews.</li> </ul>
<b>Real Estate Management</b>	<ul style="list-style-type: none"> <li>Complete 95 percent of the annual real property inventory target and report to DOT.</li> <li>Achieve 69,000 square feet space reduction goal across FAA administrative space as part of OMB’s “Reduce the Footprint” initiative.</li> </ul>
<b>Personal Property Management</b>	<ul style="list-style-type: none"> <li>Enhance management performance targets that measure adequacy of property management policies and procedures, staffing and training, performance review and improvement program.</li> <li>Implement performance targets that measure the quality and effectiveness of property management activities, staff productivity, and adequacy of checks and balances.</li> <li>Optimize the agency fleet size by reducing the number of FAA’s underutilized administrative Fleet Vehicles.</li> <li>Improve and sustain personal property asset visibility, accountability, and management.</li> </ul>

**Information and Technology Services (AIT)**

As the agency’s information and technology backbone, AIT enables the FAA to achieve its aviation safety mission by providing and overseeing all aspects of the agency’s IT enterprise, allowing all lines of business and staff offices, including Air Traffic Organization (ATO) and AVS, to seamlessly connect, interact, and respond to customers, stakeholders, colleagues, and resources. AIT keeps the FAA’s network safe from cyber threats, maintains a comprehensive cyber threat intelligence analysis capability, and supports innovative technology and tools to prevent attacks while continuing the agency on a path of increased efficiency and innovation.

AIT is responsible for providing comprehensive IT services to 55,500 technology users (45,100 employees and 10,400 contractors) across the FAA.

AIT maintains a current inventory of over 300 Federal Information Security Management Act (FISMA) reportable systems, of which 64 are marked as mission critical. Public facing

**Federal Aviation Administration**  
**FY 2021 President's Budget Submission**

---

systems such as \*<sup>3</sup>FAADroneZone, Low Level Authorization and Notification, and \*FAA.Gov are developed and maintained by AIT to ensure ease of access and transparency for our public users. AIT's Federal Identity, Credential, and Access Management (FICAM) program continues to support millions of internal and public users to ensure content accuracy and security.

AIT manages three core services:

**Shared Services and Modernization:** AIT delivers effective customer-driven solutions to enhance and modernize core services that meet mandates and initiatives. AIT capitalizes on cloud capabilities by leveraging investments in application assets, and migrating or modernizing legacy systems to provide the risk management, security and financial benefits of the cloud. AIT supports all FAA devices, IT infrastructure components, and specialized software applications.

**Cybersecurity:** The FAA is committed to advancing its cybersecurity capabilities to ensure the confidentiality, integrity, and protection of its information, information systems, and mission from evolving cyber threats. This entails collecting intelligence in a timely manner to enable a more informed threat and defense capability, as well as strengthening the synergy between the three FAA operating domains: NAS, Research and Development, and Mission Support. AIT oversees cybersecurity across the FAA enterprise including air traffic control and mission support enterprise systems. The Air Traffic Organization has centralized key cybersecurity functions to ensure consistent application and implementation of cybersecurity requirements across the NAS and provide an enterprise view for cybersecurity risk management. The Department of Homeland Security Continuous Diagnostics and Mitigation program is a dynamic approach to fortify the cybersecurity of FAA networks and systems and provides the capabilities and tools that identify cybersecurity risks on an ongoing basis, prioritize these risks based upon potential impacts, and enable cybersecurity personnel to mitigate the most significant problems first. The FAA utilizes the Cyber Security Assessment and Management tool to document, manage, and report on the status of security risks associated with Federal and National Institute of Standards and Technology IT security control standards and policies.

**Enterprise Information Management (EIM):** The EIM Capability is a modern cloud-based scalable enterprise platform that provides common information management capabilities and services across the FAA and eliminates the need to acquire and sustain dedicated and redundant information management capabilities for individual systems. EIM creates an environment that enables the integration and development of diverse operational systems and unique applications by providing a common framework for data, application re-use, and agency-wide collaboration.

---

<sup>3</sup> Reference the following links: <https://faadronezone.faa.gov/> or <https://www.faa.gov/>

**Federal Aviation Administration**  
**FY 2021 President's Budget Submission**

---

**AIT FY 2021 Anticipated Accomplishments:**

<b>Function</b>	<b>FY 2021 Anticipated Accomplishments</b>
<b>Shared Services and Modernization:</b> <i>Optimize Information Access through Technology Innovation</i>	<ul style="list-style-type: none"><li>▪ Maximize the capabilities of the Integrated Service Center to provide improved services to FAA stakeholders.</li><li>▪ Maximize employee efficiencies by implementing process improvements in core services, including onboarding, off boarding, and helpdesk services.</li><li>▪ Complete the implementation of the Technology Business Management framework in the FAA, to support the transparency of IT spending.</li><li>▪ Expand the insight into IT metrics to drive informed IT decisions on cost, quality, and value.</li><li>▪ Modernize and reduce the FAA printer inventory, optimizing employee engagement and utilization of printers to maximize efficiencies.</li><li>▪ Develop the capability to migrate Federal Information Security Management Act (FISMA) applications to the Cloud.</li></ul>
<b>Cybersecurity: IT Risk Management &amp; Information Systems Security</b>	<ul style="list-style-type: none"><li>▪ Implement the Security Operations Center hunting methodologies to improve the agency's detection and response capabilities against advanced persistent threat.</li><li>▪ Expand Continuous Diagnostics and Mitigation capabilities to prioritize critical cyber risks, and lower operational risk and exploitation of systems and networks.</li><li>▪ Implement hiring, retention and training strategies for the agency's cybersecurity workforce.</li><li>▪ Utilize automation capabilities within the Cyber Security Assessment and Management tool to conduct security assessments.</li><li>▪ Conduct incident response exercises, both domestically and internationally, to identify process gaps and coordinate remediation activities.</li></ul>

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Function	FY 2021 Anticipated Accomplishments
<b>Enterprise Information Management:</b> <i>Enable FAA's Employees to Work Smarter, Resource Optimization</i>	<ul style="list-style-type: none"> <li>▪ Enable advanced geospatial capabilities to manage and exploit the growing volume and variety of Geographic Information Systems data.</li> <li>▪ Integrate and enable intelligent computing engines to provide insights and optimization of responses on voluminous FAA data.</li> <li>▪ Integrate technologies and services to support and enable business algorithms and systems to build and deploy computer capabilities that automatically learn and improve from experience, without being explicitly programmed.</li> <li>▪ Provide modern voice technologies to support and enable FAA business systems to use cloud computing to break audio into text that computers can instantly utilize.</li> </ul>

**Mike Monroney Aeronautical Center (MMAC or AMC)**

The Aeronautical Center, located in Oklahoma City, is home to the largest number of FAA employees located outside the Washington, D.C. area, with over 6,300 employees, students, and contractors from every line of business within the FAA. In addition, the Center hosts approximately 11,000 visitors annually. The Center is comprised of 134 buildings with over 3.3 million square feet of space and is located on 1,057 acres. AMC's Office of Facility Management provides facility oversight, operations, architecture and engineering design, construction, space management, maintenance, environmental and safety support for the entire Center. Tenants supported by AMC at the Aeronautical Center include the Civil Aerospace Medical Institute, the FAA Logistics Center, Flight Program Operations, Aeronautical Information Services, National Airway Systems Engineering Division, Transportation Safety Institute, and a variety of staff support offices.

There are three core services provided by AFN at the Center include Technical Training, Financial Management Services, and Information Technology Services.

**Technical Training:** The FAA Academy (AMA) plays a crucial role in keeping FAA's technical workforce skilled and proficient at their jobs by providing management, oversight, and delivery of technical training to over 50,000 employees annually through in-resident and distance learning platforms. AMA annually provides in-resident training to over 16,000 air traffic controllers, NAS Technicians, and aviation safety inspectors. AMA also provides international aviation safety training and is actively engaged in expanding FAA's role and influence of international aviation safety through participation with the International Civil Aviation Organization.

**Financial Management Services:** The Enterprise Services Center (ESC) is an OMB designated Financial Management Center of Excellence and Shared Services Provider. ESC provides financial management services to over 25 federal agencies including all DOT modes of operation and several other federal agencies utilizing an automated financial system. ESC annually processes approximately 200,000 travel vouchers, 40,000



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

receipts and 45,000 invoices across DOT.

**Information Technology Services:** ESC is one of only six federally designated Information Systems Security (ISS) shared service providers. As an ISS shared services provider they provide independent and operational security services to assist over 40 federal customers with achieving FISMA compliance. ESC also provides oversight and management of a National Wireless Program providing best in government life-cycle management for cellular and satellite devices.

The program provides over 20,000 wireless devices to federal agencies which results in an estimated annual savings of over \$2.2 million. In addition, ESC also provides data center services, which includes management of security-certified hosted servers known as the Systems Management Facility (SMF). The SMF is one of four authorized Federal Aviation Administration Enterprise Data Centers and provides hosting services to over 35 federal agencies.

AMC also serves as the Franchise Fund Director and has oversight and responsibility for the FAA's Franchise Fund activities, managing over 2,000 customer service agreements worth \$480 million. The Franchise Fund includes the FAA Logistics Center, Enterprise Services Center, FAA Academy International Training Division, FAA Learning & Leadership Institute, Flight Inspection Aircraft Maintenance, and Aeronautical Center Franchise Acquisition Services Branch. The Franchise law allows these organizations to provide shared services to other federal agencies and leverage resources, which reduces overall cost to the federal government.

**AMC FY 2021 Anticipated Accomplishments:**

<b>Function</b>	<b>FY 2021 Anticipated Accomplishments</b>
<b>FAA Academy and Air Traffic Control Training</b>	<ul style="list-style-type: none"><li>▪ Ensure the FAA's workforce of the future is equipped with the technical skills necessary to maintain and operate the NAS.</li></ul>
<b>Facilities</b>	<ul style="list-style-type: none"><li>▪ Reduce energy intensity by 2.5 percent annually through the end of FY 2025 to meet goals in FAA Order 1053.1C Energy and Water Management for FAA Buildings and Facilities as compared to FY 2015 baseline.</li></ul>
<b>Information Technology / Financial Services at AMC</b>	<ul style="list-style-type: none"><li>▪ Maintain 99.5 percent availability for IT systems as defined in customer agreements detailing specific commitments.</li><li>▪ Improve service provision through timely mitigation of audit findings focusing on strengthening processes and closing process gaps.</li></ul>



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

<b>Function</b>	<b>FY 2021 Anticipated Accomplishments</b>
<b>Franchise Fund Director</b>	<ul style="list-style-type: none"><li>▪ Manage over 2,000 active agreements worth \$480 million of activity across FAA and other Federal agencies. These agreements are a part of the Franchise Fund activities, which include six franchise services lines.</li></ul>

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

AFN's shared services approach to delivering the agency's common finance, acquisitions, information technology, property, technical training, and regional integration services promotes financial integrity, IT infrastructure security, continuous improvement, and streamlined products and services to support the FAA's vital aviation safety mission. AFN's integrated delivery model also focuses on reducing costs across the agency, saving taxpayer dollars while providing benefit to all customers and stakeholders.

Each AFN service area works to move the agency forward by streamlining processes previously handled at the line of business or staff office level. IT support for systems, efficient, adequate space to house staff, a procurement group that can acquire needed materials and services, and a strong financial engine are critical to support the daily air traffic control work in ATO and safety inspections in AVS. AFN continues to find new and innovative ways to lessen the administrative burden on the agency's employees, allowing them to effectively meet their individual responsibilities to support the safety of the NAS.

The requested funding for FY 2021 will support all of FAA's 14 lines of businesses and staff offices and key initiatives that include:

- Overseeing the FAA's annual budget and operating financial, cost accounting, and procurement systems;
- Ensuring efficient operations of backup command, control, and communications centers for the NAS;
- Protecting and updating the agency's IT infrastructure;
- Competing, negotiating, awarding, and managing more than \$4 billion in key contracts that support critical programs and projects including NextGen;
- Training more than 16,000 resident students in safety-related occupations annually to keep the NAS operating at optimal capacity and efficiency at any given time;
- Maintaining 270,000 property and equipment assets.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

**Office of Finance and Management (AFN)  
(\$000)**

	Dollars (in Thousands)	FTP	OTFTP	FTE
<b>FY 2020 Enacted</b>	<b>\$800,443</b>	<b>1,483</b>	<b>17</b>	<b>1,459</b>
<b>Adjustments to Base</b>	<b>\$35,698</b>	-	-	-
Annualization of FY 2020 Pay Raise 3.1%	2,036	-	-	-
FY 2021 Pay Raise 1.0%	1,810	-	-	-
FY 2021 Cash Awards Increase 1.0%	619	-	-	-
FY 2021 FERS Increase	2,388	-	-	-
One Less Compensable Day 261	-939	-	-	-
Working Capital Fund	-1,828	-	-	-
Regional Projects and Facility Optimization	25,464	-	-	-
Restoration of Cuts Resulting from FY 2020 Pay Raise	6,148	-	-	-
<b>FY 2021 Request</b>	<b>\$836,141</b>	<b>1,483</b>	<b>17</b>	<b>1,459</b>

\*<sup>4</sup>Footnote: FY 2020 Enacted includes (see below)

**Annualization of FY 2020 Pay Raise:** This increase is required to provide for costs associated with base salary increases (October - December) resulting from the government-wide pay raise. The factor used is 0.25 of 3.1 percent.

**FY 2021 Pay Raise:** This increase is required to provide for costs associated with base salary increases resulting from the proposed government-wide pay raise of 1.0 percent.

**FY 2021 Cash Awards Increase 1.0%:** This increase is required for costs associated with an Administration proposal to increase pay for performance in FY 2021.

**FY 2021 FERS Increase:** This increase is required to provide for costs associated with the agency's contribution rates to the Federal Employees Retirement System (FERS). The agency FERS contribution increased for both Air Traffic Controllers and regular agency employees.

**One Less Compensable Day (261 days):** There are 261 Compensable days in FY 2021 vs. 262 days in FY 2020.

**Working Capital Fund:** This cost adjustment funds the Department of Transportation's Working Capital Fund estimates for the FAA.

<sup>4</sup> Staffing Reassignment (AFN to AAE): The FY 2021 President's Budget Submission includes the FY 2020 transfer of 1FTP/1FTE with \$203,000 in funding from the Office of Finance and Management (AFN) to the Office of Audit and Evaluation (AAE).

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Regional Projects and Facility Optimization:** FAA has several regional offices whose leases will expire in FY 2020 and FY 2021. The request covers the cost for replacement leases for these facilities as well as build-out, security, and moving costs.

**Restoration of Cuts Resulting from FY 2020 Pay Raise:** This adjustment to base restores one-time FY 2020 budget cuts that were necessary to absorb the FY 2020 pay raise.

(This page intentionally left blank)



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for NextGen and Operations Planning (ANG)**

---

**FY 2021 – NextGen and Operations Planning – Budget Request  
(\$000)**

<b>Program Activity</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Salaries and Expenses	28,570	29,972	31,296
Program Costs	32,688	31,566	31,566
<b>Total</b>	<b>\$61,258</b>	<b>\$61,538</b>	<b>\$62,862</b>
<b>FTE</b>	<b>174</b>	<b>186</b>	<b>186</b>

**What is this program and what does this funding level support?**

---

The William J. Hughes Technical Center (WJHTC) is FAA's national scientific test base for the research, development, test, and evaluation of air transportation systems. The research, testing and prototype development conducted by WJHTC staff helps shape the future of our Nation's air transportation system.

ANG maintains facilities and support services for all properties at WJHTC including land, buildings and infrastructure. The WJHTC owns and operates approximately 1.6 million square feet of test and evaluation facilities, National Airspace System (NAS) field support facilities, research and development facilities, administrative facilities and numerous project test sites.

The FAA's Federal Laboratory, WJHTC is the principal source for conducting Next Generation Air Transportation (NextGen) research, test, and evaluation. WJHTC specializes in sustaining and modernizing air traffic control automation, communications, surveillance, navigation, traffic flow management, and weather systems, and supports advancements in airport and aircraft safety, human factors, and separation standards. WJHTC also provides around the clock operational support to EnRoute, Terminal, and other Air Traffic Control facilities throughout the Nation. Annual operations and maintenance costs for WJHTC are approximately 50 percent of ANG's operations budget.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**FY 2021 Anticipated Accomplishments:**

<b>Function/Activity</b>	<b>FY 2021 Anticipated Accomplishments</b>
<b>Facility Related:</b>	<ul style="list-style-type: none"><li>• Provide the technical platform for research in aircraft safety (fire, structural, unmanned aircraft systems, etc.), airport technologies (safety and capacity), human factors, and weather.</li><li>• Provide laboratory systems for: Conducting integrated concept evaluations, modeling and simulations, and test and evaluation for all NextGen technologies in the NAS.</li><li>• 24 hours a day, 7 days a week, 365 days a year field support for all operational systems within the NAS.</li><li>• Provide facility operations and maintenance, environmental management and maintenance, and engineering support for all facilities located at the WJHTC.</li><li>• Safeguard both employees and campus infrastructure by ensuring compliance with environmental laws, policies, directives, and initiatives.</li></ul>
<b>NextGen and Operational Related:</b>	<ul style="list-style-type: none"><li>• Prepare NextGen Program Performance measurement and benefits analyses.</li><li>• Develop and coordinate the annual publication of the NextGen Implementation Plan.</li><li>• Support separation reductions in U.S. sovereign airspace and international airspace where FAA has delegated authority to provide air traffic services.</li><li>• Conduct the bi-annual review of the Performance of Reduced Vertical Separation Minimum Operations (RVSM) in North America (United States, Canada, and Mexico) compared to International Civil Aviation Organization Recommended Requirements.</li><li>• Conduct maintenance and operations of independent performance based monitoring for Altimetry System Error (ASE), a key component to the implementation of RVSM.</li><li>• Provide improved advisories for Flight Operations Center Airline/Operations Center.</li></ul>

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

Aviation enables the economic benefits of tourism, shipping, and travel for business or pleasure. Airports provide economic impact to large and small communities across this country. Continued economic growth in the aviation industry is supported through the ongoing implementation of NextGen technologies, policies and procedures.

The WJHTC is a world class research institution that provides the American public with research, engineering, development, test, evaluation, and maintenance of air navigation, air traffic management, and future air transportation system capabilities. These capabilities directly affect the day-to day operation of the NAS, ensuring that safety critical operational systems are constantly maintained and improved. The technical expertise provided by the labs is also key to the implementation of future NextGen capabilities.



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

**NextGen and Operations Planning (ANG)  
(\$000)**

	Dollars (in Thousands)	FTP	OTFTP	FTE
<b>FY 2020 Enacted</b>	<b>\$61,538</b>	<b>186</b>	<b>4</b>	<b>186</b>
<b>Adjustments to Base</b>	<b>\$1,324</b>	-	-	-
Annualization of FY 2020 Pay Raise 3.1%	225	-	-	-
FY 2021 Pay Raise 1.0%	225	-	-	-
FY 2021 Cash Awards Increase 1.0%	43	-	-	-
FY 2021 FERS Increase	266	-	-	-
One Less Compensable Day 261	-106	-	-	-
Restoration of Cuts Resulting from FY 2020 Pay Raise	671	-	-	-
<b>FY 2021 Request</b>	<b>\$62,862</b>	<b>186</b>	<b>4</b>	<b>186</b>

**Annualization of FY 2020 Pay Raise:** This increase is required to provide for costs associated with base salary increases (October - December) resulting from the government-wide pay raise. The factor used is 0.25 of 3.1 percent.

**FY 2021 Pay Raise:** This increase is required to provide for costs associated with base salary increases resulting from the proposed government-wide pay raise of 1.0 percent.

**FY 2021 Cash Awards Increase 1.0%:** This increase is required for costs associated with an Administration proposal to increase pay for performance in FY 2021.

**FY 2021 FERS Increase:** This increase is required to provide for costs associated with the agency's contribution rates to the Federal Employees Retirement System (FERS). The agency FERS contribution increased for both Air Traffic Controllers and regular agency employees.

**One Less Compensable Day (261 days):** There are 261 Compensable days in FY 2021 vs. 262 days in FY 2020.

**Restoration of Cuts Resulting from FY 2020 Pay Raise:** This adjustment to base restores one-time FY 2020 budget cuts that were necessary to absorb the FY 2020 pay raise.



**Federal Aviation Administration**  
**FY 2021 President's Budget Submission**

---

**Detailed Justification for Security and Hazardous Materials Safety (ASH)**

---

**FY 2021 – Security and Hazardous Materials Safety Budget Request**  
**(\$000)**

<b>Program Activity</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Salaries and Expenses	79,400	82,983	88,059
Program Costs	34,765	35,659	36,869
<b>Total</b>	<b>\$114,165</b>	<b>\$118,642</b>	<b>\$124,928</b>
<b>FTE</b>	<b>486</b>	<b>494</b>	<b>501</b>

**What is this program and what does this funding level support?**

---

The Office of Security and Hazardous Materials Safety (ASH) ensures aviation safety, supports national and homeland security, and promotes an efficient airspace system through development and execution of its safety and security policies and programs. ASH programs protect the flying public, airmen, FAA employees, contractors, information, facilities and assets. ASH provides Agency crisis management coordination, manages continuity of operations and government plans, and executes and supports FAA and other government agencies' national security responsibilities.

ASH protects the flying public and U.S. certificated airmen through identification and analysis of security threats to FAA, the National Airspace System (NAS), and United States civil aviation operating worldwide; regulatory oversight of safe air transport of hazardous materials; and investigation of airmen and employee misconduct.

**FY 2021 Anticipated Accomplishments:**

<b>Function/Activity</b>	<b>FY 2021 Anticipated Accomplishments</b>
<b>Office of Hazardous Materials Safety (AXH)</b> is responsible for ensuring and promoting the safe air transportation of high-risk cargo, including hazardous materials through: <ul style="list-style-type: none"><li>Setting standards for certification and oversight for operators of manned and unmanned aircraft</li></ul>	<ul style="list-style-type: none"><li>Improve industry compliance with aviation safety regulations and standards through inspections, data analyses, and risk management.</li><li>Continue the full implementation of the Safety Assurance System (SAS) to improve AXH's ability to identify hazards and risks before they result in major incidents and accidents.</li></ul>

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Function/Activity	FY 2021 Anticipated Accomplishments
<ul style="list-style-type: none"> <li>▪ Investigating major incidents to identify safety deficiencies.</li> <li>▪ Focusing operators' documented hazardous materials safety program to promote safe operations.</li> <li>▪ Evaluating the effectiveness of operators' risk mitigation strategies.</li> <li>▪ Coordinating the collaborative efforts of government and industry safety teams.</li> <li>▪ Overseeing and monitoring safe integration of UAS transporting Hazmat in the NAS.</li> <li>▪ Evaluating and analyzing the effectiveness of existing AXH certification, regulatory, and compliance systems.</li> <li>▪ Collaborating with internal and external stakeholders to identify, analyze, mitigate, and manage safety risks.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Conduct risk-based safety oversight of the aviation industry targeting the highest-risk operators to ensure continued operational safety.</li> <li>▪ Implement new programs and revised approaches directed by safety recommendations.</li> <li>▪ Automate and standardize the safety oversight and inspection process.</li> <li>▪ Manage and coordinate UAS activities for AXH and ensuring alignment with FAA and DOT initiatives.</li> <li>▪ Develop new and innovative stakeholder engagement approaches to inform the aviation community and industry of trends and emerging risks.</li> <li>▪ Improve the effectiveness of existing AXH certification, regulatory, and compliance systems.</li> </ul>
<p><b>Office of Personnel Security (AXP)</b> provides Personnel Security program policy guidance, oversight, and evaluations, for:</p> <ul style="list-style-type: none"> <li>▪ Personnel Security Program</li> <li>▪ Identification Media and Credential Program</li> </ul>	<ul style="list-style-type: none"> <li>▪ Provide oversight to ensure the FAA workforce complies with federal personnel security requirements.</li> <li>▪ Continue implementing the recently increased Federal Investigation Standards requiring 5-year background re-investigations for all employees and contractors in Moderate Risk positions (much of the FAA).</li> <li>▪ Process background investigations and fingerprint checks for FAA employees and contractors to ensure only those who merit the public trust are hired and retained.</li> </ul>

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

Function/Activity	FY 2021 Anticipated Accomplishments
<p><b>Office of Infrastructure Protection (AXF)</b> supervises nationwide Facility Security programs and provides program policy guidance, oversight, and evaluations for 1,100-staffed facilities, and supports the security needs of over 10,000 unstaffed facilities.</p> <ul style="list-style-type: none"><li>▪ Facility Security Management Program (FSMP)</li><li>▪ Information Security Program</li></ul>	<ul style="list-style-type: none"><li>▪ Ensure FAA facilities are compliant with facility and information security requirements that protect agency employees, visitors, information, systems, and facilities through robust oversight, inspection, and assessment program.</li><li>▪ Enhance the Facility Security Management Program that protects critical FAA infrastructure and personnel in the NAS.</li><li>▪ Increase the complexity of FAA facility inspections and assessments, and continue to develop the risk management and resilience aspects of program oversight to improve the security posture of the NAS's critical infrastructure, and better inform future security investment decisions.</li><li>▪ Continue actions to complete recommendations from the ZAU Security Review to enhance the Information and Facility Security Programs that protect critical FAA personnel, infrastructure, and information in the NAS.</li><li>▪ Enhance standards, programmatic safeguards and controls for protecting classified national security and sensitive unclassified information from loss, compromise, or unauthorized disclosure.</li></ul>

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Function/Activity	FY 2021 Anticipated Accomplishments
<p><b>Office of National Security Programs and Incident Response (AXE)</b> ensures Agency-level emergency readiness, crisis management, threat identification and analysis, and national security support to promote and ensure national airspace and aviation safety and security.</p> <ul style="list-style-type: none"> <li>- Washington Operations Center Complex (WOCC)</li> <li>- Current Intelligence and Threat Evaluation Watch Operations</li> <li>- Special Operations and Law Enforcement Support</li> <li>- Command, Control, and Communications</li> <li>- Emergency Preparedness and Response</li> <li>- Regulatory Investigations</li> <li>- Law Enforcement Assistance Program (LEAP)</li> <li>- Unmanned Aircraft Systems Security</li> </ul>	<ul style="list-style-type: none"> <li>- Manage the Washington Operations Center</li> <li>- Complex (WOCC) and support the Air Traffic Security Coordinators (ATSCs), who manage the Domestic Events Network (DEN); provide leadership at FAA, DOT, and the White House with situational awareness of all incidents affecting civil aviation and the National Airspace System, including a 24/7 intelligence fusion capability.</li> <li>- Provide threat identification and analysis to support FAA decision-making regarding emerging threats to aviation safety, including from technologies, such as Unmanned Aircraft Systems (UAS).</li> <li>- Support Agency efforts to progress safe integration of UAS into the NAS through liaison with national security partners to address UAS security risks and obtain and implement Counter-UAS authority.</li> <li>- Ensure the safe integration of Counter-UAS technologies into the NAS.</li> <li>- Maintain emergency operations network capability and ensure continued situational awareness of daily and emergency events.</li> <li>- Support Continuity of Operations by maintaining the Primary Alternate Facility to enable FAA relocation in an emergency to ensure the Agency can perform its Mission Essential Functions at all times, and maintain continuous monitoring of the National Airspace System.</li> <li>- Investigate airmen with alcohol- and drug-related motor vehicle actions to ensure incidents are reported in accordance with the Code of Federal Regulations (CFR).</li> <li>- Initiate enforcement action, when warranted, to remove airmen who pose a risk to the NAS.</li> </ul>

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Function/Activity	FY 2021 Anticipated Accomplishments
	<ul style="list-style-type: none"> <li>▪ Manages the FAA's Law Enforcement Assistance Program by assisting and supporting federal, state, local, territorial, tribal, and international law enforcement agencies with investigations and interdictions involving illicit use of aircraft regarding narcotics, weapons, and human trafficking.</li> <li>▪ Support Agency investigations of non-compliant UAS operations.</li> <li>▪ Draft and promulgate national policy to support regulatory investigations and LEAP activities, such as aircraft registration violations.</li> <li>▪ Develop standards to enhance LEAP mission effectiveness.</li> <li>▪ Develop, implement, and integrate, Cyber Threat Intelligence capabilities into the FAA's cyber security architecture.</li> </ul>
<p><b>Office of Investigations (AXI)</b> conducts administrative and civil investigations involving FAA employees, contractors, and non-employees suspected of violating FAA orders and policy.</p> <p>AXI provides services in the following areas: cyber investigations and analysis, insider threat detection and mitigation, e-discovery, and defensive counter-intelligence services, including foreign travel briefings and de-briefings.</p> <ul style="list-style-type: none"> <li>▪ Internal Investigations</li> <li>▪ Investigations Standards and Policy</li> <li>▪ Technical Investigations: <ul style="list-style-type: none"> <li>▪ Defensive Counter-Intelligence (DCIP)</li> <li>▪ Insider Threat Detection Mitigation (ITDMP)</li> <li>▪ Cyber Investigations</li> <li>▪ e-Discovery</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ Conduct internal investigations of FAA employees and contractors for misconduct.</li> <li>▪ Conduct administrative and civil investigations/inquiries that fall under the FAA's jurisdiction.</li> <li>▪ Develop standards and policy to enhance the efficiency and effectiveness of all AXI investigative programs. Draft and implement national policy and unit procedures ensuring consistent execution of AXI program duties.</li> <li>▪ Develop and execute FAA's Defensive Counter-Intelligence Program (DCIP), including CI cyber threat analysis, Insider Threat Detection and Mitigation Program (ITDMP), International Travel Security Program (ITSP), e-Discovery and Cyber investigations/Analysis Programs.</li> </ul>

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Program Increases:**

The FY 2021 budget request for ASH includes additional funding for the following programmatic initiatives.

<b>Discretionary Adjustments</b>	<b>Amount (\$000)</b>	<b>FTP</b>	<b>FTE</b>
<b>Improving Aviation Safety Oversight:</b> Investigation Repository/Virtual Cyber Analysis Suite (CAVE)	750	-	-
<b>Improving Aviation Safety Oversight:</b> UAS Requirements	1,515	13	7
<b>ASH Total</b>	<b>\$2,265</b>	<b>13</b>	<b>7</b>

**Improving Aviation Safety Oversight**

**Investigation Repository/Cyber Analysis Virtual Environment (CAVE):** The FAA issued an emergency prohibition order grounding the Boeing 737 MAX aircraft until further investigation, and has received several records/document inquiries related to the October 2018 and March 2019 737 MAX aircraft accidents. This funding request of \$750,000 is for the continued development and maintenance of the CAVE, including an investigation repository capability. The CAVE allows ASH to collaborate with agency partners to perform early case assessment to establish search criteria and provide sample search results. ASH uses the CAVE to cull through the data so that only responsive data remains for review. The CAVE currently holds over 49 terabytes of collected FAA data supporting the Boeing 737 Max Congressional inquiries allowing legal counsel and reviewers to search, review, and produce responsive data to current and future requests. It will enable the agency to promptly and consistently respond to inquiries, as well as process and report on the data.

**UAS Requirements:** The \$1.515 million increase will provide critical resources that meet Congressional demands on the FAA for mandatory integration of UAS and Counter-UAS (C-UAS) capabilities into the NAS. ASH will increase support to, and engagement with, federal, state, and local law enforcement partners, as well as the private sector and international partners, in order to evaluate and address implications of integrating and employing C-UAS capabilities and the impacts on the NAS and aviation-related assets.

ASH will provide Law Enforcement Assistance Program (LEAP) special agents to support the numerous NSSEs and other local requests by local law enforcement and critical infrastructure owners to provide education on and support in responding to UAS incursions. Estimates include office space and associated costs (conferences, military installations, UAS test activities, site visits to IPP locations, etc.).



**Federal Aviation Administration**  
**FY 2021 President's Budget Submission**

---

The increase will allow the FAA to expand efforts to safely and securely integrate UAS into the NAS, as well as support development of a robust security framework to enable that integration.

(See also "Operations Summary" for a detailed description of the Program Increase requests.)

**What benefits will we provided to the American public through this request and why is this program necessary?**

---

ASH is responsible for the FAA's critical infrastructure protection, personnel security, emergency operations, threat identification and analysis, contingency planning and crisis response, investigations of employees, contractors, and airmen who may present a safety or security risk to the NAS, and the safe transportation of hazardous materials in air commerce. Protecting our critical infrastructure is a national and homeland security priority, which continues to demand a high level of attention and innovation.

In recognition of the criticality of the NAS in our country's transportation infrastructure and economic stability, ASH develops and executes policies and programs to protect FAA employees, contractors, facilities, and assets, as well as airmen, aircraft, and the flying public. The FAA is committed to continuously improving the safety, security, and efficiency of flight, and continues to work with all of our partners and stakeholders to focus our experience, expertise, and new technology to ensure a safer and more secure global airspace.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

**Office of Security and Hazardous Materials Safety (ASH)  
(\$000)**

	Dollars (in Thousands)	FTP	OTFTP	FTE
<b>FY 2020 Enacted</b>	<b>\$118,642</b>	<b>529</b>	<b>1</b>	<b>494</b>
<b>Adjustments to Base</b>	<b>\$4,021</b>	<b>-</b>	<b>-</b>	<b>-</b>
Annualization of FY 2020 Pay Raise 3.1%	592	-	-	-
FY 2021 Pay Raise 1.0%	623	-	-	-
FY 2021 Cash Awards Increase 1.0%	575	-	-	-
FY 2021 FERS Increase	744	-	-	-
One Less Compensable Day 261	-293	-	-	-
Working Capital Fund	-50	-	-	-
Restoration of Cuts Resulting from FY 2020 Pay Raise	1,830	-	-	-
<b>Discretionary Adjustments</b>	<b>\$2,265</b>	<b>13</b>	<b>-</b>	<b>7</b>
Improving Aviation Safety Oversight 50 FTP/50 FTE	750	-	-	-
UAS 15 FTP/8 FTE	1,515	13	-	7
<b>FY 2021 Request</b>	<b>\$124,928</b>	<b>542</b>	<b>1</b>	<b>501</b>

**Annualization of FY 2020 Pay Raise:** This increase is required to provide for costs associated with base salary increases (October - December) resulting from the government-wide pay raise. The factor used is 0.25 of 3.1 percent.

**FY 2021 Pay Raise:** This increase is required to provide for costs associated with base salary increases resulting from the proposed government-wide pay raise of 1.0 percent.

**FY 2021 Cash Awards Increase 1.0%:** This increase is required for costs associated with an Administration proposal to increase pay for performance in FY 2021.

**FY 2021 FERS Increase:** This increase is required to provide for costs associated with the agency's contribution rates to the Federal Employees Retirement System (FERS). The agency FERS contribution increased for both Air Traffic Controllers and regular agency employees.

**One Less Compensable Day (261 days):** There are 261 Compensable days in FY 2021 vs. 262 days in FY 2020.

**Working Capital Fund:** This cost adjustment funds the Department of Transportation's Working Capital Fund estimates for the FAA.

**Restoration of Cuts Resulting from FY 2020 Pay Raise:** This adjustment to base restores one-time FY 2020 budget cuts that were necessary to absorb the FY 2020 pay raise.

**Federal Aviation Administration**  
**FY 2021 President's Budget Submission**

---

**Improving Aviation Safety Oversight:** Funding to improve the FAA's safety oversight. The funding will enable the FAA to hire employees with aviation safety technical expertise and address any recommendations identified through the 737 MAX Investigation and reviews. Funding for Aviation Safety Information will provide a central investigation repository and allow the FAA to meet standard reporting requirements and promptly and consistently reply to congressional and Office of the Inspector General (OIG) inquiries as well as process and report on data as it pertains to whistleblower notifications. This request supports a new Organization Designation Authorization (ODA) Office which will provide oversight and ensure the consistency of the FAA's audit functions under the ODA program across AVS.

**Unmanned Aircraft Systems (UAS):** The increase will allow the FAA to expand efforts to engage with the many operational, security, regulatory, and communication issues raised by the development of UAS.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

(This page intentionally left blank)



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - Staff Offices**

---

**FY 2021 - Staff Offices – Budget Request  
(\$000)**

<b>Program Activity</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Salaries and Expenses	161,206	196,773	208,496
Program Costs	54,093	51,734	56,658
<b>Total</b>	<b>\$215,299</b>	<b>\$248,507</b>	<b>\$265,154</b>
<b>FTE</b>	<b>952</b>	<b>1,172</b>	<b>1,177</b>

**What is this program and what does this funding level support?**

---

The Staff Offices of FAA include the Office of the Administrator, Chief Counsel and several assistant administrators who provide mission support services to various lines of business, including legal counsel, economic trend analysis, diversity leadership, government and industry liaisons, communications, public relations and human resources management. A brief description of staff offices is outlined as follows:

- The **Office of Audit and Evaluation** (AAE) performs audit and investigative review functions primarily for internal safety disclosures and concerns, including the FAA Whistleblower Protection Program.
- The **Office of Civil Rights** (ACR) advises, represents, and assists the FAA Administrator on civil rights and equal opportunity matters.
- The **Office of Government and Industry Affairs** (AGI) serves as the Administrator's principal adviser and representative on matters concerning relationships with the Congress, aviation industry groups, and other governmental organizations, developing and reviewing plans and strategies involving these groups to enhance aviation safety.
- The **Office of Communications** (AOC) is responsible for the policy, direction, and management of the agency's communications programs for the news media and FAA's employees nationwide.
- The **Human Resources Management** (AHR) organization provides human resource services to all operating lines of business and staff offices (LOB/SOs) at the headquarters and to all the FAA regions including the two centers and overseas.
- The **Office of Policy, International Affairs, and Environment** (APL) serves as the principle advisor to the Administrator on international matters, and manages the FAA's Regional Offices.

**What benefits will be provided to the American public through this request and why is the program necessary?**

---

Through the leadership of the Administrator, FAA successfully manages the most complex and safest aviation system in the world. By executing their mission responsibilities and providing management, leadership, and oversight, the FAA's Staff Offices have contributed to the overall success of the FAA.

Staff Offices provide services and resources necessary for the FAA's agency operations. Without these services, lines of business would not have the resources needed to meet their goals. From performing mission-critical services to receiving guidance and counsel on regulatory or legal issues, or managing annual appropriations, Staff Offices make a significant contribution to the mission of FAA.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for – Office of the Administrator (AOA)**

---

**FY 2021 – Office of the Administrator – Budget Request  
(\$000)**

<b>Program Activity</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Salaries and Expenses	2,505	2,640	3,306
Program Costs	1,698	733	733
<b>Total</b>	<b>\$4,203</b>	<b>\$3,373</b>	<b>\$4,039</b>
<b>FTE</b>	<b>14</b>	<b>17</b>	<b>17</b>

**What is this program and what does this funding level support?**

---

The Office of the Administrator (AOA) leads the FAA in its mission to provide the safest, most efficient aerospace system in the world. This office is responsible for the overall planning, direction, coordination and control of FAA programs, and represents FAA in its work with the Department of Transportation and other agencies, the White House, Congress, the aviation community and the general public.

AOA directs and controls the operations of the FAA and acts as principal adviser to the Office of the Secretary (OST) on civil aviation matters and air transportation. Throughout FY 2021, AOA will continue to lead FAA toward achieving the agency's performance goals and targets.

In leading the FAA, the Administrator oversees the Agency's employees in maintaining, operating, and overseeing the largest and most complex aviation system in the world. The Agency determines the regulatory and operational standards for the United States, and effectively sets the benchmark for aviation safety around the world.

The funding level supports executive direction of the FAA and provides for the Administrator and Deputy Administrator's direct staff.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

AOA provides direction and executive oversight for the management and operation of the world's largest, safest, and most efficient airspace system. Aviation is a significant contributor to the U.S. economy and the FAA provides continuous operational Air Traffic Control services to airlines and general aviation; safety oversight of operators and manufacturers; management of airport improvement grants; and acquisition of the FAA's NextGen air traffic control system.



**Federal Aviation Administration**  
**FY 2021 President's Budget Submission**

---

**Detailed Justification for – Audit and Evaluation (AAE)**

---

**FY 2021 – Audit and Evaluation (AAE) – Budget Request**  
**(\$000)**

<b>Program Activity</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Salaries and Expenses	3,386	3,748	3,838
Program Costs	35	352	752
<b>Total</b>	<b>\$3,421</b>	<b>\$4,100</b>	<b>4,590</b>
<b>FTE</b>	<b>20</b>	<b>21</b>	<b>21</b>

**What is this program and what does this funding level support?**

---

The Office of Audit and Evaluation (AAE) has two primary functions: safety audit/investigation and hotline operations.

- **Safety audit and investigation analysis** staff perform audit and investigative review functions primarily for internal safety disclosures and concerns, including the FAA Whistleblower Protection Program. It also coordinates and evaluates FAA responses to Department of Transportation (DOT), Office of Inspector General, General Accounting Office and United States Office of Special Counsel generated audits, investigations and evaluations.
- **Hotline operations** provides reporting and data for analysis of hotline submissions, coordination of AAE investigations, and reviews for completeness investigations conducted by appropriate FAA organizations. The Office also operates and manages several administrative and safety hotlines.

The office primarily and directly supports the Departmental goal of increased safety. AAE also supports in a more generalized way the goal of building and enhancing FAA's high performance work place. Additionally, the Office provides an impartial agency venue for investigation and early resolution of safety disclosures. The FY 2021 funding will support the operation and management of the FAA's Hotline and Whistleblower Protection Program system and provide a centralized Agency focus for internally and externally generated safety-related complaints, critical audits, and investigations.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Program Increases:**

The FY 2021 budget request for AAE includes additional funding for the following programmatic initiatives.

<b>Discretionary Adjustments</b>	<b>Amount (\$000)</b>	<b>FTP</b>	<b>FTE</b>
<b>Improving Aviation Safety Oversight: FAA Hotline Information System (FHIS)/Whistleblower Protection Program (WBPP)</b>	400	-	-
<b>AAE Total</b>	<b>\$400</b>	-	-

**Improving Aviation Safety Oversight**

**FAA Hotline Information System (FHIS)/Whistleblower Protection Program (WBPP):** Funding for \$400,000 supports the FAA Hotline Information System (FHIS) / Whistleblower Protection Program (WBPP). This includes annual license fee, managed services with remote monitoring and technical and user support, continued development and minor enhancements, database support, web form support, and security assessment fees.

(See also “Operations Summary” for a detailed description of the Program Increase requests.)

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

AAE has established itself as a viable forum for raising and addressing internal safety concerns and has developed standards to measure its successes. Currently, the success of the program can be gauged by its ability to timely process hotline matters, complete investigations, validate the completeness of agency responses to identified safety concerns, and ensure agency compliance with corrective actions.

AAE has become a vital and effective organization productively addressing and resolving safety-related whistleblower disclosures and employee workplace conflicts. Significantly, the visibility and accomplishments of the AAE Office have generated a critical awareness and recognition that employees can bring their safety sensitive disclosures to an internal organization and have them objectively reviewed by an unbiased entity.

AAE enhances agency accountability for internally identified safety concerns, whistle blower contributions, and employee workplace conflicts. The safety benefits of an effective internal reporting program are well received.

The direct beneficiaries of AAE's services are the agency and the flying public. AAE embodies FAA's commitment to a vibrant and evolving internal safety culture based on continuous review, evaluation, objective analysis and measured change. AAE provides agency employees and external stakeholders with an independent and highly visible forum to safely and constructively raise, address, and resolve safety complaints, concerns or whistleblower contributions.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for – Civil Rights (ACR)**

---

**FY 2021 – Civil Rights (ACR) – Budget Request  
(\$000)**

<b>Program Activity</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Salaries and Expenses	9,685	10,189	10,934
Program Costs	2,846	2,073	2,073
<b>Total</b>	<b>\$12,531</b>	<b>\$12,262</b>	<b>\$13,007</b>
<b>FTE</b>	<b>65</b>	<b>72</b>	<b>72</b>

**What is this program and what does this funding level support?**

---

Internally, the Office of Civil Rights (ACR) mission is to aid in the prevention of unlawful discrimination because of race, color, national origin, sex, age, religion, sexual orientation, and individuals with disabilities employed by the FAA. The Office of Civil Rights works in conjunction with FAA managers and the Administrator to ensure Equal Employment Opportunity (EEO) awareness and adherence to EEO policies and guidelines.

Externally, ACR's mission is to provide airport oversight with regard to civil rights laws and regulations. ACR works to ensure that all beneficiaries of federally assisted transportation programs are offered equal opportunity for participation and are free from discrimination. These efforts address airport compliance with the Americans with Disabilities Act (ADA), Rehabilitation Act, Disadvantaged Business Enterprise Program, Title VI, Limited English Proficiency (LEP), Environmental Justice (EJ), and other civil rights regulations.

**FY 2021 Anticipated Accomplishments:**

<b>Function/Office</b>	<b>FY 2021 Anticipated Accomplishments</b>
<b>Internal Civil Rights Services</b> <ul style="list-style-type: none"><li>- EEO Complaint Services/Alternative Dispute Resolution Services</li><li>- Model EEO Program</li><li>- Diversity and Inclusion</li><li>- EEO Training</li></ul>	<ul style="list-style-type: none"><li>- Process 100 percent of the allegations and inquiries regarding EEO complaints by providing quality counseling, mediation and consulting services.</li><li>- Assist and provide resources for agency selecting officials to increase the hiring of People with Targeted Disabilities.</li><li>- Assist the Agency in building a Model</li></ul>

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

	<p>EEO Workplace through outreach, consultations, collaboration, and educational partnerships.</p> <ul style="list-style-type: none"> <li>▪ Increase FAA managers and employees conflict resolution skills through the Conflict Coaching Program and reduce the number of EEO complaints that are filed in the agency with early intervention techniques.</li> </ul>
<p><b>External Civil Rights Services</b></p> <ul style="list-style-type: none"> <li>▪ Disability Airport Compliance</li> <li>▪ Airport Non-discrimination Compliance (Title VI of the Civil Rights Act)</li> <li>▪ Disadvantaged Business Enterprise (DBE)/Airport Concession Disadvantaged Business Enterprise (ACDBE) Compliance</li> </ul>	<ul style="list-style-type: none"> <li>▪ Conduct DBE compliance reviews and ensure that small and disadvantaged business enterprises are able to compete with larger companies for airport construction projects and concessions.</li> <li>▪ Maintain an online FAA dbE-connect system to connect DBEs and relevant airport opportunities and allow airports to identify certified DBEs in areas of work needed to support their DBE goals. <a href="https://faa.dbesystem.com/">https://faa.dbesystem.com/</a></li> <li>▪ Deliver training, technical assistance and consultations in order to increase knowledge in the areas of DBE/ACDBE, ADA/ 504 and Title VI/LEP/EJ at the Nation's airports.</li> </ul>

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

ACR provides leadership and direction with regard to civil rights, diversity, and EEO matters. The ACR mission is to implement civil rights, EEO policies, and operational programs to ensure their full and successful development in support of FAA's mission to provide the safest, most efficient aerospace system in the world.

ACR works to foster diversity and inclusion activities that lead to a healthy work environment that promotes diversity in all its dimensions and harmony across the FAA.

ACR is committed to providing a workplace that promotes equal opportunity, is free of harassment, and is an environment where employees can focus on productivity, not conflict. The result of these efforts is a diverse and satisfied workforce that collaboratively helps to ensure the safety of the flying public.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for – Government and Industry Affairs (AGI)**

---

**FY 2021 – Government and Industry Affairs (AGI) – Budget Request  
(\$000)**

<b>Program Activity</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Salaries and Expenses	1,566	1,636	1,684
Program Costs	38	182	182
<b>Total</b>	<b>\$1,604</b>	<b>\$1,818</b>	<b>\$1,866</b>
<b>FTE</b>	<b>10</b>	<b>9</b>	<b>8</b>

**What is this program and what does this funding level support?**

---

The Office of Government and Industry Affairs (AGI) supports the Administrator and represents the FAA by providing the principal linkage between the agency and Congress.

AGI works with FAA offices to coordinate, facilitate, and present FAA's legislative message. AGI consistently monitors and gauges the interest and needs of the United States Congress. This relationship also extends to coordinating FAA legislative initiatives and responses with the DOT. AGI also serves as liaison with the aviation industry, from manufacturers to carriers, and with other aviation related organizations. Additionally, AGI serves as the principal point of contact for state and local governments.

The following core activities represent the FY 2021 budget request:

- Communicate to Congress on behalf of the Administrator and Management Board.
- Provide OST Governmental Affairs with factual, concise, and complete information from significant AGI congressional contacts and activities.
- Foster strong partnerships with key industry stakeholders.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

AGI continuously improves the quality, timeliness, and usefulness of FAA core business functions. AGI fosters productive relationships with key members of Congress and Congressional Oversight Committees. AGI solicits information from program offices within the Agency to better understand and communicate areas of interest or concerns to the United States Congress.

AGI's mission is to provide high quality timely communications to Congress. It is essential that public policy be debated on its merits so that the best outcomes can result. The work of AGI enables the Administrator, Deputy Administrator, and

**Federal Aviation Administration**  
**FY 2021 President's Budget Submission**

---

Associate Administrators to effectively interact and communicate the policies and positions of the FAA before the United States Congress. AGI's established congressional relations are vital to advancing the aviation priorities of the FAA, the Department of Transportation, and the Administration.



**Federal Aviation Administration**  
**FY 2021 President's Budget Submission**

---

**Detailed Justification for – Communications (AOC)**

---

**FY 2021 – Communications (AOC) – Budget Request**  
**(\$000)**

<b>Program Activity</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Salaries and Expenses	6,071	6,506	6,939
Program Costs	520	215	715
<b>Total</b>	<b>\$6,591</b>	<b>\$6,721</b>	<b>\$7,654</b>
<b>FTE</b>	<b>28</b>	<b>31</b>	<b>30</b>

**What is this program and what does this funding level support?**

---

The Office of Communications (AOC) delivers critical safety information to the news media, stakeholders, and FAA employees worldwide to support the FAA's operations, programs and mission. AOC helps the FAA achieve its mission by providing timely and accurate information and performing robust outreach to an increasingly diverse set of stakeholders. Using a variety of communications tools, AOC delivers its services through two major programs: Public Affairs and Corporate Communications.

**Public Affairs**

Public Affairs works closely with other FAA offices to provide timely and accurate information to the media, the aviation community and the public about FAA initiatives and activities. Public Affairs develops and implements communication strategies and public outreach to alert and inform the traveling public and aviation stakeholders of urgent safety issues.

**Corporate Communications**

Corporate Communications manages the FAA's digital communications, including FAA.gov, MyFAA and the agency's social media accounts, which generate more than 470 million impressions annually. Corporate Communications leads the FAA's creative and multimedia services, including video, audio and application development. The team coordinates with other FAA offices to provide more than 40,000 FAA employees with accurate and timely information on programs and activities.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Program Increases:**

The FY 2021 budget request for AOC includes additional funding for the following programmatic initiatives.

Discretionary Adjustments	Amount (\$000)	FTP	FTE
UAS Requirements	500	-	-
<b>AOC Total</b>	<b>\$500</b>	-	-

**UAS Requirements:** The funding request of \$500,000 is to provide dedicated resources for UAS products and services. Resources will provide video production, script writing and editing, live broadcast of events and graphic designs, web support, and social media to encourage safe and proper use of UAS.

(See also "Operations Summary" for a detailed description of the Program Increase requests.

**FY 2021 Anticipated Accomplishments:**

Function/Office	FY 2021 Anticipated Accomplishments
Public Affairs	<ul style="list-style-type: none"><li>▪ Increase awareness and understanding of FAA initiatives and other issues through press conferences, media briefings, press releases, social media, and other communication channels.</li><li>▪ Increase awareness of the FAA's role as a world leader on aviation issues.</li><li>▪ Support open government initiatives to make data available, improve online services, and increase collaboration with citizens, stakeholders, and other government agencies.</li></ul>

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

<b>Function/Office</b>	<b>FY 2021 Anticipated Accomplishments</b>
<b>Corporate Communications</b>	<ul style="list-style-type: none"><li>▪ Expand the use of social media platforms to educate new audiences.</li><li>▪ Use a variety of internal communication vehicles to educate employees about agency strategic goals, programs, and activities. Obtain feedback that helps the FAA meet those goals.</li></ul>

**What benefits will be provided to the American public through this request and why is this program necessary?**

With more than 119 million page views a year, [www.faa.gov](http://www.faa.gov) provides a wealth of resources to the American public. Pilots, mechanics, and other members of the flying public consistently read FAA's news, directives, hazardous materials information, and airworthiness information every second of every day of the year.

The FAA has seen a persistent increase in demand for secure access to critical aviation safety information. Users downloaded more than 9.5 million documents from [FAA.gov](http://FAA.gov) related to pre-flight safety procedures and planning, airmen/aircraft certification, aircraft mechanical records, airport safety regulations, and accident/incident data. Information for air traffic operations, General Aviation safety, NextGen, and Unmanned Aircraft Systems is delivered via text, video, and graphical formats.

With more than 40,000 employees working in offices and in the field, across the country and abroad, the FAA intranet, employee news, daily broadcast, and audio/video production services are a vital part of ensuring employees are connected with the vision, mission and values of the agency. These vital communications vehicles ensure that employees are able to access information about everything from Human Resource benefits to changes in compensation programs that may directly affect them. Strong internal communications generate a more engaged, productive, and loyal workforce.

As the demand for safety information continues to grow from all stakeholders (employees, the public, the media, and the aviation community), these groups expect unfettered 24 hours a day/7 days per week access to information the FAA provides, and interaction with that information through the Web, email, and social media. AOC will provide accurate critical information about FAA operations, safety oversight, efficiency initiatives and other programs to all of these groups as quickly as possible.

**Federal Aviation Administration**  
**FY 2021 President's Budget Submission**

---

**Detailed Justification for – Office of Chief Counsel (AGC)**

---

**FY 2021 – Office of Chief Counsel (AGC) – Budget Request**  
**(\$000)**

<b>Program Activity</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Salaries and Expenses	39,661	42,127	44,734
Program Costs	6,714	3,608	3,605
<b>Total</b>	<b>\$46,375</b>	<b>\$45,735</b>	<b>\$48,339</b>
<b>FTE</b>	<b>215</b>	<b>229</b>	<b>229</b>

**What is this program and what does this funding level support?**

---

Funding at the FY 2021 requested level would provide necessary legal services, including representation in support of significant FAA program responsibilities and functions.

The Office of the Chief Counsel (AGC) provides mission critical legal services for the FAA. Within the FAA, AGC is both a key partner to each line of business and staff office and an integral contributor to the success of every major agency program and function. Across every line of business and every agency program, AGC provides legal advice, reviews agency action for legal sufficiency and conformity, represents agency interests in various administrative and court forums, defends the agency's actions, and enhances risk management by proactively seeking to identify and mitigate risk. In addition, AGC is responsible for internal FAA adjudicative functions responsible for adjudicating bid protests and contract disputes, aviation civil penalties below a specified threshold, and challenges made to airport grant recipients compliance with their grants. This office also provides alternative dispute resolution services.

AGC's principal legal practice areas are:

- 1) Safety through its activity in enforcing aviation safety rules, rulemaking, acquisition and commercial law, aircraft and other tort litigation;
- 2) Innovation through its rulemaking activity, environmental legal services, airport legal services which support airport expansion and capacity, and acquisition of technologies that support increased capacity and efficiency; advancing global collaboration through international activity and

harmonization of safety rules, enhancing Livable Communities and ensuring Environmental Sustainability through its rulemaking activity and

**Federal Aviation Administration**  
**FY 2021 President's Budget Submission**

---

environmental legal services; and

- 3) Accountability by enhancing FAA's high performing workforce, supporting numerous agency- wide strategic initiatives, and providing legal services in support of agency administrative functions including employment and labor law, ethics counsel, Freedom of Information Act and Privacy Act services and legislative services.

**FY 2021 Anticipated Accomplishments:**

Funding at the FY 2021 requested level would provide necessary legal services, including representation, in support of significant FAA program responsibilities and functions. Among the more significant are:

- Rulemaking, including critical safety rules and regulatory aspects of NextGen and not only the safe, but also timely the integration of new entrants into the National Airspace System (NAS). In particular, AGC has had to devote a steadily increasing amount of resources to aiding in the safe integration of UAS. For example, one UAS rulemaking project involved the substantial time of nine attorneys. More than 10 percent of the personnel of AGC are engaged in UAS matters and the workload is increasing.
- Enforcement of safety regulations.
- Acquisition of operational safety systems and equipment, including acquisition aspects of NextGen development, and compliance with commercial and fiscal requirements.
- Airports capacity enhancement and grants, environmental streamlining for airport projects, and environmental aspects of NextGen development.
- Personnel and labor matters.
- Key international agreements, harmonization of safety requirements and safety assessments.
- International technical assistance agreements and safety assessments.
- Dispute resolution services and/or administrative adjudication of acquisition related disputes, and administration of the Civil Penalty Program; representation of agency interests and choice of actions before United States federal courts and various administrative forums, including the National Transportation Safety Board (NTSB), the Merit Systems Protection Board, and the EEO Commission.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

AGC contributes to the overall success of FAA programs and functions that reside with the various lines of business and staff offices with programmatic responsibility. AGC's contribution cannot be assessed through a single measure. AGC contributes to many programs to ensure that overall FAA actions are consistent with legal requirements, risks are defined and managed to the extent practicable and the interests of the government and the flying public are strongly represented.

AGC acquisition attorneys provide key support in the development, acquisition, and deployment of NextGen air traffic control, and safety systems and technologies. The rulemaking attorneys play a critical role in establishing regulatory requirements and certification of new avionics equipment. The environmental attorneys are critical to ensuring environmental assessments are completed for new systems and airspace redesigns. The employment attorneys have a significant role in addressing the staffing and labor implications of a system where air traffic is managed rather than controlled.

The direct beneficiaries of AGC's services are the Agency organizations that have operational and programmatic responsibility for carrying out FAA's mission, and by extension, the goals of the Department of Transportation. More significantly, the flying public is the overarching beneficiary of the increased safety and efficiency of a modern air transportation system. AGC is a key partner supporting the agency's success in all of FAA's various program areas.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for – Policy, International Affairs, and Environment (APL)**

---

**FY 2021 – Policy, International Affairs, and Environment (APL) – Budget Request  
(\$000)**

<b>Program Activity</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Salaries and Expenses	25,617	53,662	55,920
Program Costs	9,402	15,975	17,146
<b>Total</b>	<b>\$35,019</b>	<b>\$69,637</b>	<b>\$73,066</b>
<b>FTE</b>	<b>115</b>	<b>288</b>	<b>295</b>

**What is this program and what does this funding level support?**

---

The Office of Policy, International Affairs, and Environment (APL) consists of the following offices:

**Aviation Policy and Plans** improves the FAA's effectiveness with corporate planning and performance management; makes coordinated and well-informed policy decisions for crosscutting and novel civil aerospace issues using independent economic, quantitative and qualitative analysis, information and tools; and positions the FAA for the future by coordinating FAA's reauthorization efforts, identifying, researching, and projecting emerging issues and trends.

**International Affairs** is responsible for formulating the FAA's international strategy and associated regional and global priorities, aligning FAA's international activities, programs and initiatives to most effectively accomplish the strategic goals and initiatives of the FAA, DOT, and the United States government, and leading collaborative engagement and cooperation with civil aviation authorities and aviation stakeholders across the world.

**Environment and Energy** is responsible for developing, recommending, coordinating, and implementing national and international standards, policy and guidance, research and technology goals, and analytical capabilities on aviation environmental and energy matters.

**National Outreach and Regional Administration** is responsible for conducting outreach, engagement, and horizontal integration to Congressional officials, federal, state and local governments, airports, military, civic organizations, as well as to customers across the agency. In addition, Regional Administrators oversee regional emergency operations and integration services to ensure that appropriate communication and coordination occurs in critical crisis response incidents related to U.S. National Airspace System (NAS) continuity.

**Federal Aviation Administration**  
**FY 2021 President's Budget Submission**

---

To achieve the performance goals outlined in the FY 2021 budget APL will maximize outcomes through the leveraging of partnerships, technology, and expertise. APL will continue to achieve the goals of the Administration and the Department in connection with various domestic and international initiatives.

**Program Increases:**

The FY 2021 budget request for APL includes additional funding for the following programmatic initiatives.

<b>Discretionary Adjustments</b>	<b>Amount (\$000)</b>	<b>FTP</b>	<b>FTE</b>
UAS Requirements	215	2	1
Community Noise Engagement	1,300	3	2
STEM AVSED Program	740	8	4
<b>APL Total</b>	<b>\$2,255</b>	<b>13</b>	<b>7</b>

**UAS Requirements:** Funding of \$215,000 is to support the policy-making activities related to integrating Unmanned Aircraft Systems (UAS) in the National and International Airspace. APL supports UAS policy alignment with other FAA strategic and policy objectives as well as any legislative activity to further FAA objectives regarding UAS.

**Community Noise Engagement:** Funding of \$1.3 million is for FAA's community involvement in the FAA's efforts to modernize the National Airspace System (NAS) through the implementation of Performance Based Navigation (PBN) which will facilitate open and effective public participation in the process, from procedural design and development through the post-implementation impacts. It will also ensure that the continued modernization of the NAS.

**STEM AVSED Program:** Funding of \$740,000 is to increase support for the Science, Technology, Engineering, and Math Aviation and Space Education program (STEM AVSED). The program exposes students to aviation and aerospace career options while promoting STEM learning. The shortage of airline pilots, maintenance technicians, and UAS professionals is being exacerbated by a decline in new entrants to the industry. This problem will only increase as economic projections show a growing demand for qualified aviation and aeronautical professionals over the next twenty years. This program will conduct routine STEM AVSED related activities, projects, events, and programs to inform K-12 students about jobs available in the aerospace industry and the education needed to get those jobs.

(See also "Operations Summary" for a detailed description of the Program Increase requests.)



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Anticipated FY 2021 Accomplishments:**

<b>Function/Activity</b>	<b>FY 2021 Anticipated Accomplishments</b>
<b>Aviation Policy and Plans</b>	<ul style="list-style-type: none"><li>▪ Facilitate the implementation of a long-term FAA reauthorization bill, working across the agency, with the Administration, and with Congress and stakeholders.</li><li>▪ Provide timely economic analysis to enable the agency to send critical safety rules, cost-relieving regulation, and economically enabling rules such as UAS advanced operations, Commercial Space Launch and Re-entry, and supersonic aviation to the Office of the Secretary of Transportation and the Office of Management and Budget.</li><li>▪ Develop national and airport level activity forecasts, benefit-cost studies, issue analysis, economic impact studies, and stakeholder outreach, to facilitate NAS planning</li><li>▪ Improve FAA's effectiveness by leading streamlined and responsive corporate planning, performance, and risk management processes for the agency.</li></ul>
<b>International Affairs</b>	<ul style="list-style-type: none"><li>▪ Influence the International Civil Aviation Organization, member States, and appropriate regional aviation organizations and industry to align global standards and recommended practices with U.S. best practices in aviation safety oversight, operational efficiency and capacity, and integration of new and innovative technologies.</li><li>▪ Achieve a safe and seamless global air transportation system through coordinated outreach on U.S. aviation innovative systems, procedures, and concepts.</li><li>▪ Manage international agreements and arrangements to support FAA and United States collaboration and technical assistance with States and key organizations to advance global aviation safety, efficiency, and capacity.</li></ul>

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

<b>Function/Activity</b>	<b>FY 2021 Anticipated Accomplishments</b>
<b>Environment and Energy</b>	<ul style="list-style-type: none"> <li>- Refine noise exposure and fuel burn targets, policies and guidance, taking into consideration research outcomes and emerging technologies.</li> <li>- Refine the NAS-wide operational framework for assessing implications of proposed air traffic procedural changes on fuel burn and noise.</li> <li>- Continue streamlining environmental review processes and revise the FAA National Environmental Policy Act implementation Order 1050.1 and associated desk reference as necessary.</li> <li>- Enable the next generation of supersonic aircraft, unmanned aircraft systems, and urban air mobility.</li> </ul>
<b>National Outreach and Regional Administration</b>	<ul style="list-style-type: none"> <li>- Enhance aviation safety by increasing awareness and outreach on the FAA high priority safety initiatives.</li> <li>- Enhance community engagement techniques and proactively address noise concerns associated with aircraft and airspace procedures.</li> <li>- Support emergency preparedness and continuity of operations.</li> <li>- Provide program management assistance and coordination activities to support the prioritization and implementation of Northeast Corridor initiatives that reduce delays and improve schedule reliability.</li> </ul>

**What benefits will be provided to the American public through this request and why is this program necessary?**

APL is the agency lead for Aviation Policy, International Aviation, and Environmental issues. Specifically, APL coordinates the agency's reauthorization before Congress, and is responsible for national aviation policies and strategies including aviation activity forecasts, economic analyses, aircraft noise and emissions analyses and mitigation, and environmental policy. In addition, the Regional Administrators serve as the corporate representatives for the FAA Administrator in communicating with local, state and Federal agencies, the aviation industry (from manufacturing to air carriers), and community organizations. APL works closely with other Federal agencies on national and international policy, environmental and energy issues, as well as with industry partners, other civil aviation authorities, academia, non-governmental organizations, and community representatives to strengthen U.S. positions as the gold standard for aviation.

As the global leader in aviation, the FAA must engage internationally to increase global safety standards and enhance aviation safety and efficiency. APL is responsible for improving environmental performance and addressing energy

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

and sustainability needs, and for developing broad based approaches and coordinating agency responses to limit and reduce future aviation environmental impacts.

APL operates the Cornerstone Regional Operations Center that serves as a 24 hours a day/7 days a week communication hubs that provide voice and data dissemination necessary to direct management of the NAS. Regional Administrators coordinate communication responses related to aircraft accidents, emergencies, missing aircrafts, hijacking, security threats, facility and system outages, airport closures, earthquakes and public information requests and complaints.

**Federal Aviation Administration**  
**FY 2021 President's Budget Submission**

---

**Detailed Justification for – Human Resource Management (AHR)**

---

**FY 2021 – Human Resource Management (AHR) – Budget Request**  
**(\$000)**

<b>Program Activity</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Salaries and Expenses	72,715	76,265	81,141
Program Costs	32,840	28,596	31,452
<b>Total</b>	<b>\$105,555</b>	<b>\$104,861</b>	<b>\$112,593</b>
<b>FTE</b>	<b>485</b>	<b>505</b>	<b>505</b>

**What is this program and what does this funding level support?**

---

The FAA workforce is the backbone of the agency's success in providing the safest and most efficient aerospace system in the world. The Office of Human Resource Management (AHR) request covers daily work in providing human resource services to the nearly 45,000 FAA employees. AHR provides the strategic management of human capital that ensures the FAA has the skilled workforce needed to meet the changing demands of the industry we serve. In FY 2021, AHR will:

- Continue implementing agency-wide leadership development programs to build a solid pipeline of future leaders and provide existing leaders with the tools needed to provide transformational leadership in support of the FAA mission.
- Refine efforts to improve the engagement, commitment and satisfaction of FAA's workforce, which is a significant factor in enabling the Department of Transportation (DOT) to advance the multi- modal transportation system of the future.
- Employ a corporate strategy that fosters effective, positive, and collaborative labor management relations.

As the FAA builds the foundation for the aerospace system of the future through the implementation of NextGen, the agency's workforce will play an increasingly critical role. AHR focuses on the FAA's human capital by identifying, recruiting, and training FAA's workforce with the leadership, technical, and functional skills needed to meet the challenges of the future while maintaining the world's safest and most efficient aerospace sector. The cross-organizational workforce strategy supports the agency's transformation through the following four sub-initiatives:

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

- Leadership Development: Launching leadership development activities and tools grounded in FAA's strategic leadership capabilities, to support our current leaders while building a pipeline of future leaders.
- Skills Identification: Assessing the skills needed to maintain the strongest technical and functional talent for positions critical to meeting the FAA's mission.
- Skills Development: Proactively providing training to FAA's employees to develop their skills and close any skills gaps that exist in order to ensure the FAA has a strong workforce with the right technical and functional skills to meet the industry's needs.
- Attracting Talent: Attracting and retaining talented, high-performing professionals and positioning the FAA as a competitive employer of choice.

**FY 2021 Anticipated Accomplishments:**

By 2021, AHR will have assessed the skills requirements of priority mission critical occupations and will have implemented training and recruitment improvements to close technical and functional skills gaps.

<b>The Office of Human Resource Services</b>	
<b>Critical Responsibilities:</b>	Establishing, delivering, and improving agency-wide employment services and programs, payroll and personnel action processing, including; position management and classification, recruitment, hiring, processing personnel and payroll transactions, and serving as a business partner to agency employees, supervisors, managers, and executives on personnel matters involving employment and pay.
<b>Key Activities</b>	<ul style="list-style-type: none"><li>• Human Resources management consultation.</li><li>• Workforce planning, position management, and classification.</li><li>• Recruitment, applicant assessment, referral of qualified applicants, and job offers.</li><li>• Personnel action processing and pay administration.</li><li>• Employee onboarding.</li><li>• Oversight and processing of personnel actions including the development of systems to support processing.</li></ul>

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

<b>FY 2021 Anticipated Accomplishments</b>	<ul style="list-style-type: none"> <li>• Adoption of a streamlined and technologically advanced employment and personnel action request process, which improves FAA's ability to attract, hire, and retain top talent.</li> <li>• Continue maturation of strategic HR services to forecast, recruit, and onboard the optimal number of FAA employees.</li> <li>• Standardizing and automating the Personnel Action Request (PAR) process.</li> <li>• Significant maturation of an agency-wide strategic workforce planning framework.</li> </ul>
<b>The Office of Compensation, Benefits and Worklife</b>	
<b>Critical Responsibilities</b>	Manages the FAA's employee benefit, retirement programs, compensation, performance management, work-life, and workers' compensation programs.
<b>Key Activities</b>	<ul style="list-style-type: none"> <li>• Provide retirement counseling including providing retirement estimates.</li> <li>• Process applications and provide counseling on survivor benefits, disability compensation, and changes to Federal Employees Health Benefits, Federal Employees Group Life Insurance, and the Thrift Savings Plan (TSP).</li> <li>• Administer two distinct performance management systems: Valuing Performance and the Performance Management System.</li> <li>• Manage the FAA and DOT's Office of Worker's Compensation Program.</li> <li>• Manage and promote work-life programs including the Employee Assistance Program (EAP), child care, nursing mothers, emergency planning, telework, and leave programs.</li> </ul>
<b>FY 2021 Anticipated Accomplishments</b>	<ul style="list-style-type: none"> <li>• Continue achievement of workers' compensation cost avoidance through facilitating return to duty and ensuring careful adjudication of claims of questionable veracity.</li> <li>• Introduce new retirement, financial planning, and TSP seminars for FAA employees.</li> <li>• Expand Agency readiness and use of telework flexibilities and alternative work arrangements.</li> </ul>
<b>The Office of Labor and Employee Relations</b>	
<b>Critical Responsibilities</b>	Manages the relationships between FAA and the unions that represent its employees.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

<b>Key Activities</b>	<ul style="list-style-type: none"> <li>• Manages Labor relations with the eight unions (with a total of 34 bargaining units) which represent 34,800 (79%) of the approximate 45,000 employees working at the FAA.</li> <li>• Represents the agency in all national and headquarters negotiations, and most regional negotiations.</li> <li>• Handles third party matters, such as unfair labor practices proceedings and arbitrations, at both the national and regional levels of recognition. Provides labor and employee relations training and guidance to management.</li> <li>• Handles third party matters, such as unfair labor practices proceedings and arbitrations, at both the national and regional levels of recognition. Provides labor and employee relations training and guidance to management.</li> </ul>
<b>FY 2021 Anticipated Accomplishments</b>	<ul style="list-style-type: none"> <li>• Provide day-to-day operational support and services to FAA managers on labor and employee relations.</li> <li>• Implement a labor and employee relations strategy.</li> <li>• Manage oversight and compliance of all bargaining with FAA unions.</li> </ul>

**The Office of Talent Development**

<b>Critical Responsibilities</b>	Manages the development of talent and leadership bench strength.
<b>Key Activities</b>	<ul style="list-style-type: none"> <li>• FAA Leadership &amp; Learning Institute</li> <li>• FAA Human Capital Management Technology</li> <li>• Executive Development</li> <li>• Succession Planning</li> <li>• Science Technology Engineering and Math (STEM) and Aviation &amp; Space Education (AVSED)</li> <li>• Rotational Development Programs</li> <li>• Senior Leadership Development Program (SLDP)</li> <li>• Program for Emerging Leaders (PEL)</li> <li>• University Outreach Initiative</li> </ul>
<b>FY 2021 Anticipated Accomplishments</b>	<ul style="list-style-type: none"> <li>• Ensure FAA leadership skills continue to evolve as the technologies and strategic priorities of the organization change.</li> <li>• Continue implementing enterprise level, innovative approaches to leadership development to build a solid pipeline of future leaders, and provide existing leaders the tools needed to deliver transformational leadership in support of the FAA mission.</li> <li>• Enhance the available learning services available to all FAA employees through the eLMS.</li> </ul>

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

<b>The Office of Accountability and Strategic Business Management</b>	
<b>Critical Responsibilities</b>	Management accountability in response to allegations; strategic communications, project management; processes/procedures enabling proactive, data driven decision-making across AHR.
<b>Key Activities</b>	<ul style="list-style-type: none"> <li>• FAA Accountability Board</li> <li>• FAA HR Data Reporting</li> <li>• FAA FedView Survey Administration</li> <li>• Awards (monetary, time off and length of service)</li> <li>• AHR Financial Contracts &amp; Records Management</li> <li>• AHR Business Management &amp; Planning</li> </ul>
<b>FY 2021 Anticipated Accomplishments</b>	<ul style="list-style-type: none"> <li>• Continue to foster a workplace free of harassment and inappropriate behavior through investigation and adjudicating allegations of employee misconduct.</li> <li>• Execute action plans for increased employee engagement across the FAA.</li> <li>• Ensure AHR compliance with IT systems, budget, contracting and financial rules and regulations</li> <li>• Develop executive level strategic partnerships and communications.</li> <li>• Provide HR data reports and analysis to support FAA-wide human capital decision-making.</li> </ul>

**Program Increases:**

The FY 2021 budget request for AHR includes additional funding for the following programmatic initiatives.

<b>Discretionary Adjustments</b>	<b>Amount (\$000)</b>	<b>FTP</b>	<b>FTE</b>
STEM AVSED Program	760	-	-
<b>AHR Total</b>	<b>\$760</b>	-	-

**STEM AVSED Program:** Funding of \$760,000 is to increase support for the Science, Technology, Engineering, and Math Aviation and Space Education program (STEM AVSED). AHR will provide support for the development of materials and routine educational supplies. The events listed all reflect the STEM AVSED Program's effort to address and align with the Reauthorization Act of 2018.



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

	<b>Region</b>	<b>Regional Support</b>
Supplies for Regional Offices	All	\$ 165,000
Commercial Space Outreach Support	AWP	\$ 30,000
Team America Rocketry Challenge	All	\$ 20,000
Global Leadership Initiative/ICAO	AAL	\$ 30,000
Walk In My Boots Job Shadow	All	\$ 10,000
EAA KidVenture	AGL	\$ 40,000
Sun N Fun	ASW	\$ 40,000
Aviation Ambassador Program	ACE	\$ 40,000
Drone 2020 Challenges	ASO	\$ 20,000
Senior Consulting	All	\$ 120,000
AOPA High School Initiative	All	\$ 10,000
National Coalition of Certification Centers	All	\$ 15,000
Women In Aviation	All	\$ 10,000
2 day training for Regional AVSED Reps.	All	\$ 30,000
1 day training for employees	All	\$ 30,000
Website Design and Support	All	\$ 150,000
<b>Total</b>		<b>\$ 760,000</b>

(See also "Operations Summary" for a detailed description of the Program Increase requests.)

**What benefits will be provided to the American public through this request and why is this program necessary?**

Funding at the requested level is critical to continue providing personnel services to all FAA employees. The non-pay costs within AHR's budget include systems like CASTLE for time and attendance and FAA's learning management system. AHR also supports the Employee Assistance Program, the FAA's Accountability Board, and the Agency's worker's and unemployment compensation program, all of which are necessary for FAA's lines of business to be successful.

With FAA's core mission of aviation safety, AHR is the lead office with responsibility for attracting, recruiting, and hiring qualified US citizens to fill safety critical positions, to ensure the traveling public is supported by a system which is safe and secure. At the requested level, AHR will be able to support the FAA and achieve and sustain the required level of employees at the right level of qualification and expertise necessary to maintain the safety of the aviation system.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

	Dollars (in Thousands)	FTP	OTFTP	FTE
<b>FY 2020 Enacted</b>	<b>\$248,507</b>	<b>1,179</b>	<b>22</b>	<b>1,172</b>
<b>Adjustments to Base</b>	<b>\$12,732</b>	<b>-</b>	<b>-</b>	<b>-</b>
Annualization of FY 2020 Pay Raise 3.1%	1,271	-	-	-
FY 2021 Pay Raise 1.0%	1,473	-	-	-
FY 2021 Cash Awards Increase 1.0%	848	-	-	-
FY 2021 FERS Increase	1,400	-	-	-
One Less Compensable Day 261	-576	-	-	-
Working Capital Fund	2,080	-	-	-
Restoration of Cuts Resulting from FY 2020 Pay Raise	6,236	-	-	-
<b>Discretionary Adjustments</b>	<b>\$3,915</b>	<b>13</b>	<b>-</b>	<b>7</b>
Improving Aviation Safety Oversight 50 FTP/50 FTE	400	-	-	-
UAS 15 FTP/8 FTE	715	2	-	1
Community Noise Engagement 3 FTP/2 FTE	1,300	3	-	2
STEM AVSED Program 8 FTP/4 FTE	1,500	8	-	4
<b>Base Transfers</b>	<b>\$0</b>	<b>-2</b>	<b>-</b>	<b>-2</b>
Staffing Reassignment FAA to OST 2 FTP/2 FTE	-	-2	-	-2
<b>FY 2021 Request</b>	<b>\$265,154</b>	<b>1,190</b>	<b>22</b>	<b>1,177</b>

\*<sup>1</sup>Footnote: FY 2020 Enacted includes (see below)

**Annualization of FY 2020 Pay Raise:** This increase is required to provide for costs associated with base salary increases (October - December) resulting from the government-wide pay raise. The factor used is 0.25 of 3.1 percent.

**FY 2021 Pay Raise:** This increase is required to provide for costs associated with base salary increases resulting from the proposed government-wide pay raise of 1.0 percent.

**FY 2021 Cash Awards Increase 1.0%:** This increase is required for costs associated with an Administration proposal to increase pay for performance in FY 2021.

**FY 2021 FERS Increase:** This increase is required to provide for costs associated with the agency's contribution rates to the Federal Employees Retirement System (FERS). The agency FERS contribution increased for both Air Traffic Controllers and regular agency employees.

**One Less Compensable Day (261 days):** There are 261 Compensable days in FY 2021 vs. 262 days in FY 2020.

**Working Capital Fund:** This cost adjustment funds the Department of Transportation's Working Capital Fund estimates for the FAA.

<sup>1</sup> Staffing Reassignment (AFN to AAE): The FY 2021 President's Budget Submission includes the FY 2020 transfer of 1FTP/1FTE with \$203,000 in funding from the Office of Finance and Management (AFN) to the Office of Audit and Evaluation (AAE).

**Federal Aviation Administration**  
**FY 2021 President's Budget Submission**

---

**Restoration of Cuts Resulting from FY 2020 Pay Raise:** This adjustment to base restores one-time FY 2020 budget cuts that were necessary to absorb the FY 2020 pay raise.

**Improving Aviation Safety Oversight:** Funding to improve the FAA's safety oversight. The funding will enable the FAA to hire employees with aviation safety technical expertise and address any recommendations identified through the 737 MAX Investigation and reviews. Funding for Aviation Safety Information will provide a central investigation repository and allow the FAA to meet standard reporting requirements and promptly and consistently reply to congressional and Office of the Inspector General (OIG) inquiries as well as process and report on data as it pertains to whistleblower notifications. This request supports a new Organization Designation Authorization (ODA) Office which will provide oversight and ensure the consistency of the FAA's audit functions under the ODA program across AVS.

**Unmanned Aircraft Systems (UAS):** The increase will allow the FAA to expand efforts to engage with the many operational, security, regulatory, and communication issues raised by the development of the Unmanned Aircraft Systems.

**Community Noise Engagement:** This will establish a strategic long-term Community Engagement approach to mitigate noise complaints from past projects and to prepare for those anticipated from new emerging technologies (e.g., UAS, Commercial Space, etc.) in the NAS.

**STEM AVSED Program:** This request re-establishes a robust Science, Technology, Engineering, and Math Aviation and Space Education program (STEM AVSED) outreach program to address the future shortage of aviation technical professionals. The program will expose students to aviation and aerospace career options while promoting STEM learning.

**Staffing Reassignment (FAA to OST):** This request transfers staff from the Federal Aviation Administration to the Office of the Secretary of Transportation (2FTP/2FTE- 1 from AGI and 1 from AOC).



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**FACILITIES AND EQUIPMENT  
(AIRPORT AND AIRWAY TRUST FUND)**

For necessary expenses, not otherwise provided for, for acquisition, establishment, technical support services, improvement by contract or purchase, and hire of national airspace systems and experimental facilities and equipment, as authorized under part A of subtitle VII of title 49, United States Code, including initial acquisition of necessary sites by lease or grant; engineering and service testing, including construction of test facilities and acquisition of necessary sites by lease or grant; construction and furnishing of quarters and related accommodations for officers and employees of the Federal Aviation Administration stationed at remote localities where such accommodations are not available; and the purchase, lease, or transfer of aircraft from funds available under this heading, including aircraft for aviation regulation and certification; to be derived from the Airport and Airway Trust Fund, [\$3,045,000,000] \$3,000,000,000, of which [\$515,000,000] \$550,000,000 shall remain available until September 30, [2021]2022, and [\$2,409,473,000]\$2,450,000,000 shall remain available until September 30, [2022]2023[, and \$120,527,000 shall remain available until expended]: *Provided*, That there may be credited to this appropriation funds received from States, counties, municipalities, other public authorities, and private sources, for expenses incurred in the establishment, improvement, and modernization of national airspace systems: *Provided further*, That not later than 60 days after submission of the budget request, the Secretary of Transportation shall transmit to the Congress an investment plan for the Federal Aviation Administration which includes funding for each budget line item for fiscal years [2021 through 2025] 2022 through 2026, with total funding for each year of the plan constrained to the funding targets for those years as estimated and approved by the Office of Management and Budget.

*(Department of Transportation Appropriations Act, 2020.)*

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

**Program and Financing**  
(in millions of dollars)

Identification code: 69-8107-0-7-402		FY 2019 Actual	FY 2020 Estimate	FY 2021 Estimate
<b>Obligations by program activity:</b>				
Direct program:				
0001	Engineering, development, test and evaluation .....	163	241	204
0002	Procurement and modernization of (ATC) facilities and equipment .....	1,859	2,278	1,934
0003	Procurement and modernization of non-ATC facilities and equipment .....	208	221	187
0004	Mission support.....	238	271	230
0005	Personnel and related expenses.....	503	540	550
0007	Spectrum Efficient National Surveillance Radar (SENSR).....	10	20	.....
0008	2017 Hurricanes/2018 Supplemental .....	30	30	11
0100	Subtotal, direct program.....	3,011	3,601	3,116
0799	Total Direct obligations .....	3,011	3,601	3,116
0801	Facilities and Equipment (Airport and Airways Trust Fund) .....	96	87	87
0900	Total new obligations, unexpired accounts.....	3,107	3,688	3,203
<b>Budgetary resources: Unobligated balance:</b>				
1000	Unobligated balance brought forward, Oct 1 .....	2,012	2,062	1,508
1001	Discretionary unobligated balance brought fwd Oct 1 .....	1,992	.....	.....
1020	Adjustment of unobligated balance brought forward .....	1	.....	.....
1021	Recoveries of prior year unpaid obligations .....	68	.....	.....
1033	Recoveries of prior year paid obligations .....	.....	.....	.....
1050	Unobligated balance.....	2,081	2,062	1,508
<b>Budget authority: Appropriations, discretionary:</b>				
Appropriations discretionary:				
1101	Appropriation (special or trust fund) .....	3,000	3,045	3,000
Spending authority from offsetting collections, discretionary:				
1700	Collected .....	58	89	89
1701	Change in uncollected payment, Federal sources .....	11	.....	.....
1750	Spending authority from offsetting collections, disc (total).....	69	89	89
Spending authority from offsetting collections, mandatory.....				
1800	Collected .....	25	.....	.....
1900	Budget authority (total) .....	3,094	3,134	3,089
1930	Total budgetary resources available.....	5,175	5,196	4,597
Memorandum (non – add) entries:				

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Identification code: 69-8107-0-7-402		FY 2019 Actual	FY 2020 Estimate	FY 2021 Estimate
1940	Unobligated balance expiring .....	-6	.....	.....
	Special and non-revolving trust funds:			
1941	Unexpired Unobligated balance, end of year .....	2,062	1,508	1,394
1950	Other balances withdrawn and returned to unappropriated receipts .....	23	.....	.....
1951	Unobligated balance expiring .....	6	.....	.....
1952	Expired Unobligated balance, start of year .....	54	84	84
1953	Expired Unobligated balance, end of year .....	78	84	84
1954	Unobligated balance canceling .....	23	.....	.....
<b>Change in obligated balances:</b>				
3000	Unpaid obligations, brought forward, Oct 1 .....	2,036	2,106	2,499
3001	Adjustments to unpaid obligations, brought forward Oct 1 .....	1	.....	.....
3010	Obligations incurred, unexpired accounts.....	3,107	3,668	3,203
3011	Obligations incurred, expired accounts.....	3	.....	.....
3020	Outlays (gross) .....	-2,924	-3,295	-3,384
3040	Recoveries of prior year unpaid obligations, unexpired	-68	.....	....
3041	Recoveries of prior year unpaid obligations, expired ...	-49	.....	.....
3050	Unpaid obligations, end of year .....	2,106	2,499	2,318
	Uncollected payments:			
3060	Uncollected pymts, Fed sources, brought forward, Oct 1.....	-76	-71	-71
3061	Adjustment to uncollected pymts, Fed sources brought forward , Oct 1	-2	.....	.....
3070	Change in uncollected pymts, Fed sources, unexpired .	-11	.....	.....
3071	Change in uncollected pymts, Fed sources, expired .....	18	.....	.....
3090	Uncollected pymts, Fed sources, end of year.....	-71	-71	-71
	Memorandum (non-add) entries:			
3100	Obligated balance, start of year.....	1,959	2,035	2,428
3200	Obligated balance, end of year.....	2,035	2,428	2,247
<b>Budget Authority and outlays, net:</b>				
4000	Budget authority, gross .....	3,069	3,134	3,089
4010	Outlays from new discretionary authority .....	885	1,352	1,357
4011	Outlays from discretionary balances .....	2,030	1,928	2,023
4020	Outlays, gross (total) .....	2,915	3,280	3,380
<b>Offsets:</b>				
	Against gross budget authority and outlays:			
	Offsetting collections (collected) from:			
4030	Federal sources .....	-49	-39	-39
4033	Non-Federal sources .....	-27	-50	-50
4040	Offsets against gross budget authority and outlays (total) .....	-76	-89	-89
	Additional offsets against gross budget authority only:			
4050	Change in uncollected pymts, Fed sources, unexpired .	-11	.....	.....

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Identification code: 69-8107-0-7-402		FY 2019 Actual	FY 2020 Estimate	FY 2021 Estimate
4052	Offsetting collections credited to expired accounts .....	18	.....	.....
4060	Additional offsets against budget authority only (total)	7	.....	.....
4070	Budget authority, net (discretionary) .....	3,000	3,045	3,000
4080	Outlay, net (discretionary) .....	2,839	3,191	3,291
4090	Budget Authority, gross	25	.....	.....
4101	Outlays from mandatory balances.....	9	15	4
Offsets against gross budget authority and outlays:				
Offsetting collections (collected) from:				
4120	Federal sources (Spectrum 011-X-5512000) .....	-25	.....	.....
4180	Budget authority, net (total) .....	3,000	3,045	3,000
4190	Outlay, net (total) .....	2,823	3,206	3,295
<b>Memorandum (non-add) entries:</b>				
5090	Unexpired unavailable balance, SOY Offsetting collections .....	3	3	3
5092	Unexpired unavailable balance, EOY Offsetting collections .....	3	3	3

Funding in this account provides for the deployment of communications, navigation, surveillance, and related capabilities within the National Airspace System (NAS). This includes funding for several activities of the Next Generation Air Transportation System, a joint effort between the Department of Transportation, the National Aeronautics and Space Administration, and the Departments of Defense, Homeland Security, and Commerce to improve the safety, capacity, security, and environmental performance of the NAS. The funding request supports the Federal Aviation Administration's comprehensive plan for modernizing, maintaining, and improving air traffic control and airway facilities services.



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

**Object Classification**  
(in millions of dollars)

Identification code: 69-8107-0-7-402	FY 2019 Actual	FY 2020 Estimate	FY 2021 Estimate
Direct obligations:			
Personnel compensation:			
11.1 Full-time permanent.....	323	355	364
11.3 Other than full-time permanent.....	2	1	1
11.5 Other personnel compensation.....	8	8	9
11.9 Total personnel compensation .....	333	364	374
12.1 Civilian personnel benefits .....	105	121	128
21.0 Travel and transportation of persons.....	45	37	31
22.0 Transportation of things .....	2	3	3
23.2 Rental payments to others.....	29	48	41
23.3 Communications, utilities, and miscellaneous charges	79	55	47
25.1 Advisory and assistance services .....	1,599	2,118	1,776
25.2 Other services from non-federal sources .....	198	155	134
25.3 Other goods and services from federal sources .....	19	52	44
25.4 Operation and maintenance of facilities .....	112	98	82
25.5 Research and development contracts .....	.....	1	1
25.7 Operation and maintenance of equipment .....	71	77	65
25.8 Subsistence and support of persons .....	.....	1	1
26.0 Supplies and materials .....	41	40	33
31.0 Equipment.....	206	246	205
32.0 Land and structures .....	169	181	148
41.0 Grants, subsidies, contributions .....	1	4	3
43.0 Interest and dividends	2	.....	.....
99.0 Subtotal, obligations, Direct obligations.....	3,011	3,601	3,116
99.0 Subtotal, obligations, Reimbursable obligations .....	96	87	87
99.9 Total new obligations, unexpired accounts.....	3,107	3,688	3,203

**Employment Summary**

Identification code: 69-8107-0-7-402	FY 2019 Actual	FY 2020 Estimate	FY 2021 Estimate
1001 Direct civilian full-time equivalent employment .....	2,586	2,628	2,660
2001 Reimbursable civilian full-time equivalent employment	50	50	50

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**EXHIBIT III-1**

**FACILITIES and EQUIPMENT  
SUMMARY BY PROGRAM ACTIVITY  
Appropriations, Obligations Limitations, and Exempt Obligations  
(\$000)**

	<b>FY 2019 <u>Actual</u></b>	<b>FY 2020 <u>Enacted</u></b>	<b>FY 2021 <u>Request</u></b>	<b>Change FY 2020-2021</b>
Engineering, Development, Test and Evaluation	194,300	218,100	153,600	-64,500
Air Traffic Control Facilities and Equipment	1,849,777	1,870,800	1,794,100	-76,700
Non-Air Traffic Control Facilities and Equipment	204,700	203,400	264,600	61,200
Facilities and Equipment Mission Support	238,400	237,700	237,700	0
Personnel and Related Expenses	512,823	515,000	550,000	35,000
<b>TOTAL</b>	<b>3,000,000</b>	<b>3,045,000</b>	<b>3,000,000</b>	<b>-45,000</b>
FTEs				
Direct Funded	2,586	2,628	2,660	32
Reimbursable	50	50	50	0

## **Program and Performance Statement**

This account provides funds for programs that improve operational efficiency, constrain costs, modernize automation and communication technology and systems, and deal with aging facilities. Particular emphasis is placed on en route and terminal air traffic control, satellite navigation and landing systems, and communications.

Funding is organized within the following activity areas of FAA:

Activity 1: Engineering, Development, Test and Evaluation

Activity 2: Procurement and Modernization of Air Traffic Control Facilities and Equipment

Activity 3: Procurement and Modernization of Non-Air Traffic Control Facilities and Equipment

Activity 4: Facilities and Equipment Mission Support

Activity 5: Personnel and Related Expenses

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

**EXHIBIT III-1a**

**FACILITIES and EQUIPMENT  
SUMMARY ANALYSIS OF CHANGE FROM FY 2020 TO FY 2021  
Appropriations, Obligations Limitations, and Exempt Obligations  
(\$000)**

<b>Item</b>	<b>Change from FY 2020 to FY 2021 (\$000)</b>	<b>Change from FY 2020 to FY 2021 (FTE)</b>
<b>FY 2020 Enacted</b>	<b>\$3,045,000</b>	<b>2,628</b>
Annualization of FY 2020 Pay Raise	3,757	
FY 2021 Cash Awards Increase	652	
FY 2021 Pay Raise	3,636	
One Less Compensable Day (261 Days)	-1,680	
Working Capital Fund	1	
Annualization of FY 2020 Hiring	5,595	32
FY 2021 FERS	4,015	
Restoration of Cuts resulting from FY 2020 Pay Raise	19,024	
<b>Subtotal, Adjustments to Base</b>	<b>\$35,000</b>	<b>32</b>
<b>PROGRAM REDUCTIONS</b>		
Engineering, Development, Test and Evaluation	-64,500	
Air Traffic Control Facilities and Equipment	-76,700	
Non-Air Traffic Control Facilities and Equipment		
Facilities and Equipment Mission Support		
Personnel and Related Expenses		
<b>Subtotal, Program Reductions</b>	<b>-\$141,200</b>	<b>0</b>
<b>NEW OR EXPANDED PROGRAMS</b>		
Engineering, Development, Test and Evaluation		
Air Traffic Control Facilities and Equipment		
Non-Air Traffic Control Facilities and Equipment	61,200	
Facilities and Equipment Mission Support		
Personnel and Related Expenses		
<b>Subtotal, New or Expanded Programs</b>	<b>\$61,200</b>	
<b>FY 2021 REQUEST</b>	<b>\$3,000,000</b>	<b>2,660</b>

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Facilities and Equipment (F&E) Index**

	<b>Amount</b>	<b>Page</b>
<b>Activity 1, Engineering, Development, Test and Evaluation</b>		
1A01 Advanced Technology Development and Prototyping	\$26,600,000	19
1A02 William J. Hughes Technical Center Laboratory Sustainment	\$16,900,000	24
1A03 William J. Hughes Technical Center Infrastructure Sustainment	\$10,000,000	27
1A04 NextGen – Separation Management Portfolio	\$21,200,000	30
1A05 NextGen – Traffic Flow Management Portfolio	\$8,000,000	34
1A06 NextGen – On Demand NAS Portfolio	\$10,500,000	37
1A07 NextGen – NAS Infrastructure Portfolio	\$15,000,000	40
1A08 NextGen – NextGen Support Portfolio	\$8,400,000	43
1A09 NextGen – Unmanned Aircraft Systems	\$22,000,000	45
1A10 NextGen – Enterprise, Concept Development, Human Factors, and Demonstrations Portfolio	\$15,000,000	48
<b>Total, Activity 1</b>	<b>\$153,600,000</b>	

**Activity 2, Procurement and Modernization of Air Traffic Control Facilities and Equipment**

2A01 En Route Modernization (ERAM) – System Enhancements and Technology Refresh	\$66,900,000	51
2A02 En Route Communications Gateway (ECG)	\$2,350,000	54
2A03 Next Generation Weather Radar (NEXRAD)	\$3,600,000	56
2A04 ARTCC and CCF Building Improvements	\$101,200,000	58
2A05 Air/Ground Communications Infrastructure	\$7,850,000	61
2A06 Air Traffic Control En Route Radar Facilities Improvements	\$7,500,000	63
2A07 Oceanic Automation System	\$9,150,000	65
2A08 Next Generation Very High Frequency Air/Ground Communications System (NEXCOM)	\$40,000,000	67
2A09 System-Wide Information Management (SWIM)	\$31,050,000	69
2A10 ADS-B NAS Wide Implementation	\$170,000,000	71
2A11 Windshear Detection Service	\$2,500,000	74
2A12 Air Traffic Management Implementation Portfolio	\$56,000,000	76
2A13 Time Based Flow Management Portfolio (TBFM)	\$16,250,000	79
2A14 Next Generation Weather Processor	\$24,300,000	82
2A15 Airborne Collision Avoidance System X (ACASX)	\$5,100,000	84
2A16 Data Communications in Support of NextGen	\$99,800,000	86

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

2A17	Reduced Oceanic Separation	\$10,450,000	90
2A18	En Route Service Improvements	\$2,000,000	92
2A19	Commercial Space Integration	\$11,000,000	94
2B01	Standard Terminal Automation Replacement System (STARS) (TAMR Phase 1)	\$74,900,000	96
2B02	Terminal Automation Program	\$3,900,000	98
2B03	Terminal Air Traffic Control Facilities – Replace	\$55,000,000	100
2B04	ATCT/Terminal Radar Approach Control (TRACON) Facilities – Improve	\$84,600,000	102
2B05	NAS Facilities OSHA and Environmental Standards Compliance	\$28,900,000	104
2B06	Integrated Display System (IDS)	\$30,000,000	107
2B07	Terminal Flight Data Manager (TFDM)	\$79,050,000	110
2B08	Performance Based Navigation Support Portfolio	\$8,000,000	114
2B09	Unmanned Aircraft System (UAS) Implementation	\$26,600,000	116
2B10	Surface Surveillance Portfolio Sustain 1	\$30,350,000	119
2B11	Terminal and En Route Surveillance Portfolio	\$78,600,000	121
2B12	Terminal and Enroute Voice Switch and Recorder Portfolio	\$43,400,000	126
2B13	Enterprise Information Platform	\$10,500,000	129
2C01	Automated Surface Observing System (ASOS)	\$5,000,000	132
2C02	Future Flight Service Program (FFSP)	\$17,800,000	134
2C03	Alaska Flight Service Facilities Modernization (AFSFM)	\$2,650,000	137
2C04	Juneau Airport Wind System (JAWS) – Technology Refresh	\$1,000,000	139
2D01	VHF Omnidirectional Radio Range (VOR) Minimum Operation Network(MON)	\$19,000,000	141
2D02	Wide Area Augmentation System (WAAS) for GPS	\$83,900,000	143
2D03	Runway Safety Areas – Navigational Mitigation	\$1,800,000	147
2D04	Landing and Lighting Portfolio	\$68,950,000	149
2D05	DME, VORTAC, TACAN, Portfolio	\$10,000,000	154
2E01	Fuel Storage Tank Replacement and Management	\$32,400,000	156
2E02	Unstaffed Infrastructure Sustainment	\$60,200,000	158
2E03	Aircraft Replacement and Related Equipment Program	\$36,100,000	160
2E04	Airport Cable Loop Systems – Sustained Support	\$9,000,000	163
2E05	Alaskan Satellite Telecommunications Infrastructure (ASTI)	\$1,000,000	165
2E06	Real Property Disposal	\$4,800,000	167
2E07	Electrical Power System – Sustain/Support	\$149,400,000	169
2E08	Energy Management and Compliance (EMC)	\$7,400,000	174

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

2E09	Child Care Center Sustainment	\$1,000,000	176
2E10	FAA Enterprise Network Services (FENS)	\$34,700,000	178
2E11	National Airspace System Risk and Performance Portfolio	\$15,900,000	180
2E12	Time Division Multiplexing (TDM)-to-Internet Protocol (IP) Migration	\$11,300,000	183
<b>Total, Activity 2</b>		<b>\$1,794,100,000</b>	

**Activity 3, Procurement and Modernization of Non-Air Traffic Control Facilities and Equipment**

3A01	Hazardous Materials Management	\$27,500,000	185
3A02	Aviation Safety Analysis System (ASAS)	\$23,500,000	187
3A03	National Air Space Recovery Communications (RCOM)	\$12,000,000	190
3A04	Facility Security Risk Management	\$24,400,000	192
3A05	Information Security	\$18,500,000	194
3A06	System Approach for Safety Oversight (SASO)	\$29,200,000	197
3A07	Aviation Safety Knowledge Management Environment (ASKME)	\$9,700,000	200
3A08	Aerospace Medical Equipment Needs (AMEN)	\$28,300,000	202
3A09	NextGen - System Safety Management Portfolio	\$21,500,000	205
3A10	National Test Equipment Program (NTEP)	\$3,000,000	208
3A11	Mobile Assets Management Program	\$2,500,000	210
3A12	Aerospace Medicine Safety Information System (AMSIS)	\$20,200,000	212
3A13	Configuration, Logistics, and Maintenance Resource Solutions (CLMRS)	\$29,300,000	215
3B01	Aeronautical Center Infrastructure Modernization	\$14,000,000	218
3B02	Distance Learning	\$1,000,000	220
<b>Total, Activity 3</b>		<b>\$264,600,000</b>	

**Activity 4, Facilities and Equipment Mission Support**

4A01	System Engineering and Development Support	\$39,100,000	222
4A02	Program Support Leases	\$48,000,000	225
4A03	Logistics Support Services (LSS)	\$12,000,000	227
4A04	Mike Monroney Aeronautical Center Leases	\$21,100,000	229
4A05	Transition Engineering Support	\$17,000,000	231
4A06	Technical Support Services Contract (TSSC)	\$28,000,000	233
4A07	Resource Tracking Program (RTP)	\$8,000,000	235

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

4A08	Center for Advanced Aviation System Development (CAASD)	\$57,000,000	237
4A09	Aeronautical Information Management Program	\$7,500,000	240
	<b>Total, Activity 4</b>	<b>\$237,700,000</b>	
5A01	Personnel and Related Expenses	\$550,000,000	242
	<b>Total, All Activities</b>	<b>\$3,000,000,000</b>	



## **Executive Summary – Facilities and Equipment (F&E) Budget Summary**

### **What is this program and what does this funding level support?**

---

The FY 2021 President's budget requests \$3.0 billion to enable FAA to meet the challenge of both maintaining the capacity and safety of the current National Airspace System (NAS) while continuing its comprehensive system modernization. This request includes \$800.9 million for Next Generation Air Transportation System (NextGen) capital related investments. The remainder of the investment will be in legacy areas to sustain current systems, including maintaining aging infrastructure, power systems, information technology, navigational aids, communications, surveillance, and weather systems.

The F&E budget is structured around five activities that group programs according to a common purpose. NextGen and Legacy Programs are found across all five activities and are specifically identified as such further in this overview.

#### **Activity 1 - Engineering, Development, Test and Evaluation:**

\$153.6 million is requested for the FY 2021 President's budget request to support initial research, and test facilities. This represents a decrease of \$64.5 million from the enacted budget of \$218.1 million for FY 2020. The primary reason for the decrease is that pre-implementation work is a lower priority under the Facilities and Equipment account at reduced funding levels.

Activity 1 programs are undertaken to validate operational concepts and proof-of-concept systems and equipment prior to making decisions about moving forward on capital investments that will be deployed across the NAS.

#### **Activity 2 - Procurement and Modernization of Air Traffic Control Facilities and Equipment:**

\$1,794.1 billion is requested for the FY 2021 President's budget request to perform modernization of air traffic control facilities, systems, and equipment, and to support infrastructure upgrades, system replacements, and technology refresh at manned and unmanned facilities. This represents a decrease of \$76.7 million from the enacted budget of \$1,870.8 million for FY 2020.

Activity 2 supports major systems acquisitions and facilities infrastructure programs in the implementation phase. These programs and initiatives fund the procurement and modernization of air traffic control facilities and equipment, including all funding related to the acquisition of air traffic control facilities, navigation and landing aids, surveillance equipment and facilities, automation systems, and communications systems and equipment. Activity 2 funding will support the following work:

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

- Upgrades to existing equipment
- Acquiring production systems to replace existing systems, extend serviceable life, or technology refresh system components
- Deploying systems for installation or transition to operational status
- Deploying new, satellite-based technologies such as Automatic Dependent Surveillance-Broadcast (ADS-B) and Wide Area Augmentation Systems (WAAS)
- Deploying communications infrastructure to provide surveillance and navigation services
- Replacing or modernizing manned and unmanned ATC facilities
- Replacing or modernizing automation, communications, navigation, surveillance/weather infrastructure, systems, and equipment
- Decommissioning and disposal of the systems and facilities that have been replaced

**Activity 3 - Procurement and Modernization of Non-Air Traffic Control Facilities and Equipment:**

\$264.6 million is requested for the FY 2021 President's budget request to support modernization of non-air traffic control facilities, business systems, and equipment. This represents an increase of \$61.2 million from the enacted budget of \$203.4 million for FY 2020. The primary reason for the increase is that a new budget line item was established under this activity in support of logistics and maintenance. These interdependent projects were moved from Activity 2.

The programs under Activity 3 support safety, regulation, security, information technology security, and regional and service center building infrastructure and support.

**Activity 4 – Facilities and Equipment Mission:**

\$237.7 million is requested for the FY 2021 President's budget request to provide system wide integration, transition engineering, and technical contractual support in direct support of system acquisition or installation. This request is the same amount as the enacted amount for FY 2020. This will provide for the following:

- Transition engineering, integration, and support
- NAS integrated logistics support
- Technical support services for implementation
- Program Support and Aeronautical Center Leases

**Activity 5 - Personnel, Compensation, Benefits, and Travel (PCB&T):**

\$550.0 million is requested for the FY 2021 President's budget request to provide for the direct cost of federal salaries, benefits, travel, related personnel costs of FAA employees supporting all capital projects under the F&E account. This amount represents an increase of \$35.0 million above the enacted amount of \$515.0 million for FY 2020.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

This President's budget request includes funding for critical system and facility infrastructure and takes into account the near term priorities identified by the NextGen Advisory Committee. As we work with our industry partners to take aviation into the future, it is critical that FAA carefully balance the need for sustaining the current infrastructure with the need to advance NextGen and to continue achieving ongoing benefits to users.

### **NextGen**

NextGen is not a single program but rather a portfolio of programs, systems, and procedures at different levels of maturity that will provide enhanced capabilities for the movement and management of Air Traffic. The work in the portfolio is being deployed in stages. Some enhancements are currently in deployment, some are nearing implementation, and some of the capabilities of NextGen are being defined and matured as the technology to support them becomes available (Pre-Implementation).

**Pre-Implementation** - \$100.1 million is requested to continue multiple basic and applied research efforts in support of future NextGen technologies and concepts. This represents a decrease of \$42.1 million from the enacted amount of \$142.2 for FY2020.

**Implementation** - \$628.1 million is requested to continue the implementation of NextGen programs that have achieved or are near a Final Investment Decision (FID). This represents a decrease of \$190.8 million from the enacted amount of \$818.7 million for FY 2020. This reduction is attributed to the operationalizing of NextGen. As NextGen has progressed over the last several years, more programs have transitioned into the implementation phase.

- **En Route Automation Modernization Technology Refresh (ERAM):** \$66.9 million is requested to perform critical component replacements as necessary in order to ensure En Route's continued supportability and security.
- **System-Wide Information Management (SWIM):** \$31.1 million is requested to continue the implementation of an information management and data sharing system for FAA's internal and external stakeholders.
- **Automatic Dependent Surveillance Broadcast (ADS-B):** \$170.0 million is requested for the continued implementation of satellite-based surveillance capabilities that will provide a more complete picture of airspace conditions and more accurate position data of aircraft.
- **Air Traffic Management Implementation Portfolio:** \$56.0 million is requested to continue software enhancements designed to deliver improvements on existing capabilities and new modeling functions for the Traffic Flow Management System (TFMS).
- **Time Based Flow Management (TBFM):** \$16.3 million is requested to maximize traffic flow and airport usage by improving flow management into and out of the busy metropolitan airspaces and corresponding airports.
- **Data Communications:** \$99.8 million is requested for data communications, to deploy a text-based data communication system in the En Route domain.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

- **NextGen Weather Processor (NWP):** \$24.3 million is requested to establish a common weather processing platform that will functionally replace the legacy FAA weather processor systems and host new capabilities in all FAA Towers, Terminal Radar Approach Control (TRACON) Facilities, and Air Route Traffic Control Centers.
- **Reduced Oceanic Separation (ROS):** \$10.5 million is requested to increase the use of current separation standards and potentially reduce separation in Oceanic Flight Information Regions
- **Terminal Flight Data Manager (TFDM):** \$79.1 million is requested to provide an integrated approach to maximize the efficient collection, distribution, and update of data supporting flight information in the terminal area (airspace around an airport and airport surface data).
- **Performance Based Navigation:** \$8.0 million is requested to install distance measuring equipment to fill in coverage gaps and provide resilient Area Navigation (RNAV) operations during Global Positioning System (GPS) outages.
- **Unmanned Aircraft Systems (UAS) Implementation:** \$26.6 million is requested for the implementation of small UAS (sUAS) capabilities in the NAS, including the operational transition of Low Altitude Authorization and Notification Capability (LAANC), and the FAA DroneZone IT platform that is required to support sUAS operations.
- **Implementation of Object Exchange and Enterprise Information Management:** \$10.5 million is requested for the continued development of the EIM platform capability and the continuation of the systems development life cycle (SDLC).
- **System Safety Management Portfolio:** \$21.5 million will support improvements to Safety Management Systems as a result of safety information discovered and shared through this portfolio.
- **Aeronautical Information Management Program (AIM):** \$7.5 million will support delivery of digital aeronautical information that enables the processing of data to improve mapping, flight planning, and the timeliness and accuracy of air traffic control instructions.

**NAS Facility Infrastructure Sustainment:**

FAA has a five billion dollar maintenance backlog for programs included in the Air Traffic Control (ATC) Facilities Sustainment Portfolio. \$585.8 million is requested to advance the state of good repair for FAA infrastructure facilities. This amount represents an increase of \$77.2 million compared to the enacted amount of 508.6 million for FY 2020. This infrastructure funding will improve and maintain the Facility Condition Index (FCI) ratings at FAA facilities that provide the backbone for the NAS and NextGen functionality. While the request represents a shift to re-invest resources in critical infrastructure, the deferred maintenance backlog is so large that additional incremental increases for these facilities are necessary in order to reduce FAA operational risk. This undertaking targets the following projects:

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

- **En Route Traffic Control Center (ARTCC) and Combined Control Facility (CCF) Building Improvements** - Projects will replace obsolete plant equipment and provide improved work areas at selected ARTCCs (21).
- **Air Traffic Control En Route Radar Facilities Improvements** - 157 Long Range Radar (LRR) surveillance facilities provide aircraft position information to FAA, to the Department of Defense, and Homeland Security for security monitoring of the NAS. The 66 LRRs established in the early 1950's have reached the end of their useful life.
- **Terminal Air Traffic Control Facilities Improve** - Initiates modifications, improvements, and repairs to Tower/TRACON facilities. System engineering, configuration management, facility planning, and facility condition assessment activities determine the projects to be accomplished and scheduling.
- **National Airspace Systems (NAS) Facilities Occupational Health and Safety Administration (OSHA) and Environmental Standards Compliance** – Funds initiatives that safeguard FAA personnel from occupational hazards and minimize the impact of FAA activities on the environment.
- **Fuel Storage Tank Replacement and Management** – Funding is requested for 153 tank unit replacements, modernization, and upgrades at approximately 63 locations across the US in support of electrical power systems.
- **Unstaffed Infrastructure Sustainment** - Program is responsible for sustaining more than 12,000 Communications, Surveillance, Navigation, Weather, and support sites across the country.
- **Facilities Decommissioning** – Program is responsible for final disposition of decommissioned infrastructures and associated property restorations.
- **Electrical Power Systems – Sustain/Support** - Is an infrastructure sustainment and renewal program that replaces and refurbishes components of the emergency power system and cable infrastructure to maintain and improve the overall electrical power quality, reliability, and availability.
- **Energy Management and Compliance (EMC)** – Program saves operational costs by installing advanced electric meters, monitoring energy and water consumption, developing cost-effective recommendations to reduce energy and water use, and implementing energy and water efficiency projects.
- **Facility Security Risk Management (FSRM)** - Implements standardized facility access and protective measures at all FAA staffed facilities.
- **Mobile Assets Management Program** - Provides easily transportable NAS equipment to establish, restore, or augment air traffic control operations. Funding will refurbish or replace 20 years old Mobile ATCT's.

**NAS System Sustainment:**

Funding of \$370.3 million is requested for Automation, Communication, Navigation/Landing, and Surveillance Air Traffic Control (ATC) systems infrastructure. This represents an increase of \$81.1 million above the enacted amount of \$289.1 million for FY 2020.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

These systems allow the NAS to operate at the highest safety standards and provide airline operators and general aviation the dependable ATC services they require. Providing continued safe and expected services to these users requires sustainment of the aging systems infrastructure. The inventory of radios supporting terminal communications is between 40 to 50 years old, voice switches used to communicate between pilots and air traffic controllers are 17 to 22 years of age, and on-airport radars are 15 to 20 years old. Of the 1,200 Instrument Landing Systems in operation today, 125 are over 25 years old. Funding is requested to replace unsupportable components and systems for this NAS System Infrastructure. As FAA progresses to satellite based services and technology, a number of these systems will continue to provide required support for advanced NextGen capabilities or to provide redundant and safety backup capabilities in the event of satellite service outages and interference. Included among these programs are:

- **Standard Terminal Automation Replacement System (STARS)** provides sustainment of a common and standardized automation system/software infrastructure across the NAS.
- **Next Generation Very High Frequency (VHF) Air/Ground Communications System (NEXCOM)** – This program will modernize the existing Air/Ground voice communication system using the limited available radio frequency spectrum more efficiently.
- **Voice Switch and Control System (VSCS)** – This is the existing legacy En Route voice switch and it will have to remain operational until the full deployment of a replacement system.
- **The VHF Omni-Directional Range (VOR) Minimum Operational Network (MON) Implementation Program** - Will conduct activities that will transition the legacy network of approximately 957 VORs to a MON of approximately 650 VORs with a target date of 2025.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

The procurement and modernization of the nation's air traffic control system was first highlighted in 1980 with the publication of the first NAS Modernization Plan. Since that time, FAA has replaced old technologies with new systems that perform required functions better and more efficiently. During this period, aviation services were extended to new, small and medium-sized localities through the expanded deployment of updated air traffic control technologies, equipment, and infrastructure at these locations.

FAA has met most of the cost and schedule goals for the programs within F&E. F&E programs contribute to the success of metrics that show a safe and efficient Airspace System and include runway incursion reduction, Air Traffic Control (ATC) system operational availability, and NAS on-time arrivals.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 1A01 Advanced Technology Development and Prototyping**

(\$000)

Activity/Component	FY 2019 Actual	FY 2020 Enacted	FY 2021 Request
Advanced Technology Development and Prototyping	\$33,000	\$40,900	\$26,600

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
A. Runway Incursion Reduction Program (RIRP)	---	\$3,000.0
B. System Capacity Planning and Improvements	---	2,000.0
C. Operations Concept Validation and Infrastructure Evolution	---	5,000.0
D. Major Airspace Redesign	---	3,000.0
E. Strategy and Evaluation	---	1,000.0
F. Dynamic Capital Planning	---	2,500.0
G. Operational Modeling Analysis and Data	---	2,000.0
H. Enterprise, Management, Integration, Planning and Performance	---	4,000.0
I. In-Service Engineering	---	2,900.0
J. Strategic Initiatives Analysis and Validation	---	1,200.0

**What is this program and what does this funding level support?**

FAA's Advanced Technology Development and Prototyping (ATDP) program develops and validates technology and systems that support safe and efficient air traffic services. For FY 2021, a total of \$26.6 million is requested to support the evolving air traffic system architecture and improvements in airport safety and capacity.

**A. Runway Incursion Reduction Program (RIRP)**

For FY 2021, \$3.0 million is requested for technology prototype development, testing, demonstration and documentation within the Runway Incursion Reduction Program (RIRP). This work will reduce risk to people and property, caused by collisions in the runway environment. The RIRP's objective is to discover research and innovative technologies that will detect the incorrect presence of an object in the Runway Safety Area at every airport, and deliver a directive cue to the individual who can take corrective action.

Consistent with standing National Transportation Safety Board recommendations, RIRP research emphasis will remain on testing the application of technology for pilot, controller, and vehicle operator situational awareness tools. Current initiatives include Runway Safety Assessment (RSA) studies such as Runway Incursion Prevention Shortfall Analysis (RIPSA) to identify candidate small-to-medium sized airports with historically high rates of Runway Incursions. Candidate technologies best suited to an airport based on causal factors encountered at that site (e.g. converging runways, ground vehicle operations, taxiway/runway hotspots, etc.) will be identified. In FY 2020, RIRP will continue the prototype operational evaluations of RIPSA technologies at candidate test locations in order to assess system suitability and performance.

### **B. System Capacity, Planning, and Improvements**

The program provides data and analyses on National Air Space (NAS) operations to help identify deficiencies and develop proposals to improve NAS performance. This program sponsors performance metric tasks as well as NAS performance and airport capacity studies where experts from the FAA, academia, and industry collaborate to analyze and develop recommendations for improving capacity and system efficiency, to reduce delays at specific airports. This work includes research, modelling, analysis of benefits of capital investment and future trends; and identifying the relationship factors between NAS modernization and industry performance. For FY 2021, \$2.0 million is requested to conduct:

- Performance metric and analysis support for the International Civil Aviation Organization (ICAO) and the Civil Air Navigation Services Organization (CANSO) Europe, Singapore, and others
- Capacity rate analysis tools used for planning and assessment of Traffic Management Initiatives
- Harmonized FAA/Airline Metrics Reporting (used for FAA/Customer forums on Capacity, Planning and Improvement)
- Initial Development of Operational Metrics for Commercial Space

### **C. Operations Concept Validation and Infrastructure Evolution**

As new concepts evolve, this program identifies operational gaps and potential technologies that could address these gaps. It conducts studies and analyses in operational focus areas to include Commercial Space Operations in the NAS, Evolution of Trajectory-Based Operations, and Time-Based Metering Operations with Advanced Rerouting. This program ensures that potential enhancements are operationally sound and captured in the Architecture plans for the NAS. In FY 2021, \$5.0 million is requested to conduct analysis and risk mitigation activities for the identified operational focus areas.



## **D. Major Airspace Redesign**

The purpose of this national initiative is to review, redesign and restructure airspace. The FAA prioritizes candidate airspace redesign projects to determine which projects provide the most benefits and develops criteria for assessing a project's system-wide impact. Redesign projects have taken on increased emphasis at both the national and regional levels to ensure that FAA is able to effectively manage the projected growth in demand at FAA facilities and airports.

For FY 2021, \$3.0 million will continue implementation of airspace redesign efforts that frequently result in changes in the number and shape of operational positions or sectors, including changes to sector, area, or facility boundaries. Required infrastructure changes can include communication modifications such as changes in frequencies, connectivity of a radio site to the control facility, controller-to-controller connectivity; surveillance infrastructure modifications to ensure proper radar coverage; automation modifications to the En-Route Automation Modernization (ERAM) data processing or flight data processing.

## **E. Strategy and Evaluation**

This program develops and maintains mathematical models of the NAS which are used to aid organizations throughout the FAA with analyses of proposed new investments, trade-off studies, and analyses of the impacts of changes in operational conditions (e.g., weather, air carrier schedules, commercial space operations, etc.) on NAS performance. The FAA and contractors use a NAS-wide model, known as the System-Wide Analysis Capability (SWAC) to analyze advanced Air Traffic Management (ATM) concepts and aid with NextGen program trade-off studies, investment analyses, and NAS performance analyses. SWAC is being enhanced to support new modeling capabilities and analysis. In addition, an airport capacity model, Airfield Delay Simulation Model (ADSIM+), is being developed for use in analyzing new airport capacity-related projects. The model will facilitate rapid analysis of airport improvements, the impact of air travel demand changes, and new air traffic technology implemented within the NAS. For FY 2021, \$1.0 million is requested to:

- Deliver SWAC executable software capable of modeling more complex airspace flows, for example, time based metering.
- Deliver ADSIM+ executable software with an advanced capability of generating arrival/departure sequencing based on user-defined scenarios to support post-implementation analyses of recently deployed NextGen capabilities.

## **F. Dynamic Capital Planning**

The Dynamic Capital Planning tools and support will allow FAA to make optimum decisions based on best business practices. These tools and support will provide

verification that disciplined management of capital programs continues to be carried out. The program will focus on the following activities:

- Determining quantitative economic value and internal benefits validation for capital projects
- Milestone tracking, schedule modeling, and performance measurement
- Auditing and trend analysis
- Earned Value Management (EVM) and monitoring through program life cycle
- Field implementation planning and support for capital portfolio management
- Post implementation analysis for corporate lessons learned results

This project will provide reliable data with an automated tracking and reporting system for F&E projects that will enable decision-makers enhanced use of agency resources. This project will help keep major acquisition programs on schedule and within cost by maximizing limited resources linked to budget information and processes. Managers and engineers will have up-to-date reliable data on F&E projects through the resource tracking program (RTP) and productivity continues to improve under standardized project management operating procedures.

#### **G. Operational Modeling Analysis and Data**

The Operational Modeling Analysis and Data program provides support to National Airspace System (NAS) performance analysis by improving the efficiency and integration of operational data, NAS performance reporting, and the tools used for both. This program also makes enhancements to the individual and consolidated products to keep up with the growing data demands in the agency in support of Air Traffic Organization (ATO) operational units operational and capital investment planning as well as post operational modeling and analysis.

A study of FAA-wide operational databases identified a shortfall in available analytical products and recommended the creation of a database to capture operational events associated with individual flights to improve the timeliness of operational analyses and reduce the cost. This program will develop and publish standardized operational events data on a per-flight basis and by facility (e.g. airport). For FY 2021, \$2.0 million is requested to modernize and integrate the NAS Data Warehouse (NAS-DW) and the Aviation System Performance Metrics (ASPM) systems.

#### **H. Enterprise, Management, Integration, Planning and Evaluation for NAS/NextGen**

The Enterprise Management, Integration, Planning and Evaluation for NAS NextGen program will support human capital management, enterprise management, technical support, and outreach functions required to deliver the NextGen enterprise. Transforming the NAS into a flexible, scalable, and time-based management system is the fundamental objective of NextGen research, infrastructure development and operational integration. The successful, ongoing rollout of NextGen is the result of

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

rigorous program and acquisition management partnered with stakeholder collaboration. This program provides technical support for conducting proof of concept for new technology planned for implementation into the NAS. This will lead to the transformation of the national airspace system and promote increased capacity and efficiency in the NAS. For FY 2021, \$4.0 million include as part of the paragraph.

**I. In-Service Engineering**

In-service engineering allows for immediate response and tactical distribution of resources to emerging technology solutions. Funding is requested for ongoing engineering support of all prototyping efforts.

**J. Strategic Initiatives Analysis and Validation**

Provides for technological advances and innovation opportunities in the interests of aviation improvements for air traffic, regulation/certification and all lines of business that cannot be anticipated 2 years prior to budget submission. Examples include demonstrations and modeling concepts, validation of commercial products offered to FAA for certification, as well as exploration of concepts for future aviation operational usage one to four years from now. Often times these opportunities arise during the execution budget year.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

The projects that are funded under this program will ensure that the essential hardware and software components are in place and operational in order to accurately collect and report operational and safety data associated with air traffic operations. These projects will support management and oversight of implementation for new programs, assess metrics and operational parameters of new programs, and allow for alterations of programs based upon that data. These efforts will ensure the NAS remains the safest and most efficient ATC system in the world.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 1A02 William J. Hughes Technical Center Laboratory  
Sustainment**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
William J. Hughes Technical Center Facilities	\$21,000	\$20,000	\$16,900

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
William J. Hughes Technical Center Laboratories	---	\$16,900.0

**What is this program and what does this funding level support?**

---

This program sustains the William J. Hughes Technical Center Laboratories. This centralized set of laboratories is depended on to support the Acquisition Management System (AMS) lifecycle of programs/projects from Concept and Requirements Definition through In-Service Management. These laboratories are the only location where it is possible to realistically simulate the National Airspace System (NAS) and it is necessary to maintain the laboratory systems with capabilities that match field sites that currently exist or are planned for the future. These test beds can be altered to replicate desired field configurations and traffic scenarios providing stakeholders with an understanding of how upgraded systems will perform prior to operational deployment. These labs also provide a flexible high-fidelity environment to conduct research and perform Human-In-The-Loop (HITL) simulations that evaluate advanced air traffic concepts and are fully integrated with the other WJHTC capabilities. For FY 2021, \$16.9 million is requested to support the following activities:

- **Laboratory Support Contracts:** Includes contract support services to sustain the operation of the laboratories including infrastructure engineering; technical services; laboratory networking; test and simulation services; laboratory maintenance; scheduling support for multi-user laboratories; and laboratory management.
- **Hardware/Software Licenses and Maintenance Agreements:** Over 55 annually renewed hardware and software licenses and maintenance agreements are required for the Laboratory equipment each year. Examples include Cisco maintenance; Lutron lighting maintenance; AutoCAD License and annual subscription services; Linux; Red Hat; etc.

- **Laboratory Space and Infrastructure Master Plan:** A long-term laboratory Master Plan will improve the overall function and efficiency of the facility. Phase 1 of this Plan consolidates essential Priority 1 (operational) systems into one ATO-compliant equipment space. Phase 2 provides for the full continuity of operations for these systems by constructing the required ATO-compliant priority 1 utility plant required for this operational equipment. The reconfiguration of space required for accomplishment of Phase 1 will free up room for new programs in the labs, such as expansion of the Unmanned Aircraft Systems (UAS) labs. Phase 3 Complete the design and initiate construction project of the space for the relocation and consolidation of the Cockpit Simulation Facility (CSF) and the Airway Facilities Tower Integration Lab (AFTIL).
- **Laboratory Equipment Technology Refresh:** Laboratory Equipment refresh addresses life-cycle replacement of NAS supporting equipment, so that equipment utilized in the laboratories is available for use and in proper operating order. Technology Refresh is required of the Laboratory Network Management and Laboratory Network Operations Center systems.
- **Land Leases, Miscellaneous Supplies and Parts:** Items include land leases for three radar sites, laboratory communications, laboratory cabling, general supplies, and diagnostic equipment.
- **Continued Improvements to Laboratory Systems and Infrastructure:** The FAA's centralized set of laboratories and infrastructure must be modified, upgraded, and reorganized as Facilities and Equipment (F&E) Programs and their supporting systems are delivered, installed, and eventually removed. The laboratory infrastructure encompasses over 210,000 square feet of laboratory space in the main buildings, along with numerous outlying buildings, and remote sites. Lifecycle replacement of infrastructure includes some of the on-going improvements such as transient voltage surge suppression (TVSS) upgrades; raised floor replacements; electrical distribution panel life-cycle replacements; power monitoring in electrical distribution panels; computer air conditioning (CAC) unit replacements; replacement of main lighting panels; and the computer room air conditioning (CRAC) monitoring system. Some improvement projects may be implemented because an opportunity exists that would generate short and long-term savings. For example, a new lab installation is an opportunity to repair raised flooring.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

The American public benefits by having a world-class laboratory supports research, development, testing, and evaluation of NAS systems. This program is necessary to sustain the WJHTC Laboratory Facilities, which are used for the operational support of NAS systems in the field. When problems are identified at field locations, the appropriate laboratory is utilized to recreate or simulate the problem; identify a solution; test the solution; and if necessary, develop a field modification that will be installed to correct the problem.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

This program is necessary to maintain these laboratory systems in configurations and capabilities that match field sites that currently exist or are planned for future deployment. The capabilities developed in the laboratories will reduce the overall cost of NAS and NextGen development and will enhance the safety and efficiency of air travel.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 1A03 William J. Hughes Technical Center  
Infrastructure Sustainment**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
William J. Hughes Technical Center Infrastructure Sustainment	\$15,000	\$15,000	\$10,000

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
William J. Hughes Technical Center Infrastructure Sustainment	1	\$10,000.0

**What is this program and what does this funding level support?**

---

The FAA William J. Hughes Technical Center (WJHTC) owns and operates approximately 1.6 million square feet of test and evaluation, research and development, and administrative facilities, plus numerous project test sites. In addition, the WJHTC owns and operates a majority of the site infrastructure located on the 5,000+ acres of land, which includes utility distribution lines for electric, water, sanitary sewer and storm water as well as roadways, parking lots, curbing, sidewalks, fencing, gates and airfield ramp space. Accordingly, the infrastructure at the WJHTC requires an annual program of capital improvements and modernization. This program is necessary as it provides and sustains a reliable environment (i.e. power, cooling, etc.) for numerous National Air Space and NextGen operational and support programs hosted at the Technical Center, some of which operate 24x7x365. In addition, this program provides site infrastructure support to other governmental agencies residing at the WJHTC.

For FY 2021, \$10.0 million is requested to accomplish the following projects that promote sustainment of the FAA's infrastructure at the WJHTC:

- **Mold Remediation Program at Technical and Administrative Building - Building 300.** Construction and design efforts required to replace Heating, Ventilation and Air Conditioning (HVAC) equipment. The air-handling units in this building are more than 35 years old and have exceeded the industry standard lifecycle. The new HVAC units will be environmentally friendly, reduce utility costs,

and reduce maintenance expenses. Employees that reside in the affected areas will be temporarily relocated.

- **Fire Detection/Annunciation System Upgrades at Advanced Automation Systems Building and Office and Training Building – Buildings 316 and 270.** Efforts will focus on the replacement of obsolete fire alarm systems that the manufacturer has discontinued. The new fire alarm systems will be compatible with all new fire alarm system installations throughout the FAA WJHTC campus, assuring interchangeability of components. Installation of new fire alarm systems will reduce maintenance expenses associated with the replacement of aged, failing components.
- **Security Dispatch Facility Improvements at Technical and Administrative Building - Building 300.** Construction efforts will focus on the useful reconfiguration of the workspace consoles, the relocation of security equipment racks, reconfiguration of the HVAC, upgrade to the electrical service to this space, and replacement of architectural finishes within the footprint of the existing Security Dispatch Facility.
- **Mechanical Equipment Replacements at Human Factors Laboratory - Building 28.** Construction and design efforts required to replace HVAC equipment and associated equipment. All of this equipment has exceeded its industry standard lifecycle of 25 years and maintenance has been difficult because some parts are no longer available. The new equipment will be environmentally friendly, reduce utility costs, and reduce maintenance expenses.
- **Electrical Distribution System Repairs at Technical Support Facility and Equipment Repair Facility – Buildings 305 and 306.** Design efforts to replace site electrical distribution elements that are well beyond their useful lives. Some systems are already failing or are exhibiting symptoms of potential failure. The improvements will be environmentally friendly, reduce utility costs, and reduce maintenance expenses.
- **Replacement of Roofing Systems at Four Facilities.** Design efforts will focus on the replacement of roofing systems at the Water Treatment Plant (Bldg. 33), the Hazardous Materials Storage Building (Bldg. 56), the Crashworthiness Lab (Bldg. 214), and the Computer Science and Fluid Dynamics Lab (Bldg. 202). The current mix of roofing systems at all of these facilities are each well beyond their useful life. This project will include an infrared inspection study to identify the existing damage to the roofing systems. This will verify the scope of work prior to construction.
- **Program Support** provides project engineering design services, design reviews, and construction management/oversight for various engineering disciplines. This work includes, but is not limited to electrical, mechanical, and architectural engineering type projects in the Capital Investment Plan.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

Infrastructure sustainment at the WJHTC saves taxpayer money by reducing expenses associated with ongoing operation and maintenance activities as well as reducing the



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

frequency of expenses associated with system replacement. System updates reduce energy consumption, and cost, on a per-square-foot basis, thus supporting current Federal Energy Management requirements for sustainability and energy consumption.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

**Detailed Justification for - 1A04 NextGen - Separation Management Portfolio**

(\$000)

Activity/Component	FY 2019 Actual	FY 2020 Enacted	FY 2021 Request
NextGen - Separation Management Portfolio	\$16,000	\$20,500	\$21,200

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
A. ADS-B In Applications – Flight Deck Interval Mgmt Plng	---	\$4,300.0
B. Wake Turbulence Re-Categorization	---	2,000.0
C. Separation Automation System Engineering	---	6,600.0
D. Closely Spaced Parallel Runway Operations	---	800.0
E. Integrated National Airspace Design and Procedures Planning	---	2,500.0
F. Space Integration Capabilities	---	2,000.0
G. Unmanned Aircraft Systems (UAS) Upper Airspace	---	3,000.0

**What is this program and what does this funding level support?**

This portfolio evaluates concepts and capabilities that enhance aircraft separation assurance through use of ground based automation and aircraft enhancements. The improvements identified under this portfolio will enable more arrival and departure aircraft operations.

**A. ADS-B In Applications – Flight Interval Management Planning:** ADS-B In Applications Advanced Interval Management (A-IM) consists of a set of ground and flight deck capabilities that are used in combination by air traffic controllers (ATC) and flight crews to more precisely manage spacing between aircraft. An air traffic controller can issue an Interval Management (IM) clearance that allows flight crews to manage spacing relative to another aircraft through speed adjustments generated by onboard Flight Interval Management avionics. For FY 2021, \$4.3 million is requested to:

- Conduct system engineering and prototyping of selected new functions for Phase A to support final investment decision requirements and cost development. Phase A provides minimum functionality to support a limited set of Interval Management operations and other ADS-B In capabilities.

- Work towards final investment decision for ADS-B In Applications A-IM Phase A in FY 2022.

**B. Wake Turbulence Re-Categorization (RECAT):** This program is focused on increasing the throughput at capacity constrained airports and airspace. Obtaining this increase requires aircraft wake mitigation separations using current weather conditions and specific performance characteristics of aircraft. This data allows for a reduction in separation between aircraft around airports, while maintaining an acceptable level of safety in the NAS. For FY 2021, \$2.0 million is requested for the following:

- Develop concepts for advanced wake separation management Air Traffic Control (ATC) tools.
- Develop refined benefit and safety assessments of the wake risk mitigation concept solutions.

**C. Separation Automation System Engineering (SASE):** This program matures emerging NextGen Separation Management automation capabilities and develops automation enhancements for En Route, Terminal, and Oceanic domains to support planned NextGen operational improvements. Separation Management automation includes all ATC computerized capabilities that assist controllers in maintaining safe aircraft separation while maximizing the number of aircraft in the airspace. Controllers will be able to provide separation assurance based on the current flight location and improved predictions of where and when the flight is expected to be at a future point in time. These efforts will result in better aircraft sequencing and fewer tactical maneuvers around airports.

For FY 2021, \$6.6 million is requested to complete remaining trajectory modeling and other decision tool improvements for the En Route Automation Modernization (ERAM) computer system and conduct investment analysis work. Activities include:

- Support development of shortfall analysis for Initial Trajectory synchronization using air craft intent capabilities and enhanced En Route communication services capabilities
- Assess Wake Turbulence Mitigation capabilities and develop a Concept of Operations for any potential controller-decision support tools proposed for future development

**D. Closely Spaced Parallel Runway Operations (CSPO):** This program involves simultaneous approaches and departures of aircraft to airports with parallel runways that are closely spaced, or less than 4,300 feet apart. These operations are utilized at several Metroplex airports to accommodate increased aircraft volume. The CSPO program will develop and finalize concepts for mixed arrival and departure operations at airports under limited visual conditions. It will focus on mixed arrival and departure concepts by conducting site analyses of applicable airports with closely spaced runway configurations; perform safety studies on simultaneous dependent staggered departures;

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

and research for reducing divergence immediately after departure for dependent and independent parallel operations. For FY 2021, \$800,000 is requested for the following:

- Development of Safety Risk Management Document (SRMD) and authorized procedural standards for mixed arrivals/departures operations
- Conduct concept development of controller tools for departures
- Complete technical report of aircraft equipage/performance effects on departure separation standards

**E. Integrated National Airspace Design and Procedures (INDP):** This program is currently preparing for the future NAS-wide implementation of Performance Based Navigation (PBN) procedures with the initial focus on Established-on-Required Navigation Performance (RNP) (EoR) Instrument Approach Procedures. As the initial EoR operational capabilities continue to mature, the research will look at the next PBN capability known as Multiple Airport Route Separation (MARS). MARS will leverage the existing EoR work and begin to explore the concept of alternate paths for air traffic at adjacent airports. The INDP PBN program works to improve efficiency by taking advantage of aircraft performance capabilities, Standard Terminal Arrivals, and Optimum Profile Descents. For FY 2021, \$2.5 million is requested for activities that include:

- Commence operations of next RNP scenarios to validate PBN operational concept at new developmental launch site
- Conduct concept validation studies based on PBN strategy and document all findings to reduce risk/uncertainties of PBN Concepts (e.g., MARS, EoR xLS, EoR RF Duals and Triples). Note this effort will also feed EoR Independent Operations Implementation Guideline materials

**F. Space Integration Capabilities:** This program will ensure the availability of airspace for space launch and reentry (L/R) operations while minimizing the effect of these operations on other NAS stakeholders. Given the growing number of stakeholders involved with L/R operations, the current use of non-integrated systems to manage operation's safe access to airspace does not exist. This program will define and mature a set of capabilities to facilitate the integration of L/R operations into the NAS. Requirements will be prioritized and bundled into a set of phased acquisitions for Air Traffic Services (ATS) with the required upgrades. The program will leverage work already completed to support decisions for modified policies, procedures, acquisitions, or other activities to support ATS.

For FY 2021, \$2.0 million is requested to develop products in support of Final Investment Decision and Source Selection Documentation.

**G. UAS Class E Upper Airspace:** This program will investigate future operations above 60,000 feet, where demand for this airspace is projected to increase. While current Class E regulations are predicated on traditional airspace usage, the advent of new technologies and increasing commercial interests present opportunities for the diversification of operations within this airspace. This program will analyze

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

communications and surveillance requirements needed to integrate these types of operations (i.e. geostationary, extreme velocity, and long duration). Activities will include engineering and assessments of communications and surveillance solutions and conducting modeling and simulation on separation procedures for traditional airspace and Upper Class E Airspace above 60,000 feet. For FY 2021, \$3.0 million is requested for investigation of surveillance and communication requirements in Class E Upper Airspace.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

Separation Management Portfolio enhancements will provide controllers with tools and procedures to manage aircraft in a mixed environment of varying navigation equipment and wake performance capabilities. Separation management in the NAS can be accomplished procedurally and/or by using automation support. Through this request, procedures, orders and automation support capabilities will be enhanced, thus improving safety, increasing operational efficiency, and expanding current capabilities throughout the NAS.

Capabilities in this portfolio will support an increase in capacity by increasing airport throughput as a result of closer spacing of flights accepted from TRACON airspace and managed on final approach. This portfolio will provide improved efficiency through the introduction of capabilities that will enable more oceanic flights to ascend and descend to their preferred altitudes. This portfolio will provide controllers automated information about wake vortex separation requirements for any given aircraft pair, along with accurate wind data which will help predict more accurate and safer separation standards.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

**Detailed Justification for - 1A05 NextGen – Traffic Flow Management (TFM)  
Portfolio**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
NextGen – Traffic Flow Management (TFM) Portfolio	\$14,000	\$19,800	\$8,000

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
A. Surface Tactical Flow (STF)	---	\$1,750.0
B. Strategic Flow Management Application (SFMA)	---	2,500.0
C. Advanced Methods	---	1,750.0
D. Initial Trajectory Based Operation (TBO) Implementation	---	2,000.0

**What is this program and what does this funding level support?**

The TFM portfolio involves NAS operators and FAA traffic managers, along with advanced automation, in managing daily flight and flow decision-making, airspace and airport capability issues, such as special activity airspace and weather to improve overall efficiency of the National Airspace System (NAS). TFM provides greater flexibility to the flight planners, and makes the best use of available airspace and airport capacity. The individual work components in the TFM portfolio will support pre-implementation efforts for future Traffic Flow Management Systems (TFMS), Time Based Flow Management (TBFM), and Terminal Flight Data Manager (TFDM) Enhancements.

**A. Surface Tactical Flow (STF):** Provides guidelines for the development of a collaborative Surface Traffic Management (STM) system with tools necessary to achieve a fully collaborative surface environment where airline, general aviation, airport and air traffic controller input are all used to provide a shared surface situational awareness. STF research will produce improvements to TFDM, TFMS, and TBFM connectivity and integration. STF will work to integrate lessons learned from past collaboration with National Aeronautics and Space Administration's (NASA) Airspace Technology Demonstration 2 (ATD-2) as a means of risk reduction of TBFM, TFMS, and TFDM Integration. For FY 2021, \$1.75 million is requested for activities that include:

- Demonstration of mobile technologies and perform industry engagements via technology transfer
- Conduct initial functional analysis and program requirements on integrated departure scheduling capabilities to TFD, TFMS, and TBFM

**B. Strategic Flow Management Application (SFMA):** This program will leverage automation to improve TFM operations by addressing system-wide demand and capability imbalances to improve support for NextGen capabilities and objectives. For FY 2021, \$2.5 million is requested for activities that include:

- Conduct engineering activities for integration of TFMS and TBFM to support capabilities from NASA ATD-3 technology transfer to include Refined Capability Preliminary Functional Analysis; Updated Capability Solution Concept of Operations; and Capability Preliminary Program Requirements.

**C. Advanced Methods:** Advanced Methods will explore technologies, infrastructure enhancements, and procedural changes to meet current and future traffic management needs. This program will support improvements to increase airport capacity, sector throughput, and reduce sector delays by providing NAS users and Air Traffic Management with a common understanding of NAS constraints. The program will develop and test prototype improvements and provide operational concepts and requirements for potential implementation of automation programs and operational organizations. Advanced Methods will explore the application of innovative technologies such as speech recognition, machine learning, and artificial intelligence to Traffic Flow Management. These leading-edge technologies could advance the use of data storage solutions and advanced coordination to drive operational analysis of Traffic Management. For FY 2021 \$1.75 million is requested for activities that include:

- Recommendation report detailing training and simulation improvements that can be identified based on TFM Advanced Coordination Analysis lessons learned
- Conducting initial prototype development capability for the advanced automation learning/data mining capability that utilizes historical and real-time data

**D. Initial Trajectory-Based Operations (iTBO)** is an Air Traffic Management (ATM) method for strategically planning, managing, and optimizing flights throughout all phases of the flight by using time-based management, information exchange between air and ground systems, and the aircraft's ability to fly precise paths in time and space. Initial TBO (iTBO) is the first step in implementing TBO and is enabled by a number of Performance-Based Navigation (PBN), surveillance, communications, and automation systems that together enable the creation of a four dimensional path for aircraft. This program will provide the overarching management activities to ensure that facilities receive the right capabilities, in the right sequence, and at the right time, consistent with the NextGen vision. This program includes the Northeast Corridor (NEC) initiative. For FY 2021, \$2.0 million is requested for activities that include:

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

- Program management of implementation strategy, location specific evolution plans, sustainment strategy, stakeholder management analyses, communication plans, reporting products
- Risk Management planning and execution
- Data and metrics gathering to support quantification of operational changes

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

The TFM portfolio researches and implements capabilities that are expected to improve both the efficiency of individual flights and optimization of throughput. This work will make travel safer for the traveling public, help reduce passenger delays leading to a better traveling experience, and contribute to less pollution as the result of improved prediction performance for TFM decision support systems. These support systems include and flexibility to avoid airspace constraints, better predict capacity demands and ensure efficient utilization of NAS capacity.

The TFM portfolio supports the average daily airport capacity metric by providing more efficient use of system capacity through maximizing airspace and airport throughput using time-based management. It also provides improved operational predictability through more accurate and efficient end-to-end strategic planning and scheduling. Enhanced flight efficiency is achieved by delivering more efficient flows into and out of major metropolitan areas through integrated operations. Increased operational flexibility is provided through increased user collaboration regarding preferred trajectories and priorities to support business objectives.



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 1A06 NextGen – On Demand NAS Portfolio**

(\$000)

Activity/Component	FY 2019 Actual	FY 2020 Enacted	FY 2021 Request
NextGen – On Demand NAS Portfolio	\$21,000	\$8,500	\$10,500

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
A. Flight Objects	---	\$2,500.0
B. Common Status and Structural Data (CSSD)	---	3,000.0
C. Dynamic Airspace (DA)	---	2,000.0
D. Flight Deck Collaborative Decision Making (FD CDM)	---	3,000.0

**What is this program and what does this funding level support?**

---

The On Demand National Airspace System (NAS) Information (ODNI) portfolio conducts pre-implementation work to reduce risk in supporting the efficient and secure exchange of information within the FAA and between the FAA and other NAS users. This portfolio provides flight planners, Air Navigation Service Providers (ANSP) staff, and flight crews with consistent, complete, and easily processed information on changes of conditions in the NAS. The ODNI portfolio examines concepts and matures capabilities through validation activities, demonstrations conducted with stakeholders, and human systems engineering to mitigate adverse impacts to the NAS.

**A. Flight Object:** The program will define the mechanisms for capturing and sharing the most up-to-date information on any flight. Additionally, the program will develop a single common reference for all system information about a flight and will seek to eliminate exchange of flight information that is redundant or inconsistently defined. This program is engaged in the alignment of the standards for flight information definitions with the emerging International Civil Aviation Organization (ICAO) efforts such as Flight and Flow-Information for a Collaborative Environment (FF-ICE).

The Flight Information Exchange Model (FIXM) standard will be the basis for Flight Object information exchange. FIXM core includes additional sets of data elements to support the ICAO FF-ICE concept. The Flight Object program uses Air Traffic

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

Management Requirements and Performance Panel FF-ICE implementation guidance to further develop and enhance the FIXM. The FAA development of FIXM is supported under the Flight Object program line.

For FY 2021, \$2.5 million is requested to update Flight Object concept documentation to reflect findings and lessons learned from the Flight Object demonstration activity, update the Flight Object operational requirements documentation, perform activity to demonstrate expanded Flight Object capabilities, develop and complete final FIXM core and extension artifacts to support UAS and Commercial Space Operation.

**B. Common Status and Structure Data (CSSD):** The program will establish the requirements and information flows for the collection, management, and maintenance of Aeronautical Information (AI) in a digital format for machine-to-machine exchange. The common data and information services and integration activities enable improved flight planning and pilot briefing services, increased on-demand NAS operational performance information and better airspace management using timely schedule information and a common awareness of Special Activity Airspace (SAA) status across the NAS.

For FY 2021, \$3.0 million is requested to fund the development of requirements for machine-to-machine information exchange using an internationally recognized standardized format for aeronautical information known as Aeronautical Information eXchange Model (AIXM). This program will work toward enhancing AIXM to support data needs to enable Trajectory Based Operations (TBO), and will also work to complete a shortfall analysis report and Concept and Requirements Definition Plan for Aeronautical Information Management Modernization (AIMM) Enhancement 2.

**C. Dynamic Airspace (DA):** Dynamic Airspace will provide the necessary research and analysis for a toolset that allows reconfiguration of existing NAS automation infrastructure to meet changing demand and capacity needs. This program will evaluate the capabilities of existing and planned NAS automation and decision support systems as well as the underlying infrastructure necessary for information exchange and communication to reallocate those functions to other locations. The capabilities associated with DA include the remapping of NAS automation (including information access such as flight data and aeronautical information, and associated adaptations), communication, navigation, and surveillance infrastructure assets to support the implementation of revised airspace configurations.

For FY 2021, \$2.0 million is requested to complete updates to the functional requirements for automation systems, functional requirements for communication systems, and coordinate initial technology transfers of requirements to applicable programs.

**D. Flight Deck Collaborative Decision Making:** The program addresses the disparities in the implementation of flight deck automation advancements to support flight crew and air traffic management decision-making in a collaborative environment. This program will determine the initial NAS and System Wide Information Management (SWIM)

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

services for use with the flight deck. It will support the flight crew decision-making by providing Electronic Flight Bag (EFB) applications and the corresponding air traffic management enhancements that will enable future capabilities such as Flight Planning, mobile Instrument Flight Rule (IFR) clearances, and trajectory negotiations. The program will develop, standardize, certify, approve and implement flight deck applications that enable enhanced participation by the flight crew in the collaborative decision-making process.

For FY 2021, \$3.0 million is requested to conduct functional analysis for Flight Deck CDM applications to support the new Flight Deck CDM capabilities, evaluate emerging technologies to develop concept and requirements document for Flight Deck CDM applications, develop prototype and systems architecture for Flight Deck CDM applications, develop technical feasibility document based on the new Flight Deck CDM functionalities.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

This portfolio will improve efficiency, minimize delays, and will provide benefits to the American Public in the areas of safety, capacity and efficiency, and cost avoidance.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 1A07 NextGen – NAS Infrastructure Portfolio**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
NextGen – NAS Infrastructure Portfolio	\$20,000	\$11,500	\$15,000

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
A. Weather Forecast Improvements	---	\$3,000.0
B. NextGen Navigation Engineering	---	1,500.0
C. New Air Traffic Management (ATM) Requirements	---	7,500.0
D. Information Management	---	3,000.0

**What is this program and what does this funding level support?**

The National Airspace System (NAS) Infrastructure portfolio conducts pre-implementation activities to reduce risk for aviation weather-related and cross cutting engineering issues. This portfolio provides the research, development, and analysis of validation activities, human system engineering, and demonstrations. Work in this portfolio addresses aviation weather-related issues by supporting the improvement of the following:

- Air Traffic Management (ATM) decision-making during adverse weather conditions
- Weather forecasting in the transformed NAS
- NextGen Navigation Engineering, New ATM Requirements, and Information Management conduct analysis to develop solutions that can apply across the NAS domain

**A. Weather Forecast Improvements:** The program seeks to improve weather predictions and determine how to improve the use of that information. Currently, there is minimal automation available to assist with identifying, analyzing, and translating raw weather data into NAS constraints. This program will improve the decision process and the accuracy of aviation weather information to include an automated translation of weather information into constraints placed on the NAS. WFI will improve aviation weather forecasting models with the goal of determining

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

and reducing weather's effects on air traffic. The program also develops the necessary policies and guidance for the provision of aviation weather services under U.S. commitments to the International Civil Aviation Organization (ICAO). For FY 2021, \$3.0 million is requested to fund activities that include:

- Coordination and integration of weather information needed to help optimize decision support tools and decision support processes
- Concept requirements definition and investment analysis work for NextGen Weather Processor (NWP) and Common Support Services – Weather (CSS-Wx) Future Enhancements
- FAA weather commitments to the International Civil Aviation Organization including updated reports depicting U.S. position on draft amendments to ICAO

**B. NextGen Navigation Engineering (NNE):** The program supports the NextGen goal to increase NAS efficiency, capacity, and access to the NAS through innovation. NextGen Navigation Engineering conducts pre-implementation activities to explore navigation needs, and to identify and develop concepts to address these needs. NextGen Navigation Engineering will focus on assessing and engineering behind navigation solutions to support new entrants such as operations above 60,000ft and Urban Air Mobility. For FY 2021, \$1.5 million is requested to investigate navigation requirements for upper Class E airspace and develop a navigation strategy.

**C. New Air Traffic Management (ATM) Requirements:** The program identifies new opportunities to improve the efficiency and effectiveness of air traffic management. It supports the NextGen goal of expanding capacity by developing decision support tools that improve the strategic management of operations in the NAS. New ATM Requirements will continue activities in support of Future Collision Avoidance Systems (CAS), Weather Transition, Synchronization of Air/Ground Procedures, Advanced Air/Ground Procedures, Command and Control in a Cloud Environment, Common Displays/Commercial Off-the-Shelf (COTS), Next Generation Input Devices, and IP Based Command and Control Data Links. For FY 2021, \$7.5 million will support requirements that include:

- Identify emerging weather requirements needs and gaps in support of ceiling and visibility weather information
- Develop a trajectory synchronization flight demonstration/trial plan
- Develop prototype command and control instance in the cloud for a selected system
- Prepare and deliver a technology transfer package for common displays/COTS
- Initiate analysis of command and control performance and security requirements and begin risk management analysis to support potential use of internet based, safety critical data exchange

**D. Information Management (IM):** Is performing engineering analysis on the information infrastructure to address future requirements for System Wide Information Management (SWIM). IM will merge the information sharing needs

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

with additional requirements from upcoming NextGen initiatives and capabilities. The research initiated within the IM program will identify gaps, business needs, alternatives, and tradeoffs that exist in the transition from the current SWIM program and define the functional requirements for future enhancements to SWIM to support information sharing with NAS systems and users. Research will also assess the factors related to information sharing such as bandwidth restrictions, security, performance requirements, and an increasing number of various types of users. The work performed within IM will be useful in resolving questions pertaining to the efficient management of information within the FAA and users.

For FY 2021, \$3.0 million is requested to identify candidate solutions that can be assessed through the Enterprise Services Infrastructure framework, perform analysis for additional requirements and additional enhancements to the information sharing infrastructure, and develop the products to support in the Investment Analysis Readiness Decision (IARD) for SWIM Enhancement 2.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

The work under the NAS Infrastructure portfolio supports the NextGen goals of improved capacity, efficiency, and safety through its cross-cutting development programs. Through improved weather forecast timeliness and accuracy, WFI will optimize the usage of available airspace. The navigation capabilities developed under NNE will enhance NAS capacity and efficiency. New ATM Requirements' span multiple areas including communications, information management, and weather. The benefits delivered by these efforts support operational improvements that will increase the number of arrivals and departures at major airports. IM will improve the use of enterprise wide data and information management for data analysis purposes while also minimizing costs by providing an enterprise solution for the collection, storage and analysis of operational data for post-operational use. This program will also provide the American public greater access to desired data housed within the FAA.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 1A08 NextGen Support Portfolio**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
NextGen Support Portfolio	\$12,800	\$11,000	\$8,400

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
NextGen Laboratories	Various	\$8,400.0

**What is this program and what does this funding level support?**

---

The NextGen Support Portfolio provides the National Airspace System (NAS) laboratory environments required to evaluate, mature, and validate the broad framework of concepts, technologies, operational functions, and systems prior to and in the early phases of implementation into the operational NAS environment. For FY 2021, \$8.4 million is requested for the evaluation and assessment of capabilities and concepts as they transition in the operational environment.

The NextGen Integration and Evaluation Capability (NIEC) Laboratory is an integration and evaluation facility located at the William J. Hughes Technical Center (WJHTC) in Atlantic City, New Jersey. The NIEC provides a real-time, environment that allows for concept development and validation, integration and operations analysis capabilities through Human-in-the-Loop simulation testing and data analysis capability. This work supports studies that measure and validate concept feasibility, human performance, usability, changes in workload, and safety.

The Florida Test Bed (FTB) is located at the Daytona Beach International Airport and provides a platform where early stage concepts are integrated, demonstrated, and evaluated. The FTB core infrastructure is configured to enable remote connections with other FAA and industry partner sites to allow for multi-site demonstration capabilities. The FTB provides the ability for industry to bring and integrate new concepts and technologies.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

In addition, Enterprise Operational Analysis - Performance (EOA-P) work provides the support and performance models to assess new capabilities and initiatives, predict, monitor and track the impact of their implementation and identify future benefits. This work will inform the NextGen Advisory Committee (NAC) decision-making process and ensure the NextGen Segment Implementation Plan (NSIP) is updated to identify and manage incremental improvements necessary to develop, integrate, and implement new capabilities in the NAS.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

The American public benefits by having flexible laboratory environments and tools to evaluate future concepts and technologies that will enhance the safety and efficiency of air travel and quantify the benefits.



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 1A09 NextGen – Unmanned Aircraft Systems (UAS)**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
NextGen – Unmanned Aircraft Systems (UAS)	\$25,000	\$51,900	\$22,000

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
A. UAS Concept Validation and Requirements Development	---	\$5,000.0
B. UAS Flight Information Management	---	12,000.0
C. Urban Air Mobility	---	5,000.0

**What is this program and what does this funding level support?**

---

These projects will allow integration of UAS operations into the National Airspace System (NAS) without impact to manned aircraft operations or creating disruptions or delays. They will also ensure that NAS operations will continue to remain as safe as they are today.

**A. UAS Concept Validation and Requirements Development:**

The UAS Concept Validation and Requirements Development program conducts the overall analysis and planning for the development and integration of UAS enabling technologies within the NAS infrastructure. The program will examine, develop, and validate concepts and requirements, leading to investment decisions in support of expanding UAS access to the NAS. This work provides the foundation for the development of new air traffic policies, procedures, automation functionality, and training requirements to enable the safe integration of UAS operations into the NAS. For FY 2021, \$5.0 million is requested to:

- Complete development of FAA Acquisition Management System (AMS) artifacts to support the Investment Analysis for the first set of capabilities known as UAS Enhancements 1.

## **B. UAS Flight Information Management (FIM):**

The UAS Flight Information Management program supports multiple UAS operations in the NAS to keep the airspace safe from aviation-related known and potential hazards and provide adequate notification to users. In order to operate safely, the FAA must be aware of when and where UAS operations are occurring. FAA Oversight of UAS operations provides a means of traceability that will:

- Inform other NAS users of UAS activity in the vicinity of the airspace in which they are operating
- Ensure that operators are complying and conforming to regulatory standards
- Identify and hold accountable those who are responsible during accident/incident investigations

Notification and tracking of UAS activity enables the FAA to provide safe and efficient flight services to both manned and unmanned aircraft in the NAS. For FY 2021, \$12.0 million will support work that includes:

- Develop Initial Concept of Operations for Integrated UTM/ATM Operations and Operations Over People
- Complete Update of UTM Data Exchange Requirements for applications such as Identification and Tracking

### UAS Traffic Management (UTM) Systems Engineering:

- Develop Safety Risk Management Plan for UTM Heterogeneous Traffic
- Complete development of Information Systems Security Assessment for UTM Heterogeneous Traffic
- Begin Human Factors Assessment for UTM Heterogeneous Traffic
- Develop Product Improvement Plan and Reference Implementation for UTM Heterogeneous Traffic
- Final Report for UTM Urban Operations
- Initial System/Subsystem Specifications for UTM Urban Operations
- Complete Update of UTM System Prototype for applications such as Identification and Tracking

## **C. Urban Air Mobility:**

This project will perform concept development and validation to allow the safe integration of Urban Air Mobility operations into the NAS. The rapid development of technology has introduced new entrants with the potential to provide transportation services to users within urban environments, essentially functioning as Air Taxis. Urban Air Vehicles may need to operate within both the UTM and ATM environments, requiring information to be shared between other occupants of the airspace. Urban environments lack traditional Air Traffic Control surveillance systems and pose unique separation challenges. This program will conduct scenario development, engineering and

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

validation of a concept of operations, modeling and simulation, and identify information data exchange requirements to support Urban Air Mobility operations.

For FY 2021, \$5.0 million is requested for the following:

- Develop systems engineering and data exchange requirements for Urban Air Mobility operations
- Conduct preliminary operational analysis

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

The UAS programs play a critical role in enabling UAS operations in the NAS without impacting manned aircraft operations and creating disruptions or delays, and ensuring NAS operations will be as safe as or safer than they are today. Government cost of allowing UAS operations will decrease due to the reduction of “exception handling” of UAS flights, and improvements to NAS capabilities and operations will be made cost effective due to the integrated framework approach to addressing needs and solutions.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 1A10 NextGen – Enterprise, Concept Development,  
Human Factors, and Demonstrations Portfolio**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Enterprise, Concept Development, Human Factors, and Demonstrations Portfolio	\$16,500	\$19,000	\$15,000

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
A. Enterprise Concept Development	---	\$1,500.0
B. Enterprise Human Factor Development	---	1,500.0
C. Stakeholder Demonstrations	---	12,000.0

**What is this program and what does this funding level support?**

---

**A. Enterprise Concept Development**

The Enterprise Concept Development program is used to identify and assess early NextGen concepts and conduct validation activities (i.e., modeling and real-time simulations) that will transform the National Airspace System (NAS) into the Next Generation of the NAS. Areas of interest include, but are not limited to, trajectory-based coordination, the use of artificial intelligence in the NAS and the potential of unmanned aircraft systems for urban transportation. When appropriate, concept activities will be considered from a global perspective including ICAO requirements for global aircraft tracking and network communication.

For FY 2021, \$1.5 million is requested to support concept development and validation activities, research, concept engineering, and concept analysis.

**B. Enterprise Human Factor Development**

The Enterprise Human Factor Development program will provide human performance guidance and recommendations to support the development and validation of NextGen concepts. The proactive identification of potential human performance issues and mitigation strategies increases the usability, acceptability, and safety of NextGen

concepts and systems as they transition into the operational environment. This work will be conducted in close collaboration with concept development and validation teams to ensure any human factors risks and issues are documented and mitigated early in the concept design and validation process.

For FY 2021, \$1.5 million is requested to identify human factors performance considerations of NextGen concepts.

### **C. Stakeholder Demonstrations**

The Stakeholder Demonstration program provides practical application and analysis of proposed NextGen system improvements to verify concept feasibility and assess the cost-benefit trade space. Through collaboration with stakeholders, operators, and end-users, these demonstrations reduce implementation risk by providing early prototyping of requirements before capabilities are fully incorporated. Demonstrations collect and provide data to support business case and investment decisions tied to the decision points in the NAS architecture. These demonstrations promote industry involvement and attain community acceptance while supporting global harmonization across NextGen. Rigorous demonstrations ensure the integration and interoperability of systems and reveal the need for rulemaking, policy changes, and training.

For FY 2021, \$12.0 million is requested to support multiple demonstrations in relation to the matured NextGen concepts including, but not limited to, the following:

#### **Trajectory Based Operations (TBO) Demonstration:**

This project will assess the need for additional capabilities required to evolve from today's NAS, with miles of separation, to the TBO model that will allow air craft to fly more precise flight paths to a specific point in airspace at a precise time. A final report and a transition package will produced.

#### **Class E Upper Airspace Traffic Management (ETM) Demonstration:**

This project will assess new capabilities needed to integrate high altitude operations in Class E Airspace (i.e. weather monitors, pseudo-stationary Unmanned Aircraft Systems (UAS), pseudo space vehicles, etc. over Flight Level (FL) 600 and through transition airspace) into the NAS. This funding will be utilized to validate the ETM concept with government/industry partners, conduct a safety assessment, develop the demonstration plan for slow moving vehicles, and to initiate the development of the necessary applications and integration of systems in a lab environment.

#### **Urban Air Mobility (UAM)**

Plan and execute a demonstration of these emerging flight operations and their interaction with Unmanned Traffic Management (UTM) and Air Traffic Management (ATM). Validate the UAM concept of operation through simulations, completion of gap analysis, developing the necessary system prototypes, and executing the necessary demonstrations in partnership with industry.

**Innovative Airports**

The project will develop a concept of operation for the use of low cost technologies to monitor aircraft movement on the airport surface, assess the performance of the network connectivity, develop the applicable prototypes, and demonstrate the use of the technologies in an operational environment.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

The Enterprise Portfolio will promote safety and efficiency and reduce air traffic delays:

- Concepts will be assessed to identify research issues; evaluate benefits; reduce aircraft reroute around the hazard area; develop preliminary operational requirements, data sharing and collaboration, and procedures to enhance safety; increase operational efficiency and airspace capacity; and expand current capabilities throughout the NAS.
- Human factors efforts will assess the intersection of tools and procedures' influence on the end users, and the end-users ability to perform their job. The program will evaluate human performance in the operational environment to ensure the delivery of benefits for the overall integrated system, and provide insight across domains and programs to avoid implementation and integration issues.
- Demonstration activities will show how to reduce air traffic delays due to more efficient metering and spacing, increased capacity of the airspace, more efficient traffic flow management, and integrated arrival/departure routes. These activities will identify key implementation issues, assist the FAA in developing its operational improvement plans to meet NextGen goals and objectives, and assist with implementing initiatives.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 2A01 En Route Automation Modernization (ERAM)  
System Enhancements and Technology Refresh**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
ERAM System Enhancements and Technology Refresh	\$115,250	\$105,950	\$66,900

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
A. ERAM Sustainment 3	---	\$34,100.0
B. ERAM Enhancements 2	---	32,400.0
C. Independent Operational Assessment (IOA)	---	400.0

**What is this program and what does this funding level support?**

---

The En Route Automation Modernization (ERAM) System is the Automation System used in 20 Air Route Traffic Control Centers. The ERAM System Displays all Aircraft positions in the En Route Sectors across the country. This is the main tool used by air traffic controllers in that environment for separation of aircraft.

**A. ERAM Sustainment 3**

ERAM Sustainment 3 is the third step in the planned technology refresh update to the ERAM equipment sustainment program. The Sustainment 3 program is targeted to start in FY 2019 and Final Investment Decision (FID) is planned for CY 2019. This sustainment program is planned to address the remaining ERAM infrastructure hardware, network equipment and operating system at operational, training and support environments that were not replaced in the previous technical refresh efforts. The ERAM Sustainment 3 program execution spans from FY 2019 to FY 2025.

For FY 2021, \$34.1 million is requested. This funding will be used for system engineering, solution development, equipment procurement and test activities:

- Hardware transition related software development/modification and test

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

- Procurement of the replacement hardware in support to key sites and the first deployment phase, including the following:
- Enterprise Storage System, Processors and Tape Backup units replacement
- IBM P5/6 Series processors (including Flight Data Processor, Surveillance Data Processor Servers and Air Traffic Workstations) running AIX (Operational Systems, Support, and ESSC) replacement

The ERAM Sustainment 3 Segment is needed to complete the sustainment of the ERAM infrastructure systems. This sustainment program also includes security adaptation to align security and network communication features with current FAA FTI standards.

## **B. ERAM Enhancements 2**

ERAM Enhancements 2 (formerly ERAM Sector Enhancements) includes improvements in separation management, trajectory prediction, and human interface capabilities to improve the delivery of air traffic services today and to continue the evolution of NextGen trajectory-based operations. The Final Investment Decision was completed in December 2016 and engineering of the first set of capabilities is ongoing.

ERAM Enhancements 2 is focusing on capabilities that the FAA has identified as high priorities, such as:

- Automating the handoff procedure between domestic airspace and international partner Canada will reduce controller workload
- Properly processing updates to International Civil Aviation Organization equipage will impact 160,000 flights per year that are currently improperly processed, leading to improvements in safety while improving the ability to perform Optimized Profile Descents (OPDs) due to the correct equipage at the Terminal Radar Approach Control (TRACON) boundary
- Conflict Probe Enhancements that Provide increased conflict detection and resolution capabilities to support separation management
- Aircraft Trajectory Modeling Enhancements that will lead to conflict probe accuracy and reduced occurrence of false and missed alerts

For FY 2021, \$32.4 million is requested. This funding will be used for the following development contractor activities:

- Complete implementation for the Phase I (Infrastructure) and continue software development with testing of Phase II for the automated handoff to Canada capability. Complete requirement and design for conflict probe and Aircraft Trajectory Modeling Enhancements.

## **C. Independent Operational Assessment (IOA)**

For FY 2021 \$400,000 is requested for IOA for ERAM Enhancements 2.



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

The program focus is on maintaining the high availability of the ERAM capability. The ERAM Sustainment projects are necessary for the replacement of equipment that is approaching the end-of-life and hardware being discontinued by the manufacturer. ERAM Enhancements will provide software enhancements for the En Route controller team and will improve the efficiency and effectiveness of En Route sector operations. This will sustain the safety critical Air Traffic operations as well as lower system life cycle cost.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 2A02 En Route Communications Gateway (ECG)**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
En Route Communications Gateway (ECG)	\$1,650	\$2,650	\$2,350

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u><b>Activity Tasks</b></u>	<u><b>Locations/ Quantity</b></u>	<u><b>Estimated Cost (\$000)</b></u>
A. ECG Sustainment	---	\$1,700.0
B. In-Service Engineering	---	650.0

**What is this program and what does this funding level support?**

---

The ECG system was a prerequisite to deploying the En Route Automation Modernization (ERAM) System at the Air Route Traffic Control Centers (ARTCCs). It formats and conveys critical air traffic data to ERAM. ECG increased the capacity and expandability of the National Airspace System (NAS) by enabling the use of new surveillance technology. ECG introduced new interface standards and data formats required for compatibility with International Civil Aviation Organization (ICAO) standards and adds capacity necessary to process data from additional remote equipment such as radars. ECG was planned to operate through 2015 and is in need of continued technology refresh of the system.

Technology refresh activities replace older and more failure-prone components and allow upgrades of operating systems and availability of spares to continue provision of critical surveillance and flight data to ERAM in support of Air Traffic Operations.

For FY 2021, \$1.7 million is requested for equipment replacement, engineering services, and program support services for ECG. Planned activities for FY 2021 include technology refresh of the Operational Local Area Network (LAN) switch, Government Accountability Office/Plan of Actions and Milestones remediation, and technology refresh of the Workstation.

In addition, \$650,000 is requested to support in-service engineering work that provides an immediate response to emerging technology solutions.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

The work under this project will sustain the availability of the ECG system to support the continued provision of critical surveillance and flight data to ERAM for Air Traffic operations while reducing sustainment costs.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

**Detailed Justification for - 2A03 Next Generation Weather Radar (NEXRAD)**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Next Generation Weather Radar (NEXRAD)	\$7,500	\$3,000	\$3,600

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
A. Next Generation Weather Radar (NEXRAD) Sustainment 1	---	\$1,100.0
B. Next Generation Weather Radar (NEXRAD) Sustainment 2	---	2,500.0

**What is this program and what does this funding level support?**

NEXRAD is a long range weather radar that detects, analyzes, and transmits weather information for use by the Air Traffic Control (ATC) System Command Center (ATCSCC), En Route, Terminal, and Flight Service Facilities. NEXRAD detects, processes, and distributes for display, hazardous and routine weather information which are processed by FAA's Weather and Radar Processor (WARP), Integrated Terminal Weather System (ITWS), and the Corridor Integrated Weather System (CIWS) systems. NEXRAD is a joint program between Departments of Transportation, and Commerce, with National Weather Service as the lead. Agencies share developmental costs in proportion to the number of systems fielded by each agency. The FAA owns and operates 12 NEXRADs, located in Alaska (seven), Hawaii (four), and Puerto Rico (one).

NEXRAD was originally installed between 1990 and 1996 with an economic service life of 20 years, there are currently 160 operational NEXRAD systems in the United States and overseas, jointly operated and maintained by the Tri-Agency partners. In FY 2015 the average age of NEXRAD reached the end of its economic life and a major sustainment effort is required to extend NEXRAD's service life. For FY 2021, \$3.6 million is requested to support National Weather Service's (NWS) Next Generation Weather Radar (NEXRAD) sustainment efforts. The FAA funding share for NEXRAD Program Improvement (NPI) is an annual requirement as established in the Memorandum of Agreement (MOA) between the Department of Transportation (FAA), and the

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

Department of Commerce (DOC) NWS. FY 2021 funds will also support NEXRAD Sustainment 2 formulation activities.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

NEXRAD systems have increased aviation safety with the accurate and timely detection of hazardous aviation weather conditions. Weather related arrival and departure delays have been reduced, thus allowing aviation fuel consumption savings. The introduction of the in-flight icing and hail detection algorithms will provide features that enhance aviation safety and detection of weather conditions while aircraft are aloft.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 2A04 Air Route Traffic Control Center (ARTCC) and  
Combined Control Facility (CCF) Building Sustainment**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
ARTCC/CCF Building Improvements	\$88,050	\$96,900	\$101,200

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u><b>Activity Tasks</b></u>	<u><b>Locations/ Quantity</b></u>	<u><b>Estimated Cost (\$000)</b></u>
A. ARTCC and CCF Facility Sustainment	21	\$90,500.0
B. Enterprise Facilities Sustainment	14	8,200.0
C. In-Service Engineering	---	2,500.0

**What is this program and what does this funding level support?**

---

The ARTCC and Combined Control Facility (CCF) Building Sustainment Program supports En Route air traffic operations and service-level availability by providing life-cycle management of the physical plant infrastructure at the 21 ARTCCs and two CCF facilities. It is one of the programs within the Air Traffic Control (ATC) Facilities Sustainment Portfolio (SSP).

Many of these structures were built in the 1960s and have been expanded several times since then. In FY 2019, there is a \$310 million facility backlog of needed repairs or upgrades, which includes all building systems such as heating, ventilation, and air conditioning (HVAC) components; all piping, plumbing, control systems; and both the exterior and interior of the building. This backlog increases the risk of outages and may result in increased maintenance costs. This program sustains these buildings to meet air traffic service requirements and to reduce the backlog.

Major construction projects will replace obsolete plant equipment and improve work areas. These projects include replacement of chillers, cooling towers and associated mechanical and electrical system elements necessary for cooling National Airspace System (NAS) electronics and computer equipment. Obsolete and proprietary building automation control systems, no longer supported by the manufacturer will be replaced

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

with current state-of-the-art open architecture systems. Fire detection and annunciation systems that have exceeded life expectancy and are not supported by the manufacturer will be replaced. New systems are more efficient and will reduce energy consumption of the facilities.

For FY 2021, \$90.5 million is requested for ongoing ARTCC sustainment projects. The requested funding amount is required to continue efforts to ensure that critical NAS En Route facilities are brought into and maintained in a state of good repair. This will prevent catastrophic outages and promote the health and safety of the Air Traffic and Technical Operations work force.

For FY 2021, \$8.2 million is requested for the sustainment of FAA Enterprise Facilities. These facilities include the Air Traffic Control System Command Center and two National Enterprise Management Centers. Projects at the Command Center will include the upgrade of the chilled water plant and the replacement of chilled water pumps. Additionally, sustainment projects associated with the Enterprise Facilities will include the funding of needed repairs or upgrades for all building systems, such as heating, ventilation, and air conditioning (HVAC) components; all piping, plumbing, control systems; electrical, conveying, and general infrastructure; and both the exterior and interior of the building.

In addition, \$2.5 million is requested for in-service engineering activities that provide an immediate response to emerging technology solutions.

Current major sustainment projects include:

- **Fire Detection and Annunciation System Project** — This project will replace the fire detection and annunciation systems at each facility. It includes demolition of the existing system and installation of a new system to include a fire alarm control panel, fire alarm annunciation panels, visual and audible annunciation devices, smoke and heat detectors, manual pull stations, addressable control devices, fire alarm conduit, and fire alarm wiring.
- **Central Plant/Control Wing Display System Replacement (DSR) First Floor and the DSR Attic Major Improvement Project** — This project includes the continued improvement of a facility's central heating and cooling plant along with the control wing DSR first floor and the DSR attic upgrades. The work in the plant includes replacement of facility chillers, boiler systems, hot water heaters, lighting and electrical panel board, and motor control center (MCC) replacement. The area for this project is the facility's Air Traffic Control Operations Room, which will remain in operation throughout the project. The DSR work includes:
  - upgrades and restoration of fire-rated walls and floors
  - replacement or upgrades of access floor systems
  - code and accessibility upgrades
  - wall and floor finish upgrades

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

- upgrades to fire suppression systems
- replacement of air handling units
- replacement of chiller and hot water piping systems
- replacement of interior lighting
- replacement of the lighting central battery system and dimming control system

Specific mission critical and local sustainment projects will also be accomplished at each facility to replace obsolete equipment and infrastructure in order to support the air traffic control (ATC) mission, and to ensure the facility is maintained in an acceptable condition.

**FY 2021 Projects**

- Construct Fire Detection and Alarm System Replacement - Denver, Atlanta, Oakland, Minneapolis, Salt Lake City, and Seattle ARTCCs.
- Construct Central Plant/Control Wing DSR First Floor and Attic – Chicago and Albuquerque ARTCCs.
- Design Central Plant/Control Wing DSR First Floor and Attic – Guam CCF, Los Angeles, Jacksonville, Indianapolis, and Houston ARTCCs.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

This program sustains 23 ARTCC and CCF facilities, which are critical and vital to facilitate the FAA's mission to serve the flying public. The mission of the En Route Facilities Sustainment Program is to support En Route Air Traffic operations and service level availability through facility life-cycle program management of the 21 ARTCCs and the CCFs at San Juan and Guam. Much of the plant equipment within these buildings has exceeded its life expectancy and must be replaced. This program replaces obsolete equipment and provides an efficient, reliable, and safe work environment for En Route air traffic control operations.



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 2A05 Air/Ground Communications Infrastructure**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Air/Ground Communications Infrastructure	\$8,750	\$7,850	\$7,850

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
A. Communications Facilities Enhancement (CFE) Expansion	10	\$6,000.0
B. Radio Control Equipment (RCE) - Sustain	---	1,000.0
C. In-Service Engineering	---	850.0

**What is this program and what does this funding level support?**

The Air-to-Ground (A/G) Communications Infrastructure Sustainment programs enhance operational efficiency and effectiveness by replacing aging radio equipment, providing new, relocated or upgraded remote communications facilities, and providing equipment and support to detect and resolve radio frequency interference with FAA communications.

**A. Communications Facilities Sustainment(CFS)** - For FY 2021, \$6.0 million is requested to initiate the expansion/replacement/upgrade of 10 CFE sites, procure replacement radios, equipment racks, antennas, towers, and prepare sites for installations. These sites include: Hampton, Georgia; Cle Elum, Washington; St. Charles, Missouri; Watford City, North Dakota; San Juan, Puerto Rico; Galbraith Lake, Alaska; Waterford, Michigan; Cleveland, Ohio; Klawock, Alaska; and Washington, Indiana

The CFE program provides new, relocated or upgraded Remote Communication Facilities (RCF's) to enhance the A/G communications between air traffic control and the aircraft when there are gaps in coverage or new routes are adopted.

**B. Radio Control Equipment (RCE) – Sustain** - For FY 2021, \$1.0 million is requested for RCE obsolescence study and to install existing RCE units supporting 40 channels and support the construction and verification of the RCE test bed. The funding will also be used to procure 100 control type power supplies and 100 redesigned modules

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

to replace obsolete parts while providing longer term support for the operational Control Site RCEs. The RCE program replaces obsolete radio signaling and control equipment which controllers use to select a remote radio channel.

Also requested is \$850,000 for in-service engineering activities.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

Air/Ground Communications Infrastructure will significantly improve safety by replacing aging and increasingly unreliable equipment and communications facilities. New communications equipment will lower periodic and correctional maintenance costs associated with the old and technically obsolete equipment in the field, and as a result will reduce costs for the FAA and taxpayers.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 2A06 Air Traffic Control En Route Radar Facilities  
Improvements**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Air Traffic Control En Route Radar Facilities Improvements	\$6,600	\$5,300	\$7,500

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u><b>Activity Tasks</b></u>	<u><b>Locations/ Quantity</b></u>	<u><b>Estimated Cost (\$000)</b></u>
A. Long Range Radar (LRR) Infrastructure Sustainment	28	\$6,500.0
B. In-Service Engineering	---	1,000.0

**What is this program and what does this funding level support?**

---

The Air Traffic Control En Route Radar Facilities Improvements Program is responsible for 157 Long Range Radar (LRR) surveillance facilities that provide aircraft position information to Federal Aviation Administration En Route control centers for Air Traffic Control (ATC), and to the Department of Defense and the Department of Homeland Security for security monitoring of the National Airspace System (NAS).

About 80 percent of the LRR inventory is older than 30 years. Sixty-six of these sites were established in the early 1950's and have reached the end of their useful life. Average Facility Condition Index (FCI) of all 157 LRR facilities is currently at 81 percent, which is below the minimum 90 percent required for such facilities. The ATC En Route LRR surveillance equipment will need to remain operational at least through year 2025. The repairs, improvements, and modernization to existing infrastructure will enable the facilities to continue to meet current operational, environmental, and safety needs. It will extend the service life of facilities, and most importantly, reduce the chance of outages that often cause air traffic delays.

The existing air surveillance infrastructure has shortfalls that must be addressed sequentially for the system to continuously meet the users' needs into the future. The immediate need is to ensure that current air surveillance capabilities do not further degrade while planning and implementing longer-term solutions.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

For FY 2021, \$6.5 million is requested to sustain approximately 31 facilities that are in poor condition and have greatest impact to the NAS. The scope of the LRR infrastructure sustainment program includes upgrades and/or replacement of electrical, mechanical, lightning protection, fire detection, and facility security systems; buildings and structures; and facility access roads. In addition, \$1.0 million is requested for in-service engineering activities that provides an immediate response to emerging technology solutions.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

The infrastructure improvements will provide greater efficiency and reduce operating costs in En Route ATC and facility maintenance operations. The goal of the LRR infrastructure sustainment program is to reach 90 percent FCI by 2025. The American public benefits from reduced operating cost and system availability.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 2A07 Oceanic Automation System**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Oceanic Automation System	\$23,100	\$15,900	\$9,150

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
A. Oceanic Improvements	---	\$1,800.0
B. Advanced Technology and Oceanic Proceed (ATOP) Enhance 1	---	7,000.0
C. Independent Operational Assessment (IOA)	---	350.0

**What is this program and what does this funding level support?**

From 2005 to 2007, the ATOP program replaced the original oceanic Air Traffic Control (ATC) system, updated procedures, and modernized the Oakland, New York, and Anchorage Air Route Traffic Control Centers, which house the oceanic automation systems. ATOP integrates flight and surveillance data processing and detects conflicts between aircraft for safe oceanic ATC operations.

- A. Oceanic Improvements:** Support a category of requirements that address system changes driven by new operational standards and other International Civil Aviation Organization mandates. These changes are small in nature, must be addressed quickly, and the scope of these enhancements does not require significant capital investments. For FY 2021, \$1.8 million is requested for analysis and solution implementation activities that improve the delivery of oceanic domain services.
- B. ATOP Enhancement 1:** Addresses the operational shortfalls of the current oceanic system as the FAA moves forward with new initiatives and other National Airspace System (NAS) upgrades. The Reduced Oceanic Separation modification will provide controllers the automated tools to safely apply and monitor reduced oceanic separation minima to the 23 Nautical Mile (NM) Lateral and 20 NM Longitudinal separation standards. For FY 2021, \$7.0 million is requested for the ATOP Enhancement 1 program to continue development and begin testing for the Enhanced

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

Controller Coordination and Enhanced Conflict Probe in Surveillance Airspace modifications to be deployed in FY 2023. The funding will also support design of the Weather Interface Rehost and subscription to convective weather and volcanic ash forecast services via SWIM, planned to be delivered in 2024 and beyond.

- C. Independent Operational Assessment (IOA):** For FY 2021, \$350,000 is requested for an assessment to identify any safety hazards and operational concerns with Enhancement 1 capabilities.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

The new enhancements will provide airlines and general aviation with reduced operating costs and system delays by delivering improved coordination and user request capabilities that support optimum flight profiles, increasing the likelihood of on-time arrivals.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 2A08 Next Generation Very High Frequency  
Air/Ground Communications System (NEXCOM)**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Next Generation Very High Frequency Air/Ground Communications System	\$60,000	\$70,000	\$40,000

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u><b>Activity Tasks</b></u>	<u><b>Locations/ Quantity</b></u>	<u><b>Estimated Cost (\$000)</b></u>
Next Generation VHF/UHF A/G Communications Phase 2	Various	\$40,000.0

**What is this program and what does this funding level support?**

---

For FY 2021, \$40.0 million is requested to replace and modernize the aging and obsolete National Airspace System (NAS) air-to-ground (A/G) analog radios that allow direct voice communication with pilots with new Very High Frequency (VHF) and Ultra High Frequency (UHF) radios at terminal and flight services facilities. The requested funding will also be used for support in the analysis of NEXCOM Phase 3. The existing VHF analog controller-to-pilot communications system lacks the capacity and flexibility to accommodate future growth in air traffic and air/ground communication frequency assignments. The system is beyond its estimated lifecycle and is increasingly expensive to maintain. Air/ground communication is the most fundamental and safety important element of the Air Traffic Control (ATC) system supporting all phases of flight for En Route, Terminal, and Flight Service operational environments.

The NEXCOM program plans to use funding to deploy 2,500 new Terminal Air Traffic Control Radios (receivers and transmitters) at 115 terminal and flight services facilities, purchase VHF and UHF radios, procure 125 Emergency Transceivers, and fund related implementation and support activities. Ultimately 35,000 VHF and UHF radios will be deployed in the NAS under the NEXCOM Phase 2 program through 2026.

NEXCOM will meet the new and growing demands for air transportation services; provide the operational flexibility and Voice over Internet Protocol (VoIP) capability required for NextGen, utilize VHF spectrum required for voice communications more

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

efficiently and have the ability to make recovered spectrum available for Data Communications should it be necessary.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

NEXCOM will improve reliability and reduce growing maintenance costs replacing existing communications equipment with modern Air to Ground Communications (A/G Comm) equipment. An added performance benefit of NEXCOM is the ability to increase capacity by expanding the number of communications channels within the spectrum assigned to the FAA. The Mean Time Between Failure (MTBF) performance metric, which is closely related to availability, will be increased from 11,000 hours to 50,000 hours at the completion of NEXCOM Phase 2. This will both increase the safety of the NAS benefitting commercial airlines, general aviation and the flying public as well as reducing costs to taxpayers.



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

**Detailed Justification for - 2A09 System-Wide Information Management (SWIM)**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
System-Wide Information Management (SWIM)	\$55,300	\$81,825	\$31,050

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
A. SWIM – Segment 2B	---	11,600.0
B. SWIM – Segment 2C	---	9,100.0
C. SWIM - Cloud	---	8,800.0
D. Independent Operational Assessment (IOA)	---	350.0
E. Transition to Operations and Maintenance (TOM) Year 3	---	1,200.0

**What is this program and what does this funding level support?**

The SWIM program is an information management and data sharing system for Next Generation Air Transportation System (NextGen). SWIM provides policies and standards to support data management, secure data integrity, and control data access and use.

**A. SWIM Segment 2B:** Continues to improve the FAA's ability to manage the efficient flow of information through the National Airspace System (NAS). Segment 2B includes additional capabilities to strengthen the overall security of NAS information systems. NAS Common Reference (NCR) will develop efficient Net-Centric Operations (NCO) for Air Traffic Management (ATM) situational awareness, geospatial awareness, data correlation, and support services. NAS enterprise Identity and Access Management (IAM) capability will enable the interoperability of security controls with NextGen partners. SWIM Terminal Data Distribution Service (STDDS) is a NAS-Enterprise Architecture (EA) Support Services system that has the capability to support various mission services in the terminal mission services area. Enterprise Service Monitoring (ESM) will provide situational awareness of Operations and Maintenance (O&M) status of NAS infrastructure and System

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

Oriented Architecture (SOA) services, including service outages. For FY 2021, \$11.6 million Segment 2B funding is requested to complete STDDS Phase 2 Release 6 Initial Operational Capability (IOC), the last SWIM Segment 2B APB milestone. In addition, FY 2021 funding will be used to cover the 2nd-level engineering support for IAM, ESM and NCR until they complete transition to Ops in FY 2022.

**B. SWIM Segment 2C:** SWIM Segment 2C plans to continue improving the FAA's ability to manage the efficient flow of information through the NAS. Segment 2C's plan includes additional infrastructure and capabilities to strengthen the overall NAS information system security posture, and a technical refresh of existing hardware to improve performance capabilities on the hardware side resulting in better overall system performance. For FY 2021, \$9.1 million Segment 2C funding is requested to:

- Complete NAS Enterprise Messaging Service (NEMS) technology refresh of Local Load Balancers and Global Load Balancers at Salt Lake City ARTCC (ZLC), Mike Monroney Aeronautical Center (OEX), Atlanta ARTCC (ZTL), and Atlantic City International Airport (ACY).
- Complete technology refresh hardware installation for SWIM Enterprise Service Monitoring (ESM) Phase I and Identity and Access Management (IAM) Phase I.

**C. SWIM Segment Cloud:** For FY 2021 \$8.8 million is requested to complete on ramping additional Tier 2 consumers to use available SWIM data via Cloud Services.

**D. Independent Operational Assessment (IOA):** For FY 2021 \$350,000 is required to support IOA activities.

**E. Transition to Operations and Maintenance (TOM) Year 3 -** When systems are first commissioned into the National Airspace System (NAS), their Operations and Maintenance (O&M) costs are paid for through the F&E appropriation for a period that is usually up to two years after commissioning. This allows FAA to identify the needs and formulate the requirements in the Operations appropriation during budget formulation. The identified O&M costs must then be transition to the Operations Appropriation. This is known as Transition to Operations and Maintenance (TOM). FAA is requesting a third year of TOM funding under this Budget Line Item within the F&E account.

---

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

SWIM reduces both the number and types of unique communication interfaces, reduces redundancy of information and better facilitates information sharing, improves predictability and operational decision-making, and reduces cost of service. The improved coordination that SWIM provides allows for the transition from tactical conflict management of air traffic to strategic trajectory-based operations. SWIM provides the foundation for greatly enhanced information exchange and sharing with other agencies.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 2A10 ADS-B NAS Wide Implementation**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
ADS-B NAS Wide Implementation	\$139,150	\$159,400	\$170,000

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u><b>Activity Tasks</b></u>	<u><b>Locations/ Quantity</b></u>	<u><b>Estimated Cost (\$000)</b></u>
A. ADS-B Sustain Leased Services	---	\$145,000.0
B. ADS-B NAS Wide Implementation - Enhancement	---	25,000.0

**What is this program and what does the funding level support?**

---

Automatic Dependent Surveillance-Broadcast (ADS-B) is a cornerstone technology for NextGen. It reduces delays and enhances safety by using an aircraft's broadcasted position instead of position information from traditional radar. ADS-B is an advanced surveillance technology that provides highly accurate and more comprehensive information. Aircraft position (longitude, latitude, altitude, and time) is determined using the Global Navigation Satellite System (GNSS) and/or an internal navigational reference system or other navigation aids. The aircraft's ADS-B equipment processes this position information, along with other flight parameters, for a periodic broadcast transmission, typically once a second, to airborne and ground-based ADS-B receivers. The information is used to display aircraft position on en route and terminal automation systems.

The Gulf of Mexico (GOM) implementation of Air Traffic Control (ATC) services is providing ADS-B surveillance data for aircraft operating in a large area without access to traditional radar coverage. Energy platforms in the GOM are utilized by the program to host surveillance, communications and weather facilities. These platforms have a temporary lifespan that are impacted by a number of economic and technical criteria. The shutdown of a platform requires that existing facilities be removed and replacement facilities installed on platforms that address any operational shortfall.

ADS-B has interdependencies with the following Programs:

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

- Advance Technologies and Oceanic Procedures (ATOP)
- En Route Automation Modernization (ERAM)
- Standard Terminal Automation Replacement System (STARS)
- Airport Surface Detection Equipment Model X (ASDE-X)
- Time Based Flow Management (TBFM)
- Runway Status Lights (RWSL)
- Communications Facilities Enhancement (CFE) Program

**A. ADS-B Sustain Leased Services:** For FY 2021, \$145.0 million is requested to provide for the continued implementation and operation of the following baseline applications:

- ADS-B Separation Services
- Traffic Information Services - Broadcast (TIS-B), Flight Information Service - Broadcast (FIS-B), and Automated Dependent Surveillance Rebroadcast (ADS-R) Pilot Advisory Services
- Weather and NAS Situation Awareness

The funding will also allow continued operation of Wide Area Multilateration (WAM) surveillance services capability to occur. WAM provides aircraft location information to the automation system at Denver Air Route Traffic Control Center, Southern California Terminal Radar Approach Control (TRACON), and Charlotte TRACON.

The funding requested will also support the continuation of FAA Air Traffic Control services as agreed upon in the Memorandum of Agreement (MOA) with Gulf of Mexico helicopter operators and energy platform owners. The funding will be used to:

- Remove and refurbish facilities and equipment from active energy platforms when MOA partner energy platform owners make the decision to shut them down.
- Identify and evaluate an appropriate site to restore any lost services.
- Install new or refurbished systems on strategically located energy platforms.
- Install equipment in new facilities on other strategically located MOA partner energy platforms.

This funding will also continue ADS-B Baseline Services, utilizing subscription fees for ADS-B infrastructure owned and operated by the prime contractor. The anticipated FY 2021 activities for ADS-B Sustain Leased Services include:

- Provide and maintain ADS-B baseline services and applications.
- Pay subscription fees:
  - Provide service to more than 300 service volumes within specified requirements.
  - Provide WAM surveillance services supporting air traffic operations for selected airspace.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

The funding requested will also support operational enhancements to the portfolio. Specifically, the funding will be used to enhance existing capabilities/services to improve service resiliency and ensure continued delivery of high-quality surveillance and ADS-B Rule enforcement.

**B. ADS-B Enhancements:** For FY 2021, \$25.0 million is requested to support the operational enhancement of this portfolio. The funding will be used to provide additional benefits based on ADS-B by implementing activities that may include:

- Utilization of additional ADS-B parameters to monitor altitude compliance, enhancing safety and efficiency of the NAS.
- Expanding ADS-B service coverage in selected areas.
- More comprehensive vehicle ADS-B equipage at large airports.
- Security enhancements for National Institute of Standards and Technology (NIST) compliance.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

Benefits provided by ADS-B to the American public include more efficient use of airspace capacity, fewer flight delays, and more optimal routing for aircraft. Other efficiency benefits include reduced weather deviations and fewer cancellations resulting from increased access to some Alaskan regions and GOM oil platforms during inclement weather conditions. These efficiencies translate to savings in both aircraft direct operating costs and passenger value of time.

ADS-B meets a large performance gap in the capability of pilots and ATC to receive situation awareness information, thus providing for safety in ways legacy systems cannot by delivering the following services through cockpit avionics:

- Enhanced see-and-avoid capabilities which will assist pilots in preventing mid-air collisions
- Air Traffic Control services in non-radar airspace
- Weather information, helping to reduce incidences related to Instrument Flight Rule operations

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 2A11 Windshear Detection Service**

(\$000)

Activity/Component	FY 2019 Actual	FY 2020 Enacted	FY 2021 Request
Windshear Detection Service	\$0	\$1,000	\$2,500

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
A. Windshear Detection Services Sustainment 2	82	\$2,000.0
B. Transition to Operations and Maintenance (TOM) Year 3	---	500.0

**What is this program and what does the funding level support?**

---

WDS Sustainment 2 is a portfolio program consisting of legacy wind shear detection systems currently deployed in the NAS. The program will address obsolescence of the legacy Weather System Processor (WSP) and Low Level Windshear Alert System (LLWAS). The program will sustain existing service levels by upgrading components of existing systems to mitigate safety hazards and to resolve obsolescence/supportability issues of the 34 WSPs and 48 LLWASs currently deployed in the NAS.

- LLWAS and WSP detect microbursts and wind shear activity near runways and along approach/departure corridors
- Sustainment of these systems will allow Air Traffic Controllers to continue providing alerts to aircraft of hazardous wind shear conditions
- Transition to Operations and Maintenance (TOM) Year 3 - When systems are first commissioned into the National Airspace System (NAS), their Operations and Maintenance (O&M) costs are paid for through the F&E appropriation for a period that is usually up to two years after commissioning. This allows FAA to identify the needs and formulate the requirements in the Operations appropriation during budget formulation. The identified O&M costs must then be transition to the Operations Appropriation. This is known as Transition to Operations and Maintenance (TOM). FAA is requesting a third year of TOM funding under this Budget Line Item within the F&E account.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

For FY 2021, \$2.5 million is requested to conduct a business case analysis and achieve the Final Investment Decision (FID) for the next phase of technology refresh under the WDS Sustainment Project and TOM.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

The projects contained within the WDS portfolio contribute significantly to the overall safety of the NAS by preventing windshear related aircraft accidents. The WDS project intends to sustain the level of service provided by these legacy ground-based systems to Air Traffic Controllers and by extension, the flying public. WDS systems are deployed at commercial airports and provide increased aviation safety through the accurate and timely detection of hazardous aviation weather conditions. Operational benefits of these components include real-time detection of windshear, microbursts, gust fronts, wind shifts as well as prediction of wind changes that allow improved airfield efficiency when making runway changes.

The WSP and LLWAS systems alert controllers of dangerous wind shear events that are detected in approach and departure corridors. Since the deployment of these systems in the late 1980s to early 1990s, no major windshear related incidents have occurred in the NAS. WDS Sustainment will resolve system obsolescence to ensure that Air Traffic Controllers will continue to receive the windshear alerts necessary to maintain the safety of the NAS.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 2A12 Air Traffic Management Implementation Portfolio**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Air Traffic Management Implementation Portfolio	\$29,755	\$50,000	\$56,000

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
A. Traffic Flow Management System (TFMS) Enhancement 4	---	\$1,000.0
B. Traffic Flow Management Improvements	---	2,000.0
C. Traffic Flow Management System (TFMS) Sustainment 3	---	51,300.0
D. In-Service Engineering	---	1,700.0

**What is this program and what does the funding level support?**

---

Throughout each day, Traffic Managers use TFMS to maintain near real-time situational awareness and predict areas that may experience congestion due to capacity reductions or unusual demand increase.

TFMS becomes especially important when external factors, such as adverse weather, reduces National Airspace System (NAS) capacity and requires proactive planning, coordination and adjustments to mitigate impacts, e.g., missed connections, canceled flights, increased fuel consumption, etc. The Air Traffic Control System Command Center (ATCSCC) uses TFMS to model and implement NAS-wide Traffic Management Initiatives (TMI) to make the most efficient use of available capacity to avoid gridlock and minimize delays.

**A. TFMS Enhancement 4 (TFMS E4):** Is the next enhancement package providing improved Traffic Flow Management (TFM) capabilities. For FY 2021, \$1.0 million is requested to continue the development of TFMS Release 19, Improving Demand Predictions (IDP) requirements. The IDP capability is focused on improving the TFMS predictions of demand for NAS resources to help reduce unnecessary delays.



**B. Traffic Flow Management (TFM) Improvements:** Respond to stakeholder-identified inefficiencies in current TFM systems. The scope of these NAS improvements is limited to operational changes that do not require significant capital investments nor involve significant systems complexity, interdependencies, or National Airspace System (NAS) operational changes. This program will support operational and engineering analyses, solution development, and solution implementation activities designed to improve the delivery of TFM services. For FY 2021 \$2.0 million is requested to continue improvements that are currently underway. These improvements include modifications to the Collaborative Trajectory Option Program (CTOP) and the Business Intelligence Reporting Tool (BIRT).

**C. TFMS Sustainment 3 (TFMS S3):** This effort will perform a technology refresh of the TFM Processing Center (TPC) hardware that is at its end of service life. Additionally, this work will modernize the remaining legacy front-facing applications supporting the TFMS that have become a cause for system outages. These efforts will increase integration and interoperability by establishing a robust, commercially available and standards-compliant system. The modernization of these legacy applications will improve system reliability/availability, and remove the current need for technical workarounds, specialized adaptors and unique, internal high-maintenance interfaces. For FY 2021, \$51.3 million is requested to conduct the following:

- Complete the system engineering and hardware procurement for the TPC hardware technology refresh
- Complete the system engineering for the redesign of the end-user applications for TFMS software releases R17 and R18 and begin the development of these releases
- Conduct an engineering assessment to determine the viability for transitioning TFMS to cloud service alternatives

**D. Air Traffic Management – In-Service Engineering** is funding for work that provides an immediate response to emerging technology solutions. For FY 2021, \$1.7 million is requested.

---

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

The requested funding will reduce erroneous alerts presented to EnRoute Supervisors and improve accuracy of demand predictions, which yields better traffic management decisions. The program will improve the overall availability and reliability of the TFMS tools by integrating data for departure management and making data readily available to traffic management unit users. In addition, sustainment of the system will allow TFMS to maintain the overall operational availability within the NAS, enabling the TFM system and capabilities that reside on it to continue providing benefits that include:

- Greater system reliability, dependability and availability, enabling TFMS to achieve and sustain its full benefits of avoiding NAS delay as well as retain TFMS users trust.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

- Decrease maintenance and repair activities, thereby reducing time to repair which will reduce the impact of outages as well as avoid increased TFMS operational and support costs.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

**Detailed Justification for - 2A13 Time Based Flow Management (TBFM) Portfolio**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Time Based Flow Management (TBFM) Portfolio	\$28,150	\$20,000	\$16,250

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
A. Time Based Flow Management Enhancement 1	---	\$5,800.0
B. Time Based Flow Management Sustainment 1	---	3,100.0
C. Time Based Flow Management Enhancement 2	---	2,900.0
D. TBFM WP3 – Independent Operational Assessment (IOA)	---	350.0
E. Transition to Operations and Maintenance (TOM) Year 3	---	4,100.0

**What is this program and what does this funding level support?**

The TBFM portfolio includes Sustainment and Enhancement initiatives that support the National Airspace System (NAS). These capabilities enhance system efficiency by leveraging the TBFM decision-support tool, a system that has already been deployed to Continental United States (CONUS) Air Route Traffic Control Center (ARTCCs), select Terminal Radar Approach Control (TRACON) facilities and select Air Traffic Control Towers.

For FY 2021, \$16.25 million is requested for the TBFM Portfolio to continue its efforts with the installation and deployment of the TBFM concepts. This work will include evaluating and maturing concepts and capabilities, validation activities, demonstrations, and integration of operational capabilities. Improvements in TBFM's core Time-Based Metering (TBM) capability, an expansion of TBFM and its departure capabilities to additional locations will enhance efficiency and optimize demand and capacity.

**A. TBFM Enhancement 1** - The core capabilities of the TBFM Enhancement 1 effort are Terminal Sequencing and Spacing (TSAS) and expansion of Integrated Departure/Arrival Capability (IDAC). TSAS will provide efficient sequencing and runway assignment by making the time-based flight plan visible to the terminal

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

controllers. Currently, visibility to the plan within the automation tool is lost as the flight is transferred from en-route to terminal controller. This visibility will allow efficiencies to be realized for the remaining 80 miles of airspace typically seen between the terminal boundary and runway. Expansion of IDAC to additional locations will increase efficiency of departure operations. For FY 2021 \$5.8 million is requested for activities that include:

- Complete Denver International Airport (DEN) TSAS Integration and Test with the William J. Hughes Technical Center
- Complete initial TSAS adaptation for 1st TSAS site (DEN)
- Improve time based metering capabilities at Philadelphia International Airport (PHL)
- Provide enhancements (adaptation, software, and procedural) as identified per Independent Operational Assessment (IOA) and initial TSAS operational use

**B. TBFM Sustainment 1** – Will replace existing hardware, increase the reliability of the current system and reduce operations costs. For FY 2021, \$3.1 million is requested to:

- Initiate Engineering Analysis for new hardware selection
- Complete hardware testing
- Initiate site surveys

**C. TBFM Enhancement 2** – FAA will build upon TBFM Enhancement 1 to deploy existing capabilities to additional locations in the NAS and provide new capabilities to enable/support the Performance Based Navigation (PBN) NAS Navigational Strategy. New candidate capabilities include: Path Stretch, TBFM Planning Tool, and Weather Source Migration via System Wide Information Management (SWIM) platform. For FY 2021 \$2.9 million is requested to:

- Initiate site requirement surveys for IDAC expansion

**D. Independent Operational Assessment (IOA)** - For FY 2021, \$350,000 is requested for an assessment to identify any safety hazards and operational concerns with TBFM capabilities.

**E. Transition to Operations and Maintenance (TOM) Year 3** - When systems are first commissioned into the National Airspace System (NAS), their Operations and Maintenance (O&M) costs are paid for through the F&E appropriation for a period that is usually up to two years after commissioning. This allows FAA to identify the needs and formulate the requirements in the Operations appropriation during budget formulation. The identified O&M costs must then be transition to the Operations Appropriation. This is known as Transition to Operations and Maintenance (TOM). FAA is requesting a third year of TOM funding under this Budget Line Item within the F&E account.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

TBFM Enhancement capabilities will enable an increase in arrivals and departures in areas where demand for runway capacity is high. TBFM will increase efficiency by allowing aircraft to fly Performance Based Navigation (PBN) operations down to approach. Additional capabilities such as Path Stretch will be able to increase delivery accuracy by providing automation-generated delay absorption advisories and deliver to the meter fix/point to reduce the need for delay absorption after descent. The public will experience fewer delays, reduced carbon emissions, and less airport noise as the result of this TBFM Enhancement 1 Implementation.

TBFM Sustainment will reduce maintenance costs of the existing hardware and continue sustainment of the TBFM system. It will ensure Operational Availability of 99.5 percent at the TBFM sites.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

**Detailed Justification for - 2A14 Next Generation Weather Processor (NWP)**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Next Generation Weather Processor	\$28,650	\$24,300	\$24,300

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
A. Next Generation Weather Processors (NWP)	---	\$12,200.0
B. Common Support Services Weather	---	11,800.0
C. Independent Operational Assessment (IOA)	---	300.0

**What is this program and what does this funding level support?**

Air Traffic Management (ATM) and flight operations rely on weather information for decision making. Current aviation weather processing infrastructure and capabilities are inadequate and do not meet the real-time needs of Air Traffic Management (ATM) DSTs, and operational decision-makers. Existing aviation weather products lack the spatial resolution and the timeliness necessary to assess the impact of weather phenomena on air traffic. Legacy weather system infrastructure is limited and unable to ingest and process observation, forecast, and modeling data to create high-quality weather products with a longer time horizon than currently available.

**A. Next Generation Weather Processors (NWP)** - Will establish a common weather processing platform that will functionally replace the legacy FAA weather processor systems and host new capabilities. NWP uses data from the FAA and National Oceanic and Atmospheric Administration (NOAA) radar and sensors, and NOAA forecast models. NWP includes sophisticated algorithms to create aviation-specific current and predicted weather information. NWP creates enhanced weather products that will be available via the Common Support Services-Weather (CSS-Wx) system. It will perform the weather translation necessary to enable the use of weather information by automated decision-support tools (DSTs). For FY 2021, \$12.2 million is requested to provide the following:

- Continue NWP Solution Development and Implementation activities (e.g. Site Acceptance Testing at Key Sites)

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

- Execute Project Management oversight by the government and its support organizations
- Conduct NWP Operational Test (OT)

**B. Common Support Services Weather (CSS-Wx)** - will enable universal access and the standardization of weather information for dissemination to users by SWIM. CSS-Wx will filter weather information by location and time. Consumers of the information published by CSS-Wx will include air traffic controllers, traffic managers, commercial aviation, general aviation, and the flying public. CSS-Wx will be the FAA's single provider of aviation weather data, consolidating several legacy weather dissemination systems, and will provide weather information for integration into NextGen enhanced decision support tools (DSTs). CSS-Wx will also be scalable to facilitate the addition of new users and new systems.

The CSS-Wx System will make improved weather products provided by the NextGen Weather Processor (NWP), the National Oceanic and Atmospheric Administration's (NOAA) NextGen IT Web Services, and other weather sources, available to FAA and NAS users for input into collaborative decision-making. The CSS-Wx program is now in the FAA's Solution Implementation Phase.

CSS-Wx will resolve the issue of multiple interfaces, inflexible and inefficient information data management, unique data types and point-to-point information exchange. Implementation of this capability will provide cost savings, improvement of capacity, efficiency and safety in adverse weather. For 2021, \$11.8 million is requested to:

- Continue CSS-Wx Solution Development and Implementation activities
- Execute Project Management oversight by the government and its support organizations
- Conduct Operational Testing (OT)

**C. Independent Operational Assessment (IOA)** - Additionally, for FY 2021, \$300,000 is requested to support IOA Activities.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

Users will be able to identify the best routes to fly based on aircraft type, flight plan and flying preferences, using optimized weather observations, improved predictions, and translation of weather information into airspace constraints. Improved weather products will enable Traffic Flow Management to plan operations that optimize airspace capacity and reduce passenger delays. Additionally, the production of advanced aviation specific weather information improves safety for the American public.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 2A15 Airborne Collision Avoidance System X (ACAS X)**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Airborne Collision Avoidance System X (ACAS X)	\$7,700	\$6,900	\$5,100

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
Airborne Collision Avoidance System X (ACAS X) – Segment 1	---	\$5,100.0

**What is this program and what does this funding level support?**

---

ACAS X will replace the existing Traffic Alert and Collision Avoidance Systems II (TCAS II) that is required in airspace for all commercial aircraft with 30 or more seats and on all cargo aircraft greater than 33,000 pounds.

The ACAS X system will address shortfalls in the legacy TCAS II system. The system architecture will be designed so that threat detection and resolution logic changes can be quickly made using an automated process, which will be useful for future adaptations to Next Generation Air Transportation System operations. ACAS X will have enough flexibility to be able to accommodate a variety of sensor types, including new generations of sensors, where necessary. ACAS X will reduce the number of “nuisance alerts” experienced by the current system while simultaneously providing a reduced probability of near mid-air collision. The ACAS X system has three variants in active development:

For FY 2021, \$5.1 million is requested to support the in-service deployment of ACAS X and the transition of the program structure to sustainment in the form of monitoring and operational characterization. Subject matter experts for the ACAS X program will support vendor outreach by means of engineering testing and evaluation support to vendors and initial operators as well as user outreach to pilots and air traffic control. Program office staff will also support the development of regulatory guidance through continued support to FAA’s aviation safety office for formalizing remaining guidance materials. Program office staff will continue to participate in Radio Technical



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

Commission for Aeronautics SC-147 groups to ensure system alignment with International Civil Aviation Organization standards harmonization.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

ACAS X will create fewer false warnings of potential midair collisions which will promote the high level of aviation safety that is critical in terminal air traffic areas. Benefits include an increase in trust for ACAS X, reduction in workload for pilots and Air Traffic Controllers, faster and less expensive implementation of updates to ACAS X in the field, and improved safety when conducting operations under Instrument Meteorological Conditions.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

**Detailed Justification for - 2A16 Data Communications in Support of NextGen**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Data Communications in Support of NextGen	\$118,902	\$136,248	\$99,800

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
A. Segment 1 Phase 2 (S1P2) Initial En Route Service	---	\$16,500.0
B. Air Ground Internet Protocol Gateway	---	2,000.0
C. Segment 1 Phase 2 (S1P2) Full En Route Services	---	18,000.0
D. Segment 1 Phase 1, DCIS Network Services	---	57,900.0
E. Independent Operational Assessment (IOA)	---	400.0
F. Transition to Operations and Maintenance (TOM) Year 3	---	5,000.0

**What is this program and what does this funding level support?**

The Data Communications (Data Comm) program will provide data communications between Air Traffic Control (ATC) facilities and aircraft and will serve as an enabler for the NextGen operational improvements. Data Comm Segment 1 will deliver the initial set of Data Comm services integrated with automation support tools, which provides NAS benefits and lays the foundation for a data-driven National Airspace System (NAS).

Data Comm is needed to bridge the gap between current voice-only ATC and the data-intensive NextGen. Data Comm will enable air traffic controller efficiency improvements and will permit capacity growth without requisite cost growth associated with equipment and maintenance. Data Comm is comprised of automation enhancements for ATC message generation and exchange (hardware and software) and the communications data link between ground and airborne users. Current analog voice communications contribute to operational errors due to miscommunications, stolen clearances, and delayed messages due to frequency congestion. In FY 2004 and FY 2005, approximately 20 percent of En Route operational errors were voice communication related and, 30 percent of the high severity En Route operational errors

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

were deemed to be communications related. Data Comm will significantly reduce communications related operational errors and improve the safety of air travel.

Data Comm will also implement a ground system to support Internet Protocol Suite (IPS) communications for advanced avionics, supporting advanced NextGen capabilities.

Initially, Data Comm will be used in conjunction with the current traffic control strategies as well as planned strategies such as traffic flow management (TFM) re-routes. Data Comm will increase controller efficiency by automating routine exchanges. As controllers become more productive, tower and En Route capacity will grow without the need to assign additional resources. This increase in traffic handling ability has a direct correlation to reduced delays and increased efficiency. Recent benefits analysis show airline operations are benefiting from reduced gate delay and taxi times and improved on-time performance. The busiest airport clearance delivery positions at the busiest airports are seeing the most dramatic benefit.

Data Comm services will improve operations in the following manner:

- Improve flight efficiency due to improved controller and flight crew efficiency by providing automated information exchange
- Improve re-routing capabilities
- More efficient routes for aircraft
- Decrease congestion on voice channels and provide an alternative communications capability
- Improve NAS capacity and reduced delays associated with congestion and weather
- Improve communication accuracy and safety with digital communication (i.e., reduced read/hear back errors, reduced loss of communications events)
- Reduce environmental impact due to less fuel burn and emissions
- Direct operating cost savings from increased throughput realized through reduced delays and improved communications

For FY 2021, \$99.8 million is requested for the Data Comm program. This funding supports the deployment of Segment 1 Phase 2 (S1P2) Initial En Route Services, development of Segment 1 Phase 2 (S1P2) Full Services, funding for the DCIS Network Services (DCNS), and investment analysis activities for the Air Ground Internet Protocol (IP) Gateway.

**A. Segment 1 Phase 2 (S1P2) Initial En Route Services**

For FY 2021, Data Comm is requesting \$16.5million for S1P2 Initial En Route Services. This funding will be used to complete the waterfall implementation, site testing, and training activities at all 20 Continental United States (CONUS) Air Route Traffic Control Centers (ARTCC).The funding will go towards En Route Automation modernization (ERAM) prime vendor support of site testing, training, and fixing any software issues found during testing and implementation. The funding will also pay for the continued Data Comm Air-to-Ground Network services throughout the En Route domain.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

Funding is also needed for program management, program control, operations and contract management support as well as second-level engineering support. S1P2 Initial En Route Services milestones include:

S1P2 Initial En Route Services milestones include:

- Achieve First Site Initial Operational Capability (IOC) for En Route Services (APB Milestone) – FY 2019
- In Service Decision (APB Milestone) – FY 2020
- Last Site IOC for En Route Services (APB Milestone) – FY 2021

**B. Segment 1 Phase 2 (S1P2) Full En Route Services**

For FY 2021, Data Comm is requesting \$18 million for S1P2 Full En Route Services. Activities will include the completion of software development integration test of Data Comm Full Services capabilities. In addition, this funding will allow the vendor to provide specialty-engineering support related to system safety, security, human factors and reliability engineering. The vendor will continue the test and evaluation process for Full Services and the program office will begin planning its implementation program. The program office will work with the vendors as well as Second Level Engineering to design scenarios, test processes and evaluation criteria, and deployment plans.

S1P2 Full En Route Services milestones include:

- Continue software development for Full En Route Services – FY 2019
- Contractor Software Development Complete – Transition to Contractor Test (APB Milestone) – FY 2020
- Complete Training Development – FY 2021

**C. Segment 1 Phase 1 (S1P1) and Segment 1 Phase 2 (S1P2) DCIS Network Services**

Data Comm is requesting \$57.9 million in FY 2021 for network services. This funding will provide the Very High Frequency (VHF) Data Link (VDL) Mode 2 air ground network service that provides connectivity between the controllers and the cockpit. Costs for the Data Comm Integrated Services (DCIS) network services that are covered in other activities are being transitioned to this activity. The DCIS network services also include operations and maintenance, monitoring and control, and certification suite activities. This Data Communications DCIS Network Service supports both surface and En Route operations.

**D. Air Ground Internet Protocol (IP) Gateway**

For FY 2021, Data Comm is requesting \$2 million in FY2021 for the Air Ground Internet Protocol (IP) Gateway. This funding will provide a ground system to support Internet Protocol Suite (IPS) communications. This additional hardware and software will allow Data Comm system to support IP communications beyond FANS. This will also include the infrastructure to support advanced capabilities and additional research and

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

development in the Data Comm Segment 2 timeframe. This will support the implementation of more advanced NextGen services such as 4D Trajectories, Advanced Interval Management, Tailored Arrivals, Digital Taxi (D-TAXI), and Dynamic Required Navigation Performance (RNP).

**E. Independent Operational Assessment (IOA)**

\$400,000 is for Independent Operational Assessment (IOA).

**F. Transition to Operations and Maintenance (TOM) Year 3**

When systems are first commissioned into the National Airspace System (NAS), their Operations and Maintenance (O&M) costs are paid for through the F&E appropriation for a period that is usually up to two years after commissioning. This allows FAA to identify the needs and formulate the requirements in the Operations appropriation during budget formulation. The identified O&M costs must then be transition to the Operations Appropriation. This is known as Transition to Operations and Maintenance (TOM). FAA is requesting a third year of TOM funding under this Budget Line Item within the F&E account.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

Data Comm will reduce operational errors associated with communications, enhancing the safety and efficiency of the NAS. Data Comm will also reduce environmental impact due to less fuel burn and emissions. The program will improve NAS capacity and reduce delays resulting in estimated passenger value of time (PVT) savings of \$11.3 billion for Tower and Initial En Route Services over the program life cycle. The addition of Full Services capabilities will add another \$734 million of PVT savings over the program life cycle.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 2A17 Reduced Oceanic Separation**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Reduced Oceanic Separation	\$17,500	\$32,300	\$10,450

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
A. Advanced Surveillance Enhanced Procedural Separation (ASEPS)---		\$10,100.0
B. Independent Operational Assessment (IOA)	---	350.0

**What is this program and what does this funding level support?**

---

The Advanced Surveillance Enhanced Procedural Separation (ASEPS) program, is exploring enhancements in surveillance to support reduced separation in oceanic Flight Information Regions (FIRs). ASEPS Automatic Dependent Surveillance – Contract (ADS-C) Reduced Oceanic Separation will be included in the Advanced Technologies and Oceanic Procedures (ATOP) Enhancement 1 program.

**A. Advanced Surveillance Enhanced Procedural Separation (ASEPS)** – For FY 2021, \$10.1 million is requested to support an operational assessment of Space Based Automatic Dependent Surveillance - Broadcast (SBA) in the Caribbean which will allow the FAA to mature the satellite based technology, assess system performance in an operational environment, and assess the far-term applications of this new technology across a broader range of operational environments. The program will use existing contracts to acquire SBA data for oceanic service volumes in the Caribbean and feed data into En Route Automation Modernization (ERAM) automation system at Miami Air Route Traffic Control Center (ARTCC) Center. Additionally, FAA will explore strategies to accelerate the implementation of enhanced communications, and deliver an operational contingency capability to mitigate the impact of disaster events. Finally, the ASEPS team, is looking at potential initiatives that would integrate SBA within the ATOP platform in the near-term. FY 2021 work will include:

- Oversight of Operational Evaluation, including coordination with Miami ARTCC and industry partners

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

- Further analysis of near-, mid- and long-term activities to evaluate and mature the development of SBA. These include investigation of the oceanic environment, contingency and resiliency capabilities, and industry engagement for future concepts
- Pursue near-term initiatives designed to implement SBA to enhance safety and efficiency in certain oceanic airspace while providing a benefit to the users

**B. Independent Operational Assessment (IOA)** - For FY 2021, \$350,000 is requested for an assessment to identify any safety hazards and operational concerns with ASEPS capabilities.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

These efforts will contribute to the development of a new operational concept for oceanic operations that includes enhanced, VHF-like communications and use of weather products paired with enhanced surveillance as part of a holistic approach to reducing separation minima.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 2A18 En Route Service Improvements**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
En Route Service Improvements	\$1,000	\$2,000	\$2,000

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u><b>Activity Tasks</b></u>	<u><b>Locations/ Quantity</b></u>	<u><b>Estimated Cost (\$000)</b></u>
En Route Service Improvements	---	\$2,000.0

**What is this program and what does this funding level support?**

---

This program supports a category of requirements that address necessary and unplanned changes in the en route domain. These sudden needs are the result of operational changes in the field, unanticipated changes from external organizations (e.g. International Civil Aviation Organization (ICAO), third party data providers, neighboring Air Navigation Service Providers (ANSP) or potential cost-savings initiatives. For FY 2021, \$2.0 million is requested for operational analysis, engineering analysis, solution development, and solution implementation activities to improve the delivery of en route domain services.

The scope of En Route Services Improvements is limited to operational changes that do not require significant capital investments or involve significant systems complexity, interdependencies, and NAS operational changes. The identification, management, documentation, and overall governance of these NAS changes will be articulated in an ATO domain service enhancement Standard Operating Procedure (SOP) and coordinated with applicable stakeholders.

This funding will be used to improve the presentation, access, and use of ERAM and other systems data by air traffic controllers and managers, resulting in more efficient, safer, and cost-effective delivery of en route services. These small but critical improvements are identified by current operations, and support FAA and/or International Civil Aviation Organization (ICAO) changes.



**What benefits will be provided to the American public through this request and why is this program necessary?**

---

This program will provide increased Air Traffic Management (ATM) efficiency, improved target levels of safety, and enhanced productivity through the implementation of high priority en route functional improvements. Improved interaction between the human and the systems, and increasing the accuracy and use of flight data will directly enhance the timeliness and fidelity of controller decisions. This will ultimately improve delivery of services. Advancing the interoperability between systems and facilities decreases manual coordination which directly enhances workforce productivity.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 2A19 Commercial Space Integration**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Commercial Space Integration	\$9,000	\$23,000	\$11,000

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
A. Commercial Space Integration into the NAS: Prototype Sustain	---	\$1,000.0
B. Commercial Space Integration into the NAS: Develop/Acq	---	10,000.0

**What is this program and what does this funding level support?**

---

The Commercial Space Integration into the National Airspace System (NAS) program will automate the FAA's ability to monitor and respond to launch and reentry operations in the NAS through development of a Space Data Integrator (SDI). Many of the planned commercial space missions will include new technologies that have never been undertaken such as reusable rockets, presenting an unprecedented level of complexity. Planning and execution challenges are making it increasingly difficult for the FAA to manage the growing volume of operations in the NAS without significant disruptions to both space and air operators. SDI will enable the FAA to safely reduce the amount of airspace that must be closed to other users and release airspace that is no longer at risk as the mission progresses.

**A. Commercial Space Integration into the NAS: SDI Prototype Sustain** - For FY 2021 \$1.0 million is requested to continue sustainment of the Space Data Integrator (SDI) Prototype in the Commercial Space Integration lab. This prototype enables Proof-of-Concept (POC) work that supports integration of launch and reentry data. The SDI POC demonstrates the benefits of an integration system but is limited in capability.

**B. Commercial Space Integration into the NAS: SDI Development/Acquisition** - For FY 2021, \$10.0 million is requested to continue development and test of an operational Space Data Integrator (SDI) capability. SDI will integrate commercial space into the NAS by automating the process of acquiring, transforming, disseminating, and displaying

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

data (telemetry, mission status, aircraft hazard areas) during launch and reentry operations. The national Traffic Flow Management environment and affected facilities will be able to receive and use launch and reentry vehicle data to improve situational awareness, monitor the transition of these vehicles through the NAS, and respond to off-nominal situations. The FAA will work to integrate the SDI with the Traffic Flow Management Platform to ultimately upload launch information with NAS traffic management automation.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

This program provides safety, flight efficiency, and cost avoidance benefits by enhancing the current level of safety through automating resource intensive processes and reducing the potential for human error during launch and reentry operations.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 2B01 Standard Terminal Automation Replacement System (STARS) (TAMR Phase 1)**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Standard Terminal Automation Replacement System (STARS) (TAMR Phase 1)	\$66,900	\$41,300	\$74,900

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
A. STARS Sustainment 2	---	\$1,900.0
B. STARS Sustainment 3	---	40,000.0
C. Transition to Operations and Maintenance (TOM) Year 3	---	33,000.0

**What is this program and what does this funding level support?**

The STARS program is a digital processing and display system that replaced legacy air traffic control automation equipment at FAA Terminal Radar Approach Control (TRACON) and Air Traffic Control Tower facilities. It is used by Air Traffic Controllers to ensure the safe separation of both military and civilian aircraft within the nation's airspace.

**A. STARS – Sustainment 2:** This program will provide engineering that will enable the FAA to replace key elements of STARS that have reached their end-of-life (EOL) and are no longer compatible with current commercial offerings. Two significant activities include engineering required to upgrade the present Solaris Operating System that reaches EOL in FY 2018, the end of vendor support in FY 2021 and engineering to develop engineering change proposal (ECPs) and qualify hardware required to transition to Digital Video from current STARS analog video. Also included is Technology Refresh of five STARS G1/G2 Local Integrated Tower Equipment (LITE) systems with new STARS G4 remote tower equipment. For FY 2021, \$1.9 million is requested to support Second Level Engineering Contractor Support for Operational Testing and Evaluation (OT&E) for Software release S8.R1 and S8.R1A.

**B. STARS – Sustainment 3:** This program is a continuation of STARS Sustainment 2. The STARS Sustainment 3 program will (1) Deploy the new Operating System to all sites, (2) Deploy Digital Video to all Terminal Control Workstations (TCW) and Tower Display Workstations (TDW) at all G4 sites (3) Deploy X4000 Replacement Processors and Digital Recording Device (DRD) and (4) Transition TDM based communication to IP based communication at remote towers. For FY 2021, \$40.0 million is requested for the following:

- Operating System Deployment
- Digital Video Deployment
- T1 replacement – Prime
- X4000 Processor Replacement
- Operating System Licenses
- Headquarters, Engineering Services and Second Level Engineering

**C. Transition to Operations and Maintenance (TOM) Year 3** - When systems are first commissioned into the National Airspace System (NAS), their Operations and Maintenance (O&M) costs are paid for through the F&E appropriation for a period that is usually up to two years after commissioning. This allows FAA to identify the needs and formulate the requirements in the Operations appropriation during budget formulation. The identified O&M costs must then be transition to the Operations Appropriation. This is known as Transition to Operations and Maintenance (TOM). FAA is requesting a third year of TOM funding under this Budget Line Item within the F&E account.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

STARS is a fully digital system that is capable of tracking all aircraft within the defined terminal airspace using available FAA and Department of Defense (DoD) surveillance or with system upgrades to global positioning satellite reports. It is designed to incorporate new functionality more quickly and easily than the previous systems. STARS infrastructure can be expanded and extended to meet increased traffic demands and accommodate the introduction of new automation functions necessary for improved safety, efficiency, and capacity.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 2B02 Terminal Automation Program**

(\$000)

Activity/Component	FY 2019 Actual	FY 2020 Enacted	FY 2021 Request
Terminal Automation Program	\$8,500	\$6,500	\$3,900

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
A. Flight Data Input / Output (FDIO) Sustainment	---	\$1,900.0
B. Terminal Improvements	---	2,000.0

**What is this program and what does this funding level support?**

---

**A. Flight Data Input/Output (FDIO) Replacement** - System provides standardized flight plan data, weather information, safety related data, and Wake Re-Categorization to air traffic controllers located at approximately 690 remote sites. This information assists controllers in tracking aircraft, providing departure clearances, and anticipating the arrival of aircrafts in the sector under their control. The FDIO Replacement program replaces end-of-life (EOL)/obsolete FDIO equipment with fully compatible commercial off the shelf (COTS) and modified COTS equipment. In addition to replacing components, this project will support a common Internet Protocol infrastructure that supports future automation systems architecture, and the Terminal Flight Data Manager System (TFDM).

For FY 2021, \$1.9 million is requested to continue the procurement of hardware and software, provide program management support, procurement and installation of replacement FDIO components at Federal Aviation Administration and Department of Defense air traffic control facilities, and all related logistics.

**B. Terminal Automation Modernization Improvements** - Support a category of requirements that address necessary and unplanned changes to various systems in the Terminal domain. These sudden needs are the result of operational changes in the field, unanticipated changes from external organizations (e.g. International Civil Aviation Organization (ICAO), third part data providers, neighboring Air Navigation Service

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

Providers or potential cost-savings initiatives. The scope of these improvements is limited to changes that do not require significant capital investments or involve significant systems complexity. The funding request for FY 2021 is \$2.0 million and this funding will be used to improve the presentation, access, and use of terminal automation systems data by air traffic controllers and managers, resulting in more efficient, safer, and cost-effective delivery of terminal services.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

These projects reduce the operating and maintenance costs associated with maintaining aging hardware and software, extend the service life of the systems and provide the latest technology and security features.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 2B03 Terminal Air Traffic Control Facilities – Replace**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Terminal Air Traffic Control Facilities – Replace	\$19,200	\$24,327	\$55,000

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
Terminal Air Traffic Control Facilities – Replace	---	\$55,000.0

**What is this program and what does this funding level support?**

---

Terminal Air Traffic Control Facilities–Replace is one of the programs included in the Air Traffic Control (ATC) Facilities Sustainment Portfolio (SSP). Funding the programs in this strategy will improve and maintain the facility condition index (FCI) ratings at FAA facilities that provide the backbone for the National Airspace System (NAS). The FAA is seeking funding for design, to support construction costs, and for the purchase of equipment and utility installation at three different sites respectively.

The FAA provides air traffic control services from more than 500 Air Traffic Control Towers (ATCT) and Terminal Radar Approach Control (TRACON) facilities. Under this program, the FAA evaluates which buildings need to be replaced, sustained, or modernized (especially relative to other facilities across the country) to ensure an acceptable level of building conditions and to meet current and future operational requirements. The average age of ATCTs in the FAA portfolio is 33 years, and the average age of a TRACON is 26 years. There are facilities that are 65 years old. In some cases, ATCTs and TRACONs built 20 years ago do not meet today's Occupational Safety and Health Administration, operational, and building requirements. The facilities also may not have been built to meet today's technological needs and, while some facilities can be modernized or sustained, replacement may be the most efficient method for the FAA to meet operational needs and conform to current building codes and design standards.



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

The ATCT and TRACON replacements are large capital investments. Given constrained resources, the FAA is focusing on risk-based analyses to ensure that those facilities in greatest need are replaced first. The FAA has a prioritized listing of all NAS terminal sites and conducts ongoing studies that determine if and when the FAA needs to replace an ATCT due to its siting, size, and physical conditions. From that list, the FAA then initiates siting and design studies and ultimately, construction of the facilities with the greatest need.

Segment 1 funding in the amount of \$8.5 million is requested for FY 2021 to support advance requirements definition and program management costs for planning and overseeing the program. Activities supported under Segment 1 include the evaluation of unique operational and maintenance requirements that impact ATCT/TRACON facilities, the development of business cases, mock-ups of the Airport Facilities Terminal Integration Laboratory (AFTIL) to assist with the evaluation of the attributes of proposed airport sites, actual site selection, and other advance engineering considerations.

Segment 3 funding in the amount of \$30.6 million is requested in FY 2021 to support construction costs associated with the new ATCT/TRACON facility at Teterboro, NJ (TEB) at \$10.0 million; and Charleston, SC (CHS) at \$20.6 million.

Segment 4 funding in the amount of \$14.8 million is requested for FY 2021 for two facilities to procure equipment and utilities installation at Greensboro, NC (GSO) at \$5.3 million and Teterboro, NJ (TEB) at \$9.5 million.

Segment 5 funding in the amount of \$1.1 million is requested in FY 2021 for one facility. This segment funds the disposition, demolition and decommissioning of the facility that has been replaced. The facility included in this request is Greensboro, NC (GSO).

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

The benefits provided by the Terminal Air Traffic Control Facilities – Replace program include:

- Eliminating line-of-sight issues, thus increasing efficiency and safety
- Providing adequate space for all approved operational and support positions to enhance efficiency at the ATCT/TRACON
- Providing adequate space and infrastructure for new modern equipment and systems to facilitate the transition to NextGen
- Reducing the high cost of maintaining old and outdated buildings
- Increasing the overall FCI of terminal facilities by providing new buildings that meet current codes

These benefits are instrumental in providing efficiency and effectiveness, which in turn will produce cost savings for taxpayers.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 2B04 ATCT/Terminal Radar Approach Control  
(TRACON) Facilities - Improve**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
ATCT/Terminal Radar Approach Control (TRACON) Facilities – Improve	\$95,850	\$96,200	\$84,600

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
A. ATCT/TRACON Sustain	---	\$73,600.0
B. Facilities Realignment Implementation	---	10,000.0
C. In-Service Engineering	---	1,000.0

**What is this program and what does this funding level support?**

---

ATCT/TRACON Terminal Facilities Improvement is one of the programs included in the FAA's Air Traffic Control (ATC) Facilities Sustainment Portfolio. For FY 2021, \$84.6 million is requested for the following:

**A. ATCT/TRACON Modernization** - \$73.6 million is requested to initiate modifications, improvements, sustainment and repairs to Airport Traffic Control Tower (ATCT)/TRACON facilities. Funding will also support system engineering activities, configuration management, facility planning, facility condition assessments and program support services.

The ATCT/TRACON Terminal Facilities Improvement program includes projects that will enable facilities to maintain current operational, environmental, and safety needs in lieu of replacing or relocating the entire facility. This effort will result in a smooth and orderly transition of new equipment into the FAA's terminal facilities. It will also improve the operational efficiency and environment of equipment within ATCT/TRACON facilities. The upgrades and improvements to terminal facilities support the NAS modernization strategy to achieve efficient aerospace systems and operations. Facility improvements must incorporate new requirements for relocated or replaced equipment with minimal impact to existing operations.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

The program funds an average of 50 sustainment projects each year. Sustainment is defined as activities to continue the NAS/terminal service mission critical capability by modifying, repairing, replacing, and reconfiguring. Routine and ongoing maintenance activities are not funded from this program. The sustainment projects include many sites throughout the NAS and will consist of efforts such as mechanical, electrical, elevators and plumbing.

**B. Facility Realignment Implementation** - \$10.0 million is requested for conducting transition planning, initiating and completing facility modifications, installing necessary equipment, supporting realignment-related training, and preparing workforce, facilities, and equipment for the transition. This project will fund the implementation of realignment recommendations submitted by the FAA Administrator to Congress.

**C. In-Service Engineering** - Also requested is in-service engineering funding in the amount of \$1.0 million to promote the improvements and allow for immediate response and tactical distribution in response to emerging solutions.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

The benefits of the ATCT/TRACON Terminal Facilities Improve program are that repairs will be made to critical infrastructure that facilitates the movement of air traffic. These repairs will increase the overall Facility Condition Index (FCI) of those facilities and reduce the risk of air traffic control outages by providing safe, secure, resilient, and efficient buildings that meet modern codes. These improvements reduce the ongoing cost of operational maintenance at these facilities.

Facility realignments are expected to deliver cost savings, cost avoidance, and staffing and operational efficiencies upon implementation and may continue to accrue overtime.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 2B05 NAS Facilities Occupational Safety and Health  
Administration (OSHA) and Environmental Standards  
Compliance**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
NAS Facilities OSHA and Environmental Standards Compliance	\$41,900	\$40,400	\$28,900

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
NAS Facilities OSHA and Environmental Standards Compliance	---	\$28,900.0

**What is this program and what does this funding level support?**

---

The Air Traffic Organization (ATO) NAS Facilities Occupational Safety and Health Administration (OSHA) and Environmental Standards Compliance Program provide occupational safety and environmental risk management technical expertise to support compliance with applicable safety and environmental protection standards and mitigate identifiable hazards in the ATO workplace.

ATO acquisitions, installations, modifications, and operations must comply with a wide variety of safety and environmental protection standards governing areas ranging from fire and life safety for our facilities through the storage and disposition of hazardous wastes and materials.

The Environmental and Occupational Safety and Health (EOSH) Services provides safety and environmental protection and risk management support management expertise through the life cycle of ATO operations. EOSH professionals consult in the planning phases of retrofitted and new construction efforts to mitigate risks and even completely engineer out hazards at the earliest possible point. EOSH professionals devise, develop, and publish orders, policies, procedures, and practices that promote cultural risk management. EOSH professionals conduct job hazard analyses and facility inspections to identify actual and potential risks. Risk mitigation plans are developed and enacted. Risk mitigation methodologies range from educational opportunities focused on safety

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

and environmental risks and how to apply risk awareness and mitigation techniques through modification of existing ATO assets.

The EOSH program performs data analyses to identify, track, and mitigate emerging or recurrent risk concerns.

EOSH program risk management efforts include:

- Protect employees and the environment
- Prevent damage and loss of FAA resources
- Promote a culture of safety and environmental responsibility

For FY 2021, \$28.9 million is requested to provide technical compliance expertise to address Federal, State, and local environmental and safety regulations and binding commitments. Primary focus areas include:

- Employee Health/Industrial Hygiene
- Fire and Life Safety
- Environmental Compliance
- Occupational Safety
- Service Area Technical Implementation
- Electrical Safety Hazard Analysis

Non-compliance with Federal, State, and local environmental, safety, health, legal, and other requirements imposes significant liabilities on the FAA in the form of personnel injury or loss, interruptions to NAS operations, violations of bargaining unit agreements, post-incident response actions (such as costly cleanups), and a decrease in employee morale. Failing to effectively manage safety and environmental risks also incurs short- and long-term financial impacts for the agency. Employee injuries directly impact not only the injured worker (lost time and productivity) but also require the cost and time commitments associated with first- and second-level responders, generate unplanned workload for post-incident investigatory and administrative personnel, and create personnel backfill requirements to achieve the continuing mission.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

The program goal is to identify and reduce or eliminate occupational hazards and environmental liabilities present in FAA operations through a combination of compliance policies and procedures, continuous hazard identification and monitoring, targeted training, deployment of protective measures, and hazard abatement activities. These efforts reduce occupational safety and environmental risks, resulting in a safer, healthier workforce, reduced employee injuries and associated costs, a strong agency compliance

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

posture, and reduced impacts to FAA operations. These efforts also put the FAA in compliance with several Federal and State compliance regulations.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 2B06 Integrated Display System (IDS)**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Integrated Display System (IDS)	\$18,000	\$24,000	\$30,000

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
Enterprise Information Display System (E-IDS) Program	---	\$30,000.0

**What is this program and what does this funding level support?**

---

In the National Airspace System (NAS), Information Display Systems (IDSs) are used operationally in Federal Aviation Administration (FAA) facilities, including En Route Air Route Traffic Control Centers (ARTCCs), Terminal Radar Approach Control (TRACON) facilities, Center Radar Approach Control (CERAP) facilities, and Airport Traffic Control Towers (ATCTs). These IDSs provide operational personnel across the NAS with auxiliary information that complements the information provided on their primary displays (i.e., radar displays). External entities (e.g., Department of Defense (DoD), airlines, airport authorities) also use or interface with these FAA IDSs.

Information displayed on IDSs consists of dynamic information (e.g., weather observations from airport surface weather sensors), airport information (e.g., runway status and visibility), and static information (e.g., airport diagrams, approach charts, and facility directives). Other information (e.g., frequency outages and ongoing traffic flow management initiatives) are captured on these systems via manual entry.

The FAA plans to address the following legacy IDS shortfalls with the E-IDS Program:

- Current IDS platforms are facing obsolescence and end-of-life issues, and are difficult to repair, maintain and technology refresh
- Maintaining multiple system baselines with aging components is costly, including training costs

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

- The hub-and-spoke architecture of current IDSs is limited to an operational area which isolates the information they manage, and in turn limits the ability to migrate parts of operational capability to another facility during NAS contingency operations
- These systems are unable to interface and integrate with NAS Enterprise Services and System Wide Information Management (SWIM)-enabled information services that provide information from authoritative sources
- These systems are not compliant with existing and future NAS security policies

E-IDS will replace five IDS currently in use at just over 450 Air Traffic Control (ATC) facilities with approximately 5,000 IDS-equipped operating positions. There are additional locations where IDS equipment is installed for remote communications, which will also be replaced. The IDS being replaced are:

- Information Display System-4 (IDS-4)
- Automated Surface Observing System (ASOS) Controller Equipment IDS (ACE-IDS)
- NAS Information Display System (NIDS)
- En Route Information Display System (ERIDS)
- Air Traffic Control Specialist (ATCS) Auxiliary Information Display (AAID)

IDS-4, ACE-IDS, and NIDS are used in the Terminal environment (ATCTs, TRACONs, and CERAPs). ERIDS is used at 20 ARTCCs. AAID is used at the Alaska ARTCC.

The E-IDS program will replace the legacy IDSs with an enterprise system providing a single NAS baseline with a single logistics pipeline, reduced training needs, and national configuration management, leading to long-term operations and maintenance cost savings.

E-IDS will allow users to work efficiently by providing timely display and correlation of relevant operational information (e.g. maps, weather, and aeronautical features) simultaneously on an integrated geospatial display. E-IDS will provide each user access to enterprise-level information coupled with efficient, consistent, easy-to-use filtering, sorting and searching capabilities and quick reference information.

E-IDS is planned for three phases. During Phase 1, the E-IDS program will deploy the enterprise infrastructure, integrate E-IDS with SWIM infrastructure, establish connectivity with external users, and integrate with interfaces. E-IDS will also deploy data administration capabilities on the mission support domain to facilitate configuration of key operational clusters in a timely manner. In Phase 1, deployment with new equipment will target several operational clusters in the Terminal and En Route domains that are chosen using specific criteria to ensure that:

- E-IDS is operationally acceptable, by replacing four of the five systems (AAID is excepted given its one of a kind status)
- Core Terminal and En Route functionality is working as expected
- E-IDS is scalable
- Connectivity to external users and systems is established

In Phase 2, deployment will continue with the remaining Terminal and En Route facilities, including the Alaska ARTCC, and the Oceanic sectors. Additional information



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

management capabilities will be deployed, and a new interface to the Traffic Flow Management Data Flow Information service will be added to provide Traffic Management Initiative (TMI) information.

Phase 3 will provide additional new system functionality, and deployment will continue to provide E-IDS capabilities at Alaska Flight Service Stations (FSSs) and the Air Traffic Control System Command Center (ATCSCC). Any information specific to the Oceanic domain, Alaska FSSs, or the ATCSCC, will be added as identified to bring operational improvements.

In FY 2021, \$30.0 million is requested in Phase 1 to support the prime contract development of preliminary software specifications and system architecture design. Funding will be utilized to develop draft Development Test (DT)/Operational Test (OT) plans. FY 2021 funding will also provide program management, contract management, program control, budget, earned value management (EVM), and risk management contractor support.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

E-IDS will provide benefits to the American public by:

- Providing increased productivity, user efficiency, and NAS safety by displaying, entering, and distributing Notices to Airmen (NOTAMs), and access to Special Activity Airspace (SAA) schedule and status
- Enhancing safety in the NAS with Pilot Report (PIREP) collection and distribution across the E-IDS Enterprise and to other NAS users
- Replacing multiple legacy IDS systems that are approaching obsolescence
- Reducing total development and sustainment costs compared to the cost of maintaining current multiple legacy IDS systems
- Increasing program oversight efficiencies by reducing from multiple legacy IDS systems to a single E-IDS system
- Improving NAS resiliency by supporting faster recovery during adverse events, and providing required operational position information to any other properly configured position in the NAS will support Air Traffic Management (ATM) service providers in maintaining the continuity of operations

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 2B07 Terminal Flight Data Manager (TFDM)**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Terminal Flight Data Manager (TFDM)	\$119,250	\$135,450	\$79,050

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u><b>Activity Tasks</b></u>	<u><b>Locations/ Quantity</b></u>	<u><b>Estimated Cost (\$000)</b></u>
A. Terminal Flight Data Manager (TFDM)	---	\$78,700.0
B. Independent Operational Assessment (IOA)	---	350.0

**What is this program and what does this funding level support?**

---

The Terminal Flight Data Manager (TFDM) program will deliver to tower Air Traffic Controllers and FAA traffic managers NextGen decision support capabilities that integrate flight, surface surveillance, and traffic management information. TFDM will provide the equipment for the collection, distribution, and update of flight data information in the terminal area, and will improve access to information for the safe and efficient control of air traffic. TFDM decision support capabilities will promote safe and efficient airport operations in managing airport surface traffic sequencing and scheduling. TFDM will automate manual flight data processes to enable enhanced data sharing between the Tower, En Route, Approach Control, Traffic Flow Management (TFM) and Flight/Airline Operations Centers.

A key component of the TFDM system is the transition from paper flight strips to electronic flight data representation and exchange. This will facilitate enhanced flight data exchange between controllers within the tower, those in other ATC facilities, and those overseeing Traffic Flow Management Systems. This will also facilitate data exchange with aviation partners such as the airlines' flight operations centers and airport operators to support Collaborative Decision Making (CDM). Providing flight data in electronic format eliminates the necessity of the physical exchange of flight data, reduces telephone call volume between facilities and reduces the manual re-entry of data among multiple ATC systems. Air traffic controllers will have more heads up time, looking out the window, to focus on the surface traffic, therefore, increasing safety.

Another key component of the TFDM system is the introduction of a surface scheduler/metering capability. TFDM will provide the basis for efficient management of traffic flows on the surface at U.S. airports by transitioning the performance of airport surface operations from a “first come, first served” model to a more strategic model that allocates taxi clearances to minimize taxi distance and time, thus reducing fuel burn and CO2 emissions.

The Final Investment Decision was approved and the prime contract was awarded in June 2016. The program's implementation plan is based on a two software build approach (Build 1 and Build 2) and deployment to 89 airports from FY 2020 to FY 2029. TFDM is currently in the Development and Testing phase and starting the implementation activities. The program has completed the following key milestones:

**Build 1 Key Milestones:**

- System Requirements Review
- Preliminary Design Review
- Critical Design Review
- Development Test Start

**Build 2 Key Milestones**

- System Requirements Review
- Preliminary Design Review
- Critical Design Review

TFDM will integrate into the National Air Space (NAS) and will have program interdependencies for data exchanges with numerous other systems. The costs associated with other system interfaces and modifications required to deliver TFDM capabilities is included in the TFDM cost baseline. In FY 2018, TFDM begun providing incremental funding for these other systems and will conclude with the Traffic Flow Management System (TFMS) in FY 2020.

In FY 2021, \$78.7 million is requested for the Implementation of TFDM Build 1 and the continued System Development of TFDM Build 2. The Prime Contract costs for FY 2021 will cover the completion of site surveys at 10 sites, hardware installation at 9 sites, completion of Build 2 Operational Test, Build 2 Key Site Initial Operational Capability (IOC), and IOC at 7 additional sites. FY 2021 Prime Contractor costs also covers the TFDM Build 2 activities that includes the Build 2 Key Site Deployment: Installation, Optimization and Site Acceptance Test. The FY 2021 funds will also provide Program Management and Technical Support resources to support the TFDM Program Office and the Systems Operations office (a TFDM stakeholder) in the planning, oversight and management of the Prime Contractor. Additionally, the remaining FY 2021 funding will provide the TFDM Program Office with the Test resources required to oversee and witness the Formal System Test activities, conduct the Operational Test, and will provide resources needed to support further preparation for the implementation of the TFDM system into the NAS.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

Anticipated key milestones for FY 2021 are summarized below:

- Complete site surveys at 10 sites
- Complete hardware installations at nine sites
- Complete Build 2 Operational Test (APB milestone)
- Achieve Build 2 Key-Site Initial Operational Capability (APB milestone)
- Conduct Build 2 Independent Operational Assessment (APB milestone)
- Achieve Build 2 In Service Decision (APB milestone)
- Achieve Build 2 Key-Site Operational Readiness Date (APB milestone)
- Achieve IOC at seven sites (nine of 89, 10 percent)

Also requested is \$350,000 for IOA activities.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

This program focuses on gaining efficient flow and management of aircraft on the surface at selected metroplex airports and the complex terminal airspaces within the NAS. High density airports typically see higher demand for runway capacity, operate multiple runways, and have complex airspace and ground interactions in the arrival and departure phases of flight. The surface capabilities resulting from this program are expected to improve both the efficiency of individual flights while optimizing runway throughput. This work will make travel safer for the traveling public, help reduce passenger delays leading to a better traveling experience, and contribute to less pollution.

TFDM will enhance airport capacity utilization during severe weather and other off-nominal conditions, improve usability, and situational awareness.

These benefits are derived through:

- **System consolidation and elimination of paper flight strips** - Consolidating Air Traffic Control Tower (ATCT) systems, panels, displays to reduce costs and allow more real estate in the tower and removing paper strips and supporting infrastructure to reduce costs.
- **Reduced accidents on the surface** - Providing electronic flight data to reduce accidents caused by controller miscommunication and overlooked flights.
- **Reduced fuel burn through Departure queue management** - Providing tools to improve pushback planning thereby shifting taxi delay from the taxi phase to the gate or non-movement area leading to reduced fuel burn and operating costs.
- **Increased opportunity for flight prioritization** - Improving coordination and data sharing between the Air Traffic Control (ATC) system and flight operators to give airlines more flexibility in prioritizing flights based on business needs; allows substitution during Surface Metering.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

- **Improved off-time compliance related to controlled departure times** - Providing more accurate predictions of event and taxi times to allow better compliance with the current controlled departure times.
- **Increased opportunity to take Call for Release (CFR) delay at gate** - Improving coordination and data sharing between the ATC system and flight operators to shift CFR delay from the taxi phase to the gate
- **Improved runway load balancing (strategic)** - Providing strategic airport configuration and runway load tools in the ATCT to better coordinate runway use.
- **Improved runway load balancing (tactical)** - Providing tactical runway balancing tools in the ATCT to better coordinate runway use.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 2B08 NextGen – Performance Based Navigation (PBN)  
Support Portfolio**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Performance Based Navigation (PBN) Support Portfolio	\$20,000	\$5,000	\$8,000

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u><b>Activity Tasks</b></u>	<u><b>Locations/ Quantity</b></u>	<u><b>Estimated Cost (\$000)</b></u>
Distance Measuring Equipment (DME) Support for PBN	---	\$8,000.0

**What is this program and what does this funding level support?**

---

Performance Based Navigation (PBN) uses Area Navigation (RNAV) and Required Navigation Performance (RNP) to improve access and flexibility in the National Airspace System (NAS) with the goal of providing the most direct and efficient aircraft routes possible. This begins with leaving the departure runway to arriving at the destination runway while also enabling right-sizing of conventional procedures and navigation infrastructure. PBN defines the requirements for routes and procedures that enable aircraft to navigate with greater precision and accuracy. It provides a basis for designing and implementing new flight paths, redesigning airspace, and providing safe obstacle clearance. In support of PBN, the objective of NextGen DME is to provide a resilient network to continue PBN operations during a Global Navigation Satellite System (GNSS) disruption. The program will add DMEs to the existing network to eliminate single points of failure (critical DMEs) and fill coverage gaps to enable DME Area Navigation (RNAV) aircraft.

For FY 2021, \$8.0 million is requested to procure four new DME systems, acquire real property, continue site preparation and installation for DMEs procured in FY 2018, and commission eight new DME sites. At the end of FY 2021, the Program will complete RNAV coverage to En Route airspace.

**What benefits will be provided to the American Public through this request and why is this program necessary?**

---

These resources benefit the American public by allowing pilots flying aircraft equipped with RNAV to continue PBN operations in the event of a GNSS outage; significantly maintaining flight efficiency, reducing delays and reducing carbon emissions and noise, thereby providing an environmental benefit. DME/DME RNAV service will be available to the 30 percent of commercial aircraft that are not equipped with Inertial Reference Unit, significantly reducing the impact on pilot/controller workload during GNSS disruptions, thereby improving safety. The NextGen DME program will discontinue existing DME facilities that are not needed for RNAV, thereby reducing maintenance costs for equipment, facilities, and instrument flight procedures.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

**Detailed Justification for - 2B09 Unmanned Aircraft System (UAS)  
Implementation**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Unmanned Aircraft System (UAS) Implementation	\$0	\$28,400	\$26,600 <sup>1</sup>

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
A. Small Unmanned Aircraft Systems (UAS) Implementation	---	\$23,600.0
B. FAA Drone Zone	---	3,000.0

**What is this program and what does this funding level support?**

The FAA introduced new and updated regulations to manage the influx of Small Unmanned Aircraft Systems (sUAS) into the National Airspace System (NAS). As a result of these new regulations, rapid implementation was necessary to manage public interactions and expedite internal FAA business processes. These projects will create the framework needed to allow UAS to operate safely without impact to manned aircraft operations or creating disruptions and delays.

**A. Small Unmanned Aircraft Systems (UAS) Implementation:** This program is used to operationalize and implement new UAS Traffic Management (UTM) programs and capabilities. Two UTM capabilities that will be in the implementation phase in FY 2021 are Low Altitude Authorization and Notification Capability (LAANC) and Remote ID (RID). For FY 2021, \$23.6 million is requested to:

**LAANC:** is an enterprise capability to automate the FAA's ability to grant authorizations to small UAS operators to obtain authorization to fly in controlled airspace. Each enhancement is the result of data gathered by stakeholders both in and outside of FAA and by ongoing usage and integration within the Air Traffic Management (ATM) community. LAANC enhancements will mature as concepts then as requirements and operating rules, and then onboarding to realize the operational enhancement. The

<sup>1</sup> The work under this BLI was previously funded under BLI 1A09 within the UAS Pre-Implementation Portfolio.



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

program office anticipates an incremental developmental approach that introduces capabilities over a yearly cycle through prototyping and national rollouts. In FY 2021, LAANC enhancements will include the following artifacts and activities:

- Complete requirements and UAS Service Suppliers (USS) operating rules enhancements to LAANC.
- Complete update of Safety, Security, and Privacy information.
- Complete implementation plan for two enhancements.
- Complete development, test, and implementation of two enhancements.
- Complete training and policy enhancements for use by ATMs on new capabilities.

**Remote ID:** Will address the continued development of a NAS wide, Part 89 compliant Remote Identification (RID) capability. The development of Remote ID capability will be performed over the period FY 2020 to FY 2024, following a model like the LAANC developmental model. Over the period FY 2021 to FY 2022, the FAA will define the RID capability, develop FAA automation platform requirements, operating rules defining how USS will provide the capability, and governance mechanisms for RID, culminating in late FY 2022 with a limited initial fielding capability. Between FY 2023 and FY 2024 the program office will develop limited range fielded prototypes and beta versions of RID, followed by fully equipped capability and fully compliant Part 89 RID capability. In FY 2021, the RID work will include:

- Develop and complete requirements for RID segments.
- Develop limited initial fielding implementation of RID systems for test.
- Develop USS Memorandum of Agreements (MOA) for RID.
- Develop Data Exchange framework for RID.

**B. FAA Drone Zone:** is a cloud-based IT platform that hosts multiple applications and supporting infrastructure. Applications include sUAS Registration System, Part 107 Airspace Authorizations/Waivers, Part 107 Operational Waivers and UAS Accident Reporting. Additionally, the FAA Drone Zone platform supports the backend IT systems that run LAANC. Funding will be used in all stages of Agile software development, database management, enterprise architecture, release management, functional/user acceptance testing, security testing, development support and project management support. For FY 2021, \$3.0 million is requested to:

- Develop products and continue enhancements to improve the public user experience and increase efficiency of internal business processes that are required for the operation of sUAS capability in the NAS.
- Develop Part 107 Waiver Enhancement to deploy a streamlined waiver application process for UAS Operators, leading to improved quality of waiver requests and more efficient use of FAA analyst resources.
- Develop CAPS Migration for an Initial Operating Capability (IOC) for submitting Public, DOD and Civil Part 91 requests from the FAA Drone Zone. In addition,

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

develop a FAA/DOD portal for reviewing and processing the Part 91 requests within the FAA Drone Zone.

- Add a Facility Map Capability to allow users to visually identify Waiver/Authorization request locations.
- Develop the Required Accident/Incident reporting system to enhance interface with the Accident/Incident Data System (AIDS).

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

The UAS programs play a critical role in enabling UAS operations in the NAS without impacting manned aircraft operations and creating disruptions or delays, and ensuring NAS operations will be as safe or safer than they are today. Government cost of allowing UAS operations will decrease due to the reduction of “exception handling” of UAS flights, and improvements to NAS capabilities and operations will be made cost effectively due to the integrated framework approach to addressing needs and solutions.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 2B10 Surface Surveillance Portfolio Sustain 1**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Surface Surveillance Portfolio Sustain 1	\$7,500	\$19,000	\$30,350 <sup>1</sup>

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
A. Airport Surface Detection Equipment – (ASDE) Sustainment	---	\$23,000.0
B. Runway Status Lights (RWSL) Sustainment	---	7,000.0
C. Independent Operational Assessment (IOA)	---	350.0

**What is this program and what does this funding level support?**

---

**A. Airport Surface Detection Equipment (ASDE) Sustainment**

The ASDE Sustainment program will address maintainability and obsolescence issues associated with the Airport Surface Detection Equipment-Model X (ASDE-X) and Airport Surface Surveillance Capability (ASSC) systems as part of a portfolio approach to sustainment. The existing ASDE-X systems at 35 airports and ASSC systems at nine airports, are surface surveillance systems that use radar, multilateration, and Automatic Dependent Surveillance-Broadcast (ADS-B) to track aircraft and vehicles. These systems help air traffic controllers prevent surface collisions and reduce runway incursions by improving situational awareness.

The ASDE Sustainment activity will address the following:

- Aging non-cooperative Surface Movement Radars (SMR)
- ASSC/ASDE-X Processors, Remote Units, and ancillary equipment
- Obsolescence and compliance issues
- Depleting inventory levels

---

<sup>1</sup> The work under this BLI was previously funded under separate individual BLIs for each project within Activity 2B and 2D.

- Necessary technological updates - Improved functionality introduced through new technology will be incidental

The timeline for sustainment activities in the portfolio is a 10 year window from FY 2020 to FY 2029. The ASDE Sustainment activity will execute multiple projects to be approved at Investment Analysis Review Decision (IARD) in FY 2020 after being reviewed by the Acquisition Executive Board (AEB). A Portfolio Stakeholder Governing Body will prioritize the projects in accordance with their charter and operating procedures, based on obsolescence data. The funding amount requested in FY 2021 is \$23.0 million.

### **B. Runway Status Lights (RWSL) Sustainment**

RWSL integrates airport lighting equipment with approach and surface surveillance systems to provide a visual signal to pilots and vehicle operators indicating that it is unsafe to enter, cross or begin takeoff on the runway. The system has automated light control logic that commands in-pavement lights to illuminate red when there is traffic on or approaching the runway.

The RWSL Sustainment activity will align RWSL to current technology, facilitating equipment sustainability, meeting information technology security requirements, improving reliability and lowering the cost of maintenance. Replacing obsolete Commercial Off-the-Shelf (COTS) hardware and upgrading hardware and software to current technology will ensure the continued sustainable, reliable and cost-effective operation of the system throughout its life cycle. RWSL was procured in late 2008 and fielded between 2009 and 2019. \$7.0 million is requested in FY 2021 to begin implementation. First article testing will be completed in FY 2020 and in FY 2021, RWSL will have a contract award upon final approval of the investment.

### **C. NAVAIDS Monitoring Equipment – Independent Operational Assessment**

In addition, \$350,000 is also requested for Independent Operational Assessment (IOA) of the navigational aids monitoring equipment.

### **What benefits will be provided to the American public through this request and why is this program necessary?**

---

The FAA's top priority is maintaining safety in the national airspace system. The safe and expeditious flow of air traffic at an airport is the product of a complex and disciplined interaction of people, aircraft, and vehicles supported by increasingly sophisticated processes, technologies, and regulatory oversight. These programs ensure the continued reliability of safety components through sustainment and standardization of control systems that support the situational awareness of air traffic control, air transportation system specialists and pilots.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

**Detailed Justification for - 2B11 Terminal and En Route Surveillance Portfolio**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Terminal and En Route Surveillance Portfolio	\$29,200	\$62,500	\$78,600 <sup>1</sup>

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u><b>Activity Tasks</b></u>	<u><b>Locations/ Quantity</b></u>	<u><b>Estimated Cost (\$000)</b></u>
A. ATC Beacon Interrogator Model 6 (ATCBI-6) Sustainment	---	\$4,300.0
B. ATC Beacon Interrogator Model 5 (ATCBI-5) Sustainment	---	3,100.0
C. Airport Surveillance Radar Model 9 (ASR-9) Sustainment 3	---	10,600.0
D. Airport Surveillance Radar Model 9 (ASR-9) Sustainment 3	---	3,500.0
E. Airport Surveillance Radar Model 8 (ASR-8) Sustainment 2	---	3,100.0
F. Airport Surveillance Radar Model 11 (ASR-11) Sustainment 3	---	6,000.0
G. Mode Select (Mode S) Sustainment 3	---	44,700.0
H. In-Service Engineering	---	2,300.0
I. Transition to Operations and Maintenance (TOM) Year 3	---	1,000.0

**What is this program and what does this funding level support?**

The current stock of FAA Primary Surveillance Radars (PSRs) and Secondary Surveillance Radars (SSRs) is aging. This includes systems such as the Air Traffic Control Beacon Interrogator-5 (ATCBI-5) and the Airport Surveillance Radar-8 (ASR-8), which were both originally fielded in the 1970s, and the ASR-9, which was originally fielded in the mid-1980s. While many of these systems will eventually be replaced, they must be maintained until replacement systems are fully fielded, preventing gaps in radar coverage.

The Surveillance Portfolio Analysis (SPA) Workgroup is identifying which radars will be retired upon adequate ADS-B equipage in 2020. A significant number of radar systems will remain in place and require sustainment past 2020.

<sup>1</sup> The work under this BLI was previously funded under separate individual BLIs for each project within Activity 2B.

The Terminal and En Route Surveillance (TES) Technology Refresh Portfolio (TRP) is being developed to consolidate, prioritize and manage the sustainment activities for the legacy surveillance systems until they are replaced or divested from the NAS. The sustainment portfolio Investment Analysis Readiness Decision (IARD) is planned for June 2021 and managed through 2029. Final Investment Decision (FID) is required for projects designated as Technology Refreshment Portfolio Project Sub-ACAT Level 1 (TP1) and determined at IARD. The following programs are identified for inclusion into the portfolio: ATCBI Model 6 Sustainment, ATCBI Model 5 Sustainment, ASR-9 Sustainment 4, ASR-8 Sustainment 1.

#### **A. ATCBI Model 6 Sustainment**

The ATCBI-6 is a Monopulse Secondary Surveillance Radar (MSSR) with selective interrogation capability that significantly improves the accuracy of aircraft position and altitude data provided to ATC automation systems. The ATCBI-6 program commissioned the first system in FY 2002 and the last system in FY 2013. This technology refresh activity will determine the retrofit requirement for the 132 operational and seven support ATCBI-6 systems. The Spectrum Efficient National Surveillance Radar (SENSR) program proposes to use spectrum sale proceeds to recapitalize certain Federal surveillance assets. Should SENSR proceed, the FAA currently estimates that solutions for cooperative surveillance systems impacted by the program, including all ATCBI-6 (99 systems) that are collocated with CARSRs and ARSR-4s, would be addressed by the SENSR program solution while, the remaining 33 ATCBI-6 beacon only systems would need to be sustained in the National Air Space (NAS). For FY 2021, \$4.3 million is required to do financial assessment analysis within the portfolio. This includes Contractor Support and Benefit Analysis, Program Management, Logistics and Sustainability Study, System Engineering and Second Level Engineering Analysis, Shortfall Analysis, the development of an Independent Government Cost Estimate, Business Case Analysis Report, and the Initial Implementation Strategy and Planning Document.

#### **B. ATCBI Model 5 Sustainment**

The ATCBI-5 is a cooperative (secondary) surveillance radar system that provides aircraft data for air traffic controllers in En Route and Terminal airspace. ATCBI-5 systems are currently installed at 54 airports and 5 DoD facilities where they are co-located with ASR-8s and ASR-9s, and there are four support systems (three at the Mike Monroney Aeronautical Center and one at William J Hughes Technical Center). The ATCBI-5 was originally commissioned in 1973. The ATCBI-5 technology refresh program will replace and/or upgrade the entire system or obsolete ATCBI-5 equipment, including original, manufacturer peculiar, and Commercial Off-the-Shelf (COTS) hardware and software. This will ensure the continued reliable and cost-effective operation of the ATCBI-5 through its designated new lifecycle of 2035. For FY 2021, \$3.1 million is requested to support investment analysis activities and artifact development in support of Portfolio IARD.

### **C. ASR-9 Sustainment 3**

The ASR-9 system was procured in the mid-1980s, fielded between 1989 and 1994, and has significantly exceeded the expected 20-year lifecycle. The ASR-9 Sustainment 3 program continues the phased strategy to extend the service life of the ASR-9 systems, implementing modifications to the ASR-9 system to sustain primary radar surveillance in terminal airspace. The ASR-9 uses hardware and software architectures that are becoming obsolete. Without modifications, the ASR-9 system will experience decreasing reliability, lowering availability and increasing supportability risks due to the limited commercial availability of some critical components. ASR-9 Sustainment 3 received a successful FID in March 2018, to keep the system operational. For FY 2021, \$10.6 million is requested for the procurement and installation of Data Communication Equipment (DCE) and program support.

### **D. ASR-9 Sustainment 4**

The ASR-9 Sustainment 4 program will continue to address and conduct an in-depth alternatives analysis to determine the optimal sustainment strategy for the ASR-9s to ensure the availability of critical terminal surveillance services until FY 2030. For FY2021, \$3.5 million is requested to support portfolio investment analysis activities and artifact development in support of the portfolio IARD.

### **E. ASR-8 Sustainment 1**

The ASR-8 technology refresh program is needed to sustain the ASR-8 primary surveillance radar systems through the 2035 timeframe. The ASR-8s were fielded between 1975 and 1980 to provide primary surveillance radar data to air traffic controllers at low- and medium-activity airports. Forty-six ASR-8 systems (44 operational systems, two support systems) currently remain in use in the NAS. The receiver portion of ASR-8s is being digitized through the Common Terminal Digitizer (CTD) program to enable the analog data to interface to the new Standard Terminal Automation System (STARS). The technical refresh will replace or redesign obsolete ASR-8 hardware and software in the legacy ASR-8 components not addressed by the CTD. For FY 2021, \$3.1 million is requested to support investment analysis activities and artifact development in support of portfolio IARD.

### **F. ASR-11 Sustainment 3**

The ASR-11 Sustainment programs are managed in five-year segments to ensure availability of critical weather and terminal surveillance services until a replacement system is deployed. The ASR-11 was procured via Interagency Agreement with the Department of Defense United States Air Force. The FAA procured 66 systems and fielded the last system in 2013. The ASR-11 Sustainment 3 (ASR-11 S3) will address parts obsolescence maintenance issues, current NAS requirements and system maintenance optimization to ensure continued reliable and cost-effective operation of ASR-11 systems. The program plans to procure form, fit and function and/or redesign

replacements, as required. For FY 2021, \$6.0 million is requested for investment analysis activities and artifact development in support of the December 2020 FID.

### **G. Mode S Sustainment 3**

The Mode S system is a cooperative, secondary surveillance radar that provides aircraft surveillance and communication to support ATC automation. Mode S systems were installed at the nation's busiest airports, where they are co-located with ASR-9s and ASR-8s. There are also Mode S Systems installed at En Route sites, where they are co-located with Common Air Route Surveillance Radars (CARSR) and Mode S that are in a Beacon-only system (BOS) configuration. The Mode S Sustainment will replace the existing Mode S equipment, excluding the antenna, with a COTS-based system, which will also support the All-Purpose Structured Eurocontrol Surveillance Information Exchange (ASTERIX) formatted data and internet protocol (IP) as well as legacy Time Division Multiplex (TDM) communications. Concerns about near-term supportability, coupled with the need for continued operational capability in the NAS, have recently become the driving requirements for a Sustainment. The Sustainment will ensure that the radars will remain operationally supportable through 2035. For FY 2021, \$44.7 million is requested for System/Software Architecture, Design and Development, First Article Systems, on-site Development Test, program management support, System Security Services, training development for FAA Field Maintenance and FAA Air Traffic Control Personnel and Information.

### **H. In-Service Engineering**

\$2.3 million is requested for in-service engineering activities that allow for immediate response and tactical distribution of resources to emerging technology solutions across the entire surveillance portfolio.

### **I. Transition to Operations and Maintenance (TOM) ASR-8 CDT Year 3**

When systems are first commissioned into the National Airspace System (NAS), their Operations and Maintenance (O&M) costs are paid for through the F&E appropriation for a period that is usually up to two years after commissioning. This allows FAA to identify the needs and formulate the requirements in the Operations appropriation during budget formulation. The identified O&M costs must then be transition to the Operations Appropriation. This is known as Transition to Operations & Maintenance (TOM). FAA is requesting a third year of TOM funding under this Budget Line Item within the F&E account.



**What benefits will be provided to the American public through this request and why is this program necessary?**

---

Outages of primary and secondary surveillance systems contribute significantly to aircraft arrival and departure delays at major airports throughout the United States. The sustainment work under this portfolio will increase equipment and service availability and reduce delays that cost airlines and the flying public money and time. Expected outcomes from the work will be to:

- Extend the Service Life of the System Capability
- Decrease System Maintenance
- Reduce Outages
- Increase Equipment and Service Availability
- Decrease Operating Costs for the Operations Account.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

**Detailed Justification for - 2B12 Terminal and En Route Voice Switch Recorder Portfolio**

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Terminal and En Route Surveillance Portfolio	\$35,400	\$40,750	\$43,400 <sup>1</sup>

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
A. Voice Switching and Control System (VSCS) Sustainment 4	---	\$12,100.0
B. Terminal Voice Switch (TVS) Sustainment 2	---	11,000.0
C. NAS Voice Recorder	---	10,000.0
D. Voice Communication Systems – Phase 1	---	10,000.0
E. Independent Operational Assessment (IOA)	---	300.0

**What is this program and what does this funding level support?**

Voice Switches and Recorders are integral parts of the FAA's air traffic control system. The reliability of communications from controller to controller and controllers and pilots is vital to a safe air traffic control system.

**A. Voice Switch and Control System (VSCS) Sustainment 4:** Ensures the operational availability and system reliability of the VSCS and VSCS Training and Back-up System (VTABS) equipment. The VSCS equipment provides voice communication services to the Air Traffic Controllers (ATCs) in the Air Route Traffic Control Centers (ARTCCs) throughout the National Airspace System (NAS). VSCS allows the en route air traffic controllers to communicate with other ATCs, pilots, ground personnel and other locations while separating, managing and directing air traffic. The VSCS Sustainment program replaces and upgrades obsolete components that are no longer supportable. For FY 2021, \$12.1 million is requested for VSCS sustainment activities including engineering, retest of spare parts, and Discrete Monitor and Control (DMC) refurbishment.

**B. Terminal Voice Switch (TVS) Sustainment 2:** Involves sustaining the aging, obsolete voice switches in Air Traffic Control Tower (ATCT) and Terminal Radar Approach Control (TRACON) facilities. Terminal voice switches provide voice

<sup>1</sup> The work under this BLI was previously funded under separate individual BLIs for each project within Activity 2B.

communication services to Air Traffic Controllers in the airport towers and TRACONs. This allows the terminal ATCs to communicate with other ATCs, pilots, ground personnel and other locations while separating, managing and directing air traffic.

This program has consisted of many multiyear equipment contracts for voice switches with only one of these contracts still available for FAA to procure voice switch equipment for new or modernized terminal facilities. All of the other contracts no longer have an open production line and are available for in-service management only. Replaced voice switches are recovered and refurbished or cannibalized for spare parts. For FY 2021, \$11.0 million is requested for sustainment activities, including procurement, testing, and implementation of a technical refresh on the Small Tower Voice Switch systems. Funding may also be used to refurbish or replace voice switch peripheral equipment if necessary, and refurbish and/or cannibalize associated legacy systems for spare parts to mitigate supportability risk of Terminal legacy voice switches.

**C. National Air Space (NAS) Voice Recorder:** Will replace the legacy Digital Audio Legal Recorders (DALRs) and provide enhanced digital voice recording functionality to meet new requirements. The replacement of aging voice recorders will reduce operational costs and address the increasing demand for more expeditious audio access and capabilities such as increased recording capacity, recording of Voice Over Internet Protocol (VoIP) telephones using secure intranet services, and connection to FAA Telecommunications Infrastructure (FTI)'s enterprise Network Time Protocol (NTP).

As the voice recorder technology and voice recorder requirements have evolved, earlier digital voice recorders are experiencing obsolescence and supportability issues. There are currently over 460 recorders in operation today, which were deployed between 2007 and 2015; they began to reach their end of service life starting in 2017. Full implementation of this program will result in the replacement of the legacy voice recorders, DALRs, which do not meet current Safety Requirements. Additionally, it will decrease the risk of Diminishing Manufacturing Sources and Material Shortages (DMSMS) issues in order to maintain Operational Availability.

For FY 2021, \$10.0 million is requested for the procurement of approximately forty (40) systems, vendor program management, systems engineering, vendor installation and training conduct. FY 2021 funds will also cover site preparation requirements for approximately eighty (80) locations throughout the NAS.

**D. Voice Communication Systems – Phase 1:** Will provide interface equipment to resolve Radio Control Equipment (RCE) obsolescence issues and add an Internet Protocol (IP) capability using secure intranet services to the existing voice switch equipment to support the FAA to transition from Time Division Multiplexing-based transport services to IP-based services. Enabling IP capability for the existing voice switch systems will allow the FAA to gain partial benefits that are inherent to Voice over Internet Protocol (VoIP) mode using secure intranet services, such as asset sharing, load sharing and contingency operations. Phase 1 interface equipment will also simplify the

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

future replacement of aging legacy voice switches with IP-based voice switching systems in Phase 2.

For FY 2021, \$10.0 million is requested to finalize products in support of investment decision ,procure and install protocol converters/interfaces to resolve RCE obsolescence, and VoIP-enable legacy voice switch and radio sites in addition to other activities to be determined at investment decision.

**E. NAS Voice Recorder - Independent Operational Assessment (IOA):** For FY 2021 \$300,000 is requested for an assessment to identify any safety hazards and operational concerns with NAS Voice Recorder capabilities.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

The programs in this portfolio reduce obsolescence and maintain availability of voice switching and recording equipment throughout the NAS. These voice switch programs reduce operational costs by reducing the current annual maintenance cost for legacy switches and promote operational availability that reduces delays.

Voice recorders are used by the FAA for recording voice conversations between ATCs, pilots, and ground-based personnel. Recorded conversations are used in the investigation of accidents, incidents, and in the routine evaluation of air traffic operations. The NVR program reduces costs associated with current voice recorder models that have obsolescence and supportability concerns.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 2B13 Enterprise Information Platform**

(\$000)

Activity/Component	FY 2019 Actual	FY 2020 Enacted	FY 2021 Request
Enterprise Information Platform	\$9,000	\$10,000	\$10,500 <sup>1</sup>

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
A. Common Support Services – Flight Data	---	\$1,000.0
B. Enterprise Information Management (EIM) Platform	---	9,500.0

**What is this program and what does this funding level support?**

---

The Enterprise Information Platform will utilize a centralized data construct to promote efficient data exchange. CSS-FD will improve preliminary flight plans and file flight plans with NAS automation systems. The Enterprise Information Management (EIM) Platform mission will realize a “big data” repository for NAS and non-NAS information.

**A. Common Support Services – Flight Data (CSS-FD):** Is a new investment leveraging the FAA’s previous investments in System-Wide Information Management (SWIM) to advance Flight Information Management across the Air Traffic Management (ATM) enterprise and stakeholders. CSS-FD will develop the following capabilities to meet the FAA’s growing need for coordinated strategic flight planning and distribution of standardized flight information:

- **Flight Planning and Filing (FP&F)** – A service that provides a single entry point for both internal and external NAS users to file flight plans. This service will also provide a toolset for users and includes a route evaluation tool that evaluates a user’s requested flight plan route against current NAS constraints and plans.
- **Flight Data Sharing (FDS)** – A service that disseminates and exchanges strategic flight planning data between NAS systems and external stakeholders and provides the following user benefits:

---

<sup>1</sup> The work under this BLI was previously funded under BLI 1A06 On Demand Portfolio.

For FY 2021, \$1.0 million is requested to support the award of the prime contract, start preparation of system design documents and finalize implementation plans for FP&F and FDS capabilities.

**B. Enterprise Information Management (EIM):** Is a cloud-based platform in the Mission Support network, which unifies and secures agency-wide data. The Platform's flexibility and scalability allows rapid strategic growth in content and services, while reducing duplicate capabilities and functions, overcoming the cost and complexities associated with building and maintaining redundant capabilities to support the Agency's array of systems and applications. The Platform is a modern, enterprise-scale big data capability that efficiently scales to support exponential growth in the volume of FAA data. This capability provides FAA systems and users with the ability to rapidly find and exploit relevant data from across the FAA, to support faster and more comprehensive analysis, synthesis and decision-making, and overcomes current data access and processing challenges and existing limitations of the legacy infrastructure. The build out of the EIM Platform will enable the integration of existing and future systems and will bring in additional data sources to maximize the operational impact of these systems. The shared capabilities of the Platform will minimize overall costs by reducing the need for redundant development, deployment and operations of common enterprise data and information management systems. For FY 2021, \$9.5 million is requested for development of staging and production environments, as well as continued systems development life cycle (SDLC) work that includes system design, implementation and deployment. Planned activities include:

- Provide an FAA Cloud Service (FCS) EIM Platform hosted development environment to support pre-production design integration needs of Operational Analysis and Reporting System (OARS), Operational Network Replacement (OPSNET-R), Enterprise Information Display System (E-IDS) or other NAS acquisition programs.
- Complete the integration of 20 additional data sources required to support new systems/applications and one additional information domain, such as Human Relations, logistics, finance, etc.
- Integrate 16 additional data curation and processing capabilities to support systems/applications.
- Provide 10 additional common service tools, such as content management, automated speech recognition, self-service compute provisioning, and cloud native on-demand server-less compute.
- Deliver enhanced security capabilities and updated security artifacts to support and maintain authority to operate, for all newly integrated capabilities.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

The program will result in increased shared situational awareness during the flight planning and filing process and for flight data sharing, increased flight data

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

standardization, and allow FAA Stakeholders to have timely and secure access to common Agency data. Benefits include the reduced need for reactive changes, reduced workload for traffic managers and tower personnel, reduced manual coordination between users and air traffic management service providers, more accurate demand predictions, improved operational effectiveness, and reduced number of times in which multiple Flight Plans are filed for a single flight. Benefits also include reduced fuel, time, costs, and level of effort with flight planning and filing improved efficiency and accuracy.

Implementation of EIM will provide FAA stakeholders with timely and secure access to common Agency data that is appropriate to their needs. EIM will explore cloud-based solutions to reduce the need to build and maintain redundant data management capabilities that support individual programs/systems. Benefits include the alignment of existing and future data requirements into an efficient and effective information-sharing environment, and the ability to use enterprise-wide data to enable complex analytical correlations.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 2C01 Aviation Surface Observation System (ASOS)**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Aviation Surface Observation System (ASOS)	\$10,000	\$4,000	\$5,000

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u><b>Activity Tasks</b></u>	<u><b>Locations/ Quantity</b></u>	<u><b>Estimated Cost (\$000)</b></u>
ASWON Sustainment 2	---	\$5,000.0

**What is this program and what does this funding level support?**

---

The Aviation Surface Observation System, also known as the Aviation Surface Weather Observation Network (ASWON), is a portfolio program that consists of multiple subsystems in the National Airspace System (NAS) that detect and report surface weather conditions required to conduct aircraft operations. Air Traffic Control (ATC), Part 91, 121, and 135 Operators, and National Weather Service (NWS) rely on the data provided by ASWON. The following NAS systems depend on the data provided by ASWON:

- Automatic Terminal Information Service (ATIS)
- Surveillance Broadcast Services (SBS) - Flight Information Service Broadcast (FIS-B)
- Standard Terminal Automation Replacement System (STARS)
- NAS Information Display System (NIDS)
- Weather System Processor (WSP)
- NEXTGEN Weather Processor (NWP)
- Common Support Services – Weather (CSS Wx)
- Integrated Terminal Weather System (ITWS)
- Weather and Radar Processor (WARP)
- Corridor Integrated Weather System (CIWS)

For FY 2021, \$5.0 million is requested to continue investment analysis and achieve a Final Investment Decision (FID) for the next phase of technology upgrades under the ASWON Sustainment 2 Program.



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

ASOS/ASWON systems provide official airport weather information that is required to conduct Part 91, 121, and 135 aircraft operations. The program also increases the accuracy and timeliness of forecast and warning products that are provided by the National Weather Service (NWS) for protection of life and property and enhancement of the national economy.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

**Detailed Justification for - 2C02 Future Flight Services Program (FFSP)**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Future Flight Services Program (FFSP)	\$10,100	\$18,000	\$17,800

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u><b>Activity Tasks</b></u>	<u><b>Locations/ Quantity</b></u>	<u><b>Estimated Cost (\$000)</b></u>
A. Future Flight Services	---	\$14,100.0
B. Future Flight Services Air/Ground Media Gateway (AGMG)	---	3,700.0

**What is this program and what does this funding level support?**

Currently, a combination of entities and platforms provide Flight Services to the General Aviation (GA) community. These services include but are not limited to: pre-flight and in-flight flight planning, advisory services, weather briefings, pilot weather report (PIREP) processing, and Search and Rescue (SAR) coordination. These services are provided within the Continental United States (CONUS), Puerto Rico, and Hawaii. Flight Services also provides Visual Flight Rules (VFR) coordination, orientation support to lost aircraft, helps maintain continuous weather broadcasts on selected Navigational Aids (NAVAID), and issues Notices to Airman (NOTAM). GA pilots access flight service information directly through web portals, thus reducing the need for pilots to talk to a flight service specialist.

**A. Future Flight Services (FFS):** Will promote the self-assisted service delivery and drive the reduction of costly human-assisted delivery of flight services as much as possible. The timeframe associated with the transformation is dependent on the technologies responsible for enabling the new capabilities, availability of the interdependent programs to perform their essential functions, and involvement from industry stakeholders such as Aircraft Owners and Pilots Association (AOPA), National Business Aviation Association (NBAA), etc. FFSP will leverage current solutions in order to increase operational efficiency, and improve aeronautical data acquisition and utilization in the support of flight services. For example, prospective service providers will use weather data from Common Support Services - Weather (CSS-Wx) and

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

aeronautical information from the Aeronautical Common Service (AIMM Segment 2) and leverage FAA enterprise infrastructure including SWIM and other planned infrastructure enhancements to the extent possible. The primary objective of FFSP is to realign the Flight Services mission by modernizing services and delivery methodologies at a lower cost.

FFSP will establish the Flight Service Engagement Team (FSET) to work with stakeholders to achieve FFSP objectives. The FFSP PMO works directly with AOPA and other stakeholder organizations evaluating recommendations for requirements changes, service delivery changes, conducting research with the objective of decrease the cost for flight service delivery.

Some Core Safety Functions will remain within Flight Services and FFSP while others will be integrated or reengineered into other service areas of the Air Traffic Organization (ATO). The Core Safety Functions were defined by Flight Service as functions that need to be provided by the FAA for the safety of the NAS and include:

- Visual Flight Rules (VFR) search and rescue operations
- Emergency services to aircraft in distress
- Weather Observation Entry (METAR Entry)
- NOTAM Coordination, Entry and Dissemination
- Security related to Special Flight Rules Area (SFRA)/Air Defense Identification Zone (ADIZ)/Flight Restricted Zone (FRZ) Flight Plans
- Instrument Flight Rules (IFR) clearance relay
- Pilot weather report (PIREP) entry
- Instrument Flight Plans (IFR) and Services provided to DOD

The Automated Flight Service Stations (AFSS) contract with Leidos currently provides human and self-assisted flight services in the CONUS. A 42-month single source contract extension has been executed to ensure the continuity of services until the new FFSP contract is awarded.

The Direct User Access Terminal Service (DUATS) II contracts provided self-assisted flight service through a web portal allowing pilots direct access to flight service information. The DUATS II contracts were terminated in April 2018. The functionality is now being delivered by Leidos through the AFSS contract and will continue delivery of these services until the new FFSP contract is awarded. When the new FFSP contract is awarded it will include scope for both human and self-assisted services.

For FY 2021, \$14.1 million is requested for FAA Telecommunication Infrastructure (FTI) non-recurring, initial recurring costs, and program management support activities (acquisition management, safety risk management, information systems security, implementation, in-service management, flight service operations; FSET activities; test and evaluation activities; and non-prime support to facilitate new contract rollout). FFSP Program Management Office will continue to conduct stakeholder outreach activities

critical to achieving the objective of migrating users away from costly human assisted services.

**B. Future Flight Services (FFS)/Air-to-Ground Media Gateway (AGMG):** Will allow Flight Services to deliver inflight services in standardized Voice over Intranet Protocol (VoIP) mode using secure intranet services for the Flight Service Provider's voice switch. This will facilitate a Flight Service contract competition by reducing the need for voice switch customizations. AGMG will function similar to Radio Control Equipment (RCE) emulation, but will provide a standard VoIP interface in addition to providing audio to the Remote Monitoring Control Facility interface and being interoperable with NAS voice switches and recorders.

For FY 2021, \$3.7 million is requested for information security, site preparation, installation of Air-to-Ground Media Gateway (AGMG) systems at six Air Route Traffic Control Centers (ARTCCs), and for lifecycle support.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

The American Public, as well as the GA community, will benefit from technology enhancements and cost savings gained by elimination/reduction of services which are redundant, obsolete and/or do not align with Flight Service Core Services.

FFSP will realize cost savings and achieve efficiencies in the delivery of flight services by modernizing services and delivery methodologies. FFSP will discontinue obsolete services and activities as well as redundant activities provided by other FAA service organizations based on collaboration with user groups and outcomes of Safety Risk Management panels.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 2C03 Alaska Flight Service Facility Modernization  
(AFSFM)**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Alaska Flight Service Facility Modernization (AFSFM)	\$2,650	\$2,650	\$2,650

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u><b>Activity Tasks</b></u>	<u><b>Locations/ Quantity</b></u>	<u><b>Estimated Cost (\$000)</b></u>
A. Alaska Flight Service Facility Modernization (AFSFM)	---	\$2,000.0
B. In-Service Engineering	---	650.0

**What is this program and what does this funding level support?**

---

The Alaska Flight Service Facility Modernization (AFSFM) program is a multi-year facility modernization and sustainment program that addresses FAA Flight Service Stations (FSS) in Alaska. Thirty-three percent of the Alaska Flight Service facilities were constructed in the 1970's require extensive renovations to meet current building codes, fire life safety, electrical standards and generally do not meet the American's with Disabilities Act accessibility requirements, as defined and imposed by the Uniform Federal Accessibility Standards and the Architectural Barriers Act Accessibility Standard (ABAAS). These conditions endanger FAA personnel health and safety and increase the risk of service outages.

Specifically, 17 FSS facilities will be updated to meet environmental, safety and accessibility requirements and the electrical and safety systems will be upgraded to ensure they meet current standards. The program identifies and corrects deficiencies such as substandard lightning, grounding and bonding protection, electrical systems, and/or heating and cooling systems that could disrupt flight service operations by reducing the reliability of flight service automation systems.

For FY 2021, \$2.0 million is requested to support safety upgrades at Sitka, Northway and Ketchikan Flight Service Stations and FTE Contract Field Support.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

Also requested is \$650,000 for in service engineering activities. The AFSFM spend plan is revised based on seasonal and logistical limitations associated with material transportation and other inherent schedule risks due to the Alaska environment and transportation infrastructure limitations.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

This program efficiently uses funds to correct deficiencies in older FSS facilities to bring them up to date with current building and safety codes. Project schedules are developed at least two years in advance, which allows opportunities to reduce costs through efficient use of engineering and technical resources. Additionally, this program allows the FAA to avoid hefty expenses and costs associated with unscheduled and emergency upgrades to flight service facilities. Effectively managing this program to ensure costs for upgrades are within project scope provides cost savings to the American public.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 2C04 Juneau Airport Wind System (JAWS) Technology Refresh**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Juneau Airport Wind System (JAWS) Technology Refresh	\$1,000	\$1,000	\$1,000

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
Juneau Airport Wind System (JAWS) Sustainment	---	\$1,000.0

**What is this program and what does this funding level support?**

---

JAWS measures and transmits wind information to the Juneau Automated Flight Service Station (AFSS), Alaska Airlines, and the National Weather Service for weather forecasting. Other Alaska aviation users access JAWS data via the Internet. JAWS provides terrain induced wind and turbulence data that addresses safety of flight and decreases the probability of experiencing unnecessary weather related delays in and out of the Juneau International Airport, Alaska. Although JAWS data is advisory, it is essential for pilots to be aware of wind conditions that affect approach and departure paths because of the restrictive geographical features on both sides of the corridor in and out of the Juneau Airport.

Periodic replacement of commercial off-the-shelf system components is necessary because of the weather condition on the mountains where the wind sensors are located. Updating these sensors assures continued supportability of the system through an indefinite service life. This program will include the replacement of computers and controllers, radios, firmware and software, anemometers, profilers, and may include National Center for Atmospheric Research consulting support.

For FY 2021, \$1.0 million is requested to initiate implementation of the JAWS Sustainment Program and procure initial equipment upgrades required to sustain the JAWS system.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

During the JAWS Post Implementation Review, the system has achieved the baseline expectation for increased capacity with actual Required Navigational Procedures. The system has achieved 91 percent detection of all alert messages. JAWS has improved the commercial flight operations with a 52 percent improvement in flights diverted and 9.51 minutes of improvement in average arrival delays while improving arrivals on time. JAWS provides the safe operation of aircraft going in and out of Juneau Airport, and has received positive feedback from Alaska Airlines.



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 2D01 VHF Omnidirectional Radio Range (VOR)  
Minimum Operating Network (MON)**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
VHF Omnidirectional Radio Range (VOR) Minimum Operating Network (MON)	\$20,000	\$20,000	\$19,000

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
VOR Minimum Operational Network (MON) Program Phase 2	---	19,000.0

**What is this program and what does the funding level support?**

---

**VOR Minimum Operational Network (MON) Program**

The Very-High-Frequency Omni-Directional Range (VOR) MON Program is repurposing the current VOR network in the contiguous United States (CONUS) to serve as a backup during Global Positioning System (GPS) outages. The scope of the program includes the following: program management, amend/cancel/replace procedures, conduct flight inspections of new service volume and procedures, relocate any services/equipment dependent on a VOR transmitter. The VOR MON program will transition the legacy network of 896 VORs in CONUS to a MON of approximately 585 VORs with a target date of FY 2025. The MON allows aircraft to navigate and land under Instrument Flight Rules (IFR) in the event of disruption in a GPS signal; however, the planned backup capability will be less than the current VOR network.

As the need for VOR based procedures and routes decreases due to the transition to Performance Based Navigation (PBN), resources that are currently being spent in sustaining and operating the conventional airspace can be shifted for more efficient use. The legacy VOR routes and procedures will be cancelled, amended, or replaced, as necessary prior to a particular VOR being discontinued.

For FY 2021, \$19.0 million is requested to meet Phase 2 goals of the VOR MON Program. The program will work with the appropriate groups to discontinue 44 VORs.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

The program will also fund approximately 804 procedures to discontinue up to 35 VORs in FY 2022, since procedures are typically funded prior to the fiscal year of the Navigational Aid's (NAVAIDs) discontinuance.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

The Federal Aviation Administration (FAA) is transitioning the National Airspace System (NAS) to more efficient PBN routes and procedures, so fewer VORs are needed. VORs do not enable PBN and few aircraft are actually using the VORs, electing to use their PBN equipment to fly the conventional Victor Airways and Jet Routes. The benefits of reducing VOR service include opportunities for reduced operations and maintenance of instrument flight procedures, flight inspection, and opportunities to avoid potential recapitalization costs. This program will result in a more optimized NAS, where the more efficient PBN operations will be primary and a MON of VORs will be retained to serve as a back-up in the event of a GPS outage or interference.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 2D02 Wide Area Augmentation System (WAAS) for GPS**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Wide Area Augmentation System (WAAS) for GPS	\$96,320	\$80,000	\$83,900

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
A. WAAS Phase 4B	---	\$83,500.0
B. Transition to Operations and Maintenance (TOM) Year 3	---	400.0

**What is this program and what does this funding level support?**

---

WAAS supports the Federal Aviation Administration (FAA) mission need of providing a satellite navigation capability across the National Airspace System (NAS). WAAS provides both horizontal and vertical navigation for precision approach operations for all WAAS equipped users at all qualified runway ends in the NAS. WAAS consists of a network of 38 precisely located ground reference stations distributed across the United States, Canada and Mexico that monitor the Global Positioning System (GPS) satellite signals. Three master stations collect reference station data and calculate corrections and integrity messages for each GPS satellite. The WAAS messages are broadcast to user receivers via leased navigation transponders on three commercial geostationary (GEO) satellites. The receiver on the aircraft applies the corrections and integrity information from the WAAS message to obtain a precise and accurate navigation position. During Phase 4B, the WAAS Program Office will continue to support GPS civil technical oversight efforts. The GPS technical oversight ensures changes the Department of Defense (DoD) makes to the GPS constellation does not impact the FAAs WAAS and GPS based aviation users.

WAAS was designed to support the unique needs of aviation but, its benefits extend well beyond aviation. The WAAS broadcast message improves GPS signal accuracy from 50 meters to less than 2 meters. WAAS accuracy, integrity and availability have led to the integration of a WAAS capability into most commercial GPS chips and receivers

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

supporting numerous applications (marine, automobile, agriculture, surveying and recreation). Other investments that WAAS interfaces with include Continuously Operating Reference Stations (CORS) operated by the National Geodetic Survey under the National Oceanic and Atmospheric Agency and Mobile E911.

For FY 2021, \$83.9 million is requested to execute planned tasks.

**GEO Satellite Acquisition, \$6.3 million**

- Complete GEO 7 satellite payload and ground station integration

**GEO Sustain Lease Services, \$28.8 million**

- Maintain existing three operational WAAS GEO leases

**Technology Refresh, \$21.6 million**

- Complete GEO 7 WAAS integration testing and preparation for operational cutover
- Complete integration testing of new Signal Generator (SIGGEN) into WAAS
- Update of WAAS Orbit Determination algorithms
- Complete of Covariance Based User Differential Range Error (UDRE) Monitor integration testing;
- Complete integration testing of update of WAAS L5 default message to be compliance with Dual Frequency Minimum Operational Performance Standard (MOPS)
- Complete testing of new GUS Receiver based on G-III receiver
- Complete study and prototyping of WAAS Assurance Level B (Safety Computer software) automated testing capability
- Finalize, evaluate and award DFO Segment 4B Prime Development contract. Equipment transition will begin upon completion of DFO Release 7 in FY22; New Prime Contractor development activities will begin in FY22

**NAS Implementation, \$1.5 million**

- Support agency wide initiative to transition to performance based navigation (PBN) through the development and publication of WAAS Localizer Performance with Vertical Guidance/Localizer Performance (LPV/LP) approach procedures

**Technology Evolution, \$6.0 million**

- Develop prototype for WAAS Dual-Frequency Service
- Develop prototype H-ARAIM ISM service
- Validate system performance for WAAS L5 messages
- Perform early prototyping of L1/L5 processing
- Conduct analysis of L5 Carrier Noise Multi-Path (CNMP), L5 cycle slips, and L1/L5 bias characteristics
- Develop an L5 test message over-the-air test capability using WAAS test environment assets

**Technical Engineering/Program Support, \$19.3 million**

- Provide system engineering, software development oversight, safety, reliability-maintainability-availability (RMA), test and evaluation, human factors, logistics, Software Assurance (DO-178B) audit, and hardware engineering support
- Provide specialty engineering support for Hazardously Misleading Information (HMI) analysis efforts, Radio Frequency Interference (RFI) investigation and mitigation, system security assessments, and system performance assessments
- Provide program management support in areas of finance; quality assurance (QA); Earned Value Management (EVM); project planning, execution, and monitoring
- Develop documentation in support of FAA Acquisition Management System (AMS) Final Investment Decision (FID) for WAAS Phase 4B
- Support WAAS DFO Segment 2 Prime Contract source selection evaluation and contract award efforts;
- Complete CY 2021 maintenance development, testing and deployment
- Complete testing of new Ground Uplink Subsystem (GUS) Receiver based on G-III receiver

**Transition to Operations and Maintenance (TOM) Year 3, \$ 0.4 million** - When systems are first commissioned into the National Airspace System (NAS), their Operations and Maintenance (O&M) costs are paid for through the F&E appropriation for a period that is usually up to two years after commissioning. This allows FAA to identify the needs and formulate the requirements in the Operations appropriation during budget formulation. The identified O&M costs must then be transition to the Operations Appropriation. This is known as Transition to Operations & Maintenance (TOM). FAA is requesting a third year of TOM funding under this Budget Line Item within the F&E account.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

WAAS supports the FAA mission need of providing a satellite navigation capability across the National Airspace System (NAS). WAAS provides both horizontal and vertical navigation for precision approach-like operations for all WAAS equipped users at all qualified runway ends in the NAS. Qualification of an airport/runway is based on FAA advisory circular 150/5300-13A, Table 3-4, 3-5 and Terminal Instrument Procedures Standards (TERPS) 8260.58a. WAAS provides both vertical and horizontal guidance during all phases of a flight, regardless of weather conditions, without installing expensive legacy navigation hardware at each runway. WAAS consists of a network of 38 FAA ground reference stations distributed across the continental United States, Alaska, Hawaii, Puerto Rico, Mexico and Canada that monitor the Global Positioning System (GPS) satellite signals. Three master stations collect the reference station data and calculate corrections and integrity messages for each GPS satellite. The WAAS messages are broadcast to user receivers via leased navigation transponders on three

commercial geostationary (GEO) satellites. The user receiver on the aircraft applies the corrections and integrity information from the WAAS message to obtain the precise navigation service. Today, WAAS users can conduct en route operations across the entire NAS and precision approach take off and landings at 95 percent of the qualifying airports in the 48 contiguous states and Alaska.

WAAS is capable of supporting all Automatic Dependent Surveillance-Broadcast (ADS-B) enhanced operations. WAAS has been used as the ADS-B on-board position sensor in all demonstrations to date, because it meets the requirements to achieve levels of accuracy, integrity, and availability required by an ADS-B position sensor for all enhanced surveillance operations and will enable ADS-B to fully implement all capabilities (reduced separation). The development of a common WAAS/ADS-B avionics suite using the same WAAS-based position sensor will reduce the overall cost to the user and will facilitate the widespread, rapid, and cost-effective deployment of both WAAS and ADS-B. WAAS accuracy, integrity and availability have led to the integration of a WAAS capability into most commercial GPS chips and receivers supporting numerous applications (marine, automobile, agriculture, surveying and recreation). Other investments that WAAS interfaces with include Continuously Operating Reference Stations (CORS) operated by the National Geodetic Survey under the National Oceanic and Atmospheric Agency and Mobile E911.

As one of four operational Satellite Based Augmentation Systems (SBAS) internationally, WAAS collaborates with both industry and international representatives through participation in the Institute of Navigation (ION), International Civil Aviation Organization (ICAO), RTCA (joint government-industry collaborative body for aviation standards development), Asian Pacific Economic Cooperative (APEC) Global Navigation Satellite System (GNSS) Implementation Team, SBAS Interoperability Working Group (IWG), and International Committee on GNSS (ICG), assuring that all SBAS are interoperable and thus support global seamless operations.

Under the National Positioning Navigation and Timing (PNT) Policy, National Security Presidential Directive-39 (NSPD-39) and 10 USC 2281, the civil agencies lead by Department of Transportation (DoT) have the responsibility to fund designated civil GPS capabilities. Currently the FAA provides the staff to perform Technical Oversight of GPS to ensure that GPS meets the needs of the aviation community. At the request of DOT, the staff also ensures that the needs of the civil sector are met. This mission shortfall is fulfilled by the GPS Technical Oversight portion of GPS Civil Requirements.

WAAS real time data and plots, daily plots, performance videos and performance analyses are available at the following website: <http://www.nstb.tc.faa.gov/> and support National Flight Standards approach publication efforts.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 2D03 Runway Safety Areas (RSA) – Navigational Mitigation**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Runway Safety Areas (RSA) – Navigational Mitigation	\$2,000	\$1,400	\$1,800

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u><b>Activity Tasks</b></u>	<u><b>Locations/ Quantity</b></u>	<u><b>Estimated Cost (\$000)</b></u>
Runway Safety Areas (RSA) Phase 2 – Navigational Mitigation	---	\$1,800.0

**What is this program and what does this funding level support?**

---

For FY 2021, \$1.8 million is requested to supply the RSA Phase II Program with additional funds. These funds will be used to fully fund the correction of approximately eleven Federal Aviation Administration (FAA) owned facilities and equipment (F&E) that are not in compliance with RSA standards contained in AC 150/5300-13 Airport Design and not part of the previous RSA Phase I Program.

The scope of the work will range from the installation of frangible connections on identified structures to the relocation of facilities within and outside the RSA. These facilities or structures are classified as: 1) fixed by function and 2) not fixed by function. Objects that are fixed by function are permitted within the RSA as long as it meets the frangibility requirements. The RSA must be free of all objects that are three inches above the grade and are not frangible. Objects that are not considered fixed by function will be moved outside the RSA to extent practical.

The activities associated with this effort will be prioritized according to the major airport hubs, their supporting reliever airports and then other airports with reported NAVAIDs violations. Interdependencies will be with the FAA Airports Organization (ARP) to provide access to the airports and runways to complete the necessary improvements.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

Compliance with the RSA standards provide a measure of safety in the event of an aircraft's excursion from the runway by significantly reducing the extent of personal injury or aircraft damage during overruns, undershoots and veer-offs. Thus, the primary benefit of the RSA Phase II program is the prevention of loss of life from aircraft striking non-compliant NAVAIDs located in designated RSAs.

Under the previous RSA Phase I effort, between FY 2010 and December 2018, the FAA successfully executed 1,401 projects to correct violations at 611 RSAs. Although significant progress has been made to mitigate all known RSA violations, additional RSA violations have been found during routine Air Traffic Organization and ARP inspections. RSA Phase II will ensure that previously undiscovered violations are corrected in a timely manner.



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

**Detailed Justification for - 2D04 Landing and Lighting Portfolio**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Landing and Lighting Portfolio	\$31,000	\$36,000	\$68,950 <sup>1</sup>

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
A. Very High Omni Directional Range (VOR) Tactical Air Nav	---	\$2,510.0
B. Instrument Landing System (ILS) Sustainment	---	4,020.0
C. Distance Measuring Equipment (DME) Sustainment	---	5,030.0
D. NAVAIDS Sustainment	---	4,070.0
E. Visual NAVAIDS – Visual NAVAIDS for New Quailifers	---	1,480.0
F. Runway Visual Range (RVR) Sustainment	---	39,310.0
G. Approach Lighting System Safety Enhancement	---	5,180.0
H. Replace Visual Approach Slope Indicator with PAPI	---	5,100.0
I. In-Service Engineering	---	1,950.0
J. Transition to Operations and Maintenance (TOM) Year 3	---	300.0

**What is this Program and what does the funding level support?**

The Landing and Lighting Portfolio contains critical ground infrastructure that collectively enables all aircraft to navigate the established aircraft routes in the sky as well as the ability to safely descend and land on the airport runway. The work under this portfolio includes assessment of the systems to determine the need for system relocations, operational modifications, sustainment work to maintain and/or improve system performance, and to procure and install systems as needed.

**A. VOR Collocated with Tactical Air Navigation (VORTAC):** Relocates, refreshes technology at VOR and VORTAC facilities, and improves VOR operational performance by procuring and installing Doppler electronic kits and Doppler antenna hardware kits to upgrade the conventional systems. Numerous VORs have radial restrictions because of

<sup>1</sup> The work under this BLI was funded under individual BLIs for each project within Activity 2D.

encroachment by obstacles that block the transmission of VOR signals. Doppler upgrades for a VOR eliminates the signal reflection restrictions caused by newly constructed tall buildings, nearby industrial parks with a high concentration of metallic buildings, overhead transmission lines, radio, television and cellphone towers, and, more recently, wind farm stations. The VOR and VORTAC (a combination of VOR and Tactical Air Navigation (TACAN) system) provide navigational guidance for civilian and military aircraft in both the en-route and terminal areas. For FY 2021, \$2.51 million is requested for engineering and technical services/support and funding to initiate two new Doppler VOR (DVOR) projects and to procure two DVOR antenna kits.

**B. Instrument Landing Systems (ILS):** Supports the establishment and sustainment of ILS and/or Approach Lighting System with Sequencing Flashing Lights (ALSF-2) systems needed for Category (CAT) II/III precision approach procedures. In addition, sustainment of CAT I ILSs and Medium Approach Lighting System with Runway Alignment Indicator Lights (MALSR) work is conducted. An ILS precision approach is comprised of a grouping of electronic devices: Localizer, Glide Slope and marker beacons and, in some cases, ancillary aids (e.g. Distance Measuring Equipment, Approach Lighting System, Runway Visual Range, etc.) that provide landing aircraft with both electronic guidance and visual landing aids. These systems allow properly equipped aircraft to land safely in adverse weather conditions. The ILS provides both vertical and lateral guidance information for the pilot to allow safe landing to touchdown and rollout. The ILS sends information to instruments in the cockpit so that the pilot can maintain a predetermined flight path to the runway even in low visibility. The ILS also provides a backup landing capability in the event of a loss of Global Navigation Satellite System (GNSS) service. The ALSF-2 and the MALSR are lighting systems installed along the extended centerline extending a distance of 2,400 feet outward into the approach zone and ending at the runway threshold to provide visual cues to help the pilot see the runway. For FY 2021, \$4.0 million is requested for engineering and technical services/support, to procure one Glide Slope Ladder Safety Kit, and initiate four sustain ILS projects.

**C. Distance Measuring Equipment (DME):** Is a radio navigation aid used by pilots to determine the aircraft slant distance from the DME location. The program is procuring and installing state-of-the-art DME systems to: support replacement of DMEs that have exceeded their service life expectancy, establish new DMEs at qualifying airports, to relocate DME facilities, and establish DMEs in lieu of Instrument Landing System marker beacons. DMEs reduce the need for less desirable step-down non-precision approach procedures in which a pilot descends to the minimum allowable altitude to visually locate the runway. DMEs lead to better specification and control over the vertical descent profile and reduces controlled-flight-into-terrain (CFIT) risk. For FY 2021, \$5.03 million is requested for engineering and technical services/support, to initiate the evaluation of bidding vendors towards awarding a new contract, procurement of 13 DME systems, and to initiate funding for 13 DME installations.

**D. NavAids Sustainment:** Renovates or replaces airport approach lighting systems at sites where there is a high risk for failure and where that failure would result in loss of the

primary precision approach. NavAids include: MALSR for Category I approaches, ALSF-2 for Category II/III approaches, Runway End Identifier Lights (REIL), Lead-In Lights (LDIN), and Precision Approach Path Indicator (PAPI). For FY 2021, \$4.07 million is requested for engineering and technical services/support to initiate two Medium Intensity Approach Lighting Systems with Runway Alignment Indicator Lights (MALSR) sustain projects, and establish Radio Link for status monitoring at one glide slope site, and to procure MALSR equipment for two sites.

**E. Visual NavAids – Visual NavAids for New Qualifiers:** These systems facilitate the transition from cockpit instruments to external visual references during the final landing phase. Different categories and types of approaches require different visual NavAids equipment. This program supports the procurement, installation, and commissioning of PAPI systems and Runway End Identifier Lights (REIL) systems. The PAPI provides visual approach glide slope information to pilots and enables them to make a stabilized descent with a safe margin of approach clearance over obstructions. PAPI projects a pattern of red and white lights along the desired glide slope so a pilot can tell whether they are on the glide slope and how to correct their glide slope if they are above or below it. A REIL is a visual aid that provides the pilot with a rapid and positive identification of the runway end in use during approach. The REIL system consists of two simultaneously flashing white lights, one on each side of the runway landing threshold. For FY 2021, \$1.5 million is requested for engineering and technical services/support; and initiate two PAPI establishment projects. Visual NavAids are necessary to assist pilots in visually acquiring the runway environment.

**F. Runway Visual Range (RVR) Replacement/Establishment:** Allows airports to conduct takeoff and landing operations during conditions of low visibility. Replaces older RVR equipment with Personal Computer (PC) Based RVR equipment as well as equipment for sites that have qualified for an upgrade from a Category I to a Category II/III precision approach. RVR provides air traffic controllers with a measurement of the visibility at key points along a runway that is used to decide whether it is safe to take off or land during limited visibility conditions. During reduced visibility weather conditions, RVR system measurements are used by Air Traffic to establish airport operating categories; thus, properly equipped aircraft with a trained crew may continue operations under reduced visibility Category I, Category II and Category III conditions. RVR decreases diversions and delays at an airport by providing an accurate measure of the runway visibility. The RVR information affects airline scheduling decisions and air traffic management decisions regarding whether flight plans should be approved for an aircraft to fly to or take off from an airport with low visibility. For FY 2021, \$39.31 million is requested for engineering and technical services/support, procurement of approximately 88 RVR systems and ancillary equipment, and to establish/sustain RVRs at approximately 53 locations.

**G. Approach Lighting System Safety Enhancement:** Upgrades approach lighting systems built before 1975. The project upgrades the equipment to current standards and reduces the potential severity of take-off and landing accidents by replacing rigid structures with lightweight and low-impact resistant structures that collapse or break

apart upon impact. The entire approach lighting system is replaced when rigid structures are replaced. The High Intensity Approach Lighting System with Sequenced Flashing Lights (ALSF-2) provides visual information on whether the pilot is aligned with the runway centerline, the aircraft's height above the runway plane, roll guidance, and horizontal reference for Category II and III Precision Approaches. The MALSR provides visual information on runway alignment, height perception, roll guidance, horizontal references for Category I Precision, and Special Authorization Category II Approaches. For FY 2021, \$5.18 million is requested for engineering and technical services/support; initiate two MALSR Alignment Indicator Lights replacement projects and to procure MALSR equipment for two sites.

**H. Replace Visual Approach Slope Indicator (VASI) with Precision Approach Path Indicator (PAPI):** The International Civil Aviation Organization (ICAO) has recommended that all international airports replace the VASI lights with PAPI lights. This standardizes the equipment used to allow pilots to determine visually that they are on the proper glideslope for landing. The program supports the procurement, installation, and commissioning of PAPI systems in order to comply with this ICAO recommendation. For FY 2021, \$5.1 million is requested for engineering and technical services/support; procurement of seven PAPI systems; initiate seven new VASI replacement projects.

**I. In-Service Engineering:** \$1.95 is requested for In-service engineering activities that allow for immediate response and tactical distribution of resources to emerging technology solutions across this entire navigation portfolio.

**J. Transition to Operations and Maintenance (TOM) Year 3:** When systems are first commissioned into the National Airspace System (NAS), their Operations and Maintenance (O&M) costs are paid for through the F&E appropriation for a period that is usually up to two years after commissioning. This allows FAA to identify the needs and formulate the requirements in the Operations appropriation during budget formulation. The identified O&M costs must then be transition to the Operations Appropriation. This is known as Transition to Operations and Maintenance (TOM). FAA is requesting a third year of TOM funding under this Budget Line Item within the F&E account. \$300 thousand is requested.

---

**What benefits will be provided to the American Public through this request and why is the program necessary?**

---

The Federal Aviation Administration (FAA) is transitioning the National Airspace System (NAS) to more efficient Performance Based Navigation (PBN) routes and procedures that rely on GNSS. To achieve the transition, FAA is aggressively pursuing the implementation of satellite navigation and the sustainment of the ground based navigation infrastructure. Ground Based Navigational Aids will continue to provide a backup function, as required, in the event of a Global Positioning System outage to

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

ensure consistent and reliable landing operations and provide resiliency in the navigation domain.

Visual Navigation Aids must continue to identify runway parameters, provide visual landing cues, and identify visibility constraints to commercial and general aviation pilots. These visual systems provide enhanced safety of operations for landing aircraft. VORs, DMEs, and ILSs will remain in the NAS for the foreseeable future to provide resiliency during GNSS disruptions. A substantial portion of these ground based navigation aids and runway lighting/visual systems have exceeded the planned service life for those assets. This portfolio provides for the systematic replacement and sustainment of those systems. The result of this work reduces operational costs for the FAA and enhances the reliability of the assets.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 2D05 Distance Measuring Equipment (DME), VHF  
Omni-Directional Range (VOR), Tactical Air  
Navigational (TACAN) (DVT) Portfolio**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
DVT Portfolio	\$0	\$0	\$10,000 <sup>1</sup>

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
DVT Portfolio	---	\$10,000.0

**What is this program and what does the funding level support?**

---

**DME/VOR/TACAN Portfolio**

The FAA is committed to ensuring that the National Airspace System (NAS) navigational infrastructure remains safe, secure, sustainable and resilient. In fiscal year 2017, Congress instructed the FAA to address the environmental footprint along with the sustainment of aging infrastructure of en route navigational aids. The systems in this portfolio are over 30 years old and must be sustained to provide resiliency during Global Positioning System (GPS) Service Interruptions.

The Distance Measuring Equipment (DME), Very High Frequency Omni-Directional Range (VOR), Tactical Air Navigation (TACAN) [DVT] Portfolio intends to provide long term sustainment of DME, VOR, and TACAN navigation services. DMEs provide slant range (Distance) information to all aircraft and enables RNAV service for air carrier aircraft. Area navigation (RNAV) is a method of instrument flight rules (IFR) navigation that allows an aircraft to choose any course within a network of navigation beacons, rather than navigate point to point. VORs provide azimuth (position) information for en route navigation and approach services. VOR navigation allows aircraft to fly point to

---

<sup>1</sup> The work under this BLI was previously funded within BLI 2D01 VOR MON.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

point along established airways between VORs. TACANs provide azimuth information to military aircraft and slant range information to military and civilian aircraft. The DVT portfolio will support navigation infrastructure that consists of DME, VOR and TACAN systems installed at Service Delivery Points (SDPs) in various configurations identified below:

<b>Estimated End State DVT SDP Requirements</b>						
	<b>VOR</b>	<b>VOR/DME</b>	<b>DME</b>	<b>VORTAC</b>	<b>TACAN</b>	<b>Total</b>
<b>DVT SDPs</b>	17	270	197	381	55	920

<b>Estimated Systems Required through the End-State of 2045</b>			
	<b>DME</b>	<b>VOR</b>	<b>TACAN</b>
<b>DVT Systems</b>	467	668	436

For FY 2021, \$10 million is requested to meet the goals of the DVT Portfolio. The program plans to award a contract to address priority efforts of DVT. Currently, \$8.0 million is planned for the utilization of the contract award and \$2.0 million for systems engineering and program management contract support.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

The DVT Sustainment program will ensure this resilient navigational backup infrastructure is available for the foreseeable future by providing effective, cost efficient operations and maintenance solutions that improve NavAid reliability and availability and address long term sustainment challenges.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 2E01 Fuel Storage Tank Replacement and Management**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Fuel Storage Tank Replacement and Management	\$25,700	\$26,400	\$32,400

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u><b>Activity Tasks</b></u>	<u><b>Locations/ Quantity</b></u>	<u><b>Estimated Cost (\$000)</b></u>
Fuel Storage Tank Replacement and Management	178	\$32,400.0

**What is this program and what does this funding level support?**

---

The ATO active tank system inventory includes over 3,700 units that support communication, navigation, weather, and surveillance missions. Fuel storage tank (FST) systems store and supply electrical generator fuel, lubricating oil, building heater and boiler system fuel, service vehicle fuel, liquid waste, and similar bulk liquids.

FST system manufacture, installation, operation, and disposal is regulated under Federal, State and local statutes, including the Clean Water Act, the Oil Pollution Act, and the Resource Conservation and Recovery Act, among others, with significant penalties for compliance failures. The FST program operates to attain three primary objectives:

- Sustain NAS operational readiness — A loss of integrity on any storage tank component can negatively affect the operational capacity of the supported systems and may ultimately result in a total ATC facility outage.
- Mitigate environmental damage and regulatory non-compliance — Non-compliance incurs short-term ATC operational impacts (use prohibitions result in inability to support the mission) and longer-term fiscal impacts, including costly cleanup activities, fines, and unplanned retrofit costs.
- Conduct effective in-service management and lifecycle replacement — As fuel tanks age beyond their service life, there is an escalating risk of failure and associated leakage with attendant operational impacts and environmental damage.



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

For FY 2021, \$32.4 million is requested to fund tank unit replacements, modernization, and upgrades at approximately 178 locations across the NAS. In coordination with the Electrical Power Systems – Sustain/Support budget line item, the FST program will perform engine systems modifications, engine systems replacement, or engine system removal when circumstances are warranted to save funding and align schedules across dependent programs for FST and power systems implementation work at the same facilities.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

Executing an FST lifecycle sustainment program achieves the cost benefit of sustaining availability of the systems for NAS operations, reducing the risk of leaking FST systems, minimizing adverse impact to personal and environmental safety, and preventing regulatory fines of up to \$32,500 per day per unit for failing to comply with regulatory standards.

Monthly tracking confirms fuel systems continually achieve the goal of 99.7 percent sustained operational availability. Operating modern equipment, sustainable, and regulatory-compliant fuel systems mitigate damage and associated costs resulting from incidental release of hazardous, toxic, or dangerous materials and assures the travelling public and aviation stakeholders a reliable and safe transit experience.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for- 2E02 Unstaffed Infrastructure Sustainment (UIS)**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Unstaffed Infrastructure Sustainment (UIS)	\$51,050	\$36,800	\$60,200

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
A. Unstaffed Infrastructure Sustainment (UIS)	191	\$54,100.0
B. FAA Employee Housing/Life Safety Shelter System Services	---	3,600.0
C. In-Service Engineering	---	2,500.0

**What is this program and what does this funding level support?**

For FY 2021, \$54.1 million is requested to complete 123 unstaffed infrastructure sustainment projects. The UIS Program sustains the buildings, broadcast towers, air conditioning systems, roads, fences, and other related infrastructure at approximately 12,000 unstaffed sites. This infrastructure, which houses and enables essentially all of the FAA's Communications, Surveillance, Weather, and Navigation systems, is past its service life and requires a comprehensive sustainment effort to ensure the integrity of the NAS.

For FY 2021, \$3.6 million is requested to complete 33 Employee Housing and Life Safety Shelter projects. The FAA owns housing units for FAA employees at remote locations (e.g. islands in the Bering Sea) and also owns a network of life safety emergency shelters in harsh environments (e.g. remote arctic and mountaintop locations). Employees who use these facilities provide air traffic control services and/or NAS facilities maintenance services.

For FY 2021, \$2.5 million is requested for in-service engineering activities that provide an immediate response to emerging technology issues. The UIS program sustains NAS supporting infrastructure, which enables the reliable and continuous operations of surveillance, navigation, communication, and weather equipment. Unstaffed infrastructure protects electronic equipment from weather hazards

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

and unauthorized entry. UIS sustainment includes major repairs and replacement of real property assets and structures that are normally not staffed, such as:

- Major repair, refurbishment, and replacement of NAS antenna and equipment towers
- Major repair, refurbishment, and replacement of buildings; shelters; roofs; HVAC equipment; electrical panels and distribution wiring; locks and alarm sensors; lighting; access roads; grounds; and fencing

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

The American Public will benefit from the NAS infrastructure sustained by this program. This program will extend the operational service life of NAS remote facilities that protect and enable critical Communications, Surveillance, Weather, and Navigation systems and associated staff.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

**Detailed Justification for - 2E03 Aircraft Replacement and Related Equipment Program**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Aircraft Replacement and Related Equipment Program	\$13,000	\$10,900	\$36,100

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
A. Aircraft Related Equipment (ARE) Sustainment	---	\$9,000.0
B. Flight Simulation Testing and Research Technologies (START)	---	3,000.0
C. Flight Program Fleet Modernization	---	21,000.0
D. Flight Program Atlantic City Operations Sustainment	---	3,100.0

**What is this program and what does this funding level support?**

This program requests funding for the FAA Flight Program Operations and Fleet Modernization Strategy, which includes aircraft and simulator procurement enhancement and sustainment, training, and operational evaluation activities. That strategy incorporates all aspects of FAA flight program safety, administration, operations, training, and sustainment. Flight Program Operations conducts multiple missions in FAA aircraft (owned, leased, rented, unmanned aircraft systems (UAS) etc.) to include aviation safety training; flight inspection; research, development, test and evaluation support; and critical event response/transportation. The FAA currently has 44 aircraft that are twelve different makes and models and the goal of this program is to reduce the fleet to 24 aircraft that are only two makes and models. In addition to standardizing the purchase of new aircraft, this program will continue to sustain and modernize the current fleet to reduce aircraft downtime and maintenance costs.

**A. Aircraft Related Equipment (ARE) Sustainment:**

This project ensures FAA owned and operated aircraft continue to meet regulatory and sustainment requirements while avoiding obsolescence. For FY 2021, \$9.0 million is requested for ongoing modifications/upgrades to aircraft, avionics, and mission equipment. These aircraft support programs such as Automatic Dependent Surveillance –

Broadcast (ADS-B) and the Very High Frequency Omnidirectional Range (VOR) Minimum Operations Network (MON) Program.

**B. Flight START:**

The Flight START Project enables the continued technology refresh of the Airbus wide body Simulator, and Boeing 737 Simulator to keep them operational and supportable. These simulators include equipment that has been mandated by FAA for commercial aircraft operations. The simulators perform realistic, operational evaluation activities and vital research and development projects. Examples of the evaluation activities include Closely Spaced Parallel Operations, Required Navigation Performance, and Human-in-the-Loop pilot/controller/aircraft operational performance in the terminal environment around airports.

For FY 2021, \$3.0 million is required for technology refresh enhancements of FAA simulators that support new NextGen technology initiatives, NAS modernization, and National Transportation Safety Board (NTSB) safety initiatives.

**C. Flight Program Fleet Modernization:**

This project requests funding to procure a fleet of new and used aircraft that will continue to meet all aspects of the FAA's flight program responsibilities. Additionally, these aircraft will require equipage and modifications to achieve that mission. The aircraft will support four primary missions and they are:

- **Aviation Safety Training:** Provides currency/proficiency services to aviation safety inspectors and flight test personnel who must remain qualified and current to inspect commercial aircraft and to operate FAA aircraft.
- **Flight Inspection:** Validates navigational aids, surveillance systems, communication systems, and other ground infrastructure for both civil and military use. This mission ensures the integrity of instrument approaches and airway procedures that constitute our NAS.
- **Research, Development, Test and Evaluation (RDT&E) Support:** Airborne research, development, test, and evaluation of new navigational, surveillance and communication aids, air traffic procedures, and aircraft design improvements.
- **Critical Event Response/Transportation:** Provides for continued FAA support in times of emergency or disaster, as well as support the National Transportation Safety Board in carrying out its duties.

For FY 2021, \$21.0 million is requested for procurement of aircraft in accordance with the Flight Program Operations Fleet Modernization Strategy, program support and acquisition planning.

**D. Flight Program Atlantic City Operations Sustainment**

Support aircraft enhancements, and sustain flight test and evaluation capabilities at the FAA William J. Hughes Technical Center. Services provided by these aircraft support programs/projects with flight and ground testing, mission planning, safety analysis, aircraft modification; as well as design, certification, fabrication and installation. These flights support the development of emerging technologies and procedures that require airborne evaluation.

For FY 2021, \$3.1 million is requested to support these test and evaluation capabilities.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

Safe, supportable, and regulatory compliant aircraft are necessary for the continued successful performance of the Flight Program Operations missions. This program provides the means to support standardization and sustainment of the FAA aircraft. This program will save taxpayer dollars through the replacement of obsolete and unsupportable components. In addition, standardization of the FAA fleet will improve the long term efficiency in upkeep and provide continuity of service.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 2E04 Airport Cable Loop Systems – Sustained Support**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Airport Cable Loop Systems – Sustained Support	\$10,000	\$8,000	\$9,000

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u><b>Activity Tasks</b></u>	<u><b>Locations/ Quantity</b></u>	<u><b>Estimated Cost (\$000)</b></u>
Airport Cable Loop Systems Sustained Support	10	\$9,000.0

**What is this program and what does this funding level support?**

---

For FY 2021, \$9.0 million is requested for advanced engineering, construction activities, and Fiber Optic Transmission Systems (FOTS) equipment installations for the initiation of four large scale Airport Cable Loop (ACL) projects, and continuation/completion of four large scale ACL projects. In addition, funding will allow the program to start and complete four smaller scale projects that will be determined at the Air Ground Integrated Requirements Team meeting in November 2020.

The program replaces existing on-airport, copper-based, signal/control cable lines that have deteriorated, and obsolete underground telecommunications cable infrastructure systems that are vulnerable to failure and have caused flight delays related to these cable outages. The primary focus will be on projects at airports with high traffic counts and enplanements. These lines feed airport surveillance radar, air/ground communications, landing systems data and information to the ATC Tower, and operational and maintenance information to FAA-staffed facilities. Where cost effective, the program will install fiber optic cable in a ring configuration to provide communications diversity.

The ACL program reduces the number of unplanned outages due to deteriorated copper lines, and improves signaling and communications, which allows for increased operational availability of infrastructure, such as navigation, surveillance, and communication systems. There have been 1,498 delays and outages associated with on airport cable loop from 2004 to 2015 for airports in the NAS, which the ACL program will reduce over time.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

The ACL program, along with multiple other programs, has mutual dependencies on the telecommunications infrastructure. ACL is linked with NextGen, and more than 15 FAA programs rely on ACL to provide connectivity to and from control facilities.

**What benefits will be provided to the American public through this request and why is this program necessary**

---

ACL is presently reducing on-airport telecommunication infrastructure related delays of core airports by three percent annually, on average. System reliability and safety are enhanced due to increased system performance from redundant or diverse pathways provided by the cable loop system. Standardizing requirements will simplify and reduce operation requirements for logistics, configuration management, training, procurement, and depot support, which saves taxpayer dollars.



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 2E05 Alaskan Satellite Telecommunications  
Infrastructure (ASTI)**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Alaskan Satellite Telecommunications Infrastructure (ASTI)	\$16,300	\$4,300	\$1,000

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u><b>Activity Tasks</b></u>	<u><b>Locations/ Quantity</b></u>	<u><b>Estimated Cost (\$000)</b></u>
Alaskan Satellite Telecommunications Infrastructure Sustainment 2 ---		\$1,000.0

**What is this program and what does this funding level support?**

---

The ASTI Core program modernized the Alaskan NAS Interfacility Communications System (ANICS) to support National Airspace Systems and Services. ASTI is a Federal Aviation Administration (FAA)-owned satellite based network that provides 90 percent of the inter-facility communications required by the FAA in Alaska to support Air Traffic Control (ATC) operations. The ASTI network topology consists of hub earth stations, remote earth stations, leased transponder space segment, and a National Operations Control Center. The ASTI Technology Modernization is an ongoing program that replaces/upgrades system components originally deployed in the 1990s. The program improves system availability and reduces the level of FAA maintenance.

The ASTI Sustainment program will establish yearly software/hardware releases to allow for continual maintenance to the deployed baselined system. The yearly releases will help to ensure that components fielded under ASTI are maintained and remain operational through the system lifecycle by:

- Resolving all Problem Trouble Reports not addressed during the deployment phase of the base program
- Addressing end-of-life products as they are identified and make changes as necessary to ensure continued operations
- Keeping the system current with evolving network security requirements

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

- Updating the system architecture to meet Internet Protocol (IP) bandwidth and maintainability requirements

For FY 2021, \$1.0 million is requested for the continuation of sustainment activities of the ASTI system and will be used to evaluate the conversion of ASTI sites to the FAA's commercial telecommunications network as a future alternative to ongoing sustainment work.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

Modernization and continued sustainment work is critical to continue the availability of a safe and reliable ATC System in Alaska. It will improve the reliability of the network that connects air traffic controllers to the radios and sensors that provide the ability to see and communicate with all aircraft within the Alaska Air Space.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 2E06 Real Property Disposition**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Real Property Disposition	\$9,000	\$9,000	\$4,800

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
Real Property Disposition	75	\$4,800.0

**What is this program and what does this funding level support?**

---

The Real Property Disposition program works with other FAA program offices to identify and plan for the timely disposition of real property assets that are no longer required by the agency. When the FAA decommissions a site or system, this program is responsible for conducting an assessment of the property and determining the best course of action for disposal. Planning for the orderly disposition of property at multiple locations across the country is prioritized considering cost, available technical resources for site restoration and disposal, and potential environmental or safety impacts to surrounding communities if disposition is delayed. Demand for disposal of real property is increasing as ground based sites are being minimized in the NAS as the FAA moves to satellite technology. Services provided by the program are:

- Identifying, verifying, and scheduling the disposition and site restoration work
- Investigating and documenting the structures to be removed at each site, determining the required restoration associated with the site, and developing scopes of work and schedules with milestones
- Final disposition of decommissioned infrastructure and property restoration including infrastructure removal or demolition, removal and disposal of debris and hazardous materials, and evaluation of impact upon cultural and historic preservation, wetlands, and natural resource protection
- Conducting Phase I Environmental Due Diligence Audits (EDDA) reports for government-owned properties, as required by the General Services Administration and applicable laws

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

For FY 2021, \$4.8 million is requested to fund the final disposition of decommissioned infrastructure at approximately 22 projects.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

The program provides cost savings by reducing Operations and Maintenance (O&M) costs (e.g. grass cutting, snow removal, utility fees, communications frequency fees, etc.) and cost avoidance by eliminating lease costs. The final disposal of the FAA's unnecessary required real property assets supports effective financial management by optimizing maintenance costs and disposing of excess assets. This program has experienced great success since FY 2005. Between FY 2008 and FY 2018, the Facility Decommissioning Program disposed of 1,662 sites at a 10-year cost avoidance of \$65.9 million.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 2E07 Electrical Power System – Sustain/Support**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Electrical Power System – Sustain/Support	\$140,700	\$130,000	\$149,400

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
Electrical Power System – Sustain/Support	192	\$149,400.0

**What is this program and what does this funding level support?**

---

For FY 2021, \$149.4 million is requested by the Electrical Power Systems – Sustain/Support (PS2) program to sustain components of the FAA's power system infrastructure necessary to operate the NAS. The PS2 program sustains components of the FAA's power system infrastructure to ensure Air Traffic operational needs are met with high quality electrical power. Power Services Group (PSG) manages the PS2 program by sustaining and supporting the existing electrical power components and systems that include prime power, power conditioning, power regulation, power distribution, backup power, grounding, monitoring, and electrical power cable infrastructure. The funding will reduce a large backlog and address systemic problems by replacing obsolete equipment and electrical systems with state-of-the-art engine generators, modern efficient uninterruptible power supplies, switchgear, power cables, and other electrical components. The largest electrical power system sustained by this program is the Air Route Traffic Control Center (ARTCC) Critical and Essential Power Systems (ACEPS).

PS2 must meet NAS Enterprise Architecture requirements for Reliability, Maintainability, and Availability (RMA). PS2 performance is reported in the National Airspace Performance Reporting System daily. The program provides power systems engineering guidance, power system standards, maintenance orders, and testing of electrical systems to NAS implementation offices and programs. It provides additional equipment such as Power Conditioning Systems (PCS)/Uninterruptible Power Supplies (UPS), Engine Generators (EG), Critical Power Distribution Systems (CPDS), and DC (Direct Current) Backup Systems (DC BUS) equipment, on a case-by-case basis, for

locations with poor power quality as well as to improve overall RMA. The program is included in the ATC Facilities Sustainment Strategic Plan.

PS2 supports the Department of Defense collocated Air Route Surveillance Radar equipment, Airport Surveillance Radar and Terminal Doppler Weather Radar as well as the Department of Commerce's Non-Continental United States National Weather Service (NWS) Weather Surveillance Radar WSR-88D. The program provides power support to other government agencies with collocated equipment such as the U.S. Coast Guard, the Drug Enforcement Administration, and U.S. Air Force. The program sustains power systems to ensure that highly reliable power is available to Automation, Communication, Navigation, Surveillance and Weather. Airport Cable Loop Systems Sustainment coordinates with PS2 program to install extra conduits in new power cable trenches to support other on-airport systems that may use fiber optic cable for data transmission. Additionally, the program provides backup and quality power to critical and essential building systems such as heating, ventilation, and air-conditioning.

The FAA PS2 program sustains 12 electrical power systems areas:

- Program Management and System Engineering (PSG): provides system engineering to define and document customer requirements for NAS power systems. It administers requirements through the design phase, system validation, quality assurance, safety improvement, and expected system operational life. This effort includes identifying alternatives, preparing drawings, administering training, and implementing power systems test facilities.
- Engine Generators (EG): provide backup power when commercial power is unavailable or becomes unreliable. EGs have a 20-year expected system operational life. In coordination with Fuel Storage Tank program (FST), the program performs fuel systems modifications, fuel tank replacement, or fuel tank removal when circumstances are warranted to save funding and align schedules across dependent programs for EG implementation at the same facilities. In some applications, a DC BUS can be installed instead of an EG, pending concurrence by the PSG.
- Power Conditioning System and Uninterruptible Power Supply (PCS/UPS): provides a power quality and backup system that conditions commercial power. PCS/UPS provides a short-duration Alternating Current (AC) power source that prevents commercial power disruptions and surges from adversely affecting electronic system performance and critical NAS services. The PS2 program currently sustains PCS/UPS systems that have an expected system operation life of up to 15 years, with the exception of batteries.
- Lightning Protection, Grounding, Bonding and Shielding (LPGBS): sustains and optimizes components of LPGBS systems to minimize electrical hazards to personnel, facilities, and electronic equipment caused by lightning, voltage surges, electrostatic discharge and power faults at NAS facilities. Sites are hardened to prevent NAS delay or loss of service, minimize or preclude outages, and enhance personnel safety.
- DC SYSTEMS (DC BUS): Using commercial power as the source, a DC BUS provides and distributes conditioned Alternating Current (AC) and DC voltages to NAS electronic equipment. It provides a medium term power source at facilities with

limited power needs. The PS2 replaces DC BUS systems with an expected system operational life of up to 15 years, with the exception of batteries.

- NAS Batteries: large “stationary” battery banks supply DC power directly to NAS service equipment (ex: Very High Frequency Omnidirectional Range installations, Backup Emergency Communication Systems) and indirectly to NAS equipment (ex: ACEPS, PCS/UPS, and DC BUS equipment). Depending on NAS requirements, batteries can support anywhere from 15 minutes to 72 hours. PS2 periodically replaces batteries and monitoring components at En Route, Terminal, and Unmanned facilities to ensure NAS service reliability. Depending on the type of battery technology and its application, the periods of replacement range from five to seven years for sealed lead acid batteries or up to 20 years for flooded batteries.
- Electrical Line Distribution (ELD): typically consists of underground distribution cables, transformers, and switchgear at airports and ancillary facilities that distribute utility level electrical power to NAS facilities. The program replaces ELDs and sustains FAA owned off-airport utility power cable systems. Approximately sixty percent of the cable is beyond its expected system operational life.
  - ARTCC Critical and Essential Power Systems (ACEPS): provides high-quality and high-reliability power to 21 En Route ARTCC's and three large TRACONs. ACEPS consists of EGs, switchgear, and UPS systems. Most of ACEPS is obsolete with EGs having an average age greater than 50 years, which is beyond its expected system operational life of 20 years. Its UPSs are more than 20 years old, obsolete, out of production and unsupportable. ACEPS II was developed to replace the legacy ACEPS in two phases to reduce operational impact to ARTCC and TRACON facilities.
    - ACEPS II Phase 1 replaces the critical bus electrical systems, the UPSs, and associated electrical systems.
    - ACEPS II Phase 2 replaces the Essential Bus and Standby Bus electrical systems, the engine generators, and associated components.
- Critical Power Distribution System (CPDS): supports FAA mission critical Terminal facilities such as Combined Control Facilities, large TRACONs and large/important Air Traffic Control Towers. It provides robust fault tolerant and highly reliable power systems to ensure efficient maintainability. It significantly improves personal safety during maintenance activities, addresses obsolescence, ensures effective national training, and timely logistics. CPDS consists of electrical distribution equipment, transfer switches, EGs, UPS, and batteries. Based on different RMA requirements, CPDS systems are divided into different types to optimally match cost, criticality and activity level of the NAS facilities. PSG maintains design and configuration control of CPDS. It sustains the components based upon reliability, age, obsolescence and supportability factors.
- Environmental Remote Monitoring System (ERMS): provides power system sensors and interfaces to the ERMS network, which reports power system status to the operations control centers. The information provides the FAA with real-time data on the status of the systems, allowing a prompt response to system-related issues. ERMS installations provide facility monitoring at sites to allow significant reduction of FAA maintenance, to ensure facilities stay operational, and to meet FAA's RMA requirements.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

- Alternative Energy Systems (AES): sustains and supports a broad range of clean energy technologies to meet NAS operational demands. AES technologies reduce the FAA's carbon footprint and help to achieve the goals of Executive Order 13693, Federal Leadership in Environmental, Energy, and Economic Performance. AES reduces fossil fuel dependencies. FAA AES include solar energy, wind energy, fuel cell, and geothermal. The program replaces aging or obsolete AES installations connected to NAS equipment. AES will construct a lab to test alternative power systems. PSG sustains the electronics at 10 years and photocells at 20 years.
- Visual NAVAIDS Cabling: provides power through dedicated, long runs of underground cables supporting Visual Navigational Aids (NavAids) systems at airports. These systems include Approach Lighting System with Sequenced Flashing Lights and Medium-Intensity Approach Lighting System with Runway Alignment Indicator Lights that are FAA and International Civil Aviation Organization required elements for instrument landing approaches. Visual NAVAIDS provide guidance information to help pilots locate the runway and land safely. Visual NAVAIDS outages can impact Instrument Flight Rules (IFR) equipped aircraft in limited visibility weather conditions (CAT I, II and III). The program replaces deteriorated Visual NAVAID power cable system found to be beyond life or unreliable.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

The PS2 program funds the replacement, refurbishment, purchase, and installation of components to sustain NAS electrical power infrastructure valued at approximately \$2 billion, which in turn sustains billions of dollars' worth of NAS services to the American public. Without this leveraged investment toward reliable power systems, NAS computers, communications, and electronics would not be able to deliver their required availability. Commercial power disruption can result in flights being kept on the ground, placed in airborne holding patterns, or re-routed to other airports.

The PS2 Program prevents expensive damage to Air Traffic Control electronic equipment and enhances the safety of NAS operations. The FAA's independent Investment Planning and Analysis (IP&A) Office determined that a single ACEPS outage results in an economic impact to NAS users of approximately \$2 million per hour in terms of Aircraft Direct Operating Costs and Passenger Value of Time savings. This estimate is based on an August 15, 2016 ERAM outage event at the District of Columbia ARTCC. The PS2 program is vital to maintaining and increasing NAS capacity, reliability, and availability through sustainment of NAS power equipment so that NAS systems and electronics can deliver their required availability. In support of modernization, PS2 sustainment ensures that the Next Generation Air Transportation System (NextGen) program reliably meets its service goals to NAS operations, the global aviation community, and to the American public.

In addition, the PS2 Program meets mandated environmental and safety objectives, using responsible program management techniques to comply with government and industry



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

requirements. PS2 is replacing EGs with new technologies to aid in the reduction of the FAA's carbon footprint to comply with Environmental Protection Agency (EPA) regulations. PS2 is working to reduce arc flash hazards to employees to meet Environmental and Occupational Safety and Health (EOSH) objectives.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 2E08 Energy Management and Compliance (EMC)**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Energy Management and Compliance (EMC)	\$2,400	\$6,400	\$7,400

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
Energy Management and Compliance (EMC)	17	\$7,400.0

**What is this program and what does this funding level support?**

---

The Energy Management and Compliance (EMC) program orchestrates cost-effective reductions of energy and water use at ATO facilities by coordinating policies, technical support, targeted infrastructure investments, and data analysis and reporting. By upgrading older facility infrastructure, such as mechanical and electrical systems, the EMC program will not only reduce operational costs but also increase reliability of the NAS by reducing the likelihood of facility outages and disruptions that can be caused by out-of-service building systems. The EMC program promotes energy and water-use efficiency and the use of off-grid power and non-polluting energy sources for all activities and acquisitions.

For FY 2021, \$7.4 million is requested to support the following:

- Perform energy and water improvements at ten high energy using facilities
- Install advanced electric meters at seven high energy using facilities
- Develop and implement performance-based contracts to maximize third-party investments in ATO infrastructure
- Provide required quarterly and annual reports on progress against legislative and executive order mandates to the Department of Transportation (DOT), the Department of Energy, and the Office of Management and Budget

The EMC program has identified 325 facilities that comprise 75 percent of the ATO's energy usage. The mandates of the Energy Independence and Security Act (EISA) and the Energy Policy Act (EPAct) require the agency to identify and implement

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

recommended energy and water improvements to reduce utility usage and associated costs at these facilities. The EMC program has already identified more than \$200,000,000 in recommended improvements to lower energy usage at ATO facilities, many of which would pay back in fewer than 10 years.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

The EMC program is necessary to provide a coordinated approach for identifying and implementing cost-effective investments in the FAA infrastructure to reduce ongoing utility expenses. The American public benefits from reduced energy consumption at FAA facilities as well as cost savings that are the result of those efforts.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 2E09 Child Care Center Sustainment**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Child Care Center Sustainment	\$1,000	\$1,500	\$1,000

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
Child Care Center Sustainment	12	\$1,000.0

**What is this program and what does this funding level support?**

The FAA-owned centers are reaching a facility age of 20 - 25 years; many are in need of roof replacements, HVAC system upgrades, and modernization to meet safety and building code requirements. This program is a multi-year sustainment program that will address facility requirements for the 12 FAA Operated Child Care Centers. The Child Care Centers provide FAA personnel with priority enrollment and flexibility to meet the unique schedule needs of air traffic personnel. FAA is responsible for maintaining the safety of the buildings. The program is necessary to ensure that the Centers are properly maintained according to local building codes and regulations, and are safe and secure.

For FY 2021, \$1.0 million is requested to improve the condition of Child Care Centers that are located at FAA facilities. This funding will be used to modernize the 12 FAA Operated Centers that are in need of major projects and other expenses unique to a child care center (e.g. kitchen, children size restrooms). Playground equipment located at FAA Child Care Centers is considered real property, permanent structures, and an integral part of the child care center facility.

**What benefits will be provided to the American public through this request and why is this program necessary?**

The required funding specifically allocated to these Centers will decrease deferred maintenance – which is the cost of rebuilding or replacing components whose service life

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

has exceeded their scheduled lifetime. It will increase the employee retention rate, employee satisfaction, loyalty, and decreases job vacancies. Employee satisfaction leads to more productive employees that benefit the American Public by making government more efficient. Additionally, these Centers have a 92 percent national child care accreditation rate compared to only five percent nationwide.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 2E10 FAA Enterprise Network Services (FENS)**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
FAA Enterprise Network Services (FENS)	\$40,000	\$38,500	\$34,700

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
FAA Enterprise Network Services (FENS)	---	\$34,700.0

**What is this program and what does this funding level support?**

---

The FENS program is the successor to the existing FAA Telecommunications Infrastructure (FTI) program which provides the majority of the telecommunications services required by the FAA. Telecommunications services are essential to the operations of the National Airspace System (NAS) and the FAA. As the FTI program comes to an end, FENS is necessary to ensure there is no interruption to the NAS and FAA operations. The current FTI program is providing services today with its contract ending in 2022. FENS will provide high-availability, low latency telecommunications services for NAS systems and a separate Mission Support network that serves as the FAA's Intranet for secure connectivity to FAA internal administrative applications as well as the public Internet.

FENS will be responsible for establishing a modern infrastructure that is capable of meeting the FAA's future demands for telecommunications services through 2035. FENS will provide a robust competitive environment for meeting the FAA's future telecommunications needs. For example, FENS will implement modern Internet Protocol (IP)-based infrastructure to replace legacy Time Division Multiplex (TDM)-based infrastructure that will no longer be supported in the commercial marketplace. The FENS network infrastructure will support the connectivity requirements of NextGen-enabling programs such as System Wide Information Management (SWIM) and Data Communications (Data Comm).

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

For FY 2021, FENS is requesting \$34.7 million to fund the necessary resources, program and contract support to:

- Develop enterprise-level networking functions, and other functions such as site reconstitution and contingency services
- Establish tools for network management and operations, service ordering and invoicing tracking
- Conduct requirements review on the solution development
- Support communications network planning and engineering, security management and operations
- Provide prime and non-prime program management support
- Support development test and operational test, build out of FAA and contractor test lab facilities
- Develop an overarching transition plan and oversight of site specific detail plans for key sites

The requested funding will also support the following activities:

- Develop the following products:
  - Power and Space NAS Change Proposals
  - Security Certification and Authorization Package
  - Operational Test Plans and Procedures
- Plan and conduct Integrated Baseline Review

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

The FENS program will benefit the American Public directly and indirectly upon implementation:

- Ensure continuity of the telecommunications services required for the operation of the United States Air Traffic Control system as the existing telecommunications services contract reaches the end of its period of performance
- Reduce telecommunications service delivery timeframes so that new capabilities can be put into operation more quickly to support the flying public and air carriers
- Provide enhanced network service monitoring, control, and security capabilities that improve visibility in outage impacts and reduce restoration times
- Provide the enhanced security capabilities needed to ensure secure communications with internal and external stakeholders that depend upon the FAA's wide area networks and SWIM enterprise messaging services

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 2E11 National Airspace System Risk and Performance Portfolio**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
National Airspace Risk and Performance Portfolio	\$4,500	\$7,100	\$15,900 <sup>1</sup>

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
A. Data Visualization, Analysis and Reporting System (DVARs)	---	\$4,500.0
B. Operations Analysis and Reporting System (OARS) Phase 1	---	6,400.0
C. Operations Network (OPSNET) Replacement	---	5,000.0

**What is this program and what does this funding level support?**

---

**A. Data Visualization, Analysis and Reporting System (DVARs):** Will provide data and analyses on NAS operations to FAA executives, Air Traffic Managers, and Air Traffic Operations personnel to help them identify deficiencies and develop proposals to improve NAS performance. DVARs will replace the existing Performance Data, Analysis and Reporting System (PDARS), which helps field facility personnel and FAA offices develop recommendations for reducing delays in the National Airspace System (NAS) that are the result of capacity and system efficiency problems. DVARs will provide the same capabilities as the existing system and will provide added benefits to the FAA that include leveraging FAA Enterprise IT services and data repositories, streamlined system updates, and the ability to expand user access.

For FY 2021, \$4.5 million is requested to complete implementation of DVARs data and processing system capabilities. This funding will also allow for the development of new visualization and reporting capability requirements. Critical enhancements and transition support to sustain the existing the PDARS system will also be funded from this program.

---

<sup>1</sup> The work funded under this portfolio was funded under BLI 1A01 in past years.



**B. Operational Analysis and Reporting System (OARS):** Will provide the Air Traffic Organization with data-sharing capability among legacy and future systems used for safety risk analysis. The result will provide the end-user with quick and easy access to consistent, accurate, and timely data to allow more efficient, comprehensive, and proactive analyses of risk in the NAS. OARS will be delivered in multiple phases. OARS Phase 1 will develop a single portal user interface to all current legacy safety tools and improve the login and security features for over 40,000 users. OARS Phase 1 will rehost selected legacy applications into the FAA's cloud infrastructure. The legacy applications that will be part of Phase 1 are:

- Comprehensive Electronic Data Analysis and Reporting
- Falcon Rapid Air Traffic Replay Tool
- Traffic Analysis and Review Program
- Risk Analysis Process (RAP) Tools (Airborne (A-RAP), Surface (S-RAP) and Service Integrity (SI-RAP))
- Search and Rescue database

For FY 2021, \$6.4 million is requested for Phase 1 system design and development, system engineering support, and program management support.

**C. Operations Network (OPSNET) Replacement:** A system of data collection that consists of an automated component collecting data from multiple systems, and a manual component requiring data entry from personnel at each facility. The OPSNET reporting components generate and distribute delay and traffic activity reports to the Department of Transportation (DOT) and FAA Executive leadership, Air Traffic Management decision makers, and the Aviation Community. Primary uses of OPSNET include NAS performance monitoring, post-operational assessments of traffic management initiatives, measurement of NextGen improvements, financial benchmarking, facility reviews and classifications, and investment planning.

The existing system is outdated and constrained by difficulties in correlating data from multiple sources to resolve flight delay issues. The OPSNET replacement program will replace and modernize the existing system to provide a comprehensive and accurate accounting of delays with appropriate attribution of causal factors. The replacement system will provide near real-time delay reporting capability for evaluation of performance during the day-of-operation. The replacement system will automate, to the maximum extent possible, the collection of operational data and minimize manual entries. For FY 2021, \$5.0 million is requested for activities that support the migration from the legacy system with the goal of achieving Initial Operating Capability in 2021.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

Planning for facility and system enhancements requires the ability to track, monitor, and analyze the daily NAS operations information. The modernization of the systems in this

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

portfolio will provide a modernized enterprise solution inclusive of data processing, visualization, and reporting. FAA will realize efficiencies by modernizing and enhancing air traffic control services after determining root causes for performance and risk issues in NAS as identified and monitored by information in these systems. Additionally, FAA will realize productivity gains for the personnel that track and monitor the information provided by these systems.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 2E12 Time Division Multiplexing (TDM)-to-Internet  
Protocol (IP) Migration**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
TDM-to-IP Migration	\$38,000	\$20,000	\$11,300

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u><b>Activity Tasks</b></u>	<u><b>Locations/ Quantity</b></u>	<u><b>Estimated Cost (\$000)</b></u>
TDM-to-IP Migration	Various	\$11,300.0

**What is this program and what does this funding level support?**

---

Time Division Multiplexing (TDM) is a lower bandwidth, 1960s technology that is reliant on copper wires, and increasingly outdated, unsupportable equipment that is labor intensive and costly to sustain. More than 90 percent of the 23,000 plus services obtained under the FAA Telecommunications Infrastructure (FTI) contract are TDM-based to meet the interface requirements of systems like surveillance radar, air/ground voice, and interphone (ground/ground voice). FTI uses the infrastructure of commercial telecommunications carriers to reach more than 4,000 facilities operated by the FAA. These services are provisioned over wireline infrastructure provided by local exchange carriers. Commercial telecommunications carriers are phasing out TDM based infrastructure and moving to broadband Internet Protocol (IP)-based technology. The FAA has been notified by some carriers that TDM-based infrastructure and services are being phased out and transitioned to broadband Internet Protocol (IP)-based technology. This will render thousands of TDM Access connections within the NAS inoperable.

Notably, a major carrier plans, by 2023, to discontinue support for the Network Reconfiguration Service (NRS) system used for remote network provisioning. Furthermore, other carriers will deprioritize outage restoration for TDM services, or no longer support them, by 2022. These discontinuances will affect the FAA's ability to make cost-effective changes to its telecommunication infrastructure as service needs evolve and will result in severe service disruptions. FAA will use some of the requested funding for Remote Telecommunications Infrastructure Replacement (RTIR) to address the NRS problem and determine locations that will require fiber connections to reduce

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

copper lines at remote sites. In addition, FAA has developed a TDM-to-IP migration strategy that will:

- Modernize some NAS systems to support IP communications with standard Ethernet interfaces
- Modernize the system communications interface of NAS systems to be IP-compatible as part of the standard technology refresh process
- Implement FTI provided TDM-to-IP network conversion device

For FY 2021, \$11.3 million is requested to develop and implement an Enterprise Interface Modernization Solution, which will allow us to communicate between systems like Air to Ground Voice, Ground to Ground Voice, Automation, Communication, Navigation, Surveillance and Weather service categories. Without this solution, FAA will be unable to communicate between facilities or control the vast array of NAS equipment by the year 2024.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

The work under this program supports FAA initiatives to improve the resiliency of the NAS through a robust infrastructure that has the ability to auto-recover during outages in a manner that is transparent to FAA end user systems and results in a reduction in air traffic delays.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 3A01 Hazardous Materials Management**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Hazardous Materials Management	\$29,800	\$20,000	\$27,500

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u><b>Activity Tasks</b></u>	<u><b>Locations/ Quantity</b></u>	<u><b>Estimated Cost (\$000)</b></u>
Hazardous Materials Management	26	\$27,500.0

**What is this program and what does this funding level support?**

---

The FAA operates the hazardous materials, or HAZMAT management program, to clean up approximately 772 contaminated areas of concern (AOC) that require investigation, remediation, and closure activities. Investigations at the identified sites have revealed that toxic contamination resulted from a variety of hazardous substances, including cleaning solvents, degreasing agents, pesticides, asbestos, polychlorinated biphenyls, and heavy metals.

The FAA has identified cleanup schedules as part of enforcement agreements with regulatory agencies. These agreements require the FAA to remediate contaminated soil and groundwater. Extensive contamination at the William J. Hughes Technical Center (WJHTC) in Atlantic City, New Jersey prompted the Environmental Protection Agency (EPA) to place the site on the EPA's National Priority List (NPL) or "Superfund" as one of the nation's most environmentally dangerous sites. Other contaminated sites (many of which are located in Alaska) and the requirements of the HAZMAT management program account for a large portion of unfunded environmental liabilities documented in the FAA's financial statements.

For FY 2021, \$27.5 million is requested to continue the management and remediation of 772 contaminated AOCs, as of October 2018. The HAZMAT program began FY 2018 with 690 identified AOCs and removed 131 AOCs. During FY 2018, 213 new AOCs entered the program, predominately inflows identified during facility decommissioning efforts.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

To achieve compliance with Federal, State, and local environmental cleanup statutes, including the Resource Conservation and Recovery Act (RCRA) of 1976, the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, and the Superfund Amendments and Reauthorization Act (SARA) of 1986, the FAA must continue mandated program activities. Highlight activities include:

- Continue remediation activities at the Superfund site at the WJHTC.
- Move the status of sites listed on the EPA Federal Hazardous Waste Compliance Docket (Docket) to “No Further Remedial Action Planned (NFRAP)” status. The majority of non-NFRAP status sites remaining on the Docket have significant technical challenges to obtaining closure (e.g., long timeframe for site remediation, Superfund site, and ownership liability issues). The five remaining FAA Docket sites include the Mike Monroney Aeronautical Center (MMAC); Ronald Reagan Washington National Airport (DCA); WJHTC; the Alexandria International Airport (AEX) Air Route Surveillance Radar (ARSR); and the Sunset Cove, Alaska (JNU) remote communications outlet (RCO).
- Continue to perform investigations and remediation projects at all other identified contaminated sites under Federal, State, and local mandates and enforcement agreements to limit future liability to the agency and foster environmental stewardship.

Postponing remedial activities at these contaminated AOCs can lead to noncompliance with the Federal, State, and local environmental cleanup statutes. Noncompliance with these statutes includes maximum penalty amounts that range from \$1,000 (Bahamas) to \$100,000 (Alaska) for the first day of violation, and that range from \$1,000 (Bahamas and Idaho) to \$50,000 (Hawaii, New Hampshire, and New Jersey) for each day after the first day of violation.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

The direct outcome of closing these sites leads to overall decreased environmental remediation (ER) liability to the FAA. Investigating, remediating, and obtaining site closure at the FAA's contaminated AOCs also increases employee and public safety by minimizing exposure to toxic and hazardous substances at these sites.

The FAA is currently analyzing alternate remedial technology that optimizes remediation and cost efficiency. Examples of this optimization are at Area D, and Area 20A at the WJHTC NPL site, which expect at least a 1,000 percent return on investment (ROI) at Area D, and 69 percent ROI at Area 20A.

The HAZMAT program goal is to annually remove 10 percent of the AOCs listed in the HAZMAT management program's published Environmental Site Cleanup Report (ESCR). From FY 2009 through FY 2018, the HAZMAT management program has closed 847 AOCs.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 3A02 Aviation Safety Analysis System (ASAS)**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Aviation Safety Analysis System (ASAS)	\$18,700	\$19,700	\$23,500

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u><b>Activity Tasks</b></u>	<u><b>Locations/ Quantity</b></u>	<u><b>Estimated Cost (\$000)</b></u>
A. Regulation and Certification Infrastructure for System Safety	---	\$21,500.0
B. FAA Critical Infrastructure for System Safety (FCISS)	---	2,000.0

**What is this program and what does this funding level support?**

---

The FAA workforce must have a modern reliable Information Technology (IT) infrastructure and tools to effectively perform its data-driven analytical safety work and collaborate with both internal FAA and external aviation stakeholders. Periodically, IT infrastructure components must be modernized in order to maintain safety operations without disruption due to failure or security vulnerabilities. Funding is required in order to deploy modern Commercial-Off-the-Shelf (COTS) IT products and services in the following areas:

- Mobile Technologies and End User Devices
- Network Infrastructure and Data Services
- Remote Connectivity Telecommunications
- Consolidated Server/Data Storage Systems
- Safety and Business Application Hosting Services
- Enterprise COTS Software and Infrastructure Management Tools
- Disaster Recovery
- Implementation and Planning Support Services
- End User Technology Training

These products and services ensure continuity of operations for critical and non-critical Mission Support safety and business systems. Additionally, these services ensure that

critical safety data are safeguarded against loss by providing a secure, reliable and timely back up of data. Modern IT infrastructure and services also safeguard against evolving security threats that cannot be mitigated by antiquated hardware and software solutions.

**A. Regulation and Certification Infrastructure for System Safety (RCISS):** For FY 2021, \$21.5 million is requested for RCISS in order to provide all IT infrastructure components that support the 6,400-person AVS safety workforce and ensure standard and reliable accessibility to safety data. RCISS provides safety data to the AVS workforce while they are mobile and conducting safety inspections and investigations of airlines, manufacturers, pilots, accidents, etc. It also provides methods to access all AVS national safety applications developed by System Approach for Safety Oversight (SASO), Aviation Safety Knowledge Management Environment (ASKME), Aerospace Medicine Safety Information System (AMSIS), and all other AVS national safety programs including the Pilot Records Database (PRD). RCISS also supports the coming integration of AVS's disparate safety data, where individual stove-piped applications' data sets are combined into an enterprise level data store that isolates the data from the applications. In this new environment, safety workers assemble data as needed from various data sources to support new business processes.

The program supports the AVS safety workforce in their effort to reduce aviation accidents by making real-time safety data immediately accessible to and from all involved, e.g., inspectors, engineers, investigators, and medical examiners. The program infrastructure was designed to be flexible and scalable, allowing for adaptation to meet emerging AVS business requirements. Additionally, workload capacity, performance, and reliability of the workforce is increased without additional staffing requirements, by the creation of a mobile workforce and virtual workplaces.

**B. FAA Critical Infrastructure for System Safety (FCISS):** For FY 2021, \$2.0 million is requested for technology refresh of the legacy IT infrastructure FCISS will replace. FCISS will provide similar infrastructure products, services, and benefits as RCISS to the nearly 50,000-person FAA workforce not included under RCISS scope. FCISS will be the IT infrastructure that most FAA Mission Support systems and Capital Investment Programs (CIPs) will rely on. Currently, there are over 600 legacy FAA Mission Support business applications and several CIPs such as Unmanned Aircraft Systems (UAS); Traffic Analysis and Review Program (TARP); Knowledge Services Network (KSN); Data Visualization, Analysis, and Reporting System (DVARs); and Operations Network Replacement (OPNET-R) that will utilize the FCISS IT infrastructure.

FCISS will be responsible for maintaining the availability and reliability of the Mission Support infrastructure at National Airspace System (NAS) facilities. Personnel at both NAS and Mission Support sites will utilize this infrastructure to access applications and data vital to the health of the NAS including weather-related data and services. For example, NAS facilities management uses the Mission Support network for logging maintenance tasks and certification status of NAS equipment, tracking outages, and dispatching technicians for maintenance/repair assignments.



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

Unlike RCISS, the infrastructure FCISS seeks to modernize has not been proactively replaced in accordance with prescribed technology life cycles. As a result, the infrastructure is becoming increasingly less reliable, insecure and more prone to failures that can cause disruption to operations and the possible loss of critical data and applications used by the FAA workforce. FCISS will enable greater scalability and flexibility to meet the needs of the FAA workforce as it continues to adapt to a rapidly changing aviation environment. Proactive planning and modernization of the FCISS infrastructure will result in fewer operational disruptions and more efficient utilization of fiscal and personnel resources.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

A proactive technology refreshment and modernization approach will positively impact the reliability, maintainability, and availability of IT infrastructure components for the critical applications and data systems that are utilized by the FAA Safety and Mission Support workforce. Operational disruptions caused by out-of-lifecycle infrastructure components will be minimized and the security of vital data will be enhanced. Further, proactive technology refreshment, modernization, and standardization of the infrastructure will reduce maintenance costs and allow greater scalability and flexibility for the infrastructure to meet evolving business needs, including mitigation of events that could adversely impact the flying public and aviation industry revenue.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 3A03 National Air Space Recovery Communications  
(RCOM)**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
National Air Space Recovery Communication (RCOM)	\$12,000	\$12,000	\$12,000

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u><b>Activity Tasks</b></u>	<u><b>Locations/ Quantity</b></u>	<u><b>Estimated Cost (\$000)</b></u>
National Air Space Recovery Communication (RCOM)	---	\$12,000.0

**What is this program and what does this funding level support?**

---

For FY 2021, \$12.0 million is requested for RCOM. This program supports the Office of Security and Hazardous Material Safety's Command and Control Communications (C3) Division that provides the FAA with survivable, secure, and redundant communications that assure the Agency's ability to respond to emergencies, to assist in the minimum essential restoration of the NAS and enable the continuity of FAA operations. When normal common-carrier communications are interrupted, C3 provides and enhances a variety of fixed-position, portable, and transportable emergency communications systems that support crisis management; enables the FAA and other Federal agencies to exchange classified and unclassified communications to protect national security; and several FAA continuity of operations (COOP) sites. This ensures FAA decision makers have command and control communications during times of crisis. Funding is requested to meet the minimum support necessary to maintain the infrastructure mandated by Federal continuity directives. For FY 2021, \$12.0 million is requested to support work that includes:

- Continue funding the Very High Frequency/Frequency Modulated and national High Frequency radio network modernization efforts.
- Continue funding Emergency Operations Network (EON). Support includes the continued development of EON Geographical Informational Systems layers, maps, and visualization tools, as well as the EON Dashboard, EON Collaborative Communication platform, and the EON Data Discovery platform.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

- Continue funding Command and Control Communications IT activities used to maintain the IT infrastructure for COOP sites, including audio/visual display systems, conference-bridge, help desk support, and the Emergency Operations Network.
- Funds multiple Technology Refresh initiatives for supporting infrastructure.

The C3/RCOM program has Presidential and Congressional mandated responsibilities to provide reliable communications support to the White House, DOT, FAA, and other government agencies during national security events, disaster recovery efforts, accident investigations, government exercises, and special invitational events.

Since September 11, 2001, the C3/RCOM program's responsibilities have increased to meet the current national security demands.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

The FAA's C3/RCOM program has a mission to develop web-based emergency operation information-sharing tools that create a common operational picture and support effective decision-making. A secure, highly available, and flexible infrastructure has been created for effective collaborative communications, continuity of operations, and adaptive situational awareness for enhancing decision support. This Emergency Operations Network (EON) infrastructure has been built upon existing FAA networks and technologies, and the operations framework is built upon the lessons and best practices learned from previous and existing initiatives.

During disasters, C3/RCOM assists in the minimal communications restoration of the NAS to help ensure safety of flight for the American public.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 3A04 Facility Security Risk Management**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Facility Security Risk Management	\$17,800	\$15,100	\$24,400

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u><b>Activity Tasks</b></u>	<u><b>Locations/ Quantity</b></u>	<u><b>Estimated Cost (\$000)</b></u>
Facility Security Risk Management	53	\$24,400.0

**What is this program and what does this funding level support?**

---

In 1999, the FAA established the FSRM program. The program implements standardized facility protective measures at all FAA staffed facilities. These measures include personnel access control (via card readers, fencing, gates, and security guards), surveillance (cameras), vehicle access control (barriers), visibility enhancements (lighting), and X-ray machines. The FSRM program participates in the construction of facilities that secure FAA personnel and assets, such as guard houses, and facility retrofitting to protect against blast or explosive attacks.

The FSRM program manages contracts that install security systems, and that provide maintenance services to installed security systems regardless of age, manufacturer, or condition. In addition to the protection of FAA personnel and assets, another program goal is one of standardization across the NAS. The standardization of security equipment and processes will result in a substantial cost savings to the FAA. To aid in NAS-wide standardization, the FSRM program facilitates security system installation for not only ATO facilities, but also for facilities serving AVS and ARP lines of business within the FAA. FSRM is participating with NextGen Planning to identify the security needs and vulnerabilities of NextGen facilities in order to ensure that the safety and security of FAA assets and personnel are maintained as the FAA prepares for the future of flight.

The FSRM program was added to the Sustainment Strategy Portfolio on February 21, 2018. The FSRM Sustainment program is instrumental in ensuring that FAA efficiently and cost effectively implements all issued Presidential Directives aimed at securing

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

Federal facilities and personnel. For FY 2021, \$24.4 million is requested to support security upgrades that will result in increased security at FAA staffed facilities.

- Construction/Installation for security upgrades
- Engineering design and equipment installation for the Eastern and Western Pacific regional offices
- Security PIV upgrades at Facility Security Level (FSL) 2 and FSL 3 facilities
- Technology refresh of security systems at FSL 1, FSL 2, and FSL 3 facilities to replace outdated security equipment
- Begin installation of cameras and PIV card readers at all access points to areas housing critical NAS systems in all ARTCCs and ATCTs/TRACON facilities that support the busiest United State terminal areas

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

FSRM has contributed to obtaining security accreditation at over 980 FAA facilities. This was accomplished by the program's management of national contracts through which security measures such as X-ray machines, cameras, card readers, gates, vehicle barriers, etc., were installed. The installation of the measures led to security accreditation of the facility as required by FAA Order 1600.69. The impact of those upgrades has been to reduce the risk of intrusion and unauthorized entry to the facility. The FSRM program is necessary because aviation assets are attractive targets for those who would seek to harm and terrorize the American public.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 3A05 Information Security**

(\$000)

Activity/Component	FY 2019 Actual	FY 2020 Enacted	FY 2021 Request
Information Security	\$20,900	\$23,300	\$18,500

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
A. Information Systems Security (ISS)	---	\$12,000.0
B. NAS Critical Infrastructure Cyber Enhancements	---	6,500.0

**What is this program and what does this funding level support?**

---

The Federal Information Security Management Act of 2014 requires that the FAA must identify and provide information security protection commensurate with the risk and magnitude of potential harm that could result from unauthorized access, use, disclosure, disruption, modification, or destruction of information that supports the Agency, aviation safety and security, and the NAS. This includes detection of alerts and attacks generated against the FAA/DOT infrastructure, mitigation of cyber events, and privacy breaches. The FAA Security Operations Center (SOC), a 24x7x365 operation, serves as the foundation of the FAA Security Program by providing security against threats, attacks and weaknesses in FAA networks and systems. The SOC is also the central reporting point for all cyber events occurring within the FAA and DOT.

**A. Information Systems Security (ISS) Enhancement**

For FY 2021 \$12.0 million is requested to support a comprehensive cybersecurity strategy to improve management security controls, incorporate software development and life-cycle processes, and address the interdependencies between aircraft and air traffic systems. The FAA is evolving its risk-based approach to computer network defense by integrating new technologies into the cybersecurity program. The Mission Support ISS Program supports efforts that fortify the security and protection of FAA networks and infrastructure, including:

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

- Cybersecurity Operations – Addresses Advanced Persistent Threat and Emerging Technologies by evaluating and implementing new tools/solutions that will allow greater visibility across the enterprise.
- FAA's Office of Next Gen Enterprise/NextGen Cybersecurity Test Facility – Ensures the integrity and availability of FAA's critical information systems, networks, and administrative systems.
- Cybersecurity Risk Model (CyRM) – Researches and tests new technologies capable of providing an agency-wide threat model consistent with the National Institute of Standards and Technology (NIST) Cybersecurity Framework (CSF).
- Aviation Ecosystem – Improves the Agency's understanding of cybersecurity risks to critical NextGen systems by determining risk exposure and operational impact of a security breach.
- Continuous Diagnostics and Mitigation (CDM)/Federal Identity, Credential, and Access Management (FICAM) – Provides privilege and credential management solutions that strengthen information and physical security by ensuring only authorized user access.

**B. NAS Critical Infrastructure Cybersecurity Enhancement**

For FY 2021 \$6.5 million is requested to support the NAS Critical Infrastructure Cybersecurity Program provides services and capabilities to enhance Air Traffic Control (ATC), ensuring the NAS remains secure and resilient. Specific NAS Critical Infrastructure Cybersecurity Program security investments include:

- NAS Data Flow Monitoring (Intelligent Traffic Monitoring (ITM) – Enables full monitoring coverage of internal and external data flows through implementation of sensors.
- NAS Centralized Software Security Management (CSSM) – Provides the capability to effectively maintain and report on the cybersecurity posture of NAS-wide system software.
- NAS Security Enterprise Asset Management (SEAM) – Provides a centralized NAS asset inventory management and automated NAS asset information collection capability to meet OMB Mandates.
- NAS Cyber Management System (NCMS) – Enhances security event collection capabilities at NAS facilities and reduces network load and impact to operations.
- Enterprise Solution Program Management – Provides F&E program contract support to perform Secure Provisioning functions as defined in the National Institute of Standards and Technology (NIST) National Cybersecurity Workforce Framework.
- Remediation of Vulnerabilities – Continues to address weaknesses in F&E funded systems that are identified in risk assessments, outcomes from GAO and OIG audits, changes to system FIPS PUB 199 Security Categorizations, and revisions to NIST SP 800-53 security control requirements.
- Solution Integration – Integrates NAS Systems with F&E funded NAS Critical Infrastructure Cybersecurity Program security investments to enhance system identification, protection, detection, and response/recovery capabilities.

**What benefits will be provided to the American Public through this request and why is this program necessary?**

---

The continuing mission of the FAA is to provide the safest, most efficient aerospace system in the world. Such efforts include satellite communications, navigation, weather and aircraft worthiness to prevent aviation related fatality, injury or significant property loss. The FAA is undertaking multiple strategic and tactical initiatives in the development of a comprehensive and strategic framework to reduce cybersecurity risks to the NAS, civil aviation, and agency information systems. Cybersecurity ensures the reliability and accessibility of systems to the flying public.

The FAA plays a crucial role in the Nation's critical infrastructure through management of the national airspace and other critical mission systems for air transportation. Air traffic in the national airspace has increased dramatically. This, coupled with hundreds of internal and external users traversing the gateways, has increased the risk and potential threat damage of cyber-attacks, which may include unauthorized access to NAS and non-NAS systems. A major threat facing federal government departments and agencies is cyber espionage. Nation-state actors routinely engage in cyber espionage activities in order to steal critical information in an effort to gain advantages politically, economically, and militarily. There is a pattern of ongoing attacks to access and maintain a presence in the network and data of the target Department or Agency. Sophisticated threats, or advanced persistent threats, are found with increasing frequency within government networks and engage in long-term cyber espionage activities. Damage to FAA systems and aviation safety related information, including Air Traffic, Airway, and Airport Information Systems, Pilot and Airman Medical processing and Certifications, have serious consequences to the entire aviation community and American public.

The majority of NAS Critical Infrastructure Cybersecurity Program initiatives are mandated by federal law. Implementing the initiatives at an enterprise level, rather than on a system-by-system basis, provides NAS with economies of scale and reduces/eliminates redundant costs. Through analysis performed in accordance with Presidential Executive Order 13636, it was determined that a successful cyber-attack on the NAS could have catastrophic economic impact. Enhanced NAS Cybersecurity Protection, Detection and Response capabilities would greatly reduce the likelihood of a major cyber-attack against the NAS being successful; hence greatly reducing the likelihood of a major economic impact to the FAA and the nation.



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 3A06 System Approach for Safety Oversight (SASO)**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
System Approach for Safety Oversight (SASO)	\$25,400	\$23,100	\$29,200

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u><b>Activity Tasks</b></u>	<u><b>Locations/ Quantity</b></u>	<u><b>Estimated Cost (\$000)</b></u>
A. System Approach for Safety Oversight (SASO) Phase 3	---	\$12,700.0
B. System Approach for Safety Oversight (SASO) Phase 4	---	16,500.0

**What is this program and what does this funding level support?**

---

For FY 2021, the System Approach for Safety Oversight (SASO) program requests a total of \$29.2 million for continued development of the Safety Assurance System (SAS) including \$12.7 million to continue funding activities supporting SASO Phase 3 and \$16.5 million to continue funding activities supporting SASO Phase 4.

The SASO program increases aviation safety and controls cost by adopting the International Civil Aviation Organization (ICAO) mandate to revise Safety Programs to incorporate Safety Management System (SMS) principles. The SASO program also supports the FAA Administrator's transition to risk-based decision making and integrated oversight philosophy. To accomplish this, the SASO Program is reengineering Flight Standards Service (AFS) business processes and developing an oversight system based upon SMS principles. The scope of the SASO investment includes reengineering AFS business processes and consolidating AFS applications into the appropriate number of enterprise applications. SASO serves approximately 4,800 FAA Aviation Safety employees across headquarters and approximately 100 field offices, and more than 25,000 additional aviation industry professionals managing aviation safety throughout the United States.

AFS is responsible for oversight of nearly the entire civil aviation industry using the National Airspace System (NAS). Its legacy safety oversight system is stove piped, reactive in nature, and "regulatory compliance-based." While many technical and human factors problems contributing to accident rates have been resolved, more complex

organizational factors remain which requires additional systems-based, data-supported analysis and assessment for their resolution. SASO closes the performance gap between a “regulatory compliance-based” approach and the reengineered SMS-based approach to safety oversight.

Increases in technical and operational complexity of aviation operations and introduction of new technologies further stress today's oversight system. SASO implements a more structured data-supported risk-based oversight system, for the AFS aviation safety inspector workforce. The primary product is the SAS. AFS uses SAS to more efficiently manage its statutory responsibility to oversee NAS certificate holders, and as a hazard identification and risk assessment tool to formulate surveillance plans and target AFS resources to the highest risk areas in the NAS. The SAS core functionality was first deployed in 2016 for oversight of three Title 14 Code of Federal Regulations (14 CFR) Parts, a subset of AFS overall responsibility.

SASO Phase 3 implements the SASO program requirements associated with safety oversight of aviation training schools and adds an interface with the Designee Management System. SASO Phase 3 enhances SAS functionality in the areas of activity recording, office workload list, risk profile, and the Certificate Services Oversight Process. Finally, SASO Phase 3 develops SMS safety educational materials and support systems for general aviation certificate holders.

During FY 2021, with automation development and operational testing complete, SASO Phase 3 plans to refine training courses, automation and policy, then begin full deployment. The program will achieve First Production Site Initial Operational Capability (IOC) in February 2021, then continue will full deployment through the remaining year. An aggressive change management effort will accompany the deployment to ensure successful transition of the workforce from the legacy system.

SASO Phase 4 will work to implement the remaining SMS components that began in Phase 3, such as avenues for outreach to the general aviation community; integrating Unmanned Aircraft Systems (UAS) into the SAS; expanding and enhancing the risk profile model, and extending safety policy to bring SMS to the full range of AFS oversight activities in accordance with the FAA's Integrated Oversight Philosophy.

During FY 2021, SASO Phase 4 will conduct a robust business process re-engineering (BPR) effort via integrated product teams for core Phase 4 objectives. Upon completion of the BPR, the program will begin automation design to determine the Phase 4 SAS design.

The success of the SASO program depends upon continued development funding through FY 2027 to achieve and sustain full benefits. The required funding supports further SAS automation development, policy updates, training, and implementation to achieve the full oversight capabilities and benefits as envisioned during the business process reengineering analysis and design phase of the program.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

The primary benefit of the SASO program to the American public is its contribution to the reduction of aviation accidents and fatalities. By implementing the SMS principles, FAA oversight of the aviation industry results in fewer accidents attributable to FAA oversight gaps or failures. Standardization and consolidation of business processes and associated systems lowers maintenance costs and increases workforce efficiency while maintaining, rather than increasing, the current number of aviation safety inspectors.

The new processes and tools developed under this program allow AFS to focus its resources on the highest risk areas in the NAS. The flying public is the primary beneficiary of SASO's SMS-based safety oversight system of the aviation industry.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 3A07 Aviation Safety Knowledge Management  
Environment (ASKME)**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Aviation Safety Knowledge Management Environment (ASKME)	\$6,000	\$5,300	\$9,700

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
A. Aviation Safety Knowledge Management Environment Enhance	---	\$8,400.0
B. Transition to Operations and Maintenance (TOM) Year 3	---	1,300.0

**What is this program and what does this funding level support?**

The Aviation Safety Knowledge Management Environment (ASKME) program was established to provide a comprehensive suite of Information Technology (IT) applications and other services to support critical safety processes within the Aircraft Certification Service (AIR) of Aviation Safety (AVS). Phase 1 was completed in 2014 and Phase 2 completed in September 2019. ASKME Enhancements will include:

- Business Process Re-engineering (BPR) effort to document, update, streamline, and connect business processes during the Refinement phase of AIR Transformation.
- Enhancements to previously funded applications, including updates to the underlying technology, integration with non-ASKME systems that will deploy after FY 2019, and enhancements related to major policy changes like Modernization of Special Airworthiness Certificates (MoSAiC).
- New automation of AIR business functions that were not included in ASKME Segment 1 or Phase 2.
- Data transformation and support for the Information Management Strategy for AIR, coordinating with Enterprise Information Management (EIM) and the Safety Data and Analysis Team (SDAT) initiatives.

For FY 2021, \$8.4 million is requested to complete the following activities:

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

- Business Process Re-engineering that includes documenting, updating, streamlining, and connecting business processes at a detailed level; Identify similar data across existing systems and identify authoritative reference data.
- Data Transformation that includes establishing data management strategy, data stewards and taxonomy, as well as identifying requirements for IT Solutions.
- Software Development: Define requirements and design for Airworthiness Certificates policy changes

**Transition to Operations and Maintenance (TOM) Year 3** - When systems are first commissioned into the National Airspace System (NAS), their Operations and Maintenance (O&M) costs are paid for through the F&E appropriation for a period that is usually up to two years after commissioning. This allows FAA to identify the needs and formulate the requirements in the Operations appropriation during budget formulation. The identified O&M costs must then be transition to the Operations Appropriation. This is known as Transition to Operations and Maintenance (TOM). FAA is requesting a third year of TOM funding under this Budget Line Item within the F&E account. For FY 2021, \$1.3 million is requested.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

ASKME Enhancement will increased productivity and efficiency by providing a centralized system to facilitate knowledge transfer that promotes quicker and more effective decision-making. The program promotes rapid data sharing through an external public portal that allows faster access to FAA resources. This fast exchange allows rapid identification of potential safety trends and reduces safety risks to the traveling public.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 3A08 Aerospace Medical Equipment Needs (AMEN)**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Aerospace Medical Equipment Needs	\$14,000	\$13,800	\$28,300

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
A. Aerospace Medical Equipment Needs (AMEN) – Sustainment 3	---	\$4,000.0
B. Wind and Wave Evacuation/Survival Facility Phase 1	---	24,000.0
C. Transition to Operations and Maintenance (TOM) Year 3	---	300.0

**What is this program and what does this funding level support?**

---

Civil Aerospace Medical Institute (CAMI) research and training personnel discover methods and recommend strategies to enhance the safety, security, health, and performance of the most important aspect of the National Airspace System (NAS), the human operator and the public that she/he serves. CAMI is the only federal entity that performs this work on behalf of the U.S. The AMEN investment supports research that includes assessments of human performance under various conditions of impairment, human error analysis and remediation, and agency workforce optimization. To perform their missions, CAMI's personnel require sophisticated, highly technical, and specialized equipment. Much of the laboratory equipment used by CAMI's scientists, physicians, and engineers is old and becoming obsolete.

**A. Aerospace Medical Equipment Needs Sustainment 3 (AMEN 3)**

FAA will replace a number of critical and highly technical pieces of specialized equipment. These items must be replaced due to advanced age, lack of support, diminished technology capability, and limited strategic resource optimization. The current funding of \$4.0 million for FY 2021 supports the replacement of these items for Aerospace Medical and Human Factors research and training.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

- Replace Airman Education Division's Reduced Oxygen Training Enclosures to allow more efficient throughput of training participants
- Upgrade computers and monitors for the Air Traffic Control Advanced Research Simulator (ATCARS)
- Replace several outdated pieces of protein/blood/tissue imaging and analysis equipment for our Aerospace Medical Research Division
- Replace Cabin Safety team's Aircraft Firefighting Research Laboratory with one that is self-contained, safer and cheaper to operate, and provides dramatically improved capabilities
- Replace Biodynamics research team's inoperable milling machine to a modern one that allows us to fabricate parts as needed, add an extension to the crane used to move large unwieldy metal impact-sled test components, replace a 50<sup>th</sup> percentile Anthropomorphic Test Device (crash-test dummy) and its associated Data Acquisition System
- Upgrade the Aircraft Environmental Research Facility's data gathering/way finding systems and replace several pieces of medical monitoring equipment used to ensure the safety and health of human research and training participants.

**B. Wind and Wave Evacuation Survival Facility (WiWaves)**

For FY 2021, \$24.0 million is requested to enable the Wind and Wave Evacuation and Survival (WiWAVES) program to replace the aging Water Survival Research Facility (WSRF) at CAMI. The funding is to continue the process of building the new WiWAVES facility. The funding will support of Final Investment Decision approval and construction contract award for the WiWAVES facility to include:

- Site preparation and relocation of utilities
- Construction of water survival tank and dry test area to include wind generation system
- Construction of external holding tank
- Acquire Wave Generation equipment
- Construction of briefing room and support spaces (e.g., locker rooms, support equipment, control room, etc.)

CAMI team plans to construct a new Wind and Wave Evacuation and Survival (WiWAVES) Facility, to be located west of the CAMI building. The WiWAVES facility will be approximately a 50,000 sq. ft. building that houses a water survival tank and a dry test area comprising a wind and wave chamber for escape and survival systems equipment studies, wind studies, research, education and testing. The tank and dry test area will be surrounded by structural and mechanical apparatus necessary to support: Fuselage placements; aircraft attachments for multiple escape slides; deployment of water survival inflatables; wind machines to emulate high-fidelity windstorm operating environments; and wave generating capability necessary to challenge the design and function of water safety and survival equipment and procedures. These upgrades are designed to facilitate the FAA's research and education activities that ensure aircraft

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

passengers have the knowledge and equipment necessary for water survival during emergencies. No other such capability currently exists within the civil aviation industry.

WiWAVES team is replacing the current WSRF, which was installed in 1967 and is deteriorating to the point of potential structural failure. The current WSRF failed structurally in 2012 and was out of service for several months. All activities involving the use of overhead cranes, aircraft escape slide attachments, fuselage dunking equipment, and emergency equipment repair/reconfiguration were not conducted during this period. The antiquated WSRF was repaired but is continuously being monitored for potential structural failure. The tank's structural failure could severely damage the adjacent surrounding infrastructure and resources, e.g., the newly installed impact sled, computer systems, aircraft simulators, multimedia equipment, classrooms, auditorium, and medical certification records.

**C. Transition to Operations and Maintenance (TOM) Year 3** - When systems are first commissioned into the National Airspace System (NAS), their Operations and Maintenance (O&M) costs are paid for through the F&E appropriation for a period that is usually up to two years after commissioning. This allows FAA to identify the needs and formulate the requirements in the Operations appropriation during budget formulation. The identified O&M costs must then be transition to the Operations Appropriation. This is known as Transition to Operations and Maintenance (TOM). FAA is requesting a third year of TOM funding under this Budget Line Item within the F&E account. For FY 2021, \$300,000 is requested.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

These investments will allow for the continued performance aerospace medical and cabin safety research. This research serves as the knowledge base for Physicians, Physiologists, Human Factors Experts, Engineers, Psychologists, Educators, Flight Attendants, Aircrew, and numerous other academia, industry, and government personnel in the U.S. and abroad who are concerned with the safety of humans in aerospace operations. Identifying survival factors in simulated studies is essential to prevent death and injury.

The beneficiaries of the research resulting from the use of the facility and equipment sought by AMEN and WiWAVES include: the General Public, Aeromedical Scientific and Engineering Communities, Aeromedical Education/Training Communities, Aeromedical Certification, including FAA AAM Regional Flight Surgeons and Aviation Medical Examiners (AMEs), Aircraft Accident Prevention and Investigation, Aircraft Certification, Flight Standards, Legal Counsel, Space Transportation, Quality Management, Aviation Operations Personnel and their organizations, Aircraft manufacturers, and Industry/Government Accreditation/Standards development organizations.



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 3A09 NextGen – System Safety Management Portfolio**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
System Safety Management Portfolio	\$14,200	\$24,500	\$21,500

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
A. Aviation Safety Information Analysis and Sharing (ASIAS)	---	\$18,000.0
B. System Safety Management Transformation (SSMT)	---	1,000.0
C. Transition to Operations and Maintenance (TOM) Year 3	---	2,500.0

**What is this program and what does this funding level support?**

---

This portfolio contains activities that ensure that changes introduced with NextGen enhance and do not degrade safety while delivering benefits. The work under this program will enable the development of tools to convert both text and numeric data into safety information. It will also support the development of anomaly detection and visualization capabilities to enable causal/contributing factor analyses and risk assessments. In addition, safety analysis capabilities, tools and metrics will be developed to integrate safety data from a number of disparate sources into a suite of system level models.

**A. Aviation Safety Information Analysis and Sharing (ASIAS)**

The mission of ASIAS is to provide a national resource to discover emerging, systemic aviation safety hazards impacting the National Airspace System (NAS) and the global air transportation system, to inform timely development of safety mitigations and reduce risks. The program is a collaborative government/industry initiative to analyze data and share aviation safety analysis, in order to discover safety concerns before accidents/incidents occur. ASIAS participation includes more than 150 stakeholder organizations across the aviation community (including commercial and corporate aviation, general aviation, trade associations, government agencies, universities and others) who contribute various safety data for use in safety analyses. This funding

includes program efforts to address new and emerging risks in collaboration with the aviation community. For FY 2021, \$18.0 million is requested to provide the following:

- Conduct initial predictive analytic activities to extract information from aviation-related data, enabling trend detection methodologies to inform safety analyses.
- Provide an expanded aviation data repository with information from new sources, to include new program participants and data types as appropriate.
- Deliver enhanced data-fusion metrics based on radar surveillance data merged with digital flight data and aircrew safety reports, infused with additional data sources to provide improved safety analyses and discovery of aviation-related hazards in the NAS.
- Conduct initial development of a capability to provide stakeholder access to ASIAs data for customized safety analyses/studies, through a shared analytic environment.
- Develop initial capability of a new generation/ASIAs portal that disseminates relevant ASIAs information and results to appropriate stakeholders in a more efficient and timely manner.
- Conduct activities leveraging artificial intelligence/machine learning technologies to identify emerging aviation risks and safety issues in the National Airspace System and global operations.

#### **B. Safety Systems Management Transformation (SSMT)**

SSMT is a stakeholder-driven, cross-functional program to support the development and implementation of integrated safety management systems across the air transportation system to ensure that safety risk throughout the system is managed to an acceptable level. SSMT incorporates integrated safety risk models, enables customization of models from the NAS to a single operator or region, and provides identification of, data about, and replay of detected candidate safety events for surface and en route operations. For FY 2021, \$1.0 million is requested to provide the following:

- Identify, implement, and deploy prioritized anomaly detection capabilities and reports for “hot spot” candidate safety events for airport surface operations and potential wake encounters.
- Align existing automated methods for quantification of commercial aviation safety risk baseline with updated/new FAA data sources and Enterprise Information Management requirements and maintain quantification of commercial safety risk models necessary for ongoing safety risk assessment of NextGen OIs.
- Continue joint development with EUROCONTROL of integrated safety risk assessments models for commercial aviation.

**C. Transition to Operations and Maintenance (TOM) Year 3** - When systems are first commissioned into the National Airspace System (NAS), their Operations and Maintenance (O&M) costs are paid for through the F&E appropriation for a period that is usually up to two years after commissioning. This allows FAA to identify the needs and formulate the requirements in the Operations appropriation during budget formulation. The identified O&M costs must then be transition to the Operations Appropriation. This

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

is known as Transition to Operations and Maintenance (TOM). FAA is requesting a third year of TOM funding under this Budget Line Item within the F&E account. For FY 2021, \$2.5 million is requested.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

The planned growth and complexity in the air transportation system requires a fundamental change in the way the air transportation community manages safety. System safety management research provides a shared, proactive approach to identifying, assessing and mitigating risk, enabling all stakeholders to be more effective in their approach to managing safety. The primary benefit of this program is the development of safety analysis to proactively reduce aviation accidents and fatalities.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 3A10 National Test Equipment Program (NTEP)**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
National Test Equipment Program (NTEP)	\$5,000	\$3,000	\$3,000

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
National Test Equipment Program (NTEP)	---	\$3,000.0

**What is this program and what does this funding level support?**

---

The National Test Equipment Program (NTEP) manages the modernization, distribution, calibration, and inventory of test equipment. This equipment is required to perform preventive and corrective maintenance, equipment installations, modifications, and service certifications in support of numerous National Airspace System (NAS) Platforms. Failure to achieve certification of critical NAS systems (at any of the 27,000 FAA facilities) will result in the restriction of air traffic in the facility's air space and potentially cause major flight delays.

Test equipment supports NAS systems on the following platforms: communication, automation, surveillance, power, navigation, and weather. NTEP is responsible with procuring and maintaining test equipment. Furthermore, ensuring the NAS is operating to optimal standards by troubleshooting, repairing, and re-certifying both new and legacy systems.

A large portion of the test equipment is either damaged or rife with supportability and maintenance issues. The problem affects Mean-Time-To-Restore (MTTR), safety, maintenance cost, and inventory management for every system within the NAS; no other FAA program office or initiative currently addresses this problem.

For FY 2021, \$3.0 million is requested to replace obsolete test equipment. The program will finalize the prioritization of test equipment requirements based on the facility need and equipment availability. Current requirements reflect critical need for oscilloscopes,

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

universal data test sets, vector network analyzers, and reducing the test equipment backlog.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

The National Test Equipment Program's mission is to support the restoration of Air Traffic services by procuring and delivering functioning test equipment throughout the NAS. Failure to provide these services will have a negative effect on the NAS. Technicians need up to date calibrated test equipment in order to make necessary adjustments and alignments to major NAS systems. The lack of up to date test equipment poses a serious risk to the technicians that will result in delaying the restoration of critical Air Traffic systems crucial for the protection of the flying public.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for – 3A11 Mobile Assets Management Program**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Mobile Assets Management Program	\$2,200	\$1,800	\$2,500

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u><b>Activity Tasks</b></u>	<u><b>Locations/ Quantity</b></u>	<u><b>Estimated Cost (\$000)</b></u>
A. Mobile Assets Sustainment	---	\$2,100.0
B. Transition to Operations and Maintenance (TOM) Year 3	---	400.0

**What is this program and what does this funding level support?**

---

The Mobile Assets Sustainment Program (MASP) provides transportable NAS equipment to restore certain operations during periods of extended equipment outages. It ensures continuity of NAS operations. Mobile NAS equipment provides for the continuity or restoral of air traffic control when an Air Traffic Control Tower (ATCT) or other NAS system is out of service due to a disaster or an extensive repair, modernization, or upgrade. The MASP provides assets needed to augment air traffic control in support of major public events such as NASCAR and the NFL Super Bowl. The MASP provides mobile assets that function as ATCTs, TRACON facilities, remote transmitter/receiver sites, remote communications air/ground sites, and other facilities/systems that experience unexpected outages or planned system downtime for non-routine maintenance, modernization, or upgrade.

The FAA's inventory of mobile assets is in a serious state of disrepair and is often incapable of providing its intended service without first undergoing significant maintenance or repair before the asset can be deployed. The inventory consists of 104 assets, of which 45 are directly involved with controlling aircraft. The assets range from 30 kilowatt mobile engine generators to four-position mobile ATCTs (MATCTs). The near-term priorities are to upgrade/replace eight obsolete large four-position MATCTs, replace the deteriorating medium size MATCTs, and prioritize and restore the remaining assets in the inventory to a full operational capability. The four position MATCTs, which were acquired in the 1990s, are experiencing material failures and must be upgraded or

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

replaced. A National Mobile Asset Staging Area (MASA) has been established in the Central Service Area (Independence, MO) and a new MASA has been built for the Western Service Area (Boise, ID). The MASP will establish a MASA in Greensboro, NC for ease of deployment for the Eastern Service Area. For FY 2021, \$2.1 million is requested to ensure that a sufficient number of the FAA's mobile assets are available to maintain and restore continuity of aviation operations.

**Transition to Operations and Maintenance (TOM) Year 3** - When systems are first commissioned into the National Airspace System (NAS), their Operations and Maintenance (O&M) costs are paid for through the F&E appropriation for a period that is usually up to two years after commissioning. This allows FAA to identify the needs and formulate the requirements in the Operations appropriation during budget formulation. The identified O&M costs must then be transition to the Operations Appropriation. This is known as Transition to Operations and Maintenance (TOM). FAA is requesting a third year of TOM funding under this Budget Line Item within the F&E account. For FY 2021, \$400,000 is requested.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

The American public will benefit from the efficient restoration of air traffic control operations in emergencies or natural disasters within hours of MATCTs arriving on site. The program will be working to ensure the availability and readiness of mobile assets to maintain or re-establish continuity of air traffic operations in response to emergencies and natural disasters. The FAA's mobile assets have been deployed to support relief efforts during natural disasters such as the earthquake in Haiti or the hurricanes that hit the Gulf Coast each year.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for -3A12 Aerospace Medicine Safety Information System  
(AMSIS)**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Aerospace Medicine Safety Information System (AMSIS)	\$16,100	\$13,800	\$20,200

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u><b>Activity Tasks</b></u>	<u><b>Locations/ Quantity</b></u>	<u><b>Estimated Cost (\$000)</b></u>
A. Aerospace Medicine Safety Information System (AMSIS) Phase 1---		\$9,500.0
B. Aerospace Medicine Safety Information System (AMSIS) Phase 2---		10,700.0

**What is this program and what does this funding level support?**

---

The AMSIS program is developing a new aerospace medical information network that integrates critical medical information associated with pilots, air traffic controllers, and other aviation related personnel. AMSIS will provide the tools necessary to analyze and verify information to make risk-based policy decisions through an automated method of collecting, reviewing, and analyzing medical information.

The Office of Aerospace Medicine (AAM) is responsible for advancing the field-of-study of aerospace medicine and for the medical certification of pilots, Air Traffic Control Specialists (ATCS) and other safety critical personnel. AAM processes approximately 450,000 medical applications annually and maintains records on millions of past examinations as part of AAM's role in the oversight of 600,000 pilots and approximately 15,000 ATCS.

Currently, all the coordination between FAA and the medical certification applicants is conducted through the United States Postal Service and is very labor intensive. In addition, the information systems that support the storage and record keeping for this information were originally developed in the 1990's, and while they have undergone several upgrades, the architecture of these systems is becoming unsupportable and will eventually become obsolete. The business processes that support the medical



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

certification of airmen, and the other aviation safety programs, have changed and need to be re-engineered.

The AMSIS Program will eliminate the current labor-intensive process required by applicants today as well as align the new technology with industry architectural and security standards. AMSIS will provide better data accessibility and a greater ability to analyze medical information and denial data to identify safety trends that could impact system safety. Specifically, AMSIS is necessary to:

- Improve safety for the public by reducing fraudulent certification
- Improve FAA's responsiveness to the individual/pilot with reduced turn-around times, enhanced ability to track status, and to protect health and identifying information
- Improved visibility for airlines and other employers on the certification history of their pilots
- Deliver a better product for use by Aviation Medical Examiners

AMISIS will be implemented in two phases. Phase 1, baselined in FY 2017, will deliver automation improvements to the following processes:

- Common Functionality (such as user management and support)
- Medical Certification (Airman) and Medical Clearance (ATCS)
- Industry Substance Abuse Oversight and Management
- Workflow Management
- Reporting and Data Services

AMISIS Phase 2 will deliver automation improvements to the following processes:

- Internal Substance Abuse program support module
- Aerospace Medical Analysis support module
- Budget process support module

For FY 2021, \$9.5 million is requested to fund Phase 1 software development, development and operational testing, and to provide for program office system engineering and program management support. For Phase 2, \$10.7 million is requested in FY 2021 to fund software development, and to provide for program office system engineering and program management support.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

AMISIS will provide the tools required to capture, exchange, evaluate, and analyze information with significant improvements in efficiency, accuracy, and detail. AMSIS will simplify current processes and eliminate wasted effort by incorporating current

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

technical medical standards. In addition, the updated automated process will reduce operational cost while improving customer service.

The information technology of these medical information systems will be aligned with OMB/DOT/FAA information systems architecture and security standards, the national health information technology standards and security requirements, private sector, and voluntary standards organizations. These systems will successfully and securely interface with approximately 4,250 AME's to perform pilot and ATCS medical examinations.

AMSIS will provide increased access to medical history and support earlier National Driver Register (NDR) checks to determine ineligible candidates more effectively. This will result in an improved ability to prevent pilots from flying while incapacitated by health conditions or substance abuse.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

**Detailed Justification for - 3A13 Configuration, Logistics, and Maintenance  
Resource Solutions (CLMRS)**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Configuration, Logistics, and Maintenance Resource Solutions (CLMRS)	\$30,200	\$27,400	\$29,300 <sup>1</sup>

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
A. Logistics Support Systems and Facilities (LSSF) Segment 2	---	\$9,000.0
B. Logistics Support Systems and Facilities (LSSF) Segment 3	---	1,700.0
C. Automated Maintenance Management System (AMMS)	---	11,000.0
D. Remote Monitoring and Logging System (RMLS) Sustainment	---	4,600.0
E. Configuration Management Automation (CMA)	---	3,000.0

**What is this program and what does this funding level support?**

**A. Logistics Support Systems and Facilities (LSSF):** This project is a mission support procurement that automated the FAA's logistics management and supply chain processes. The processes include planning, procurement, sales, maintenance, repair, overhaul, quality, inventory management, finance, and engineering of National Airspace System (NAS) equipment for the Air Traffic Organization. LSSF automates these processes for routine and emergency logistics products and services to FAA customers at facilities nationwide, as well as to the Department of Defense, Department of Homeland Security, state agencies, and foreign countries.

For FY 2021, \$9.0 million is requested to perform operational functionality corrections, decommissioning of Logistics Inventory System (LIS), and begin the enhancements phase for additional capabilities. These additional capabilities include implementation of the planning module in Industrial Financial System (IFS), upgrade to the latest version of IFS, provide micro-purchase functionality, transition from Warehouse Management

<sup>1</sup> The projects under this BLI were previously funded under individual BLIs within Activities 2, 3, and 4.

System (WMS) to the warehouse module in IFS, incorporation of configuration management, and maintenance. These enhancements streamline the engineering, maintenance, repair, and procurement processes and improve spare and stock forecasting capabilities

**B. Automated Maintenance Management System (AMMS):** Will deliver benefits through technology and infrastructure by interfacing dispersed maintenance system within the currently existing System Wide Information Management (SWIM) Service Oriented Architecture environment. System interfaces will be standardized, and governance will be applied to data exchanges. Data will be cleansed, and authoritative data sources will be documented. Data exchange services will be utilized to provide common services for maintenance systems, and enhanced, modernized maintenance tools will be implemented, as to promote more efficient maintenance practices.

For FY 2021, \$11.0 million is requested to perform software and hardware engineering activities to continue solution implementation based on the chosen alternative for AMMS Phase 1 activities. The components to be addressed utilizing this funding will be to: procure required software licenses and hardware; execute hardware, software and database design, development, and configuration; continue external interface development; continue development of training materials; perform program management to assist with program solution implementation; and sustain the data exchange standard. The specific initiatives to be supported by this funding include:

- Program Management contractor support to assist with activities associated with planning, implementing, and managing actions that must be accomplished for successful program implementation.
- Perform software and hardware engineering activities in support of solution implementation.

**C. Remote Monitoring and Logging System (RMLS) Sustainment:** Will replace aging legacy core hardware components to accommodate National Airspace System (NAS) growth and ensure that the legacy National Logging Network (NLN) and the National Remote Maintenance Monitoring (RMM) Network (NRN) infrastructure supports the agency's storage, bandwidth, and security needs. This program is necessary because the hardware upgrade will allow the RMLS infrastructure to comply with the FAA's mandated security requirements.

For FY 2021, \$4.6 million is requested to perform hardware engineering activities to continue solution implementation. RMLS Sustainment contractor support will perform hardware install, assemble, test and checkout RMLS NRN equipment at eight locations, and provide program management to assist with program solution implementation.

**D. Configuration Management Automation (CMA):** The goal of FAA's Configuration Management (CM) is to record technical information, including system specifications and installation data, of all systems installed in FAA facilities. In addition, CM requires documentation for all proposed and actual changes to these systems in order for maintenance technicians and replacement programs to have accurate and up to date

information for maintaining or replacing existing systems. The primary tool currently used to support CM has become obsolete.

The Configuration Management Automation (CMA) program will utilize a phased approach to replace the legacy tool and establish lifecycle traceability and enhanced interfaces (Phase 2) with updated functionality. This will align the FAA with industry best practices and lifecycle management of agency assets and restructure interfaces to meet industry standards that support emerging transfer technology. CMA will have the ability to effectively manage business rules, trace, predict, and manage an asset's status, opportunities, and risks during any phase of the lifecycle. For FY 2021, \$3.0 million is required for continued development of the CMA Phase 1 solution.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

The elements included under this program will meet the demands of sustaining the NAS in a more efficient and cost competitive manner by managing inventory levels, optimizing delivery channels to meet NAS Availability requirements, and reducing cycle time of parts acquisition, ensuring and documenting standardized configurations. This program will upgrade existing systems with current hardware and software that support all of FAA sustainment and inventory supply chain management. The current systems are obsolete and unsupportable. The new technology will reduce FAA operating costs because they offer efficiencies and will not require intensive maintenance as do the current systems.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for: 3B01 Aeronautical Center Infrastructure Sustainment**

(\$000)

Activity/Component	FY 2019 Actual	FY 2020 Enacted	FY 2021 Request
Aeronautical Center Infrastructure Sustainment	\$14,000	\$18,000	\$14,000

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
Aeronautical Center Infrastructure Sustainment	1	\$14,000.0

**What is this program and what does this funding level support?**

---

The Mike Monroney Aeronautical Center (MMAC) is an aging facility of 137 leased and FAA-owned buildings. The ages of the buildings vary from a few months to 73 years. Missions are accomplished in MMAC facilities whose personnel train controllers to direct air traffic across the country and at airports and train technicians to maintain NAS. Parts and repair services are provided by logistics personnel in these facilities and comprise the FAA's centralized NAS inventory, sharing support of some systems with DoD and foreign countries having common systems. There is \$50 million of requirements to replace heating, ventilation, air conditioning, boilers/chillers, electrical/lighting, plumbing, interior finishes, exterior enclosures, roofs, interior construction, elevators, and stairs to prevent deterioration of building conditions. Seismic, wind bracing, and added fire protection is needed in many buildings. The requirements can be addressed with systematic funding to improve conditions and assure the aging infrastructure remains viable in future years.

For FY 2021, \$14.0 million is requested for the following:

- To award design and renovation construction for replacement of building systems that include: heating, ventilation, air conditioning (HVAC), electrical, plumbing, roofs, energy systems (lighting, insulation) and building automation systems.
- To provide technology replacement of telecommunications at the Aeronautical Center. Over a six year phased cycle, funding will replace the telecommunications

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

network switches, routers, internet filtering hardware for redundancy, reliability, security and availability in a total of 74 buildings.

- To provide NAS Integration Support Services and Technical Support Services Construction inspectors.
- To award contracts for mechanical, electrical and HVAC system upgrades in Building #195 and Building #204.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

Renovation improves facility space and energy utilization, reduces maintenance costs of major systems within renovated buildings, provides for incremental upgrades of telecommunications infrastructure, and improves productivity of personnel using renovated facilities through space efficiencies and improved environmental controls. It extends the useful life of the buildings, 25 to 30 years, for current and future generations of the FAA work force.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 3B02 Distance Learning**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Distance Learning	\$1,000	\$1,000	\$1,000

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
Distance Learning	---	\$1,000.0

**What is this program and what does this funding level support?**

---

The Distance Learning Program provides the infrastructure to deliver simulations and training to all FAA employees via Distance Learning Platforms (DLP) and the FAA Academy Virtual Training Network (AVTN). The funding of this program provides for the technology refresh of DLPs at FAA field site Learning Centers, Expansion of AVTN through increased connectivity, and upgraded network multimedia support and services. Technology refresh is accomplished in a phased, multi-year approach. This year's funding will provide for the technology refresh of the DLPs at various Learning Centers located at all Air Traffic, Federal Contract Towers, and Air Traffic System Specialists (ATSS) Facilities around the world. Technology refresh of the DLPs are needed to support high-performance media/simulations required in many lessons and to replace hard to obtain, obsolete parts for current platforms. This year's funding will also provide for multiple field sites to be connected to the AVTN system, thereby, allowing virtual training at an expanded number of field locations.

This program reduces the cost of training to perform Air Traffic operations and to maintain and operate the NAS by providing a standard training platform, the DLP, at field sites to accomplish initial, refresher, operator, and maintenance. It also provides productivity improvements for ATO employees by shortening the time to achieve employee full performance and certifications. The training time reduction is a result of having Distance Learning delivered via DLPs at the employee's field site thus avoiding travel to FAA Academy or factory schools.



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

For FY 2021, \$1.0 million is requested to fund contracts and hardware for the procurement, configuration, and installation of modernized DLPs and AVTN equipment to various Air Traffic and ATSS field facilities. The FAA will procure and install 400 DLPs and an AVTN site.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

The requested resources will be used to support the FAA initial and qualification training to all ATC and ATSS personnel. A major cost savings benefit of distance learning is a substantial reduction in student time away from work and reduced travel and per diem costs associated with resident-based training. In addition, distance learning delivery methods increase training effectiveness as well as increase training opportunities for all FAA employees, and provide flexibility in training schedules through local management control.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 4A01 System Engineering and Development Support**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
System Engineering and Development Support	\$39,700	\$38,000	\$39,100

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
A. System Engineering Support	---	\$36,100.0
B. ATC/AFN Systems Support Program Evaluation	---	3,000.0

**What is this program and what does this funding level support?**

---

For FY 2021, \$39.1 million is requested to provide technical contract support services, which will ensure sound systems engineering practices and business case development processes, instrumental to the safety, efficiency, and security of the National Airspace System (NAS).

The System Engineering and Development support budget line item provides future enhancement of the Air Traffic System by establishing and documenting the FAA's Enterprise Architecture (EA) requirements. The EA is the blue print for the future air transportation system and must be documented clearly and accurately. This program assists in developing, delivering, and implementing guidance and support tools to move forward the engineering and prototyping effort for NextGen. In addition, contract support services have ensured sound systems engineering practices and business case development processes. The contract also provides support to FAA's planning and budgetary processes and contract administration, ensuring consistent application of the Acquisition Management System (AMS) policy.

The research of emerging procedures and technologies will help to determine the best way to develop and deploy critical NextGen initiatives. These activities include demonstrating that NextGen procedures and operational changes will work on a large scale within the current and evolving air traffic system. In addition, automated data processing and information resource support is required to support the development

and/or enhancement of computer simulation models, miscellaneous software upgrades, databases, and program management tools. Program management, financial management and investment analysis support are provided to assist with planning, decision-making, and budgetary oversight of the activities involved in implementing newly acquired systems, components, and equipment in existing operational NAS facilities.

**A. System Engineering Support:**

- Provides continuous critical support activities, which complement NextGen Air Transportation System programs, which include Configuration Management, Infrastructure Roadmaps, Operation Planning, Requirements Engineering, System Engineering Services, Enterprise Integration Services, Forecast Analysis and Investment Planning and Analysis for the life of the NextGen Program.
- Supports critical programs such as NAS Enterprise Architecture (integrate and align the Enterprise Architecture portal), Segment Implementation Plan, and Safety Process Improvement are procured through this budget line item.
- Supports the oversight and administration of contract portfolios consisting of multiple prime contractors with large subcontracting teams who provide support across a broad range of Research and Mission Analysis and System Engineering requirements thus reducing the need for new standalone contracts and contract vehicles, which reduces overall costs and promotes efficiency.
- Supports the Office of Investment Planning and Analysis (IP&A) to conduct investment analysis and to support business case development and analyses. Investment analysis is conducted in the context of the FAA Enterprise Architecture and strategic goals and objectives. This work will provide decision makers with a clear picture of investment opportunities, risks and value.
- Supports the integration and development of corporate tools and processes to strengthen NextGen integration into the NAS.
- Funds data warehouse enhancements that expand upon existing financial management and accounting analytics and reporting capabilities.
- Provides cost estimating, cost and benefit analysis, operations research, risk and schedule analysis, market surveys, and business case analysis and development in support of investment analyses for NextGen and the NAS. Conduct Engineering Analysis on NextGen systems.
- Supports application and upgrades to program management financial tools. Supports the design, development, maintenance, training, and reporting on all aspects of Simplified Program Information Reporting and Evaluation, FAA Acquisition System Toolset, Financial Management System, and other management tools.

**B. ATC/AFN Systems Support:**

- Supports technical analysis and oversight of acquisition programs goals and performance reporting

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

This request will support the agency's goals of improving aviation safety, security, and efficiency while increasing capacity and productivity by providing technical assistance through cost effective contracts for various programs. The technical assistance will provide support for enhancing software tools, integrating and aligning the Enterprise Architecture portal, along with updating infrastructure roadmaps annually. The economies of scale created by the contracts under this project will allow for a reduction in award time of new tasks and a shorter cycle time for product implementation into the NAS. It also increases agility in response to stakeholder requirements and serves to track funding costs and resources efficiently and effectively.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 4A02 Program Support Leases**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Program Support Leases	\$47,000	\$48,000	\$48,000

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
Program Support Leases	---	\$48,000.0

**What is this program and what does this funding level support?**

---

For FY 2021, \$48.0 million is requested for approximately 2,800 real estate leases, comprised of land and facilities that are managed by this program. The funds are required for rental payments or other requirements to provide the necessary real property rights for land, tower space, aerial easements, and technical operational space. These leases directly support air traffic control. Requirements include:

- Payment of rents for land and space leases that directly support navigation, communication, weather observation and reporting, air traffic control, and other functions that support the NAS
- Funding for leased access roads, easements providing ingress to and egress from leased facilities, and other leased restrictive easements
- Costs associated with the rental and management of land and space for service/maintenance centers, deployment/development centers, laboratories, test beds, and other types of facilities that support the deployment and operation of technical facilities
- Funds for conversion of existing leases to fee ownership or perpetual easements
- Payments for condemnation (leasehold or fee) of real property interests
- Costs for real estate appraisals, market surveys, title reports, land surveys, and other costs associated with the acquisition and management of real property assets
- Funds to relocate offices, facilities, personnel, equipment, and to downsize or consolidate offices when technically feasible and economically advantageous to include finishes and furniture

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

- Funding for the development of business tools to enhance real estate acquisition and management activities and for implementing program efficiency practices
- Funding for costs associated with real property lease terminations and equipment disposals
- Funding for testing and studies (environmental, suitability, sustainability, cost-effectiveness, etc.) in connection with the leasing, purchasing, usage, management, and disposal of real property

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

Maintaining operational ground based navigational aids, towers, facilities, and equipment is paramount to the safety of the flying public. Accurate management will prevent FAA from incurring significant costs associated with defaults on leases. Funding for the implementation of co-location, consolidation, and oversight measures are an integral part of this program in order to achieve long-term savings and effectively use tax-payer dollars.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 4A03 Logistics and Acquisition Support Services**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Logistics and Acquisition Support Services	\$12,500	\$11,800	\$12,000

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
Logistics and Acquisition Support Services	Various	\$12,000.0

**What is this program and what does this funding level support?**

---

For FY 2021, \$12.0 million is requested to fund property and acquisition support services. This program provides critical support to ensure the effective and efficient management of taxpayer dollars in the acquisition, management, and disposal of real and personal property. The funds are required to meet contractual obligations including real property acquisition support and management, internal control activities related to personal property assets and real and personal property capitalization support. This program provides critical support personnel involved in the acquisition of new facilities and/or upgrades to existing facilities. These include: Air Traffic Control Towers, Terminal Radar Approach Control Facilities, and support facilities throughout the NAS. These functions are performed at various sites across the nation.

This support provides:

- Contract management and support of activities supporting the NAS
- Asset tracking and documenting of capitalized assets
- Performance of contract activities in support of FAA Capital Investment Plan projects, including contract oversight and audits that ensure that no unallowable or unreasonable costs are being paid

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

Maintaining appropriate oversight of the acquisition and management of these assets will ensure that tax payer dollars are utilized in the most prudent and transparent manner.



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 4A04 Mike Monroney Aeronautical Center Lease**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Mike Monroney Aeronautical Center Lease	\$20,200	\$20,600	\$21,100

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
Mike Monroney Aeronautical Center Lease	1	\$21,100.0

**What is this program and what does this funding level support?**

---

The MMAC leases provide leased land/building rent and insurance that comprise approximately 80 percent of Aeronautical Center space. 2.7 million square feet of leased space and 1,067 acres of land, having a leased facility replacement value of \$804 million. The MMAC provides facilities that support the work of 6,300 employees, students, and contractors on a daily basis and is the largest concentration of FAA personnel outside of Washington D.C. Approximately 11,000 visitors come to the Aeronautical Center annually.

The MMAC requires large parcels of land as National Airspace System (NAS) test sites for surveillance radar, communications, weather, and navigation/landing systems, as well as warehouse, administrative office space, and training facilities. It is a Level IV security site based on numbers of employees, facility square footage, sensitivity of records, volume of public contact, and mission essential facilities whose loss, damage, or destruction would have serious impact on the NAS. For FY 2021, \$21.1 million is requested to pay rent under the long-term lease agreement and to correct a backlog of deferred sustainment needs in leased buildings to prevent deterioration of facility conditions. These facilities support missions that include:

- Aviation training for 90,000 FAA and international students per year in resident and distance learning, including approximately 1,000,000 hours of distance learning delivered annually

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

- Logistics services and supply support to the operational NAS to all FAA Airway Facility locations, Air Traffic, and approximately 70 DoD and international organizations
- Engineering services for NAS systems modification and repair
- Aviation research of medical and human factors impacting aviation personnel
- Regulation certification of safety related positions and equipment, airmen and aircraft records and registration

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

This program benefits the American Public and NAS and by leasing cost effective space in the Oklahoma City, Oklahoma market which has one of the lowest lease and utility rates in the nation. Facilities allow flexibility and growth to support NAS operations and maintenance support. Investments made at the MMAC decrease energy consumption and operations costs by replacing old equipment with more efficient systems.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 4A05 Transition Engineering Support**

(\$000)

Activity/Component	FY 2019 Actual	FY 2020 Enacted	FY 2021 Request
Transition Engineering Support	\$22,000	\$21,000	\$17,000

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
NAS Integration Support Contract (NISC)	---	\$17,000.0

**What is this program and what does this funding level support?**

NISC program provides engineering and technical resources to the FAA organizations responsible for NAS transition and implementation. The NISC team, working in partnership with these organizations, ensures that capital investments and regional projects are implemented most effectively to support the NAS mission. This program provides technical support to assist the FAA's technical workforce in handling a surge in demand for short-term programs and projects that are vital to managing the volume of diverse systems and equipment associated with NAS modernization.

For FY 2021, \$17.0 million is requested to support the modernization schedules for NAS programs. The budget level is necessary to provide continual NISC contract management and infrastructure support for the prime contractor for the NISC III contract valued at \$1.4 billion. In addition, these funds will be used for program acquisition management, financial management, administrative support services, continued operation and IT support services for the NISC contract tracking system and reporting system, other indirect contractor costs, and other program management support.

**What benefits will be provided to the American public through this request and why is this program necessary?**

It affords the FAA the flexibility in obtaining the technical expertise required to meet demand surges with minimal lead-time and without the need for long-term commitments.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

The NISC program provides the FAA with rapid access to highly qualified and experienced professional engineering and technical support where and when determined necessary by the incumbent Federal workforce. The NISC program facilitates other national programs in defining, securing and administering the utilization of hard to capture professional labor categories once deemed necessary by those program offices.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 4A06 Technical Support Services Contract (TSSC)**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Technical Support Services Contract (TSSC)	\$28,000	\$28,000	\$28,000

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
Technical Support Services Contract (TSSC)	---	\$28,000.0

**What is this program and what does this funding level support?**

---

For FY 2021, \$28.0 million is requested to continue the TSSC infrastructure. Funding the TSSC infrastructure sustains the FAA's national capability to supplement and leverage Federal workforce skills during site-specific NAS implementation efforts. TSSC is the agency's primary installation support service vehicle and is used by a myriad of capital budget improvement program customers to achieve timely and cost-effective NAS modernization. The TSSC program is the agency's vehicle to provide a workforce multiplier that installs equipment and supports the capital budget improvements to the NAS in a timely, cost-effective manner. These activities include work planning, quality control, subcontracting, the contractor safety program, and award fee paid under the contract, as well as the usual rent, telecommunications, and utility costs incurred under the contract.

Significant work is required to install, modify, and relocate equipment by personnel with electronic, mechanical, and civil engineering skills. Often the engineering and technician support is of short duration and requires skills that the FAA government employee workforce does not have or that exist in insufficient numbers. The TSSC program allows the FAA to avoid hiring additional employees for a limited duration to handle a surge in demand, such as when new equipment is installed at multiple locations and during compressed schedule periods.

TSSC infrastructure funding pays for the following:

- Project implementation safety, security, and quality control efforts

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

- The prime contractor's costs to award and administer subcontracts to accomplish \$35 million of annual public works efforts on behalf of the FAA
- Contractor management of its personnel, office rent, communications, and utilities

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

The TSSC program has an award fee for the performance-based acquisition contract vehicle to promote efficiency and FAA customer satisfaction. The TSSC customer award fee evaluation survey participation return rate is typically greater than 90 percent. Direct FAA customer award fee feedback rated contractor performance greater than 90 percent in the excellent and good range across several hundred individual contractor performance evaluations in the past years of TSSC performance.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 4A07 Resource Tracking Program (RTP)**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Resource Tracking Program (RTP)	\$6,000	\$8,000	\$8,000

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u><b>Activity Tasks</b></u>	<u><b>Locations/ Quantity</b></u>	<u><b>Estimated Cost (\$000)</b></u>
Resource Tracking Program (RTP)	---	\$8,000.0

**What is this program and what does this funding level support?**

---

The RTP is a computer management system (including hardware, software, development, training, and support) used by the FAA Service Centers, the William J. Hughes Technical Center, and the Mike Monroney Aeronautical Center for identifying requirements, internal budget preparation, implementation planning, resource estimating, project tracking, and measuring performance of projects. The Corporate Work Plan (CWP) process is the ATO's method to implement approved projects and to standardize National Processes in support of the NAS. The CWP system, which falls under the RTP program, enables users to share FAA's project data during the various stages of implementation (e.g., planning, scheduling, budgeting, execution, and closeout). CWP and its supporting data are continuously used for reporting project metrics to project managers, responsible engineers, program offices, and various other customers.

For FY 2021, \$8.0 million is requested to continue to keep hardware and software licenses current, program/project management support in the NAS, maintain TSSC and NISC, upgrade training documentation, and continue to provide training to users and data administrators. Also, hardware and software licenses will be maintained to keep the cost of upgrades to a minimum. The hardware and software for CWP must be constantly maintained and upgraded, to support FAA and the processes that will be impacted as it continues to evolve. CWP is used to track all ATO capital projects from cradle to grave. This system is also used to develop the CWP and work releases for the TSSC.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

This system interfaces with DELPHI and Fund Control Module and various other systems. CWP is a centralized system with load-balanced servers residing in Oklahoma City, Oklahoma.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

CWP contributes to improving the efficiency of the FAA and enhances program management of FAA capital programs. This project provides cost and schedule assistance for major acquisition programs by providing enhanced program/project management capabilities with reliable data on cost accounting of capital expenses for FAA Managers and engineers through CWP. This product improves productivity (on time completion of projects in the field) when a standardized project management process is supported by the toolset and emulates current operating procedures.



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 4A08 Center for Advanced Aviation System  
Development (CAASD)**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Center for Advanced Aviation System Development (CAASD)	\$57,000	\$57,000	\$57,000

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u><b>Activity Tasks</b></u>	<u><b>Locations/ Quantity</b></u>	<u><b>Estimated Cost (\$000)</b></u>
Center for Advanced Aviation System Development (CAASD)	---	\$57,000.0

**What is this program and what does this funding level support?**

---

CAASD is an FAA-sponsored Federally Funded Research and Development Center (FFRDC) operated under a Sponsoring Agreement with the MITRE Corporation since 1990. CAASD's high quality research, systems engineering, and analytical capabilities help FAA meet the technically complex challenges in the National Airspace System (NAS). CAASD provides independent advanced research and development required by the FAA to obtain technical analyses, prototypes and operational concepts needed to fulfill the agency's Strategic Initiatives, under the Capital Investment Plan (CIP).

The support provided by CAASD is critical for the continuing development for the future of NAS systems and the NAS Enterprise Architecture. CAASD's high quality research, systems engineering, and analytical capabilities are key to the FAA meeting technically complex challenges in the NAS. CAASD provides independent advanced research and development required by the FAA in technical analyses, prototypes, and operational concepts needed to fulfill FAA's mission and vision. CAASD plays a key role in meeting FAA's near and long-term mission objectives and in maturing the NAS to meet the nation's public air transport needs. Its expertise is critical to FAA's efforts in transforming the nation's air transportation system in an effective and timely manner.

FAA relies on CAASDs integrated knowledge of the NAS and long-term experience with FAA's enterprise level efforts developing the NAS infrastructure. The challenges the FAA faces in meeting established goals and charting an achievable course for the development of the NAS are extensive and technically complex. CAASD assists FAA

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

with addressing NAS complexity challenges effectively. CAASD provides a unique system-wide integrated understanding, tools, labs, and other capabilities that are fundamental to FAA's ability to address these challenges. The required development of system architecture and comprehensive research, development, and system engineering services can only be provided by an FFRDC whose charter permits special access to sensitive Agency and Aviation Industry information and data, not normally available to support contractors. Numerous elements of the CAASD work program are highly specialized research and systems engineering activities that require extensive knowledge of the present and planned NAS systems.

For FY 2021, \$57.0 million is requested to fund technical, engineering, as well as research and development support for the CAASD program. The FY 2021 funding will support core MITRE research and systems engineering work as well as technical and operational analyses. Efforts to be supported in FY 2021 include:

- Validation of the operational feasibility, user benefits and productivity of NAS operational improvements and concepts
- Affordability assessments with long-term economic implications of NAS investments, and proposed FAA Policies
- Analyses of US and International Air Traffic Management (ATM) Enhancements
- Identification and assessment of advance capabilities and standards mitigating Safety issues in the NAS
- Assessment of Industry equipage (inventories and capabilities) alignments with proposed NAS operational improvements

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

This is a critical time for the Agency and the evolution of the NAS. NextGen's development of Trajectory Based Operations (TBO) is underway and CAASD provides key research and infrastructure support to those efforts across the FAA. Additionally, MITRE has access to commercial industry knowledge and data not available from any other source. MITRE CAASD leverages commercial aviation industry data (such as fleet equipage, pilot incident information, and airline operations planning) to directly assist FAA in its decision-making; acting as a "trusted partner" for both the FAA and the commercial airline industry. Finally, MITRE's long-term experience provides crucial support to agency rule making activities from an Aviation Safety standpoint. The required development of system architecture and comprehensive research, development, and system engineering services can only be provided by an FFRDC whose charter permits special access to sensitive Agency and Aviation Industry information and data not normally available to the FAA or its support contractors.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

Specific immediate benefits to the American public include:

- Improvements in Airport Operations through demand analysis and modeling
- Improvements to Arrival/Departure Scheduling through Time Based Flow Management (TBFM) under the Traffic Flow Management System (TFMS)
- Flight Safety improvements through Trajectory Based Operations, Procedure Design improvements and
- Operations Integration with Performance Based Navigation (PBN)
- Improvements to the National Airspace System (NAS) Cybersecurity Operations and Resiliency; and security of our Global Navigation Satellite Systems (GNSS)
- Airspace Policy and Rulemaking improvements focused on integration of UAS and Commercial Space Operations into the NAS

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for - 4A09 Aeronautical Information Management Program**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Aeronautical Information Management Program	\$5,000	\$5,300	\$7,500

**COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR**

<u>Activity Tasks</u>	<u>Locations/ Quantity</u>	<u>Estimated Cost (\$000)</u>
Aeronautical Information Management Program Enhancement 1	---	\$7,500.0

**What is this program and what does this funding level support?**

---

The Aeronautical Information Management Modernization (AIMM) Enhancement 1 (E1) will build on the prior phases of the program, to continue integrating aeronautical data services within the National Airspace System (NAS) with a focus on internal NAS automation system integration.

AIMM E1 will develop and integrate information flows for the management and maintenance of aeronautical information in a digital format for machine to machine exchange with NAS Automation systems. The digital format is essential for enabling NAS automation integration and information distribution to NAS consumers involved in NAS decision support, flight planning, and pilot briefing. These services will increase on-demand NAS operational performance and help manage airspace with timely NAS constraint information such as Notices to Airmen (NOTAMs). Program work will include providing a common airspace tool that consolidates capabilities of several legacy tools and provides a single access point to digitally publish all airspace descriptions.

For FY 2021, \$7.5 million is requested for the AIM Program. In FY 2021, AIMM E1 will perform design and development activities to include: Completion of Module 1 Preliminary Design review, System Segment Specification, Verification Requirements Traceability Matrix, Critical Design Review, Software Requirements Specifications, Software Design Document, and Web Service Description Documents. Remaining funding will be used for Program Office Contractor Support and Project Scope Agreements (PSA).

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

FY 2021 funding will also be used for Aeronautical Information Systems Technology Refresh (NOTAM Modernization) which will include NOTAM system consolidation responsive to the 2018 Reauthorization Act.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

The AIMM E1 program is necessary because there will be a reduction in accidents attributable to pilot briefing errors, missing information, or accidents caused by violation of NAS flow constraints and restrictions. Flight efficiency and reduction in delays will improve as airplane operators will realize savings from better information leading to improved flight planning and pilot briefing. The FAA will realize costs benefits through infrastructure enhancement and SWIM connectivity as well as reduced cost of aeronautical information gathering, management, and utilization across NAS enterprise.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for – 5A01 Personnel and Related Expenses**

(\$000)

<b>Activity/Component</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Salaries and Benefits	\$437,887	\$484,819	\$500,794
Non-Pay	\$74,936	\$30,181	\$49,206
<b>Total</b>	<b>\$512,823</b>	<b>\$515,000</b>	<b>\$550,000</b>
<b>FTE</b>	2,586	2,628	2,660

**What is this program and what does this funding level support?**

---

This request provides funding for the personnel, travel and related expenses for the Facilities and Equipment (F&E) workforce performing work essential to FAA's efforts to sustain and modernize the National Airspace System (NAS). These employees are assigned to all phases of managing and implementing major capital acquisitions including site engineering, installation and implementation, and oversight of capital programs.

The F&E workforce includes electronic, civil and mechanical engineers; electronics technicians; quality control and contract specialists; Operations research analysts, and safety inspector personnel. The F&E workforce resides in Air Traffic, Aviation Safety, NextGen, and Finance and Management offices. Approximately, seventy-five percent are located in the field.

<b>FY 2020 Enacted</b>	<b>\$515,000</b>
<b>FY 2021 Adjustments</b>	<b>\$35,000</b>
Annualization of FY 2020 Pay Raise	3,757
FY 2021 Cash Awards Increase	652
FY 2021 Pay Raise	3,636
One Less Compensable Day (261)	(1,680)
Working Capital Fund	1
Annualization of FY2020 Hiring	5,595
FY 2021 FERS	4,015
Restoration of Cuts Resulting from FY 2020 Pay Raise	19,024
<b>FY 2021 Request</b>	<b>\$550,000</b>

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**F&E personnel and related expenses are distributed across FAA Organizations as follows:**

(Dollars in Thousands)

<b>Organization</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY2021 Request</b>
ATO	\$367,242	\$367,253	\$396,754
AVS	\$11,398	\$11,447	\$12,158
AFN	\$38,888	\$38,800	\$40,612
ANG	\$95,295	\$97,500	\$100,476
<b>Total</b>	<b>\$512,823</b>	<b>\$515,000</b>	<b>\$550,000</b>

F&E employees perform essential services in managing the acquisition and installation of new systems into the NAS. Major capital programs can take over a decade to implement from proof of concept to final implementation, which requires a sustained engagement. Civil, mechanical and electrical engineers, along with technicians, provide technical support for design reviews, perform site preparation and installation, conduct technical evaluations, and provide systems integration and in-service management. Operations research analysts and cost estimators conduct investment analyses for new capital projects. Contracting officers provide acquisition services, and safety inspectors conduct the necessary regulatory and safety oversight functions for new services and operational capabilities being installed in the NAS.

On average, the FAA has over 8,000 active projects and completes approximately 2,500 every year. This requires long-term program management and oversight capabilities to ensure continuity and to get best value for the government's investment in new systems and technology. This budget line item provides FAA personnel with the long-term technical expertise necessary to oversee the design and implementation of new NAS systems as well as provide for the sustainment of core NAS Infrastructure such as radar, communication, automation, facilities, and navigation systems.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

The FAA's Facilities and Equipment capital program invests in developing and implementing new technologies to meet future demand and to sustain the current NAS.

The FAA continues a wide-ranging transformation of the United States air transportation system. NextGen will transform America's air traffic control system from a ground-based system to a satellite-based system. GPS technology will be used to shorten routes, save time and fuel, reduce traffic delays, increase capacity, and permit controllers to monitor and manage aircraft with greater safety margins. Planes will be able to fly closer together, take more direct routes and avoid delays. The FAA requires a stable workforce in order to sustain the current infrastructure of air traffic control facilities staffed and unstaffed and to move toward completion of the NextGen transformation.

Page intentionally left blank





**RESEARCH, ENGINEERING, AND DEVELOPMENT**

**(AIRPORT AND AIRWAY TRUST FUND)**

For necessary expenses, not otherwise provided for, for research, engineering, and development, as authorized under part A of subtitle VII of title 49, United States Code, including construction of experimental facilities and acquisition of necessary sites by lease or grant, [\$192,665,000]\$170,000,000, to be derived from the Airport and Airway Trust Fund and to remain available until September 30, [2022]2023: *Provided*, That there may be credited to this appropriation as offsetting collections, funds received from States, counties, municipalities, other public authorities, and private sources, which shall be available for expenses incurred for research, engineering, and development[: *Provided further*, That funds made available under this heading shall be used in accordance with the explanatory statement described in section 4 (in the matter preceding division A of this consolidated Act): *Provided further*, That not to exceed 10 percent of any funding level specified under this heading in the explanatory statement described in section 4 (in the matter preceding division A of this consolidated Act) may be transferred to any other funding level specified under this heading in the explanatory statement described in section 4 (in the matter preceding division A of this consolidated Act): *Provided further*, That no transfer may increase or decrease any funding level by more than 10 percent: *Provided further*, That any transfer in excess of 10 percent shall be treated as a reprogramming of funds under section 405 of this Act and shall not be available for obligation or expenditure except in compliance with the procedures set forth in that section]. (*Department of Transportation Appropriations Act, 2020.*)

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

**PROGRAM AND FINANCING  
(\$ in Millions)**

Identification code: 69-8108-0-7-402	FY 2019 Actual	FY 2020 Estimate	FY 2021 Estimate
<b>Obligations by program activity:</b>			
0011 Improve aviation safety .....	89	129	114
0012 Improve Efficiency .....	19	.....	.....
0013 Reduce environmental impact of aviation .....	31	48	45
0014 Improve the efficiency of mission support .....	6	16	11
0100 Subtotal, direct program .....	145	193	170
0799 Total direct obligations .....	145	193	170
0801 Research, Engineering & Development (Airport & Airway Trust Fund (Reimbursable)) .....	11	9	9
0900 Total new obligations (total) .....	156	202	179
<b>Budgetary resources available for obligation:</b>			
1000 Unobligated balance brought forward, Oct 1 .....	120	166	166
1021 Recoveries of prior year unpaid obligations .....	2	.....	.....
1050 Unobligated balance (total) .....	122	166	166
<b>New budget authority (gross), detail:</b>			
Appropriation, discretionary:			
1101 Appropriation (special or trust fund) .....	191	193	170
Spending authority from offsetting collections, discretionary:			
1700 collected .....	10	9	9
1701 Change in uncollected payments, Federal sources .....	1	.....	.....
1750 Spending Auth from offsetting collections, disc (total) .....	11	9	9
1900 Budget authority (total)	202	202	179
1930 Total budgetary resources available .....	324	368	345
Memorandum (non -add) entries:			
1940 Unobligated balance expiring .....	-2	.....	.....
1941 Unexpired Unobligated balance, end of year .....	166	166	166
Special and non-revolving trust funds:			
1950 Other balances withdrawn and returned to unappropriated receipts .....	2	.....	.....
1951 Unobligated balance expiring .....	2	.....	.....
1952 Expired Unobligated balance, start of year .....	5	6	6
1953 Expired Unobligated balance, end of year .....	4	6	6
1954 Unobligated balance canceling .....	2	.....	.....
<b>Change in obligated balances:</b>			
Unpaid obligations:			
3000 Unpaid obligations, brought forward, Oct 1 (gross) .....	136	127	153
3010 New obligations incurred, unexpired accounts .....	156	202	179

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

3020 Outlays (gross).....	-162	-176	-224
3040 Recoveries of prior year unpaid obligations, unexpired	-2	.....	.....
3041 Recoveries of prior year unpaid obligations, expired....	-1	.....	.....
3050 Unpaid obligations, end of year.....	127	153	108
Uncollected payments:			
3060 Uncollected payments, Federal Sources, brought forward, Oct 1.....	-3	-3	-3
3070 Change in uncollected pymts, Fed sources, unexpired.....	-1	.....	.....
3071 Change in uncollected pymts, Fed sources, expired.....	1	.....	.....
3090 Uncollected payments, Federal sources, end of year ...	-3	-3	-3
Memorandum (non-add) entries:			
3100 Obligated balance, start of year .....	133	124	150
3200 Obligated balance, end of year .....	124	150	105

**Budget Authority and outlays, net:**

Discretionary:			
4000 Budget authority, gross.....	202	202	179
Outlays, gross:			
4010 Outlays from new discretionary authority .....	46	94	84
4011 Outlays from discretionary balances .....	116	82	140
4020 Outlays, gross (total) .....	162	176	224

**Offsets against gross budget authority and outlays**

Offsetting collections (collected) from:			
4030 Federal sources .....	-11	-9	-9
4040 Offsets against gross budget authority and outlays (total) .....	-11	-9	-9
Additional offsets against gross budget authority only:			
4050 Change in uncollected pymts, Fed sources, unexpired.....	-1	.....	.....
4052 Offsetting collections credited to expired accounts.....	1	.....	.....
4070 Budget Authority, net (discretionary).....	191	193	170
4080 Outlays, net (discretionary).....	151	167	215
4180 Budget authority, net (total) .....	191	193	170
4190 Outlays, net (total) .....	151	167	215

This account provides funding to conduct research, engineering, and development to improve the national airspace system's capacity and safety, as well as the ability to meet environmental needs. The proposed funding is allocated to the following performance goal areas of the Federal Aviation Administration: improve aviation safety, efficiency, and environmental sustainability.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

The request includes funding for several research and development activities of the Next Generation Air Transportation System (NextGen), as well as activities related to unmanned aircraft systems.

**OBJECT CLASSIFICATION  
(\$ in Millions)**

Identification code: 69-8108-0-7-402	FY 2019 Actual	FY 2020 Estimate	FY 2021 Estimate
Direct obligations:			
Personnel compensation			
11.1 Full-time permanent.....	28	30	31
12.1 Civilian personnel benefits .....	9	9	10
21.0 Travel and transportation of persons.....	2	1	1
25.1 Advisory and assistance services.....	22	37	25
25.2 Other services from non-Federal sources.....	38	50	39
25.3 Other goods and services from Federal sources...	8	9	7
25.5 Research and development contracts .....	13	20	20
25.7 Operation and maintenance of equipment .....	1	1	1
26.0 Supplies and materials .....	1	2	2
31.0 Equipment .....	1	2	2
41.0 Grants, subsidies, and contributions .....	22	32	32
99.0 Direct obligations.....	145	193	170
99.0 Reimbursable obligations.....	11	9	9
99.9 Total new obligations.....	156	202	179

**Employment Summary**

Identification code: 69-8108-0-7-402	FY 2019 Actual	FY 2020 Estimate	FY 2021 Estimate
1001 Direct civilian full-time equivalent employment	219	217	217

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**EXHIBIT III-1  
RESEARCH, ENGINEERING & DEVELOPMENT  
Summary by Program Activity  
Appropriations, Obligation Limitations, and Exempt Obligations  
(\$000)**

	<b>FY 2019 ACTUAL</b>	<b>FY 2020 ENACTED</b>	<b>FY 2021 REQUEST</b>
Research, Engineering and Development etc.	\$ 191,100	\$ 192,665	\$ 170,000
<b>TOTAL</b>	<u>\$ 191,100</u>	<u>\$ 192,665</u>	<u>\$ 170,000</u>
FTEs			
Direct Funded	245	217	217
Reimbursable, allocated, other			

**Program and Performance Statement**

This account provides funding for establishing and overseeing FAA's Research and Development (R&D) policies and plans. Its diverse scientific, engineering and technical workforce supports all aspects of aviation from research on materials to development of new products and procedures.

In partnership with both domestic and international entities within the aviation community, the FAA RE&D programs provide world leadership by conducting high-priority research and developing innovative technologies to support a safe, efficient, and environmentally acceptable global aviation system.

Federal Aviation Administration  
FY 2021 President's Budget Submission

---

**EXHIBIT III-1a**

**RESEARCH, ENGINEERING & DEVELOPMENT  
SUMMARY ANALYSIS OF CHANGE FROM FY 2020 TO FY 2021  
Appropriations, Obligations, Limitations, and Exempt Obligations  
(\$000)**

	<b><u>\$000</u></b>	<b><u>FTE</u></b>
<b>FY 2020 Enacted</b>	<b><u>\$192,665</u></b>	<b><u>217</u></b>
	-	-
<b>ADJUSTMENTS TO BASE:</b>		
Annualization of FY 2020 FTE	0	
Annualization of Prior Pay Raise(s)	303	
FY 2021 Pay Raise	296	
GSA Rent		
Working Capital Fund		
Non-Pay Inflation		
One less Compensable Day	-154	
FERS Increase	635	
<b>SUBTOTAL, ADJUSTMENTS TO BASE</b>	<b>1,080</b>	<b>0</b>
<b>PROGRAM REDUCTIONS</b>		
Research, Engineering and Development	-23,745	
<b>SUBTOTAL, PROGRAM REDUCTIONS</b>	<b>-23,745</b>	<b>0</b>
<b>PROGRAM INCREASES</b>		
<b>SUBTOTAL, PROGRAM INCREASES</b>	<b>0</b>	<b>0</b>
<b>FY 2021 REQUEST</b>	<b>170,000</b>	<b>217</b>

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

	<b>FY 2021 Request</b>	<b>Page</b>
<b>FEDERAL AVIATION ADMINISTRATION</b>		
<b>A. Research, Engineering and Development</b>	<b>170,000</b>	
a. Fire Research and Safety	7,136	9
b. Propulsion and Fuel Systems	4,215	12
c. Advanced Materials/Structural Safety	1,003	16
d. Aircraft Icing/Digital System Safety/Aircraft Cyber	6,426	20
e. Continued Airworthiness	9,642	27
f. Flightdeck/Maintenance/System Integration Human Factors	7,469	30
g. System Safety Management/Terminal Area Safety	5,485	34
h. Air Traffic Control Technical Operations Human Factors	5,685	39
i. Aeromedical Research	10,235	43
j. Weather Program	6,236	46
k. Unmanned Aircraft Systems Research	24,035	49
l. Alternative Fuels for General Aviation	2,524	53
m. Commercial Space Transportation Safety	5,840	56
n. NextGen - Wake Turbulence	3,698	59
o. NextGen - Air Ground Integration Human Factors	6,757	62
p. NextGen - Weather Technology in the Cockpit	1,982	66
q. Information/Cyber Security	4,769	69
r. NextGen - Flight Deck Data Exchange Requirements	1,000	72
s. Environment and Energy	17,911	75
t. NextGen Environmental Research Aircraft Technologies, and Fuels	27,009	79
u. System Planning and Resource Management	8,022	83
v. William J. Hughes Technical Center Laboratory Facility	2,921	85



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for A.a Fire Research and Safety**

---

**FY 2021 – A.a Fire Research and Safety - Budget Request  
(\$000)**

<b>Program Activity</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
A.a Fire Research and Safety	7,200	7,200	7,136

**What is this program and what does this funding level support?**

---

The Fire Research and Safety program seeks to prevent accidents caused by in-flight fire and to improve survivability during a post-crash fire. The program is necessary due to the catastrophic consequences of an uncontrollable aircraft fire, which include: the large loss of life and the destruction of the aircraft. The program conducts research to understand the fire safety implications of new technologies and materials the aviation industry continues to introduce in order to decrease weight and increase operating efficiency. This research is used to develop effective mitigation procedures and to update existing regulations, which often do not address the unique behavior of these new technologies. Finally, the program conducts research to better understand and mitigate the threat of lithium battery cargo fires, which are a continuing concern due to the increasing number, sizes and energy densities of batteries being shipped and to the unusual and severe hazards associated with lithium battery fires.

The program supports 1) the FAA's Office of Aviation Safety, which is responsible for issuing regulations, standards, and guidance material to ensure the highest level of safety in commercial aviation; and 2) the FAA's Security and Hazardous Materials organization. Research efforts specific to hazardous material transport are completed in coordination with the Department of Transportation's Pipelines and Hazardous Materials Safety Administration (PHMSA). The program also supports safety enhancements (specifically: SE126, or 'Mitigation of Hazardous Materials Fires') recommended by the Commercial Aviation Safety Team (CAST), which is a voluntary collaboration between regulators and the aviation industry to identify emerging risks to aviation safety and developing mitigation procedures to reduce the risks.

The requested funding supports the fire safety facilities at the FAA's William J. Hughes Technical Center, Atlantic City, NJ, where the majority of the program's research is conducted. These facilities, where research is led by internationally recognized experts in aircraft fire safety research, are the most extensive civil aircraft fire test facilities in the world. The facilities include a full-scale fire test facility that houses both a wide-body and narrow-body test fuselage with extensive instrumentation capability. This allows for highly controlled testing of any aircraft fire scenario along with measurements of factors affecting occupant survivability. The testing is also supported by a variety of smaller scale testing labs where new flammability

requirements are developed and inflight atmospheric conditions can be replicated. In addition, the facilities include a chemistry lab that can support the testing through collection and measurement of all fire combustion gases and where innovative fire science experiments can be conducted. The technical expertise developed through the use of these facilities has continually contributed to aviation safety through the ability to quickly and effectively address newly emerging fire hazards. As a result, the international aviation community looks to the FAA for leadership in aircraft fire safety research and development. Research activities to increase aircraft fire safety include fire tests for interior materials; fire detection and suppression systems; inflight fire-fighting procedures and guidance material; testing to validate Halon replacement suppression agents against minimum performance standards; and safeguards to protect against fires involving lithium batteries, fuel cells, and hazardous materials. The program has extensive partnerships and collaboration with all aspects of the international aviation industry, fire science researchers, and academia.

Additionally, funding will provide for engineering, technical, and management support of overall research activities.

**Major Activities and Accomplishments Planned in FY 2021 Include:**

**Aircraft Fire Safety**

- Improve aircraft ability to mitigate fires involving hazardous materials transported as cargo.
- Improve capability for detection of inflight fires.
- Develop standardized methods for evaluating non-metallic aircraft structural and component materials.
- Test and evaluate the fire hazards and mitigation options for lithium battery powered personal electronic devices and other flammable materials on transport aircraft.
- Evaluate the capability of new fire suppression agents and systems.

**Goals for FY 2021 Funding:**

- By 2025, develop the enabling technology to prevent accidents caused by in-flight fires in cargo and passenger large transport aircraft by improving fire detection and suppression capabilities and upgrading the flammability requirements for materials in inaccessible areas.
- By 2025, enable the introduction of new, lightweight/energy efficient, fire-safe materials, and components into commercial transport aircraft, such as composite structure, additive manufacturing components, magnesium and other metallic alloys, cabin furnishings, and advanced electrical power sources.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

- By 2025, support and facilitate the evaluation and replacement of Halon fire extinguishing agents and halogenated cabin material flame-retardants with effective and practical alternatives.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

The primary benefit of this research to the American public is the prevention of catastrophic aircraft accidents caused by in-flight fires and increased survivability during a post-crash fire. Other benefits derived from this program include: 1) the introduction of enabling technologies to prevent accidents caused by fire in freighter aircraft and hidden in-flight fires in passenger-carrying airplanes, and 2) the development, validation, and transfer of cost-effective aircraft fire safety technology to the aviation industry.

The aircraft fire related fatality rate has shown measurable improvement in recent years for traditional aircraft construction techniques and materials. This program is necessary to ensure the continued safety of transport aircraft as materials and construction methods evolve for reduced weight and improved efficiency. The testing supports the need to upgrade aircraft certification standards to keep pace with the emerging technologies employed by aircraft manufacturers. The electrical power requirements of modern aircraft continue to increase and manufacturers are employing new sources and configurations to meet those needs. This potentially introduces new and unforeseen failure scenarios and ignition sources. Metallic structure and components are increasingly being replaced with composite materials with different flammability and heat transfer properties. Additive manufacturing (3D printing) is becoming more common and the change in flammability is generally unknown. The ability to conduct full scale, realistic fire testing to evaluate the contribution to aircraft fire safety of these new materials and systems will allow the safe implementation of these technologies resulting in improved fuel efficiency, lower production costs, and reduced environmental impact.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for A.b Propulsion and Fuel Systems**

---

**FY 2021 – A.b Propulsion and Fuel Systems - Budget Request  
(\$000)**

<b>Program Activity</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
A.b Propulsion and Fuel Systems	2,100	2,100	4,215

**What is this program and what does this funding level support?**

---

The FAA establishes rules for the certification and operation of aircraft propulsion systems. Research from this program is used as the basis for the development, implementation and modification of policy, guidance, and rulemaking to ensure the safety and continued airworthiness of new and existing aircraft propulsion systems, fuels, and energy technologies. This program conducts research on advanced damage tolerance, testing and inspection methods, as well as risk assessment and failure analysis tools to reduce and eliminate the safety hazard posed by uncontained aircraft turbine engine failures.

Although the history of turbine engine operation in commercial aviation is a safe one, the risk of an engine failure is always present and the potential consequences are enormous (e.g., large loss of life in accidents and the destruction of the aircraft). Accidents such as United Airlines Flight 232 on July 19, 1989 in Sioux City, Iowa, and Delta Airlines Flight 1288 on July 6, 1996 in Pensacola, Florida are noteworthy because they were caused by the failure of turbine engine components that caused catastrophic loss of life. The 2010 Qantas A380 uncontained failure of a modern engine and four more recent events further illustrate this safety threat. Two non-fatal failures, one of a high pressure compressor disk on British Airways Flight 2276 on September 8, 2015, and one a high pressure turbine disk on October 28, 2016 on American Airlines Flight 383 resulted in aborted take-offs and passenger evacuations along with extensive damage to the aircraft. Air France Flight 66 experienced a full separation of the fan rotor on September 30, 2017 followed by an emergency landing and the April 17, 2018 fatal uncontained fan blade failure of Southwest Airlines Flight 1380 - serve as reminders that such failures, although extremely rare, do still occur with potentially catastrophic consequences.

Investigations revealed that material and manufacturing anomalies that degraded the structural integrity of the high energy rotors was a primary cause that led to the uncontained failures. Research provided by this funding will develop and validate a probabilistic-based turbine engine design code called DARWIN® (Design Assessment of Reliability With Inspection) that determines the risk of fracture of turbine engine rotors containing rare, undetected material anomalies. DARWIN® satisfies FAA requirements defined in the Federal Regulations, section 14 CFR 33.70 "Engine Life-limited Parts" for the purposes of preventing uncontained turbine engine rotor failures. DARWIN® is being developed and validated collaboratively with the major U.S. engine manufacturers. This research is also providing data to support the preparation

of a series of FAA Advisory Circulars that provide industry with technical information on acceptable means to comply with the regulation.

Research will also address the need to develop better nondestructive testing (NDT) methods to characterize engine component material conditions that can compromise integrity. This need was highlighted by the NTSB in recommendations A-18-3 and A-18-4 resulting from the AA Flight 383 accident investigation. In addition to the need for enhanced nickel alloy inspection, other inspection research is needed to measure compressive residual stresses, grain abnormalities, titanium texturing, and cracks. Improved NDT will not only detect defective components, but it can also be used to validate complex manufacturing processes and aid in developing more accurate life predictions.

In response to NTSB recommendations stemming from recent events to review and update the guidance in the FAA Advisory Circular AC20-128, research is on-going to revise the large engine debris fragment model and Uncontained Engine Debris Damage Assessment Model (UEDDAM) code, thereby improving vulnerability assessment tools to meet the hazard minimization requirements of 14 CFR 25.903(d). The current engine and aircraft certification methods require full-scale destructive tests of an engine as defined in 14 CFR 33.94. Development of more accurate analytical methods and predictive tools will improve safety assessments while also minimizing full-scale destructive tests. Standardized methods and numerical tools to analyze effects of both engine rotor-burst and fan blade releases assist the FAA certification offices and industry applicants in gaining a common understanding in demonstrating compliances of regulatory requirements. The analysis tools developed in this program will 1) help to mitigate aircraft damage from uncontained engine failures and prevent potential aircraft catastrophic failures, and 2) allow FAA engineers to validate proprietary tools currently used by engine manufacturers and streamline the certification process. The increased use of composite materials for both engine containment and fuselage structure also creates a need for robust failure models able to capture the brittle and directional nature of these materials compared with traditional aerospace metals. The long-term goal is certification-by-analysis.

A new challenge to preventing catastrophic outcomes on large transport from an uncontained failure has emerged with the proposed open-rotor engine concept, which promises greater efficiency. In this design, the engine containment is removed (in contrast with current ducted fan design) and counter-rotating fan blades create a new configuration that requires fuselage shielding. Proposal of new fuel and energy technologies including electric propulsion present similar certification challenges. Research is necessary to apply products previously developed under this program to evaluate these new configurations and the impact on safety and airworthiness on new and existing aircraft.

Work will continue on Advanced Analysis Methods for Impact of Aircraft Materials from Rotor Burst and Blade Release developing material models, guidelines and test cases for use in predictive analysis efforts that are needed for certification by analysis.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

This program works closely and collaboratively with National Aeronautics and Space Administration (NASA), Department of Defense (DoD), FAA commercial space, and industry on these initiatives.

Additionally, funding will provide for engineering, technical, and management support of overall research activities.

**Major Activities and Accomplishments Planned in FY 2021 Include:**

- Conduct experiments to investigate crack formation and growth from naturally-occurring nickel anomalies.
- Enhance DARWIN analysis capabilities to address lathe turned rotor surfaces.
- Support the LS-DYNA Aerospace Working Group, a partnership of government, industry, and academia. This effort is developing predictive analytical models for impact of metal and composite materials in LSDYNA, along with associated test data, quality assurance problems and methods, sample problems, and guidance to advance certification by analysis capability.
- Update the Uncontained Engine Debris Damage Assessment Model (UEDDAM) in conjunction with DoD, as a means of compliance for ducted and open rotor engines.
- Support validation of compliance methods for Draft AC20-128

**Goals for FY 2021 Funding:**

- By 2022, release new DARWIN version to support the proposed FAA Advisory Circular AC 33.70-5 on “Damage Tolerance of Lathe Turned Surfaces in High Energy Rotors”.
- By 2024, validate composite material models with associated guidance for certification.
- By 2024, develop enhanced capabilities within DARWIN to conduct fracture and life prediction of nickel rotor components containing inherent anomalies.
- By 2025, develop inlet impact modeling test case that includes containment of the blade and load transfer into the inlet and fan cowl structure.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

The specific benefits of the propulsion and fuels research program to the American public will be the reduction or elimination of commercial aircraft uncontained turbine engine failures and in-flight engine shut downs. Benefits will accrue in the form of reduced risk of engine failures and fewer aircraft accidents, which in turn will lead to fewer injuries, fatalities, and property damage. This research program is necessary because it is producing publicly available tools and means of

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

compliance that enable the FAA and industry to enhance safety with improved regulation and/or guidance and advance the FAA's certification by analysis goals.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for A.c Advanced Materials/Structural Safety**

---

**FY 2021 – A.c Advanced Materials/Structural Safety - Budget Request  
(\$000)**

<b>Program Activity</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
A.c Advanced Materials /Structural Safety	14,720	14,720	1,003

**What is this program and what does this funding level support?**

---

The Advanced Materials and Structural Safety Program conducts research to support FAA safety and regulatory activities in the technical areas of composite and other advanced materials, and aircraft dynamic impacts. This program is divided into three research areas: Advanced Materials, Structural Safety (crashworthiness) and Additive Manufacturing.

The long-term effects of aging, environmental factors, flight loads, damage, manufacturing defects, and many other aspects of the intensely complex operating environment of transport aircraft are not fully understood. Advanced Materials research seeks to fill these knowledge gaps before they cause catastrophic loss of aircraft and lives.

The Structural Safety component of the program performs research to evaluate test and analysis procedures used by the industry to meet crashworthiness regulations. These regulations are evolving and are supplemented with special conditions for transport aircraft with composite fuselage and wing structures. The program ensures new aircraft structures demonstrate levels of safety equivalent to existing aircraft structures subjected to survivable crash conditions.

Additive manufacturing (AM) research addresses the inherent variability of the additive process across numerous material systems and technologies. Research will focus on addressing fundamental questions on process and machine-to-machine variability, as well as the effect of defects on mechanical properties.

The Advanced Materials and Structural Safety program works with industry, academia, and other government laboratories as research partners; effectively leverages its resources, with industry fully matching research funds. The majority of the research performed by this program is funded through and managed by the congressionally mandated Joint Centers of Excellence (COE) for the Advanced Materials and Structures (JAMS). Under the leadership of the University of Washington and Wichita State University, the following serve as core members of the COE JAMS and external partners of this research program: Edmonds Community College, Florida International University, Northwestern University, Oregon State University, Purdue University, and University of California at Los Angeles, University of Delaware, University of Utah, Tuskegee University and the Washington State University and Mississippi State University (pending). These universities act as vehicles for workforce education and technology transfer, as



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

most students participating in the program are offered engineering and technology positions in the aviation industry and continue working on composite design and manufacturing. Additionally, funding will provide for engineering, technical, and management support of overall research activities.

**Major Activities and Accomplishments Planned in FY 2021 Include:**

Damage Tolerance of Composite Structures

- Evaluate critical defects & damage threats to understand the damage tolerance of airframe structures representative of GA, rotorcraft, and transport category airplane applications.

Composite Maintenance Technology

- Develop standards for composite repair material properties (both new and aged), process specifications and associated test protocols.

Continued Operational Safety and Certification Efficiency for Emerging Composite Technologies

- Develop and document simplified means of compliance for composite structures to promote for UAS and urban mobility platforms.
- Develop certification protocols for polymer AM and chopped fiber materials (thermoset and thermoplastic) used in transport category airplanes.
- Update the Composite Failure Analysis Handbook co-developed by the FAA and the AFRL based on results of investigating the effects of fire on composite failure analysis procedures and methods.

Certification and Maintenance Protocols for Bonded Joints:

- Generate guidelines for bonded joint certification and repairs.
- Evaluate aged structural bonds with an emphasis on understanding the mechanism leading to potential bond failure and delamination of rotorcraft blades.

Additive Manufacturing for Aircraft, Engine, and Propeller Applications

- Develop data on various aspects of metal AM that is needed to generate policy, guidance, and industry standards.

**Goals for FY 2021 Funding:**

- By 2023, provide detailed background on the unique static, fatigue, environmental durability, and impact performance of advanced composite splicing concepts.
- By 2023, publish an advisory circular and/or share results with industry standardization organizations on guidelines to the certification of metal AM applications.
- By 2024, provide data for regulatory action to assure reliable processing of adhesively bonded structures. (FAA Strategic Composite Plan Deliverable).
- By 2025, develop a handbook for failure analysis of structures subjected to a fire event after structural malfunction. (FAA Strategic Composite Plan Deliverable).

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

The use of advanced materials and structural concepts is central to a vibrant aviation industry in the U.S. All aircraft manufacturers are using more and more advanced composite materials on their aircraft. As the methods of structural verification are being extended to new components and aircraft applications, it is important to understand the envelope of acceptable design parameters that have not been explored with composite materials and structures. This will ensure that as more applications are introduced with composite aircraft structures, civil aircraft manufactured with these materials will be safe and reliable for the American public.

Currently, there are no existing structural crashworthiness requirements for transport airplanes. The FAA is seeking to develop a single policy for demonstrating crashworthiness that would be applicable to all transport airplanes regardless of the structure, thereby reducing fatalities and injuries in the event of a crash.

Public knowledge and historical usage of additively manufactured (AM) components is essentially non-existent yet there is currently an exponential rise of their use in aerospace applications. Current regulations were not written to address the unique aspects AM and data generated will be used to develop new guidance in support of industry standardization efforts.

Output of the Advanced Materials and Structural Safety research program helps keep the flying American public safe. Research tasks and required funding levels outlined above are driven by industry advancements in construction of composite airframes and related components presented to FAA for certification. The FAA must assure that changes due to the ever-increasing use of composites in aviation maintain an equivalent or improved level of safety compared to that achieved with current operational aircraft. Requests from the FAA aircraft certification offices and from the aircraft manufacturers seeking approval for emerging composite technologies are major influences that shape the scope of this research program.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

Additionally, The National Transportation Safety board review of accidents (e.g., AA587 (<http://www.nts.gov/investigations/AccidentReports/Pages/AAR0404.aspx>), R22 ([https://www.atsb.gov.au/publications/investigation\\_reports/2007/aair/aair200701625.aspx](https://www.atsb.gov.au/publications/investigation_reports/2007/aair/aair200701625.aspx)) involving composite structures provides additional impetus for research required to understand advanced composite materials and structures as emerging technologies.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for A.d Aircraft Icing/Digital System Safety/Aircraft Cyber**

---

**FY 2021 – A.d Aircraft Icing/Digital System Safety/Aircraft Cyber - Budget Request  
(\$000)**

<b>Program Activity</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
A.d Aircraft Icing/Digital System Safety	9,253	9,000	6,426

**What is this program and what does this funding level support?**

---

Aircraft Icing

The Aircraft Icing Research Program conducts research on structural airframe icing in flight, ground deicing/anti-icing prior to takeoff, and engine compressor icing due to the ingestion of ice particles into the engine core. In FY 2021, research will focus on ground icing.

FAA policy for ground icing is guided by the “Clean Aircraft Concept,” meant to ensure that aircraft are aerodynamically clean at takeoff. An aircraft with frozen contamination is deiced, and if freezing or frozen precipitation is falling, it is then anti-iced. The Program conducts research on a range of issues that arise in operations, partnering with Transport Canada and the National Research Council of Canada, and enabling the FAA to play a leading role in the international SAE Ground Deicing Committee, which promotes uniformity and safety in ground deicing and anti-icing practices around the world, including the growing markets in Southeast Asia.

Digital System Safety

Airborne complex system designs have become increasingly dependent on highly integrated software and hardware architectures that share power, computing, networking, input/output, and other resources to support the needs of multiple aircraft functions. Adding to this complex environment, advanced computational techniques including Artificial Intelligence/Machine Learning (AI/ML) are being explored by the industry for implementation in airborne systems. Developing verification and validation methods for highly adaptive systems is a major challenges and research is required to address the evolution of these highly complex digital systems' architectures and software. The FAA is working towards assurance standards and guidance that are focused on flexibility (less prescriptive) that does not compromise safety or ignore rules. Research is required for these complex digital systems that begin to explore using a risk-based approach, to proactively address emerging safety risks and focus on process- vs product-based oversight.

The FAA has taken a proactive approach to keep pace with the ever-changing technological industry and is conducting research on software and digital aircraft systems to facilitate certification of such systems. Complex digital systems that are developed, integrated, validated,

or verified using unproven processes, techniques, and methodologies including commercial-off-the-shelf products and streamlining processes could introduce a safety risk for undetected errors with failure manifestation at the aircraft level. For example, industry is actively looking into introducing Artificial Intelligence/ Machine Learning applications and very little is known about the validation and verification of these applications in safety critical environment. These applications could introduce unknown risk if not properly addressed early in the design process. The majority of operational software and electronic hardware issues are due to missing or incorrect requirements. Many of these issues can be attributed to system complexity and associated difficulty in requirements validation to ensure completeness and correctness. The research proactively addresses certification issues that may arise with the use of new methodologies, tools, and techniques. These issues can potentially cause new failure conditions posed by the introduction of new and novel development processes on the highly integrated and distributed systems. This is achieved by developing new assurance methods, assurance criteria, analysis tools, and by collecting long-term service data of new airborne electronic hardware technologies. The research results will be used to help develop criteria and data required to improve the assurance standards, guidance, and training material for certification engineers.

Outputs from Digital System Safety program research will be used to develop new or revised guidance and training material as well as to recommend best practices for the industry. The resulting best practices and the associated guidance will help in preventing the events similar to the following:

- The Malaysian Airlines Boeing 777 incident on August 1, 2005 (caused by a faulty accelerometer being processed by the air data inertial reference unit and used by the primary flight computer, autopilot and other aircraft systems).
- U.S. Customs and Border Patrol Predator-B, Nogales AZ, 2006. (the loss of engine power resulted in loss of electrical power except for the standby battery, attributed to defective system design and missing requirement that allowed an unsafe condition to arise by allowing handover with a misplaced control lever setting and a susceptibility to a single point failure).
- The Qantas A330 incident on October 7, 2008 (caused by an abrupt pitch down due to a faulty air data inertial reference unit sending incorrect data to the flight control system and caused partially by a single event upset in the digital equipment).
- Several instances of Boeing 787 (e.g., October 29, 2014 Australian registered B787) transmitting inaccurate Automatic Dependent Surveillance—Broadcast (ADS-B) positional data due to improper software logic used for extrapolation of longitude and latitude.

#### Aircraft Cyber

The focus of this Aircraft Systems Information Security Program (ASISP) cyber research is on the aircraft itself and includes aircraft connectivity to external links (also called access points or

apertures). The research tasks identify and assess aircraft cyber risk and provide recommendations for mitigation of security vulnerabilities in aircraft net-centric architectures and internal/external wired and wireless interfaces that could affect aircraft safety.

The research addresses one of the four FAA Administrator strategic initiatives (Risk-Based Decision Making RBDM), and outlined in broader FAA requirements from FAA Order 8000.369 (SMS - Safety Management System, May 2013) and FAA Order 8040.4b (SRM - Safety Risk Management, May 2017). Order 8000.369 states that *“FAA organizations with product/service provider oversight responsibility apply the concepts of Safety Risk Management (SRM) to decisions that may lead to the initiation of regulatory changes through rulemaking. Doing so ensures that regulations address hazards in the aerospace system and provide boundaries on acceptability of design and performance of products and services.”* Order 8000.369 further states that *“SMS is the formal, top-down, organization-wide approach to managing safety risk and assuring the effectiveness of safety risk controls. It includes systematic procedures, practices, and policies for the management of safety risk. The four main components of an SMS are: (1) Safety Policy, (2) Safety Risk Management, (3) Safety Assurance, and (4) Safety Promotion. They provide a means of defining SMS within the FAA and a systematic approach to describing and achieving the desired safety performance.”*

A systematic approach is needed for to address aircraft cyber risks, also known as ASISP. The Order also mandates that AVS *“must establish and maintain [a] SRM function that provides for initial and continuing identification of hazards and the analysis and assessment of safety risk.”* *“[An] organization’s SRM must meet the intent of the policy set forth in the latest version of FAA Order 8040.4, Safety Risk Management Policy, and accomplish”*: system analysis, identify hazards, analyze safety risk, assess safety risk, control safety risk, track and monitor. Given the more-recent introduction of networked aircraft avionics, ASISP is an emerging area of concern for the FAA, and there is a need to implement a systematic SRM process to address these potential safety risks.

In addition to these long-standing FAA Orders, on 8/17/17 OMB issued memorandum M-17-30, identifying Presidential priorities for R&D federal funding. The ASISP program addresses “American Security”, one of the four “R&D Priority Areas”. ASISP is responsive to *“Emerging threats.... [that] compel the Federal Government to develop the technologies necessary to prevent terrorist attacks, mitigate the effects of... adversarial threats and hazards. Agencies should invest in R&D to increase the security and resilience of the Nation’s critical infrastructure from... cyber-attacks.”* Of the three “R&D Priority Practices”, ASISP addresses two. The first is “Supporting Innovative Early Stage Research - agencies should give priority to funding basic and early-stage applied research that, supplemented by private sector financing of later-stage R&D, can result in the development of transformative commercial products.... Strong partnerships with the private sector will be critical to maximizing the efficacy of Federal funding. Furthermore, agencies should take advantage of innovation from the private sector, where possible, to adapt to Federal needs.” The second is “Maximizing Interagency Coordination - Agencies should support ongoing interagency initiatives and participate in applicable interagency coordination groups. The interagency process is encouraged to avoid

duplicative efforts and maximize collaboration....” Of the two “R&D Workforce and Infrastructure” areas, ASISP supports “Modernizing and Managing Research Infrastructure - Innovative partnership models involving other agencies, state and local governments, the private sector, academia, and international partners can help maximize utilization of underused facilities and lead to sharing the costs of new R&D facilities.”

FY 2021 will initiate the implementation phase, to significantly expand upon the trial assessments and collaboration in Phase 3, broadening the range of SRA subject candidates for consideration to be prioritized and selected jointly by industry and FAA, based upon criteria to be determined. The new industry concept of “use cases” would be well-defined and considered as SRA subjects as well. Broad arrangements would be created and established to more efficiently and quickly enable Government and industry partners to collaborate and share information. Other Government organizations should be leveraged during this phase to supplement SRAs with intelligence information, additional subject-matter expertise, and resources where appropriate. International collaboration will be considered in this phase. A determination should be made by the end of this phase regarding the effectiveness of involving the FAA as a facilitator to coordinate and arrange collaboration between select, relevant industry partners and other Government and international contributors for each given subject. Mechanisms and processes would be defined to foster the appropriate documentation and sharing of assessment results between Government and industry to support the ultimate goal of quickly, efficiently and adequately reducing cyber risk through industry proactive technology and process changes and FAA promotion of aviation cyber safety, with reduced need for regulation.

Reports and technical data from this ASISP collaborative research with industry will be used to provide information to reduce and focus the development of policy, guidance, best practices, standards, regulations, and training procedures to address gaps, safety issues, and potential malicious intent from various cyber threats. The same information will be available immediately for industry to consider using to proactively address any cyber risks associated with in their own avionics products.

Additionally, funding will provide for engineering, technical, and management support of overall research activities.

### **Major Activities and Accomplishments Planned in FY 2021 Include:**

#### Aircraft Icing

##### Safe Operations and Take-off in Aircraft Ground Icing Conditions

- Transfer data package supporting annual guidance to airline industry for updating of airline ground deicing programs.
- Complete geometric and roughness characterization of cold soaked fuel frost.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

Digital System Safety

- Study the assurance issues of Artificial Intelligence/Machine Learning (AI/ML) implementations in airborne systems and develop assurance criteria for dataset requirements, runtime monitoring, and safety monitor.
- Develop a Generic Framework (Using Overarching Properties) and metrics for assurance processes and evaluate the assurance metrics using test cases.

Aircraft Cyber

- Establish a trusted environment between all participants from both Government and industry to protect sensitive and proprietary information.
- Refine the SRA methodology to adapt for Government-industry collaboration and enhance efficiency to allow SRA execution to provide adequate results for decision-making regarding aviation systems and Government policies and regulation.
- Execute Safety Risk Assessments (SRAs) with use cases, to include risk identification and characterization (including degrees of vulnerabilities, threats, risks and capabilities required for exploit) and mitigation identification and evaluation (amount of risk reduction, implementation time and cost, and ramifications of implementation).
- Document SRA results including appropriate aggregation of relevant/related information between SRAs to provide consistent, methodical and technical, fact-based reports that support risk-based decisions for potential pro-active measures to reduce or eliminate certain cyber risks.

**Goals for FY 2021 Funding:**

Aircraft Icing

- Through 2022, conduct aerodynamic testing of an airfoil with cold soaked fuel frost.
- Through 2022, report on protection of ice contamination of vertical stabilizers in ground icing conditions.

Digital System Safety

- By 2022, identify assurance issues with the use of new technologies in the development of safety critical systems, analyze digital system safety issues that could affect aircraft airworthiness and develop assurance criteria for safe certification.
- By 2022, develop generic framework for assurance and determine an acceptable means to analyze, integrate, validate, and verify complex airborne digital systems to reduce cost and improve safety.



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

Aircraft Cyber

- By 2023, create a proactive industry-government cyber-safety forum that provides early risk identification and mitigation in design, manufacture, and certification of aircraft avionic systems. The outputs of this effort also will permit necessary changes to support continuing operational safety/airworthiness re-certification.
- By 2023, provide FAA Aviation Safety regulators with data to support fact-based promotion of aviation safety through coordinated guidance, while minimizing regulation.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

Aircraft Icing

Valuable research on flight in freezing rain and freezing drizzle has been accomplished, but research funding in this area is not to be provided in FY 2021. FAA ground icing research enables the FAA to provide industry timely guidance to airlines each winter on safety issues that have arisen, and also to provide international leadership in this area through its role in the international SAE Ground Deicing Committee. In this way it promotes uniformity and safety in ground deicing and anti-icing practices not only in the U.S. but also around the world, including the growing markets in Southeast Asia. This program is necessary for the FAA to continue to play this role both domestically and internationally. Valuable facility and analytical research has also been accomplished on simulation of engine ice crystal icing, but research funding in this area is not to be provided in FY 2021

Digital Systems Safety

The Digital System Safety research proactively looks into the safety issues of highly integrated systems and has the potential to prevent accidents/incidents and mitigate fatalities and injuries. While great strides have been made in the processes of developing and verifying individual components, developing and verifying the functionality and behavior of a system of complex components still contains many challenges to be resolved at both the component level and system level. Inadequate and misunderstood integration, validation, and verification techniques for complex components leave potential for faults to exist with failure manifestation at the aircraft level. Most standards and regulations address development and safety requirements for individual components. Little exists for complex, highly integrated components and resulting systems, particularly using commercial-off-the-shelf equipment developed for a non-aviation (non-safety) market. As technology continues to change and become more complex, the verification and validation processes must change to adequately assess systems for compliance to the regulations and to minimize risk to the public. Research will be conducted in collaboration with the other agencies such as NASA to maximize the benefit and minimize the cost.

### Aircraft Cyber

Aircraft network systems security is an increasing concern for current and future aircraft. Some of these concerns also have been documented by the Government Accountability Office (GAO)<sup>1</sup>. The future generations of aircraft will be increasingly network centric with expanded aircraft connectivity for improved safety, operations, and maintenance. The aircraft manufacturers and modifiers are installing avionic systems to allow increased connectivity within an aircraft, as well as to networks external to the aircraft, to take full advantage of new computer technologies for more efficient aircraft operations and safety enhancements. The increased connectivity - particularly to external networks and systems without sufficient security controls - could introduce information security vulnerabilities. If this is exploited, it could impact safe aircraft operations and continued airworthiness. Examples of such external networks and services - referred to as apertures - include airline operation centers, airport gate links, radio and satellite communication (including voice, data & navigation), aircraft software uploads and maintenance, electronic flight bags, flight information databases, etc. These concerns, which encompass certification and continued operational safety, will be addressed through the ASISP initiative. Because air transportation demands are expected to continue increasing in the near future, capacity and efficiency need to increase to avoid huge delays in civil aviation. One key enabling technology to improve the capacity and efficiency of the NAS is to allow future generations of aircraft to be network centric with advanced avionics systems that will allow for improved safety, operations, and maintenance. This can only occur if the aircraft avionics systems can ensure data integrity and reliability. The ASISP initiative will help the aviation industry and the FAA to promote the safety of aircraft avionics systems from cyber threats and provide the public benefit of timely and safe air transportation.

---

<sup>1</sup> GAO, GAO-15-370 (published April 14, 2015) entitled *FAA Needs a More Comprehensive Approach to Address Cybersecurity as Agency Transitions to NextGen*.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for A.e Continued Airworthiness**

---

**FY 2021 – A.e Continued Airworthiness - Budget Request  
(\$000)**

<b>Program Activity</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
A.e Continued Air Worthiness	11,269	10,269	9,642

**What is this program and what does this funding level support?**

---

The Continued Airworthiness research program supports the FAA aviation safety oversight responsibility to ensure that aircraft maintain operational safety as they age. The FAA accomplishes this by 1) anticipating aging issues during the certification process and ensuring that they are adequately covered in operations, maintenance, and inspection protocols; and, 2) by monitoring in-service data as it accumulates, finding issues at the earliest possible point, and managing the issues through Advisories, Directives, regulation, or other guidance.

For FY 2021, the FAA will focus on the following topics:

Aircraft Electrical Systems

The aerospace community has found that progressive electrification of on-board services reduces or removes the need for hydraulic, mechanical and bleed air/pneumatic systems; thereby improving aircraft efficiency, reliability, and maintainability. Research in this area will be used to develop and publish FAA regulations and guidance addressing safe certification of aerospace vehicles utilizing more electric and full electric concepts.

Flight Controls and Mechanical Systems (FCMS)

FCMS research aims to reduce general aviation (GA) fatal accidents due to loss of control, stall, and spin. This research will help the FAA identify design and certification requirements for flight path control autopilot technology in GA, and develop standards for design, architecture, testing, and certification for intelligent systems and automation.

Rotorcraft Systems

Rotorcraft systems research seeks to understand the flight characteristics of multiple rotor vehicles and translate that into the development of new rules and guidance. Current rotorcraft rules do not address new entrants into the NAS. The Integrated Flight and Propulsion Control (IFPC) research program will help the FAA identify design and certification requirements for general flight characteristics and performance criteria to certify new vehicles.

### Structural Integrity Metallic (SIM)

SIM research supports the safe introduction of new metallic material forms and technology advancements into aircraft and promotes a uniform level of safety by developing and maintaining safety standards through a widely recognized government-industry organization. Through this program, FAA resources are optimized by streamlining approval of data submittals, allowing for the rapid response to safety issues, and providing improved confidence in data for decision-making.

Additionally, funding will provide for engineering, technical, and management support of overall research activities.

### **Major Activities and Accomplishments Planned in FY 2021 Include:**

#### **Aircraft Electrical Systems**

##### Novel and Unusual Electric Aircraft Systems

- Provide data for safe installation High voltage systems for electric propulsion.

##### Large Electric Energy Storage System

- Investigate methods of inducing thermal runaway for large battery validation and certification.

#### **FCMS**

##### Integrated Flight Path Control to Address GAJSC/FAA GA Safety Interventions

- Develop specific technology interventions using simple autopilot controls to develop basic envelope protection that will reduce or prevent loss-of-control GA accidents.

##### Transfer of New Technologies for Enhancement of GA Safety

- Identify and document new technologies to enhance GA safety and on what platforms they could be used.

#### **Rotorcraft Systems**

##### Integrated Flight and Propulsion Control

- Identify, test and document new technologies that can develop standards, rules and guidance for the flight characteristics of multi-rotor vehicles.

#### **Structural Integrity**

- Assess emerging technologies in partnership with industry to support developing policy, guidance and standards needed for certification and continued airworthiness by testing advanced fuselage panels, composite wing panels, and subscale components using the FAA's Full-Scale Aircraft Structural Test Evaluation and Research (FASTER), Aircraft Beam Structural Test (ABST), and Structures and Materials Labs.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

- Collaborate with NASA, DoD and industry to develop tools, methodologies and data to mitigate the risk associated with structural failures and provide updates and distribution of standardized handbooks supporting aircraft certification and continued airworthiness.

**Goals for FY 2021 Funding:**

- By 2022, develop a process for establishing mechanical property standards (used in FAA certification guidance) for emerging process-intensive metallic materials, including metal additive manufacturing.
- By 2022, develop technical data to evaluate the use of electronics to detect wires and physical wire cutting technology to reduce rotorcraft wire strikes.
- By 2023, publish advisory circular and/or share results with the American Society for Testing and Materials (ASTM) on the new autopilot technology, with advanced flight path control for incorporation into an industry standard.
- By 2024, publish guidance for improving design requirements, architecture, and certification processes for flight path control autopilots in general aviation aircraft.
- By 2024, develop technical data to evaluate the flight characteristics of multi-rotor vehicles that will be used in the development of the certification rules of these vehicles.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

Continued Airworthiness program research ensures increased safety for the flying public by reducing aviation accidents through the safe implementation of rapidly evolving aircraft technologies and emerging materials in aircraft products. Research results will provide a better understanding of the key failure mechanisms and processes that can occur while in-service and allow these new technologies to be safely introduced to certified aircraft. Research to understand these new technologies will help streamline certification efforts and ensure the continued airworthiness within the aerospace industry.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for A.f Flight deck/Maintenance/System Integration Human Factors**

---

**FY 2021 – A.f Flight deck/Maintenance/System Integration Human Factors - Budget  
Request  
(\$000)**

<b>Program Activity</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
A.f Flight deck/Maintenance/System Integration Human Factors	7,305	7,300	7,469

**What is this program and what does this funding level support?**

---

The Flight Deck/Maintenance/System Integration Human Factors Program provides the research foundation for the FAA to update guidelines, handbooks, orders, Advisory Circulars (ACs), technical standards orders, and regulations that help ensure the safety and efficiency of aircraft operations. The program's research focuses on the needs of pilots, inspectors, and aircraft maintainers; it develops human performance information for the aviation industry to use in designing and operating aircraft, and training pilots and maintenance personnel.

The revolution in digital avionics has changed flight deck design and operational practices and enabled new Head-Up Display (HUD) technologies, surface moving maps, electronic flight bags, advanced controls, communications, navigation, surveillance systems, and tools for aircraft system management. With these advances come important human performance implications that must be understood and applied in the appropriate guidance material developed for policy, procedures, operations, and training. This research supports the development of these products. Human error continues to be a major contributor to aircraft accidents and incidents both in commercial and general aviation (GA). Current research is proactive in identifying error tendencies and developing mitigations; thereby enhancing the safe and effective introduction of new technologies and procedures into the National Airspace System (NAS).

The Advanced Vision Systems (Enhanced Flight Vision System (EFVS), Enhanced Vision System (EVS), Synthetic Vision System (SVS), and Combined Vision System (CVS), Heads Up Display (HUD), and Head Mounted Displays (HMD) Research Program will characterize pilot performance considerations using the latest technology in Advanced Vision Systems, HUDs, and HMDs for low visibility conditions. This research informs operational requirements, standards, conditions, and limitations to ensure safe operations and will increase access to airports in adverse weather conditions without costly changes to the airport infrastructure.

The Fatigue Mitigation in Flight Operations Research Program will reduce accidents and incidents caused by air carrier pilot fatigue. Pilot fatigue data will be evaluated to determine the effectiveness of fatigue risk management approaches utilized by 14 CFR Part 121 certificate holders under Part 117. The research informs regulatory updates and educational materials

associated with fatigue risk-management programs (FRMP) and fatigue risk-management systems (FRMS).

The Pilot Training, Qualification, Procedures and Flight Operations Research Program will examine the effectiveness and appropriateness of various methods of training, qualification, and operations. This involves addressing methods and specific topics, including crew resource management and performance-based airman certification. This research will provide data-driven guidance to inspectors and operators on training methodologies (especially concerning use of technologies in training, such as distance learning and virtual reality) and operational procedures. Research will also provide recommendations for data to support emerging risks, including those introduced by complex flight deck systems such as those found on highly automated aircraft (e.g., 737 Max and others), the emerging pilot workforce, and human factors mitigations to address those risks. Finally, funding will provide for engineering, technical, and management support of overall research activities.

**Major Activities and Accomplishments Planned in FY 2021 Include:**

Advanced Vision Systems (EFVS, EVS, SVS, CVS), Head-Up Displays (HUD), and Head Mounted Displays (HMD): Operational Standards & Approval Criteria

- Technical report on pilot performance when using flight director, HUD, and SVGS during the instrument segment to inform lowering standard CAT I approach minima.
- Technical report characterizing pilot performance and operational impacts associated with the use of HUDs to conduct CAT II and CAT III approaches using other than ALSF I or ALSF II approach lighting systems.
- Technical report characterizing pilot performance and human factors considerations when using SVGS on an SA CAT I approach with less than a MALSR approach lighting system (in support of the development of operational standards and approval criteria for specific SVS operations).

Fatigue Mitigation in Flight Operations

- Improve the FAA's understanding of pilot fatigue during flight operations exceeding the limitations of the 14 CFR part 117 regulations.
- Provide recommendations for operational guidance and educational materials based on the effects of short haul multi-segment flight operations on pilot workload and cumulative sleep loss across trip pairings.
- Investigate the effects of multiple time zone shifts associated with long-haul and ultra-long-range flight operations on pilots behavioral and physiological adaptations and provide recommendations for operational guidance and educational materials.

Pilot Training, Qualification, Procedures and Flight Operations

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

- Assess different training methodologies to enable more cost-effective flightcrew training with similar or superior quality.
- Analyze the upcoming pilot workforce to help adapt training and procedures to address any emerging risks associated with generational differences.

**Goals for FY 2021 Funding:**

- By 2023, make recommendations for training mechanisms and methodologies based on scientific and technical data.
- By 2024, increase safety, access, efficiency, capacity, and throughput in low visibility conditions by expanding the use of advanced vision systems, HUD, and HMD.
- By 2024, develop and/or revise the guidance needed for pilots, operators, inspectors, and airport personnel to conduct low visibility operations using advanced vision systems.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

The flying public depends on the FAA to ensure the safety of flight operations and this program supports that goal by providing scientific and technical information to those responsible for regulations and guidance that ensure safe pilot and maintainer performance. Recent NTSB data show that human error is a contributory factor in 81 percent of aircraft accidents. Tragic accidents such as Asiana and Colgan emphasize the continuing need to address flightcrew performance. This program addresses some of the most critical areas for flight safety:

Advanced Vision Systems — Certification and Operational Approval Criteria

This research program has demonstrated the safety of pilots using advanced flight vision systems to land at airports that do not have the appropriate infrastructure for low visibility conditions, and secondarily provided data posing the increased capacity of the NAS by use of these systems. This research program will provide the FAA with guidance to keep up with the rapid pace of technology innovations. Pilot performance will be measured using new technologies to safely perform additional operations in low visibility conditions, increasing the capacity of the NAS.

Fatigue Mitigation in Flight Operations

This research provides the airline industry with methodology to measure fatigue and assess its risk. Research is needed to advance the science of assessing pilot alertness and predicting performance decrements due to fatigue. The findings of this research will be directly applied by the airline industry to improve flightcrew member alertness through educational materials associated with FRMPs and FRMS. By taking advantage of new advancements in technology and improving the science of proactive risk assessments, this research will increase the safety and efficiency of air travel by ensuring highest level of human performance.



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

Pilot Training, Qualification, Procedures and Flight Operations

Concrete recommendations from this research will inform FAA guidance for training and procedures for both manual and automated flight, in the form of advisory materials and orders.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for A.g System Safety Management/Terminal Area Safety**

---

**FY 2021 – A.g System Safety Management/Terminal Area Safety - Budget Request  
(\$000)**

<b>Program Activity</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
A.g System Safety Management/Terminal Area Safety	5,500	4,500	5,485

**What is this program and what does this funding level support?**

---

System Safety Management

The System Safety Management (SSM) program is designed to improve safety through developing safety data collection methods, advanced safety data and risk analysis techniques, and prototypes of risk-based decision-making capabilities to identify and analyze emerging safety issues in a cooperative nature with aviation stakeholders. The program provides an ability to analyze trends across the aviation community that is more effective than monitoring individual certificated entities, (e.g., air operators and air traffic facilities).

The SSM program addresses issues identified in several U.S. Government Accountability Office (GAO) studies (e.g., <http://www.gao.gov/assets/310/304182.pdf> and <http://www.gao.gov/assets/600/590389.pdf>) that call for the FAA to collect better data and improve its effort to identify and address safety issues. In addition, the Integrated Domain Safety Risk Evaluation Tool (ID-SRET) project supports the FAA's commitment to the International Civil Aviation Organization's (ICAO) Global Aviation Safety Plan, which establishes objectives for 'implementation of an effective safety oversight system' and 'full implementation of the ICAO State safety program framework' by 2022, and 'establishment of an advanced safety oversight system including predictive risk management' by 2027. This program also promotes the FAA Risk-Based Decision Making Strategic Initiative.

Through this program, the FAA developed -the Aviation Safety Information Analysis and Sharing (ASIAS) system that enables the free sharing and analysis of de-identified safety information derived from government and industry sources. Research is being conducted to understand the unique challenges posed by helicopters in terms of helicopter flight data monitoring (FDM) equipment, data formats, and processing techniques; and how to apply different safety risk methodologies to increase safety across the complex mix of helicopter mission segments and operational environments to incorporate this community into ASIAS. Research will identify the tools and techniques necessary to analyze rotorcraft flight data and create prototype safety metrics specific to the unique needs of the helicopter community and its various mission segments. The helicopter FDM (HFDM) tool is available at <https://HFDM-ASIAS.rotor.com>. Research will also examine current and legacy training requirements and

flight maneuvers for GA operations and assess the effectiveness of these maneuvers to determine which ones should be trained and tested to mitigate the loss-of-control accident rate.

In addition, through this program, the FAA developed a methodology and tool called Facility Risk Assessment Tool - to determine risk at ATO facilities within the NAS by using safety indicators. The FAA's field and headquarter personnel can target available oversight resources towards facilities posing the highest risk to air traffic safety using this methodology. The research is being conducted to complete a methodology and decision-making prototype tool to support the evaluation of risk controls that are proposed by the Air Traffic Organization to mitigate or eliminate potential hazards due to changes in the NAS. The scope and capabilities of the decision-making prototype tool are available at <https://ida.tc.faa.gov>, identified as ID-SRET, which supports the evaluation of risk controls proposed by the ATO to mitigate or eliminate potential hazards due to changes in the NAS. The FY 2021 funding will allow the FAA to complete ongoing research, which includes an additional tool called Safety Oversight Management System (SOMS), to improve the Air Traffic Safety Oversight Service's (AOV) safety oversight system and transform it into a state-of-the-art risk-based safety oversight system.

#### Terminal Area Safety

The Terminal Area Safety (TAS) program improves the safety of operations near or at an airport. Research projects in the program focus on developing training solutions and identifying effective technologies to mitigate key causes of fatal accidents such as the loss of control, runway excursions, and runway overruns. These are the leading causes of fatalities in the worldwide commercial jet fleet<sup>2</sup>.

The FAA will recommend solutions to reduce fatal accidents in the terminal area through:

- Exploring alternatives to determine runway slipperiness
- Developing objective criteria to minimize inappropriate simulator training

In addition, the FAA will analyze the potential solutions to reduce fatal accidents in the terminal area through:

- Evaluating the effectiveness of Angle-of-Attack indicators on flight crew response during upset and recovery
- Enabling safe helicopter approaches when using advanced vision systems
- Exploring consistent operational standards for a stable approach to reduce runway excursions

---

<sup>2</sup> *Boeing Annual Summary of Commercial Jet Airplane Accidents* that is based on corresponding ICAO, NTSB, and Flight Safety Foundation (FSF) definition of accidents and events (*Statistical Summary of Commercial Jet Airplane Accidents Worldwide Operations 1959 – 2014*).

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

- Developing a logical go-around training curriculum that mitigates the operational go-around problems that have arisen
- Performing flight tests on representative domestic and international runways that support turbine-powered airplane operations in order to validate the wet-ungrooved and wet-grooved wheel braking coefficient models in 14 CFR Part 25.109(c) and (d)

These projects address the principal causes of fatalities in the commercial jet fleet but also fill aviation safety research gaps identified in NTSB Safety Recommendations A-07-003, A-04-62, A-07-64, A-01-069, and A-96-094, available at

<https://www.nts.gov/layouts/nts.recsearch/RecTabs.aspx>.

Several landing overruns on wet runways, such as Southwest Airlines Flight 1919, a Boeing 737-700 at Chicago Midway Airport, IL on April 26, 2011, have raised questions regarding the validity of current wet runway stopping performance requirements and methods. Research will address issues regarding wet runway stopping performance requirements and methods and NTSB recommendation A-11-029 available at [https://www.nts.gov/safety/safety-recs/\\_layouts/nts.recsearch/Recommendation.aspx?Rec=A-11-029](https://www.nts.gov/safety/safety-recs/_layouts/nts.recsearch/Recommendation.aspx?Rec=A-11-029).

Additionally, funding will provide for engineering, technical, and management support of overall research activities.

**Major Activities and Accomplishments Planned in FY 2021 Include:**

System Safety Management

Adapting a NAS-Wide, Top-Down Safety Risk Model to Accommodate Bottom-Up Safety Risk Assessment

- Analyze the representation of contextual, conditional, and common cause failures across industries to include systems, procedures/processes, technology, and human factors.
- Establish methodology for NAS risk representation focusing on the quantification of risk.

Runway Operations Safety Monitoring and Surveillance Tool

- Identify gaps in runway operations safety monitoring and surveillance.
- Develop Concept of Operations for the runway operations safety monitoring and surveillance tool.

Terminal Area Safety

Improving Go Around Safety

- Develop and conduct human-in-the-loop flight simulation experiments to evaluate and refine proposed training or technology solutions for improving go-around safety.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

Wet Runway Wheel Braking Testing

- Complete comprehensive flight testing efforts involving the control of numerous variables affecting wet runway wheel braking capability to determine their specific influences on stopping performance.
- Analyze data from flight testing activities, document findings in publicly available reports, and provide technical data for updating wet runway wheel braking standards.

Improved Helicopter Simulation Models

- Collect simulation data from helicopter types and operations via existing simulator/flight training devices and flight test helicopter platforms performing candidate maneuvers to inform model improvements.

**Goals for FY 2021 Funding:**

System Safety Management

- By 2023, enable NAS-wide safety risk analysis with a common baseline to reduce commercial aviation fatalities.
- By 2023, provide risk-based decision-making support prototype tools to enhance Aviation Safety Services' oversight capabilities.

Terminal Area Safety

- By 2022, develop and validate models to estimate the wheel braking capability of aircraft based on runway parameters and meteorology data.
- By 2023, provide recommendations for wet runway performance standards as well as runway construction and maintenance standards.
- By 2023, provide recommendations for training or technology solutions to improve go-around safety.
- By 2024 - 2025, provide recommendations for changes in policy, regulations and guidance material for implementing advanced vision systems for helicopter operations.
- By 2026, develop and test higher-fidelity mathematical and performance models of helicopter flight dynamics during various mission segments and phases of flight.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

SSM projects benefits the public through a reduction in the risk of accidents and incidents associated with commercial and general aviation operations, in particular, by providing risk-based analysis capabilities that identify and assess emerging safety risk issues to support FAA's

decision making. The runway operations has often been identified as one of the top safety concern areas, and the runway operations safety monitoring and surveillance research will enhance and improve Air Traffic Safety Oversight Service (AOV)'s safety oversight capabilities by enabling the identification of safety risk patterns and potential risk prediction as well as proactive risk mitigation.

Research projects in the SSM program support improved risk-based decision-making, which allows the FAA to (a) identify system-level vulnerabilities through evaluating and developing aggregate level data and metrics, (b) determine safety performance indicators and safety risk indicators to assess and predict the NAS safety, and (c) reduce the aviation accidents and incidents and improve the aviation safety.

TAS research benefits 1) the public, by reducing the risk of incidents or accidents through developing training solutions and identifying effective technologies to mitigate key causes of fatal accidents such as the loss of control, runway excursions, and runway overruns, and 2) the aviation community, by developing safety standards in collaboration with the aviation industry such as wet runway braking performance and runway construction/ maintenance standards that reduce the risk of miscalculating aircraft stopping performance on wet runways.

Research projects in the TAS program are necessary to support the development of new operational guidance and data packages in support of training and standards that mitigate risk of fatal accidents such as the loss of control, runway excursions, and runway overruns in the terminal area.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for A.h Air Traffic Control Technical Operations Human Factors**

---

**FY 2021 – A.h Air Traffic Control Technical Operations Human Factors - Budget Request  
(\$000)**

<b>Program Activity</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
A.h Air Traffic Control/Technical Operations Human Factors	5,800	5,800	5,685

**What is this program and what does this funding level support?**

---

This research program provides timely products and consultation services focused on improving the safety and efficiency of complex air traffic control (ATC) systems. Research addresses FAA Air Traffic Organization (ATO) challenges in five human factors R&D focus areas: (1) guidance to reduce air traffic controller and technician errors and improve safety; (2) development of human factors design guidance and standards as well as human factors studies to support integration of technology into the National Airspace System (NAS); (3) methods and data to optimize the controller and technical operations workforces; (4) development of recommendations and methods for enhancing human performance, including individual and team performance; (5) developing recommendations to improve FAA flight inspection operations and maintenance. As the aviation industry has no motivation to fund cross-cutting human factors research that will improve the ATC system, there is no other source for the critically important human factors scientific and technical information that we obtain to support ATO requirements.

The program strives to provide useful human factors R&D results that support the ATO's development and implementation of new technologies and procedures in the NAS, in accordance with FAA Order 9550.8 *Human Factors Policy*.<sup>3</sup>

ATO human factors research needs are also driven by the evolution of the workforce and the advancing technologies and associated procedures that are expected to be implemented in the NAS over the next several years through the Next Generation Air Transportation System (NextGen). The workforce challenges are especially acute in the large terminal radar air traffic control facilities (TRACONs) and in several of the busy air route traffic control centers (ARTCCs). The FAA must hire, place, and train several thousand new air traffic controllers in the coming years, while continuing to provide safe and efficient air traffic services to the users of the NAS with a dwindling number of fully qualified staff (Certified

---

<sup>3</sup> *'Human factors shall be systematically integrated into the planning and execution of the functions of all FAA elements and activities associated with system acquisitions and system operations. FAA endeavors shall emphasize human factors considerations to enhance system performance and capitalize upon the relative strengths of people and machines. These considerations shall be integrated at the earliest phases of FAA projects.'*

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

Professional Controllers).<sup>4</sup> The FAA will also need to address a shortage of several hundred technical operations specialists, who are essential for maintaining and certifying systems and services for use in the ATC system. Funding in FY 2021 will improve the efficiency with which ATO can select and train new aviation professionals needed to operate, maintain, and conduct essential flight inspection operations in the NAS.

Additionally, funding will provide for engineering, technical, and management support of overall research activities.

**Major Activities and Accomplishments Planned in FY 2021 Include:**

Human Factors R&D to Support Controller Selection, Placement, and Training Performance Evaluation

- **Research to Support Controller Training for Trajectory Based Operations.** Conduct controller task performance research that identifies metering skills for ATC System Command Center (ATCSCC) personnel and the potential improvements in scenario-based training that result.

Human Factors R&D to Support Air Traffic Control Safety and NAS Technology Integration

- **Research to Address Controller Workload with New Entrant Operations in the NAS.** Conduct human performance modeling research to identify potential controller workload impacts with mixed traffic types operate in controlled airspace, for a variety of aircraft types and missions, beginning in the TRACON environment.
- **Research to Support Safety by Addressing Controller Fatigue.** Conduct controller survey studies to determine the extent to which perceived controller workload contributes to the perception of fatigue.
- **Research to Improve Controller Performance and Safety in the NAS.** Continue research to develop recommended training on best practices for controller visual scanning in a variety of traffic situations and to reduce the likelihood of wrong surface landings.

Human Factors R&D to Support ATO Flight Program Office Operations and Maintenance

- **Research to Address Flight Inspection Aircraft Maintenance and Inspection Efficiencies.** Develop and apply a method to establish normative task durations and workflows for FAA King Air 300 flight inspection aircraft maintenance and inspections.

**Goals for FY 2021 Funding:**

- By 2022, develop recommendations regarding improved, alternative, more efficient training technologies for newly hired ATC personnel over the next decade.

---

<sup>4</sup> FAA Controller Workforce Plan, 2019-2028

[http://www.faa.gov/air\\_traffic/publications/controller\\_staffing/media/2018-ABA-200-CWP\\_2019\\_Report\\_508.pdf](http://www.faa.gov/air_traffic/publications/controller_staffing/media/2018-ABA-200-CWP_2019_Report_508.pdf)



- By 2023, recommend a method for establishing normative task durations and work process flows for FAA King Air 300 flight inspection aircraft maintenance and inspections, in order to update aircraft maintenance tasking to that of industry best practices for maintenance task labor resources, cost, safety, and product output.
- By 2024, identify controller best practices for visual scanning in tower facilities, and develop guidance and recommended training to improve controller performance and safety in the NAS.
- By 2025, recommend procedures and best practices to address air traffic controller performance factors contributing to wrong surface runway safety events.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

The NAS is a human-centered enterprise. Human performance is a key factor in total system performance, and enhancements to human performance will contribute to enhancing the total system's performance, reducing errors, and helping reduce life cycle ownership costs. The FAA's Human Factors research program provides products to enhance the quality of this service through the successful integration of the human into the total system. The research program contributes scientific and technical information to the Air Traffic Organization to inform policies and system design decisions that will prevent and reduce transportation-related fatalities and serious injuries across the transportation system. The benefit is reflected in improvements to air traffic safety and efficiency, which are both necessary for an air transportation system that serves the American public.

**Improving Infrastructure:** This program provides the human factors research and expertise upon which FAA system development programs rely to ensure that FAA ATC/TO systems are accepted by the user community and utilized to achieve maximum operational benefit. These investments in our NAS infrastructure ensure safety, mobility, and accessibility; and NextGen efficiencies are expected to stimulate economic growth, productivity, and competitiveness for American workers and businesses.

**Increasing Innovation:** FAA research identifies and develops recommended mitigations for human factors challenges in the design of new and enhanced NAS systems and capabilities. The intent is to improve human-system performance and the resilience of the air traffic system when system anomalies occur (e.g., when equipment or software degrades or fails).

**Promoting Safety:** A review of the FAA ATC five greatest safety concerns during recent years shows that all of the issues involve controller performance. The human factors program is responsible for proactively identifying the potential for human error and recommending mitigations to reduce the probability that people will make errors, minimize the impact of such errors, and through the informed application of technology and

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

procedures, enhance the potential for human operators and maintainers to arrest the error and recover in a timely manner.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for A.i Aeromedical Research**

---

**FY 2021 – A.i Aeromedical Research - Budget Request  
(\$000)**

<b>Program Activity</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
A.i Aeromedical Research	9,080	7,919	10,235

**What is this program and what does this funding level support?**

---

The Aeromedical Research Program develops new and innovative ways to support FAA regulatory and advisory missions to improve the safety of humans in civilian aerospace operations. Personnel at the Civil Aerospace Medical Institute (CAMI) in Oklahoma City, Oklahoma, discover methods and recommend strategies to enhance the safety of the most important aspect of the National Airspace System (NAS): the human (e.g., the operator and the public who she/he serves). CAMI is the only entity that performs this work on behalf of the U.S. The results of this research improve aeromedical certification decision-making processes, education programs, accident investigation practices, certification of aircraft equipment and protective devices, and harmonization of standards across the world.

Aeromedical research is performed by in-house personnel of the Aerospace Medical Research Division of CAMI. The division has two branches, Bioaeronautical Sciences and Protection & Survival, each with five research teams. The program is formulated to keep abreast of emerging human safety risk issues such as those brought by the aging pilot population with changes in their health condition and accompanying therapeutic solutions. It also concerns aircraft materials, equipment, cabin configurations, life support systems, and cabin evacuation procedures that may affect survival from an aircraft accident. The program is designed to address the complexity of continuously evolving software, technology, and systems integration practices. Advances in computational biology, omics sciences, modeling, simulation, and tools to facilitate the integration of large aeromedical data sets containing disparate information will lead to improved knowledge management and decision-making processes in aerospace medicine.

This program addresses 7 research areas identified as priorities in White House (OMB & OST) Memorandum M-17-30: (1) Prosperity. FAA is the only entity engaged in the discovery of biomarkers that signal fatigue, hypoxia, impairment, and disease in civil aviation operations. (2) Health. We are the only entity that has the information and facilities to conduct research pertinent to incapacitation in-flight; aging U.S. airmen; and medications used by the same. (3) Accountability & Efficiency. Our products are peer-reviewed and available to the public - findings are based on sound science and do not duplicate others' efforts. Since 2003, the American Board of Forensic Toxicology has accredited our forensic laboratories. All laboratories are accredited by the International Organization for Standardization (ISO 9001:2015

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

and ISO 14001). (4) Modernizing. The FAA just completed an \$18 million investment on its CAMI research equipment and facilities. (5) Innovation. We foster creativity and innovation to provide solutions beyond today's boundaries. (6) Interagency Coordination. Research personnel work with > 54 national and international external agencies (government, industry, and academia). (7) Future Workforce. Our success depends on the diversity and commitment of our personnel. The program actively supports STEM goals via internships and attracts talent due to the quality of our workforce and state-of-the art facilities.

Additionally, funding will provide for engineering, technical, and management support of overall research activities.

**Major Activities and Accomplishments Planned in FY 2021 Include:**

CAMI Aerospace Medical Systems Analyses

- Production of technical reports about inflight medical events and improved galactic cosmic radiation
- Delivery of a 5-year report to Congress on the impact of BasicMed policy

CAMI Aerospace Medical Accident Investigation & Prevention

- Production of technical reports related to opioids, toxicology, sleep deprivation, and pilot response to sleep schedule disturbances

CAMI Human Protection & Survival

- Creation of a protocol for the effects of medications on human performance at altitude
- Report on the effects of cabin seat pitch and alternative seat configurations on evacuation

**Goals for FY 2021 Funding:**

- By 2022, provide an assessment of new safety equipment/technology that can be retrofitted onto legacy rotorcraft. Examples are adding four-point harnesses for all occupants, inflatable seatbelts and airbags, including side impact airbags (for rollover phenomena) and dynamic seats/energy absorbers for occupants

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

In-house aeromedical expertise is fundamental to the continued technical and scientific discovery that would assure the future of the FAA as a world leader in aviation safety. It is critical to the safety mission of the FAA to maintain and enhance its aeromedical research program, recognized as unique in the nation for civilian aviation operations, and a model sought by international civil

aviation authorities. The efficacy of any product introduced in the NAS will be compromised if the safety and health of the user of such products (operators and customers) is neglected. The FAA's aeromedical research activities (a) promote transparent and collaborative scientific discovery, (b) allow for continuous development and high risk/returns, and most importantly, (c) ensure sharing of results and independent science and technology assessments in support of the regulatory mission of the FAA.

The aeromedical research program is unique in its expertise regarding human vulnerability in civil aviation. The results of aeromedical research benefit the American public by providing:

- (1) Continued Operational Safety – Results of research maximize the strengths of the human link in the NAS by improving human safety through evidence-based medicine.
- (2) Enhanced Standards and Policy – Investigation and analysis of injury and death patterns in civilian flight accidents and incidents enable the development of preventive strategies.
- (3) Risk Management – The results of this research support accident investigation, aircraft certification, flight standards, and medical certification processes to identify hazards and augment aeromedical safety information systems towards an Aeromedical Safety Management System.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for A.j Weather Program**

---

**FY 2021– A.j Weather Program - Budget Request  
(\$000)**

<b>Program Activity</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
A.j Weather Research	15,476	12,911	6,236

**What is this program and what does this funding level support?**

---

As the aviation meteorology authority for the United States, the FAA is solely responsible for determining aviation weather requirements and weather research programs regarding impacts on the National Airspace System (NAS). The FAA's Weather Program, in particular, performs applied research intended to mitigate the impact of weather on the NAS. It mitigates weather related NAS safety and/or traffic flow efficiency issues with a line of sight to operational exploitations. Applied research supports the evolution of legacy weather capabilities that meet the weather information needs of today's NAS users into the capabilities that are being developed/deployed as NextGen decision-support weather processes. The program frequently collaborates with the FAA's designated weather provider, the National Weather Service (NWS).

The Weather Program leverages research activities with members of industry, national laboratories, and other government agencies through interagency agreements, contracts, and memorandums of cooperation. The Weather Program partners with the National Oceanic and Atmospheric Administration (NOAA) to develop high resolution rapidly updating models that have and continue to be implemented into NWS operations. These modeling efforts have resulted in enhanced diagnosis and forecasts of weather hazardous to aviation, including turbulence, convective weather, ground and in-flight icing and restricted ceilings and visibility (C&V). Weather Program radar technique development efforts - also developed in partnership with NOAA - have been implemented into NWS operations and are enhancing in-flight icing, turbulence, and convective weather forecast capabilities.

In-flight and ground icing diagnosis and forecast capabilities developed by the Weather Program are being used by aircraft dispatchers and pilots to make ground deicing decisions and takeoff and landing decisions, and by pilots, dispatchers, and controllers to make flow and route of flight decisions. These efforts are being coordinated and leveraged with radar technique development at the NOAA. The Weather Program has also developed Continental United States (CONUS) turbulence forecast capabilities. Planned efforts will address the expansion of turbulence capabilities globally in harmonization with International Civil Aviation organization (ICAO) requirements.

Additionally, funding will provide for engineering, technical, and management support of overall research activities.

**Major Activities and Accomplishments Planned in FY 2021 Include:**

- Complete domain expansion of OPC to include CONUS, Hawaii, and Guam and transition to the NWS and/or the PMO.
- Complete development of enhancements to the Convective Weather Avoidance Model and transition to the PMO.
- Commence development of probabilistic turbulence and high resolution turbulence nowcast capabilities.
- Commence the transition of camera-based visibility estimates into operations.

**Goals for FY 2021 Funding:**

- By 2022, complete development of high-resolution ceiling and visibility analysis capability to the NWS for implementation into Helicopter Emergency Medical Services Tool (improving safety of operations in areas with limited observation capabilities).
- By 2023, complete a global version of the Offshore Precipitation Capability as well as a 0-12 hour forecast capability for offshore thunderstorms and precipitation.
- By 2024, complete development of a global-scale probabilistic turbulence forecast capability for implementation (reducing aircraft encounters with unacceptable levels of turbulence, increasing passenger safety and airspace capacity).

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

This request will enable the Weather Program to continue to develop and enhance diagnosis and forecast capabilities that will benefit the American public. This will include applied research in naturally occurring atmospheric aviation hazards including turbulence, convective activity, and restricted ceiling and visibility. The FAA will either deploy these capabilities on new or existing platforms and systems or transition them to NWS platforms or procedures through FAA regulations. These benefits include:

- Increased GA safety in Alaska, as focused efforts target enhancements to turbulence, and restricted ceilings and visibility analyses and forecasts.
- Enhancements to convective weather forecasts that minimize gate-to-gate delays and improve efficiency of flights.
- Enhancements to turbulence analyses and forecasts to increase passenger comfort, safety of passengers and crew, safety of GA operations, and increased capacity in the NAS.

The Weather Program works as evidenced by the implementation into operational use of significant safety, capacity, and efficiency enhancing capabilities including:

- Aviationweather.gov is a web-based portal offering access to weather information in text, digital, and graphical formats for a wide community of NAS users including pilots, dispatchers, and ATM. It provides access to forecasts, analyses, and observations of aviation-related weather conditions and hazards, including inflight icing, turbulence, and restricted ceilings and visibility. It is currently operational at the NWS.
- Rapid Refresh Weather Forecast Model, operational at the NWS, provides a 1-hour update rate and 13 km resolution of more accurate wind forecasts and improved forecasts of aviation hazards including en route turbulence, convective weather, in-flight icing and restricted ceilings and visibility over North America and Alaska. This program also funded the development of the High Resolution Rapid Refresh, now operational at the NWS, to provide storm-scale resolution to capture convective activity at the cell level.

The Weather Program supports NextGen operational improvements, FAA Strategic Priorities related to efficiency, capacity, safety, and environmental impacts and the DOT Strategic Plan (2018-2022) goal of Safety. Weather is frequently cited as a primary or secondary cause for accidents and injuries. Per the National Transportation Safety Board, turbulence is the leading cause of inflight injuries and the GA fatality rate in weather related accidents, on average is 35% (GA accounts for 75% of weather related accidents). Between 2007 and 2016, air carrier delay hours were reduced by more than 55%, from 733,000 hours down to 328,000 hours, resulting in savings of more than \$315 million in delay costs. While there are several factors that played a part in this reduction, forecast improvements and weather mitigation techniques developed from Weather Program research efforts directly contributed. However, \$300 million in delay costs still occur annually. Continued evolution of improved forecasting algorithms with applicability to achieving higher aviation safety and capacity during hazardous weather is needed. The Weather Program also supports the need to provide high quality weather observations and forecasts, often in conjunction with the NWS, uniquely designed to allow for rapid and effective decision making by ATM, dispatchers, and pilots to proactively select safe and optimal routes. Weather Program initiatives whether benefitting commercial or GA, advancing science or facilitating integration into NAS decision support processes, are ultimately supporting the achievement of the NextGen weather vision.



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for A.k Unmanned Aircraft Systems Research**

---

**FY 2021 – A.k Unmanned Aircraft Systems Research - Budget Request  
(\$000)**

<b>Program Activity</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
A.k Unmanned Aircraft Systems Research	24,035	24,035	24,035

**What is this program and what does this funding level support?**

---

The Unmanned Aircraft Systems (UAS) Research program supports the FAA's implementation of the Next Generation Air Transportation System (NextGen) by studying safety implications of new aircraft operational concepts and technology to the National Airspace System (NAS) and by supporting the development of new and modified regulatory standards. The program's research activities focus on UAS that are fundamentally shifting the aviation landscape and have the potential to provide a wide range of benefits to society. However, there are technical and regulatory challenges that must be overcome as the FAA works to safely integrate these new technologies into the NAS.

Safe, efficient, and timely integration of UAS into the NAS poses substantial technical challenges not only to the FAA but also to the aviation industry. UAS often use new or novel technologies to achieve unique operational capabilities that challenge the expectations of current NAS users. These unique capabilities have demonstrated potential to address commercial applications as well as scientific research needs. Integrating UAS into the NAS potentially affects the entire NAS due to various sizes of UAS (less than a foot up to the size of a commercial jet), a wide range of maximum take-off weight (less than a pound to the weight of a large jet), large performance disparities compared to existing certificated aircraft, and capabilities of operating in all classes of airspace. Even UAS weighing less than 100 pounds may be capable of operating in Class A airspace and the integration of a significant volume of UAS air traffic could potentially disrupt normal aircraft traffic flow and induce unknown safety hazards.

Research is the key to solving integration challenges and unlocking potential UAS societal benefits. FAA-sponsored research results are being used to shape rulemaking, guide decision-making, and grow the UAS industry. Applied research will continue to be critical to safe integration of UAS into the NAS, and to reaping their potential societal benefits. Activities within the UAS research program are aligned with the FAA's UAS integration strategy. The UAS research program must remain agile and adaptive in order to keep up with the pace of industry innovation and to respond to FAA, DOT, and White House executive priorities and those mandated by Congress.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

Research results will continue to drive the FAA's decision-making process, inform rulemaking, enhance operational procedures and air traffic management, and maintain safety. UAS research and analysis yields data and results to inform decision-making processes. Research generates technical information to support development of rules, policies, guidance materials, advisory circulars, and FAA Safety Management System.

The FY 2021 portfolio of UAS research will focus on standards to enable beyond visual line of sight operations, safety data collection and risk-based assessments, advancing UAS concepts and applications, enhanced security, and other research that will support the safe, efficient, and timely integration of UAS in the NAS within the 14 Code of Federal Regulations (CFR) regulatory framework. Additionally, funding will provide for engineering, technical, and management support of overall research activities and support the integration of UAS into the NAS by studying new operational concepts and technology, and providing information that supports the development of new rules and regulatory standards. Outcomes of this research may also lead the development of new procedures or modifications to NAS equipment.

**Major Activities and Accomplishments Planned in FY 2021 Include:**

FY 2021 research activities are categorized according to key thrust areas that directly support FAA Aviation Safety strategic goals.

UAS standards research supports the strategic goal of safety through the achievement of performance standards. FY 2021 research will inform the development and validation of UAS standards related to:

- Detect and Avoid performance for both small (below 55 lbs) and large UAS, to enable beyond visual line of sight operations
- Command and Control link performance
- UAS standards analysis to track and map existing standards, and to identify gaps in UAS standards
- Severity of small UAS impacts with commercial transportation aircraft engines
- Test methodologies to validate operational safety cases and to certify small UAS
- UAS pilot and visual observer training and qualification

Research on data collection and risk-based assessments supports the strategic goal of safety through the improvement of data collection methods and analyses. FY 2021 research includes:

- Development and enhancement of UAS safety data collection and reporting processes in support of the UAS regulatory framework

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

- Collection and analysis of UAS data to identify safety risks for industry and government partners within the UAS Safety Team
- Identification and evaluation of potential risks of UAS operations on and around the airport surface

Research on advanced UAS concepts and applications (including Urban Air Mobility) supports the strategic goals of safety, innovation, and infrastructure. The expanding set of UAS use cases brings integration challenges that must ensure the safety of the NAS. These new use cases also promote new technologies and practices into transportation systems, and the NAS systems, equipment, and procedures must be robust and resilient in order to support these operations safely. FY 2021 research in these areas include:

- Evaluations of UAS operations for wake turbulence considerations with emphasis on Urban Air Mobility
- Evaluations of the demand and safety impacts, focusing on increased UAS autonomy for large UAS cargo and passenger transport operations
- Exploring Air Carrier Operations for UAS to inform requirements and regulatory efforts
- Investigating the use of UAS in response to natural disaster and emergencies, focusing on coordination between federal agencies and state/local governments

Research on UAS security supports the strategic goals of infrastructure and innovation, through the need to protect critical infrastructure, data, and aviation systems. Security research in FY 2021 includes:

- Identification of risks and proposed mitigations related to UAS security, including cybersecurity
- Exploring Counter UAS detection technologies and their potential impacts on airport operations

**Goals for FY 2021 Funding:**

FY 2021 funding must support the research areas identified above in order to meet FAA objectives for safe UAS integration. As UAS technologies and business cases evolve, so will the demand for increased UAS operations. The FAA must keep up with the UAS community as operations expand, in order to ensure the safety of the NAS and to people on the ground. Research needs that were previously unanticipated may arise due to additional research priorities directed by Congress, as well as the rapid pace of the UAS progression, increased operations, and the associated safeguards and mitigations. Goals for funding include:

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

- By 2021, determine common risks and additional safety requirements from the BVLOS Concept of Operation (ConOps) and Operational Risk Assessment (ORA).
- By 2021, conduct experiments and related analysis for air carrier UAS remote pilot crew staffing and requirements.
- By 2021, continued operation of the UAS Center of Excellence for UAS research activities.
- By 2021, expose students to current FAA rules and regulations that apply to drones.
- By 2022, conduct designed experiment(s) and related analysis as defined for UAS air carrier remote pilot knowledge and skills testing.
- By 2022, establish the scope of non-segregated operations co-existing, with restrictions, in controlled airspace with manned aircraft.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

The safe integration of unmanned aircraft into the NAS is a significant challenge. Current UAS research contributes and informs technical and regulatory standards, policy guidance, and operational procedures on which successful UAS integration depends. These research efforts significantly contribute to addressing the challenges of integrating UAS into the NAS by leveraging studies of UAS operations and associated technologies. These research programs will help develop unmanned aircraft systems, training, technology, and procedures that increase the safety of UAS operations and increase the confidence of the American public that UAS flights can be safely and efficiently integrated into national airspace. The research will facilitate approval and use of systems that prevent accidents and help reduce the severity of UAS accidents in the NAS.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for A.I Alternative Fuels for General Aviation**

---

**FY 2021 – A.I Alternative Fuels for General Aviation - Budget Request  
(\$000)**

<b>Program Activity</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
A.I Alternative Fuels for General Aviation	1,900	1,900	2,524

**What is this program and what does this funding level support?**

---

The FAA is the sole certification authority for the U.S. aviation community. This program generates the research data required to support FAA modification or creation of policy, guidance, and rulemaking that ensures the safety and continued airworthiness of aircraft and their propulsion systems using alternative fuels, which includes new energy storage systems. This research includes the evaluation and safe integration of new fuels, and the evaluation of associated propulsion systems and aircraft for the safe integration of these new technologies into the General Aviation fleet and the National Airspace System. In addition, research supports industry standards bodies and research sharing organizations for the development of standards and for the understanding of safe operation of current and new aircraft technologies. This research also supports similar policy, rulemaking, and guidance activities designed to enhance the airworthiness, reliability, and performance of these systems for reduced environmental impacts and increased operational efficiencies.

Approval of new fuels and propulsive technologies creates certification challenges for the FAA. The FAA is faced with considerable difficulty in both applying existing and creating new regulations, policy, and guidance to address these new alternatives. Further, authorizing the use of new technologies into the existing fleet and associated airspace system creates its own unique set of challenges. The impact on performance, operability, and compatibility with aircraft and engine propulsion systems needs careful evaluation before approving use of alternative fuel and energy sources. Research conducted at the Propulsion and Airpower Engineering Research (POWER) and Aviation Fuel Research Laboratories (AFRL) and other laboratories is used to support FAA certification and rulemaking, and industry standards maintenance and development, for the authorization for use of alternative fuels, the evaluation of fuel and energy performance specifications, the safety evaluation of novel propulsive technology and energy storage systems, modifications to existing type certificated engines and airframes, the safe transition to more environmentally friendly technologies, and the development of regulatory and guidance materials. This research is conducted under coordination with industry to leverage FAA state of the art research facilities and expertise as well as using private industry, other government agencies, and Centers of Excellence (COEs) to provide additional capabilities and maximize the return on combined public/private research funding.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

This funding level supports laboratory materials, test equipment, test support systems, ground based testing, altitude simulation testing, and in-flight testing at state-of-the-art laboratories and Center of Excellence (COE) facilities. Research also includes unleaded fuel replacement and associated engine and airframe technologies to support the Piston Aviation Fuels Initiative to address the recommendations of the Unleaded AVGAS Transition Aviation Rulemaking Committee, and to comply with section 504 of the FAA Reauthorization Act of 2018 Public Law No: 115-254. Additionally, funding will provide for engineering review and modification, technical upgrades, and management support of overall research activities and research laboratories in accordance with FAA Order 2500.8B.

Additionally, funding will provide for engineering, technical, and management support of overall research activities.

**Major Activities and Accomplishments Planned in FY 2021 Include:**

- Investigate the fit-for-purpose performance of alternative fuels in conformance with FAA and industry standards.
- Perform testing on alternatives for compliance to FAA regulations and industry standards.
- Investigate material compatibility issues on alternative fuels for safe integration into the GA fleet.
- Acquire test related equipment, and perform testing on alternative energy systems and related propulsive technologies per industry and FAA standards.
- Complete Technology Transfer with one or more Cooperative Research and Development (CRADA) or Memorandum of Understanding (MOU) holders.

**Goals for FY 2021 Funding:**

- By 2023, complete material compatibility testing on alternative fuels, including Center of Excellence (COE) cooperative research, for safe integration into the GA fleet.
- By 2023, develop engine and aircraft fuel systems and operational modification recommendations for testing to support alternative fuels.
- By 2024, complete the research and Technology Transfer on testing. This includes data for industry to support ASTM Production Specifications.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

This program benefits the American public by supporting Federal Research Priorities in the areas of:

Safety - As new alternative fuels and energy sources for propulsion are introduced, this program provides critical research products to industry through technology transfer, and internally to the FAA Certification Office. This research increases the knowledge base and understanding of the safety and airworthiness issues related to: the approval of new entries into the fleet, as well as impacts on the continued airworthiness on existing airframes from these technologies. The end outcome is to maintain the safe operation of the GA fleet as it transitions to alternative technologies;

American Health - Successful and safe transition to environmentally friendly alternatives will improve the environment for all Americans. This includes the elimination of lead from aviation gasoline, a known major health hazard, from aviation sources at over 16,000 public and private airports and landing facilities accessible to the GA community nationwide;

American Prosperity – Directly or indirectly, general aviation (GA) accounted for over 1.1 million high-skilled, high-wage jobs in professional services and manufacturing in 2015 and contributed over \$219 billion to the U.S. economy. This program supports research and regulatory action to ensure that the economic contributions of the GA segment are not impeded by new technologies or sudden international market changes based on European regulatory actions;

Government Accountability – Industry has invested, and continues to invest heavily in cooperative research activities in support of these efforts.

This program is necessary to support PL No. 115-254 – the FAA Reauthorization Act of 2018 as well as the 5 key and 14 supplemental recommendations from the Unleaded AVGAS Transition Aviation Rulemaking Committee (UAT-ARC). One of those recommendations was for the FAA to establish a centralized certification office to address the concerns raised with authorizing the use of alternative fuels in the GA fleet. The FAA completed this with the establishment of AIR-20. In PL No. 115-254 – the FAA Reauthorization Act of 2018, Congress and the White house directed the FAA to allow the use of unleaded aviation gasoline in aircraft upon the completion of certain criteria. A targeted completion of 2024 was called out in the 2018 Reauthorization. Without the Cooperative Research conducted with industry and academia under this program, the agency, via the AIR-20 office, will not be able to meet this objective.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for A.m Commercial Space Transportation Safety**

---

**FY 2021 – A.m Commercial Space Transportation Safety- Budget Request  
(\$000)**

<b>Program Activity</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
A.m Commercial Space Transportation	2,500	2,500	5,840

**What is this program and what does this funding level support?**

---

The primary mission of the FAA Office of Commercial Space Transportation (AST) is to “protect the public health and safety, safety of property, and national security and foreign policy interests of the United States”<sup>5</sup> during commercial launch and reentry operations. Additionally, Congress tasked AST with “promoting the continuous improvement of the safety of launch vehicles designed to carry humans.” Research priorities included safe integration of commercial space into the NAS, spaceport infrastructure, systemic safety initiatives, and regulatory reform, aligning directly with the FAA R&D outcomes and goals, National Space Council/Department of Transportation strategic goals and objectives, and OMB’s FY 2020 Research and Development Budget Priorities.<sup>6</sup>

AST’s CST R&D program supports the development of a 21st century licensing regime, through regulatory streamlining and innovation to support DOT’s strategic goal of accountability.<sup>7</sup> The results include improved regulations and industry guidance material to address lessons learned and to keep pace with the dynamic commercial space transportation industry. CST R&D provides industry with flexibility to innovate, by allowing AST to regulate only to the extent necessary, and to execute its responsibilities under Presidential Space Policy Directive-2 (SPD-2)<sup>8</sup> and SPD-3.<sup>9</sup> AST plans include research to improve regulations that govern launch and reentry sites and operations, as well as industry guidance to support industry compliance with AST regulations.

In accordance with DOT’s published Strategic Goals and Objectives, CST R&D develops and deploys a range of innovation to facilitate the safe and efficient integration of space traffic through the NAS, ensure the safety of population centers, and avoid overly burdensome regulatory approaches. AST’s research will advance innovation to increase safety and efficiency while passing through the NAS. The CST R&D program also focuses on systemic safety by applying a risk-based approach on advanced vehicle safety technologies, human spaceflight, and

---

<sup>5</sup> Quotes in this paragraph cited from 51 USC Chapter 509 – Commercial Space Launch Activities, Sec. 50901. Findings and purposes.

<sup>6</sup> Office of Management and Budget Memorandum, FY2020 Administration R&D Budget Priorities, July 31, 2018, p. 3 and 5.

<sup>7</sup> U.S. Department of Transportation, Strategic Plan for FY 2018-2022, February 2018, p. 30.

<sup>8</sup> Executive Office of the President, Space Policy Directive-2, May 24, 2018, Sec 2(b).

<sup>9</sup> Executive Office of the President, Space Policy Directive-3, June 18, 2018, Sec 6(b)-(h).



physiological safety guidelines that provide a direct benefit to the strategic needs of industry (e.g., improved preparation and operations, and ensuring safety of human spaceflight occupants).

The multiple research activities included in the FY 2021 R&D program will support the four research priorities mentioned above. Examples include improving predictions of environmental conditions for launch and reentry to ensure safe integration of air traffic management during space vehicle operations, and refining collision avoidance analysis methods. Other tasks, such as developing spaceport siting tools, focus on the priority of improving spaceport infrastructure. Tasks supporting the priority of overall systemic safety of commercial space include the creation of a launch vehicle breakup database to determine aircraft debris vulnerability. Finally, the priority of regulatory streamlining includes developing leading-edge methodologies in performance-based regulations (PBRs), and investigating new standards that improve fidelity and reduce overly burdensome or conservative regulatory approaches. Through this approach, the industry can be regulated to the least extent necessary while maintaining safe operations. Overall, FY 2021 funding will continue the activities to meet AST's needs for an improved regulatory framework, safety assessment methods, and industry guidelines and technologies. This important research will allow AST to keep pace with the dynamic CST industry.

Additionally, funding will provide for engineering, technical, and management support of overall research activities.

**Major Activities and Accomplishments Planned in FY 2021 Include:**

- Develop improved models and methods to reduce over-conservatism applied to airspace keep-out areas used to protect against launch or re-entry failures.
- Continue work on spaceport site location prototyping tool for assessing the site integration and safety challenges using data on air-traffic and airport operations, space vehicle trajectories and hazard areas, data on other transportation modes, population centers, and critical national assets.

**Goals for FY 2021 Funding:**

- By 2022, develop methods to share data and software tools that estimate aircraft hazard areas suitable for use in early design and mission planning.
- By 2022, provide performance based regulation recommendations and guidance, to support regulatory reform for commercial space, enabling greater flexibility for operators.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

Protecting the safety of the uninvolved public and their property from the potential consequences of commercial space launches and reentries demands that the FAA keep pace with the emerging technologies and operational concepts coming from a diverse and exponentially growing industry. The areas discussed above highlight critical topics that must be addressed for AST to achieve its statutory missions. Funding the program at the requested level will allow the FAA to continue to develop the portfolio of high-value research activities designed to ensure that CST is efficiently regulated in a streamlined manner that prioritizes public safety, reduces overly burdensome regulatory regimes, and facilitates the competitiveness of the U.S. in the international marketplace.

AST has consistently conducted license and permit application evaluations resulting in determinations made within the statutorily mandated time limit to ensure the continued safety of the public. This record has been maintained while experiencing significant growth in the number of space launch systems, operators, and spaceports, the complexity of operations. This research program will position the FAA to have increasingly timely guidance and regulations, and improve our responsiveness to this emerging sector. Similarly, the industry would benefit from improved techniques, practices, and technologies that result from a strong FAA commercial space R&D program.

The CST industry has noted that some regulations in 14 CFR 400 have not kept pace with modern operations and technology, such as the lack of requirements or formal guidelines for autonomous flight safety systems. The public and industry will benefit from a modernized set of efficient and effective CST regulations. A safe and efficient CST industry will help maintain an assured space access capability to meet U.S. government needs, and strengthen U.S. competitiveness in the international commercial launch market. A healthier, more competitive U.S. space transportation industry will facilitate new markets, encourage new industries, create high technology jobs, lead to greater economic growth and security, and promote the U.S. leadership role in space. In addition, improving the cost effectiveness of CST would allow the U.S. Government to invest a greater share of its resources in other needs, such as facilities modernization, technology advancement, scientific discovery, and national security.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for A.n NextGen – Wake Turbulence**

---

**FY 2021 – A.n NextGen – Wake Turbulence - Budget Request  
(\$000)**

<b>Program Activity</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
A.n NextGen - Wake Turbulence	6,831	5,000	3,698

**What is this program and what does this funding level support?**

---

This research program aims to create additional throughput capacity gains by developing wake separation standards that adjust to the atmospheric conditions encountered by the aircraft and through evaluating the flight performance of the leading and following aircraft. These complex technology-based dynamic air traffic control (ATC) wake hazard mitigation solutions and associated decision support tools are expected to increase National Airspace System (NAS) runway throughput capacity another 5-7% above what can be achieved with current static wake separation procedures and implemented by the FAA's Wake Re-Categorization (RECAT) program. This research also provides ATC the wake hazard mitigation separation for new aircraft types being introduced into the NAS. Other near-term products produced by this program are ATC wake mitigation procedural solutions that help alleviate delays due to airport construction and runway maintenance projects that restrict airport operations.

Increasing NAS throughput capacity is the major focus of this research program; however, it also supports the analyses required to determine that the program's products will not adversely affect NAS safety. Developing safe, capacity-efficient, ATC wake hazard mitigation solutions requires measured wake decay and transport data to validate the analytical and probabilistic models. This data is used in evaluating proposed changes in wake hazard mitigation procedures. Aircraft generated wakes are not visible and do not lend themselves to be sufficiently detected by today's ground-based and air-based surveillance systems. Currently, the program has three wake data collection sites located close to major airports, using prototype light detection and ranging systems to collect and compile measured tracks of aircraft generated wakes. This program also analyzes wake data collected in flight by the Canadian National Research Council and wake data collected by NASA in collaboration with other research organizations. The data is used to validate the outputs of wake transport and decay models in development for evaluating proposed ATC wake hazard mitigation solutions and ATC wake hazard mitigation decision support tools. Early versions of these models are already contributing to safety case analyses for paired departures and proposed changes to intersection departure separations as part of an enhancement to ATC's use of RECAT wake mitigation separations.

Outputs of this research program that do not require any changes to the NAS infrastructure - such as recommendations for wake hazard mitigation separation standards for new aircraft (A380,

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

747-8/9, 787) go directly into operational use. Yearly, there are 25 to 125 new aircraft types recognized by International Civil Aviation Organization (ICAO), which the FAA must assess for wake turbulence categorization. While this must be done for all aircraft types, the FAA has a special commitment to the National Transportation Safety Board (NTSB) to assess Super, Heavy and Upper large aircraft for wake turbulence separations (in front and behind) prior to entry into service. These required assessments are accomplished by the NextGen – Wake Turbulence research program in partnership with Flight Standards.

The funding level supporting this research program addresses the needs of the FAA Air Traffic Organization and the Aviation Safety Organization to ensure new throughput capacity-increasing procedures and technology solutions are safe in terms of wake encounter risk. The program also provides the knowledge-based applied wake research, which has and will continue to enable incremental increases in airport and air corridor throughput capacity. It also provides analyses requested by airports (and associated air carriers) to determine if their runways can qualify for use of ATC wake mitigation procedures that would result in higher runway throughput capacity. The research program works with controllers, airlines, pilots, and aircraft manufacturers to include their recommendations and ensure training and implementation issues are addressed in the program's research from the start. Customers receiving direct benefit from this program include: pilots, FAA ATC, flight standards organizations, air carriers, and airport operators. Stakeholders include: commercial pilot unions, FAA unions, other ICAO, air navigation service providers, and aircraft manufacturers.

The NextGen – Wake Turbulence research program funding addresses both the FAA's near-term need (capacity-enhancing wake mitigation procedures and processes) for enhancing current operations and developing wake mitigation solutions that will be required as FAA transitions to trajectory-based and flexible terminal operations.

Additionally, funding will provide for engineering, technical, and management support of overall research activities.

**Major Activities and Accomplishments Planned in FY 2021 Include:**

- Assess new aircraft types entering service in the NAS for wake separation recommendations.
- Develop wake encounter mitigation technology aided concepts/procedures for manned aircraft en-route trajectories.
- Develop wake encounter mitigation technology aided concepts/procedures for integrated Unmanned Aircraft System (UAS) operations in the NAS.

**Goals for FY 2021 Funding:**

- By 2022, determine required wake separations for new aircraft entering service in the NAS.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

- By 2022, update the Generic New Aircraft Type Methodology to include UAS assessment capability.
- By 2023, develop feasible concepts including procedures, processes, and applications of NextGen era capabilities that allow the safe relaxation of the ATC wake encounter hazard mitigation constraint on NAS throughput capacity.
- By 2024, make available algorithms for use by flight deck avionics and ground-based ATC decision support tools that will allow safe and throughput-efficiency, dynamically adjusted wake hazard mitigation separations and operations between aircraft.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

The research by the NextGen – Wake Turbulence Program provides necessary data and modeling results to drive the development of safe, more advanced capacity-efficient ATC wake mitigation solutions and standards that will add an additional 5-7% throughput capacity in the NAS. More airports and air corridor throughput capacity translates into:

- lower operating costs for air carriers and the ability to expand their business without airports having to invest in difficult (public resistance) and costly runway construction projects
- reduced flight delays – especially those associated with weather events - for passengers.
- widening of flight choices for passengers and potential reduction of fares due to increased competition between air carriers
- more direct flight paths and a corresponding reduction in emissions and noise

The NextGen Advisory Committee formed the Joint Analysis Team (JAT) by bringing together operational and analytical experts from the FAA and industry. The JAT analysis methodology for ReCat has been applied to multiple ReCat 1.5 implementation sites (CLT, ORD, MDW, IND) and a ReCat 2.0 site (PHL) using different aircraft pair separation matrices. The JAT conclusions estimated yearly savings in airborne and taxi times of \$6,451,000.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for A.o NextGen – Air Ground Integration Human Factors**

---

**FY 2021 – A.o NextGen – Air Ground Integration Human Factors - Budget Request  
(\$000)**

<b>Program Activity</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
A.o NextGen - Air Ground Integration	6,757	5,300	6,757

**What is this program and what does this funding level support?**

---

The NextGen – Air Ground Integration Human Factors program provides the strategic research foundation for FAA to update guidelines, handbooks, Orders, Advisory Circulars (ACs), technical standards orders, procedures, and regulations that help ensure the safety and efficiency of current and future aircraft operations. Human factors work products aim to improve operational human performance and support FAA personnel who evaluate emerging flight deck systems, procedures, and operations. In FY 2021, the program will focus research in these areas:

NextGen Aircraft Systems and Controls research (Avionics Design & Evaluation, Advanced Vision Systems) will evaluate the human-system performance benefits and limitations of emerging flight deck technologies, systems, and controls. Products from this research identify and address human factors installation and integration issues that could arise when combining NextGen aircraft changes with legacy technologies, systems, controls, and their respective mode(s) of operation. Products from this research will also characterize human factors and pilot performance considerations related to the use of future technologies, such as sensor-based technologies and displays, for new concepts of operation.

NextGen Human Error Mitigation research (Human Error & Complex Systems) will examine human factors vulnerabilities that may be introduced by flight deck technology design alternatives, automated systems, and future NAS operations. Products from this research will identify and address human-system integration gaps, human-system interface issues, and NextGen operational impacts that could increase the opportunity for human error in future NAS operations. This research will also address system resiliency impacts, pilot task management needs, and pilot information management needs.

NextGen Flightcrew Readiness research (Procedures, Tasks, Skills, Training) will evaluate new concepts of operation to identify their impact to pilot knowledge, skills, and abilities and flightcrew training and checking requirements. Products from this research will identify and address human performance impact(s) introduced by new NextGen normal, rare normal, and non-normal operations. It also will evaluate the effectiveness of future training and checking methodologies. This research aims to support the successful implementation and operational use of future NextGen air/ground capabilities and procedures.

NextGen NAS and Flightcrew Procedures research (Instrument Procedures) will proactively identify and address operational integration issues that could result from the implementation of complex NAS procedures, flight deck procedures, and advanced separation management concepts. Products from this research will identify and address the impact of procedure design alternatives (e.g. fly-ability, workload, cognition, usability) on flightcrew performance, including flight path monitoring and flight path management needs. This research will also address flightcrew information display needs (e.g. charting) and the human performance impact of procedure-based complexity factors.

Additionally, funding will provide for engineering, technical, and management support of overall research activities.

**Major Activities and Accomplishments Planned in FY 2021 Include:**

NextGen Aircraft Systems and Controls Research (Avionics Design & Evaluation, Advanced Vision Systems)

- Assess the human factors acceptability and usability of minimum cockpit display of traffic information (CDTI) display requirements during dependent runway operations to inform future avionics standard updates (DO-361A, DO-328B).
- Evaluate the FAA's visual advantage concept to support the expansion of low visibility technology benefits and maintain a high-level of operational human-system pilot performance.

NextGen Human Error Mitigation Research (Human Error & Complex Systems)

- Evaluate low energy awareness and alerting (LEAA)/predictive system state awareness (PSSA) technology prototypes to identify emerging human factors design and evaluation needs.
- Evaluate the impact of interdependent flight deck systems in highly automated aircraft to pilot performance in failure detection, diagnosis, and mitigation, including the impact of aural clutter.
- Evaluate emerging flight deck technologies, including control automation and information automation, to identify task management impacts and their effects on the role of pilots and the expectations placed on them in the future.

NextGen Flightcrew Readiness Research (Procedures, Tasks, Skills, and Training)

- Assess the human factors impact of flight deck information automation systems to future flight operations and pilot cognitive skills.
- Identify and evaluate the impact of emerging flight deck technologies, pilot procedures, and flight deck system dependencies to existing pilot flying/pilot monitoring knowledge, skills, and abilities (KSA).

**NextGen NAS and Flightcrew Procedures Research (Instrument Procedures)**

- Complete a strategic human factors assessment of notional airspace concepts to address operational integration issues and impacts to flight deck procedures and pilot performance.

**Goals for FY 2021 Funding:**

- By 2023, reduced accident rates due to human error with airspace procedure design or use as a causal or contributing factor and improved operational implementation of PBN-based airspace procedures, with reduced need for redesign after initial implementation.
- By 2024, create comprehensive human factors guidelines that will assist certification and flight standards personnel. Examples include:
  - Develop guidance and job aids to assist inspectors in the field
  - Collect empirical data for updating FAA guidance and industry standards
  - Support streamlining the certification approval process

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

This program addresses flight deck and air traffic service provider integration for each operational improvement or NextGen application considered, with a focus on those issues that primarily affect the pilot side of the air-ground integration challenge. Through use of simulation, and demonstration, the program assesses interoperability of tools, develops design guidance, identifies training needs, and verifies procedures to support certification, flight standards, and the FAA's Air Traffic Organization's service units for ensuring safe, efficient, and effective human-system integration in transition of NextGen capabilities.

Research supports development of FAA policy, standards, and guidance required to design, approve, and operate NextGen equipment and procedures. To meet the requirements of new NextGen capabilities, human factors research supports updates to standards for pilot certification and training. Additionally, human factors research will include integrated evaluations of NextGen procedures and equipment to identify and recommend mitigations for air ground integration human factors challenges. In particular, these evaluations will address human performance aspects of multiple concurrent NextGen technologies, procedures, and capabilities.

A U.S. Congress, Office of Technology Assessment report titled 'Safe Skies for Tomorrow' concluded that long-term improvements in aviation safety will come from human factors solutions and that such solutions are established through consistent, long-term support for human factors research and development, analysis, and the application of human factors information. Human performance is often the largest contributor to system variability, so the implementation



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

of advanced systems and the implementation of new procedures associated with NextGen will challenge the human components of the aviation system. Reviews of accidents and incidents have identified that human factors and human performance is a major factor in two thirds to three quarters of all civil aviation accidents. Specifically, research is required to ensure that system design, procedures, and training support the flightcrew functions, responsibilities, information needs, and interactions necessary for successful implementation of NextGen operational improvements, which often involve multiple new technologies operating in parallel.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for A.p NextGen – Weather Technology in the Cockpit**

---

**FY 2021 – A.p NextGen – Weather Technology in the Cockpit - Budget Request  
(\$000)**

<b>Program Activity</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
A.p NextGen - Weather Technology in the Cockpit	3,644	3,144	1,982

**What is this program and what does this funding level support?**

---

The NextGen - Weather Technology in the Cockpit (WTIC) program develops recommendations for minimum weather services (MinWxSvc) needed to support sound pilot decision making and cockpit decision support tools (such as the Flight Management System). WTIC accomplishes this by providing meteorological (MET) information that is ready for direct integration to support operations in the transformed National Airspace System (NAS). The WTIC program determines and recommends standards and guidance for a Part 121/135 and a Part 91 MinWxSvc along with addendums to address new entrants and other type of aircraft as applicable and to resolve or minimize previously-identified safety risks and hazards. The MinWxSvc will define the necessary MET information, the associated parameters of the information (i.e., accuracy, latency, update rates), presentation and updated pilot weather training.

National Transportation Safety Board (NTSB) data demonstrate the need for this program:

- Approximately 29% of all general aviation (GA) accidents are weather related.
- Weather related accidents have one of the highest fatality rates.
- The overall GA accident rate has decreased over the last few years, but it has increased approximately 20% for recreational/personal GA flights.
- Of the 446 accidents reported over a recent 10 year span for Part 121 flights: 1) approximately 37% are weather related and 2) turbulence is the number one cause of serious passenger injuries accounting for approximately 71% of them.

The WTIC MinWxSvc, including the resulting standards and guidance, will enable NextGen weather-related goals including reducing weather delays via increasing capacity and efficiency under adverse weather conditions, enhancing air traffic management (ATM) and aircraft re-routing flexibility to avoid adverse weather, reducing safety risks, and reducing greenhouse emissions.

In addition to supporting NextGen goals, WTIC research directly benefits other parts of the FAA by providing 1) MinWxSvc recommendations and supporting research data to support efforts to

update/develop standards, guidance documents, and pilot written exams and 2) research to support enhanced automated services to GA pilots at reduced costs compared to voice services and to modify VFR Not Recommended (VNR) statement procedures that align more with the increased use of automation and meet pilot preferences for delivery of services. The WTIC program also collaborates with non-FAA stakeholders such as the Aircraft Owners and Pilots Association (AOPA), RTCA, the National Association of Flight Instructors (NAFI), and the Alaska Air Carriers Association (AACA). The WTIC program will work closely with multiple RTCA special committees, European Organization for Civil Aviation Equipment, and other industry and stakeholder committees to further those program objectives, leading to the development and harmonization of industry and government minimum systems standards.

For GA operations, the WTIC program is performing research to identify gaps of MET information in the cockpit that were identified as causal factors in previously reported accidents or incidents and gaps of MET information in the cockpit that have potential of being a causal factor in a future GA accident or incident. The WTIC program is developing recommendations to resolve or reduce these MET information gaps to potentially reduce the weather-related GA accident, fatality, and incident rates. In addition, the WTIC program is providing enhanced training modules, curriculums, and questions for the pilot written exam on the minimum weather service recommendations and evolving cockpit MET technology.

Recent newsworthy accomplishments of the WTIC program include numerous airlines and aircraft manufacturers implementing the Eddy Dissipation Rate algorithm using the WTIC developed technical transfer package and cockpit reader to provide objective turbulence information to the cockpit. Conducted an operational flight demonstration using WTIC recommended convective information in oceanic regions demonstrating efficiency benefits based on preliminary benefits analyses. Wind research findings and MinWxSvc recommendations were incorporated into RTCA DO-369 and general aviation research on new FIS-B information was incorporated into DO-358A. In support of General Aviation, the WTIC program has provided 100 new weather related test questions to Flight Standards, transitioned the capability demonstrated in their Weather Information Latency Demonstrator (WILD) to industry for incorporation into commercial training and simulator systems, and transitioned the WTIC WeatherXplore application and augmented reality methodology into multiple industry publications. GA research also confirmed the lack of utility in the current subjective method for VNR issuance and WTIC is using that study to develop recommendations for making the issuance objective and compatible with automated briefing systems.

Additionally, funding will provide for engineering, technical, and management support of overall research activities.

**Major Activities and Accomplishments Planned in FY 2021 Include:**

- Analyze benefits of stratified icing cockpit display for Part 91 and Part 135 aircraft and generate technical transfer documents and data for the stratified icing display.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

- Demonstrate using crowd sourcing to produce and provide ceiling information from Alaska webcam images.
- Make MinWxSvc recommendations to resolve selected gaps in weather information in helicopter cockpits linked to safety and efficiency operational shortfalls.
- Create objective criteria that are compatible with automating VNR statement issuance for selected adverse weather scenarios.

**Goals for FY 2021 Funding:**

- By 2023, develop MinWxSvc recommendations for stratified rendering of selected adverse weather conditions (icing, convection, etc.) in cockpits using Multi Radar Multi Sensor (MRMS) radar mosaic information to resolve safety and efficiency related gaps.
- By 2023, complete development of objective criteria and associated MinWxSvc recommendations for fully automated VFR Not Recommended (VNR) issuance
- By 2024, resolve cockpit weather related gaps for helicopter operations.
- By 2025, produce meaningful visibility, ceiling, weather radar, and wind information to remote regions that lack infrastructure, Automated Surface Observing System (ASOS), and weather radars.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

Research conducted under the WTIC program enhances aviation safety and efficiency and reduces gaseous emissions. WTIC research is needed to identify resolutions to the current gaps in cockpit MET technology and information in order to ultimately achieve the desired goals and planned benefits of NextGen.

WTIC executes a portfolio of research projects that identifies gaps that are causal factors in safety hazards and risks for all types of aircraft. Follow-on research projects will help resolve these gaps, leading to improvements in aviation safety and efficiency for the American public. The trade studies, demonstrations, and verifications performed by the WTIC program are necessary to identify optimum resolutions to the associated gaps and to mitigate negative impacts that will result in new gaps, risks, or operational shortfalls.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for A.q Information/Cyber Security**

---

**FY 2021 – A.q Information/Cyber Security Program– Budget Request  
(\$000)**

<b>Program Activity</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
A.q Information/Cyber Security	1,232	2,675	4,769

**What is this program and what does this funding level support?**

---

The Information/Cyber Security Research and Development (R&D) program will continue the research, analysis, demonstration, evaluation and development of tools, technologies and methods to detect, prevent and mitigate the effects of disruptive cyber incidents. The program will research existing and proposed event and data logging activities for use in Machine Learning/Artificial Intelligence (AI) technologies and collaborate with industry to protect critical elements of aviation operations, including aviation information, data flow and data services.

Congressional direction specified in the FAA Extension, Safety and Security Act of 2016 recognized the need to protect, defend and enhance the resiliency of the national air transportation infrastructure. Information/cybersecurity R&D enhances the NAS security and resiliency and is consistent with the goals specified in the FAA Cybersecurity Strategy Document (2020-2025). Within each initiative, the program will establish research, analysis and exploratory development activities to discover and validate improved capabilities to enhance the cybersecurity posture of the national airspace system (NAS) and the aviation ecosystem.

In addition to the statutory direction contained in the FAA reauthorization congressional language, this program is necessary to “strengthen and maintain secure, functioning, and resilient critical infrastructure.”<sup>10</sup> More specifically, many recent reports from the Government Accountability Office and the National Research Council point to the urgency of additional work in the area of cybersecurity for the NAS. This research program is also in direct alignment with the American Security National Research Priority that calls for agencies to “invest in R&D to increase the security and resilience of the Nation’s critical infrastructure from both physical threats and cyber-attacks, which have increased rapidly in number and complexity in recent years.”<sup>11</sup> This program also supports the strategic objectives outlined in the National Strategy for Aviation Security (NSAS) of the United States of America, December 2018.

The requested funding supports ongoing and future industry-government collaborative efforts, integration of innovative algorithms, execution of advanced technology concept exploration studies, demonstrations and evaluations of promising Artificial Intelligence/Machine Learning tools, technologies and/or methods to enhance the security and resiliency of NAS and the

---

<sup>10</sup> Presidential Policy Directive (PPD-21), The White House Office of the Press Secretary, February 12, 2013

<sup>11</sup> Executive Office of the President, OMB Memorandum M-17-30 , August 17, 2017, p2

aviation ecosystem. When such research studies and evaluations establish the feasibility and utility of particular technologies, program funding will be applied toward formulation of technology development, implementation and operational transition plans. The cybersecurity research goals of technology transition to the FAA domains will be accomplished through demonstrations, coordinated approaches with various programs and also establishing policy directives or requirements specifications for future program implementation.

Additionally, funding will provide for engineering, technical, and management support of overall research activities.

**Major Activities and Accomplishments Planned in FY 2021 Include:**

- Cyber Data Science Algorithms to detect Advanced Persistent Threats (APTs)
- Demonstrate Cyber applications of emerging network technologies
- Concept exploration study of Virtual Dispersive Networks (VDN) capabilities
- Concept exploration study of Context-aware behavioral analytics capabilities
- Analysis of Cloud based integrity improvement methods
- Identify and evaluate the initial set of data parameters for cyber data analytics across the aviation ecosystem
- Investigate the various data suites for cybersecurity threats across the aviation ecosystem
- Establish cyber data distribution models and analytical cells for the aviation ecosystem
- Initiate cross correlation toolsets between cyber and safety data to identify cyber risks
- Establish the baseline of event/data logging for information/cybersecurity

**Goals for FY 2021 Funding:**

- By 2022, initial demonstration of cyber data science algorithms to detect APTs for the NAS domain. Identify and validate data parameters for cyber data analytics across the aviation ecosystem
- By 2023, maturation of self adaptive systems and networks principles, technologies and design methods for mixed trust environments for implementation into FAA networks. Develop NAS and data communication service provider data analytics within analytical cells across the aviation ecosystem (e.g., Gatelink, Maintenance, AOC, etc.)
- By 2024, a) Develop AI analytics utilizing event/data logs and establish data distribution models, b) Demonstrate NAS and data communication service provider data analytics for the analytical cells across the aviation ecosystem c) Demonstrate VDNs within a NAS domain and d) Demonstrate multiple layered approach of context-aware behavioral analytics with improved visualization techniques.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

- By 2025, a.) Cyber data science algorithms to detect APTs across the aviation ecosystem, b.) Demonstrate baseline performance of VDNs, c.) Demonstrate and integrate context-aware behavioral analytics with mobile devices, and d.) Perform final analysis of cloud based integrity improvements methods into the NAS.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

The NAS is an integral part of the nation's critical infrastructure as identified in PPD-21. Maintaining continuity of operations of the nation's air traffic management system and preventing interruptions of its functions are essential to providing an efficient air travel system and ensuring the safety and security of the American Public. This request will enable critical research and development leading to enhanced capabilities for a more resilient, safe and secure system.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for A.r NextGen – Flight Deck Data Exchange Requirements**

---

**FY 2021 – A.r NextGen – Flight Deck Data Exchange Requirements - Budget Request  
(\$000)**

<b>Program Activity</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
A.r NextGen - Flight Data Exchange	1,035	1,005	1,000

**What is this program and what does this funding level support?**

---

The Flight Deck Data Exchange Requirements (FD-DER) program addresses the data exchange format and performance requirements, which enable enhanced data exchange between onboard avionics systems and ground systems for Collaborative Decision Making (CDM). Recent advancements in flight deck automation such as Electronic Flight Bags (EFBs), Aircraft Interface Devices (AIDs), and the availability of on-board Internet Protocol (IP) data links have introduced an opportunity for flight operators to leverage these technologies in the collaborative decision-making process. This program evaluates the emerging technologies that enable the exchange of data between certified and non-certified avionics such as EFBs, AIDs and the FAA ground automation systems using IP data links. Specifically, this research will evaluate the current cybersecurity requirements and state-of-the-art cybersecurity standards that can be imposed on the new FD data exchange architecture, and identify any additional requirements needed to achieve a secured data exchange environment. It will also define performance standards required to enable operational information exchange like taxi instructions, Instrument Flight Rule (IFR) clearances, and trajectory negotiations, and establish data exchange protocols to enable seamless integration between airborne and ground systems.

The FD-DER program addresses the need for extensive information exchange between the flight operator and the Air Navigation Service Provider (ANSP) in a secure manner. The current voice-based information exchange mechanisms are not adequate to enable the rich data exchange requirements to achieve full potential of CDM. The implementation of Data Communications (DataComm) Aeronautical Telecommunications Network (ATN) Baseline 2 (ATNB2) is not expected to fully address these requirements due to mixed equipage in data communication capabilities driven by cost factor of ATNB2. The resulting mixed equipage will leave a gap of potential benefits pool for the remaining portion of the National Airspace System (NAS) operations. To supplement the ATNB2 equipped aircraft, alternate means of data exchange capabilities are possible by leveraging emerging technologies that are already being implemented by flight operators. Technologies such as EFBs and AIDs coupled with IP Data Link capabilities can provide a subset of the capabilities of ATNB2 to enable increased participation in CDM, benefiting the NAS. It is imperative that these new capabilities have robust security protocols and exchange mechanisms that ensure that safety critical systems onboard the aircraft and NAS automation systems on the ground are not compromised.

The requested funding will be used to finalize the prototype environment for FD DER to enable exchange of information between system components mentioned above. Based on the exchanges



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

in the prototype environment, the project team will identify and evaluate threats and vulnerability associated with current avionics, onboard aircraft systems, IP Data Link, and data exchange elements. The project team then will provide and evaluate recommendations for mitigation strategies to add or tailor security controls to meet the security needs. The efforts in FY 2021 will also identify current operational limitations that can be overcome by security measures identified through cybersecurity risk assessments, and further refine operational limitations.

Additionally, funding will provide for engineering, technical, and management support of overall research activities.

**Major Activities and Accomplishments Planned in FY 2021 Include:**

- Finalize the FD DER prototype environment to enable exchange of information in a secured environment for EFBs and AIDs applications through the use of IP Data Link.
- Identify and evaluate threats and vulnerability associated with current avionics, on-board aircraft systems, IP Data Link, and their associated data elements, and provide mitigation strategies to address cyber security risks.
- Provide recommendations for performance and cyber security standards for EFBs, AIDs, and Data Link hardware and software applications.
- Refine operational and technical assessments based on results of the cyber security risk assessments exercise.

**Goals for FY 2021 Funding:**

- By 2021, complete development of the prototype environment and cyber security risk assessments that result in mitigation strategies for EFBs, AIDs, and IP Data Link hardware and software applications. The program is expected to provide recommendations for performance and cyber security standards for such applications.
- By 2025, expand the research to include additional on-board aircraft systems such as Flight Management System (FMS), as well as ground automation systems in order to fully address the cybersecurity needs of the connected aircraft concept.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

This program aims to benefit the American Public by addressing the national aviation priority of flight deck and air traffic control (ATC) integration for NextGen operational capabilities. Ongoing research conducted by this program will ensure that pilots receive the right information at the right time for decision-making and collaboration with ATC in order to operate in the NAS

safely by allowing more flexibility for information access and ensuring that critical data is exchanged in a secure manner.

Through this work, the Flight Deck Data Exchange Requirements program will enable the participation of an increased number of aircraft in the necessary data exchange environment required to enable collaborative decision making and the evolution to trajectory-based operations (TBO) through secure and standardized data exchange protocols. By leveraging these capabilities, more aircraft can conduct dynamic and flexible operations that reduce the inefficiencies present in a rigid navigation and surveillance structure. These requirements and flight deck capabilities will enable flight operators to operate at their optimal performance envelopes while reducing the need for air traffic control intervention. The flying American Public derives benefits in the form of safer flights, reduced delays, secured data exchanges, and more optimized and predictable flights. In the long term, TBO environment enhanced by advanced flight deck capabilities will lead to lower operating costs for the FAA as well as the airline industry.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for A.s Environment and Energy**

---

**FY 2021 – A.s Environment and Energy - Budget Request  
(\$000)**

<b>Program Activity</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
A.s Environment & Energy	18,013	18,013	17,911

**What is this program and what does this funding level support?**

---

The Environment and Energy (E&E) Program is key to the FAA's strategy to achieve environmental protection that allows sustained aviation growth. Aviation noise and emissions are a considerable challenge to the continued growth of the National Airspace System (NAS). Despite the technological advancements achieved during the last four decades, and the resultant 95 percent reduction in the population exposure to significant noise, the impact of aircraft noise demands considerable Federal resources and is a constraint on aviation growth. Since 1982 the FAA has provided over \$10.6 billion for sound insulation of houses and schools around U.S. airports through the Part 150 Program. Environmental impacts, especially aircraft noise, are often the number one cause of opposition to airport capacity expansion and airspace redesign (<http://www.gao.gov/assets/310/309622.pdf>). This challenge is anticipated to grow with new entrants such as unmanned aerial systems, urban air mobility, civil supersonic aircraft, and commercial space vehicles. The ability to manage this growth will partly depend on the extent to which we address the effects of noise and emissions. Technologies that reduce noise and emissions are regulated at the vehicle level as a part of airworthiness certification. These environmental standards are harmonized internationally through the International Civil Aviation Organization's (ICAO) Committee on Aviation Environmental Protection (CAEP). A significant portion of this Program is devoted to informing decision making at ICAO CAEP.

**SCIENTIFIC KNOWLEDGE AND INNOVATION.** The E&E Program is producing data and knowledge that are the scientific and technical foundation for decision making and mitigation development for aviation noise and emissions. The Program is advancing our understanding of the impacts of aviation noise on community annoyance, sleep, health, and children's learning. It is also advancing our understanding of aircraft particulate matter emissions and their impacts.

The Program also supports noise measurements of new entrants to aid in the development of airworthiness noise certification requirements. The E&E Program, in close collaboration with industry, NASA, and international partners through ICAO CAEP, is providing the technical basis for a review and possible elimination or modification of existing regulations to enable the development and growth of supersonic air transportation.

Efforts under this Program will also help the FAA understand the noise that is generated by unmanned aircraft systems and urban air mobility vehicles, which are sometimes referred to as

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

electric vertical takeoff and landing (eVTOL) vehicles, such that the FAA is prepared to address certification and standards for noise before these vehicles enter service as well as to develop operational procedures concepts that could reduce their noise. This work will help ensure that FAA has adequate information to establish any needed environmental policy regarding the certification and operation of these aircraft.

**AVIATION ENVIRONMENTAL TOOLS SUITE.** The E&E Program is developing a comprehensive suite of analytical tools to quantify the environmental consequences and impacts of aviation. At the center of these analytical tools is the Aviation Environmental Design Tool (AEDT), which can quantify the noise, fuel burn and emissions resulting from all aspects of aircraft operations. As a part of this effort, the Program is working to develop an improved analytical model to quantify aviation-related pollutant concentrations around airports for compliance with the National Ambient Air Quality Standards. This model is needed to address shortcomings with the current compliance tool, which is affecting the approval of Federal airport and air space infrastructure projects.

**STREAMLINING ENVIRONMENTAL APPROVALS.** The E&E Program is providing knowledge and tools to improve and streamline the required environmental review processes for infrastructure projects and other Federal actions. Given the sensitivity and high visibility of such activities in today's environment, the Program is developing an improved screening tool that will allow users to rapidly and conclusively identify Federal actions that do not require further environmental review, thus reducing the time and costs for environmental reviews. The new tool will enable the FAA to perform effective screening analysis and provide users with powerful analytics to improve communications.

Additionally, funding will provide for engineering, technical, and management support of overall research activities.

**Major Activities and Accomplishments Planned in FY 2021 Include:**

- Using advances in scientific understanding, enhance the aviation environmental tool suite to improve our ability to calculate environmental consequences and impacts of aviation.
- Develop innovative, cost-effective solutions to reduce noise, fuel use, and emissions for both fixed wing and vertical takeoff and landing vehicles through technology and operational procedure concepts.
- Conduct analyses to inform decision making on operational procedure concepts, policy measures, and standards that could reduce noise, fuel use, and emissions.
- Develop improved measurement capabilities and airworthiness certification methods for both noise and emissions, for both existing air vehicles and new entrants.
- Conduct analyses and gather data to inform the development of noise and emissions standards to enable the introduction of new entrants, such as Unmanned Aerial Systems, Urban Air Mobility vehicles, and civil supersonic aircraft.

**Goals for FY 2021 Funding:**

- By 2022, complete analyses to quantify the potential health impacts of aircraft noise.
- By 2022, release AEDT Version 4 with improved characterization at lower noise levels where some communities are expressing concerns as well as to include supersonic aircraft.
- By 2022, release noise screening tool to streamline environmental approval process and improve communication on noise matters with communities.
- By 2022, conduct measurements and complete analyses to inform the development of noise standards for unmanned aerial systems and urban air mobility vehicles.
- Through 2025, complete analyses to support the development of new international standards for supersonic transport aircraft and engines in ICAO CAEP.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

Civil aviation is evolving continuously, and so must the analytical tools and research that quantify and characterize the environmental consequences of civil aviation. The increased knowledge and analytical capabilities provided by the E&E Program ensure the FAA has ability to define and mitigate environmental issues that the aviation industry will need to overcome to ensure sustained aviation growth. This request would continue efforts to advance our scientific understanding of the environmental impacts of civil aviation, develop tools to quantify these impacts, and then use the tools to inform decision making to ensure that cost-effective solutions are developed to address the environmental and energy issues confronting aviation.

**PUBLIC TOOLS.** The E&E Program has enabled the development of AEDT to quantify the integrated fuel burn, noise, and emissions consequences of aviation as well as the analytical tools to convert these consequences into impacts on the community. AEDT version 3b (<https://aedt.faa.gov>) is the FAA's standard noise and emissions model. AEDT is used internationally by academia, industry, and manufacturers in over 30 countries, thus establishing AEDT as the recognized reference tool for modeling environmental consequences and furthering the global leadership position of the U.S.

**INTERNATIONAL STANDARD SETTING.** During the last four triennial ICAO CAEP meetings, the aviation environmental tool suite was the primary provider of the data upon which the standards were evaluated and selected. Continued funding for the E&E Program would ensure that the U.S. leads the development of standards for supersonic aircraft, which are anticipated to be developed in ICAO CAEP in the early 2020s. Each of these impact the health

and welfare of the American public as well as having a multi-billion dollar impact on the aviation industry.

**U.S. INDUSTRY BENEFITS.** The U.S. aviation industry relies on the international harmonization of standards to ensure that aircraft that leave the U.S. are accepted for operation across the globe. The U.S. aviation industry relies on the FAA to negotiate these standards at ICAO CAEP and to certify that their aircraft and engines comply and can be sold to airlines around the world. If standards are either not harmonized or are not promulgated domestically, then U.S. manufactures of aviation products will need to seek certification from foreign governments. The result would be increased cost for industry and delays in product launches of new aircraft and engines.

**WORKFORCE DEVELOPMENT.** Much of the research in this program is carried out via the Aviation Sustainability Center (ASCENT - <http://ascent.aero>), which supports 16 universities and over a hundred students nationwide. In addition to producing world-class research, ASCENT is developing a workforce that will help aviation overcome challenges posed by aviation noise and emissions for decades to come.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for A.t NextGen - Environmental Research - Aircraft Technologies and Fuels**

---

**FY 2021 – A.t NextGen – Environmental Research – Aircraft Technologies and Fuels  
– Budget Request  
(\$000)**

<b>Program Activity</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
A.t NextGen – Environmental Research – Aircraft Technology and Fuels	29,174	29,174	27,009

**What is this program and what does this funding level support?**

---

In partnership with industry through the Continuous Lower Energy, Emissions and Noise (CLEEN) program, the “NextGen – Environmental Research–Aircraft Technologies and Fuels Program” develops aircraft and engine technologies that reduce noise and emissions while increasing fuel efficiency. Technologies developed by this Program will result in a fleet of aircraft that have lower noise, use less fuel, and produce fewer emissions, thus supporting the overarching environmental performance goal for NextGen to achieve environmental protection that allows sustained aviation growth. This Program also provides test data, analyses, and methodologies to ensure that alternative jet fuels that are drop-in compatible with today’s fleet of aircraft are certified as being safe for use and are being appropriately credited under the ICAO Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA).

Historically, advances in aircraft technology have been the main factor in reducing aviation’s environmental impacts. Because of advancements in technology, there has been a 95 percent reduction in the number of people exposed to significant noise and more than a 70 percent improvement in fuel efficiency. The vast majority of noise reductions over the last four decades have come from enhancements in engine and airframe design that have also yielded substantial gains in fuel efficiency. However, because of factors such as the growth in the number of operations and the implementation of new flight procedures, community concerns about noise remains a considerable challenge.

Through the public-private partnership of the CLEEN Program (<http://faa.gov/go/cleen>), the FAA and industry are working together to develop technologies that will enable manufacturers to create aircraft and engines with lower noise and emissions as well as improved fuel efficiency. The technologies being accelerated by the CLEEN Program have relatively large technological risk. Government resources help mitigate this risk and incentivize aviation manufacturers to invest and develop these technologies. By cost-sharing the development with the FAA, industry is willing to accept the greater risk associated with this technological development. Once entered

into service, the CLEEN technologies will realize their noise, fuel burn, and emissions benefits throughout the fleet for years to come.

This Program also provides funding for alternative jet fuel testing and analysis efforts of the Aviation Sustainability Center (ASCENT), the FAA Center of Excellence (COE) for Alternative Jet Fuels and Environment, a cooperative aviation research organization co-led by Washington State University and Massachusetts Institute of Technology (<http://ascent.aero>). This Program also supports the Commercial Aviation Alternative Fuels Initiative (CAAFI) and its effort to engage with both the commercial aviation and emerging alternative fuels industries (<http://caafi.org>). The continuing work of CLEEN, CAAFI and ASCENT to develop alternative jet fuels via fuel testing, integrated analysis and coordination will help to ensure that aviation has a wide range of energy options for decades to come.

All three of these programs, CLEEN, CAAFI and ASCENT, are conducted in partnership with a wide range of aviation stakeholders that leverage resources from the private sector. CLEEN is a public private partnership where industry contributes cost share that matches or exceeds that provided by the FAA. CAAFI is a coalition among the FAA, airlines, aircraft and engine manufacturers, and industry where each entity contributes staff resources to focus the efforts of commercial aviation to engage the emerging alternative fuels industry. ASCENT, like all FAA COEs, has a 100% cost share requirement from non-federal sources and an Advisory Committee that has robust participation from a wide range of aviation stakeholders, including industry.

Additionally, funding will provide for engineering, technical, and management support of overall research activities.

**Major Activities and Accomplishments Planned in FY 2021 Include:**

- Develop aircraft and engine technologies, as well as novel drop-in fuels, for both subsonic and supersonic aircraft, that reduce noise and emissions while increasing fuel efficiency through the CLEEN Program.
- Evaluate innovative technological solutions to reduce noise, emissions and fuel burn from both subsonic and supersonic aircraft through ASCENT.
- Support the approval of novel jet fuel pathways within the American Society of Testing and Materials (ASTM) International certification process via testing and coordination to ensure these fuels are safe for use.
- Support the inclusion of sustainable aviation fuels, created from waste and biomass feedstocks, and lower carbon aviation fuels, created from fossil feedstocks, within the International Civil Aviation Organization (ICAO) Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA).



**Goals for FY 2021 Funding:**

- By 2022, develop lifecycle greenhouse gas emissions values and sustainability criteria for use in CORSIA.
- By 2022, identify innovative solutions to reduce noise, emissions, and fuel burn through the university research of ASCENT.
- Through 2025, continue activities within the third phase of CLEEN to demonstrate technologies that can reduce energy use, emissions, and noise for both subsonic and supersonic aircraft.
- Through 2025, conduct testing to support the approval of at least one alternative jet fuel type per year and to streamline the ASTM certification process to reduce the time and cost of certification.
- By 2025, assess the benefits of the technologies matured under the third phase of the CLEEN Program.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

The technologies matured in the first five-year period of CLEEN will reduce U.S. fleet-wide fuel burn by 2 percent from 2025 through 2050, representing a cumulative savings of 22 billion gallons of jet fuel. The CO<sub>2</sub> savings are the equivalent of taking 1.7 million cars off of the road over the duration of this 25 year period. It will also save airlines 2.75 billion dollars per year while contributing to a 14% decrease in the land area exposed to significant noise.

The CLEEN Program has matured technologies that have entered the fleet and industry anticipates that additional technologies will enter into service in the coming years as opportunities arise for their insertion into new aircraft and engine designs. For example, the General Electric Twin Annular Premixing Swirler (TAPS) II combustor entered into service in 2016 in a CFM International engine and is being used on the Boeing 737 MAX and Airbus 320 aircraft with almost 8,000 orders already placed. The combustor technology reduces landing and takeoff emissions by 55% relative to current standards and reduces particulate matter by 90% relative to the international visibility limit. The CLEEN Program also aids industry in developing the analytical tools to create aircraft and engine designs that have lower noise, emissions and fuel use. As such, these investments are also leading to noise and fuel burn reductions across industry.

Funding from this Program has also supported the development of a methodology to evaluate select sustainable aviation fuels within the ICAO CORSIA. Ongoing work will expand the list of eligible fuel pathways and ensure that lower carbon aviation fuels are also included in CORSIA. Continued funding will ensure that the United States is able to exercise global leadership on how

these fuels are counted within CORSIA. In part due to the funding provided under A13.b, five alternative fuels pathways have been approved by ASTM International as being safe for use by commercial aviation. Work is underway to approval additional fuel pathways and streamline the ASTM approval process thus expanding the opportunities for fuel production at greater blend percentages and at lower costs.

The first alternative jet fuel production facility in the U.S. began deliveries of fuel to United Airlines at Los Angeles International Airport in March 2016. United has subsequently purchased several million gallons of fuel from the facility and there are plans for expansion in the industry by a variety of airlines and fuel producers across the United States.

Sustainable aviation fuels are a key part of industry efforts to address sustainability concerns being raised by the public, both in the United States and overseas. Both the commercial airlines and the business jet community have made commitments to advancing the commercialization and deployment of these fuels to help the industry meet its emissions reduction goals, diversify fuel supply and enhance energy security.<sup>12</sup> Several companies that are working to develop the coming generation of supersonic aircraft also see sustainable aviation fuels as a key part of their plans to address public concerns about the sustainability of supersonic aircraft operations.<sup>13</sup>

By reducing the environmental impact of aviation through new technologies and alternative jet fuels this funding helps to ensure the continued growth of aviation while also reducing the impacts of aviation noise and emissions on airport communities as well as on the public at large. By removing barriers to the deployment of alternative jet fuels, this program would support the development of a new industry thus providing economic development as well as environmental benefit.

---

<sup>12</sup> For more information, please see <https://www.futureofsustainablefuel.com/> and [https://www.airlines.org/wp-content/uploads/2019/08/A4A-Sustainable-Fuel-Report\\_FINAL.pdf](https://www.airlines.org/wp-content/uploads/2019/08/A4A-Sustainable-Fuel-Report_FINAL.pdf)

<sup>13</sup> For example, see <https://blog.boomsupersonic.com/aviation-companies-innovate-for-sustainability-f35bebe90c93>

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for A.u System Planning and Resource Management**

---

**FY 2021 – A.u System Planning and Resource Management - Budget Request  
(\$000)**

<b>Program Activity</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
A.u System Planning and Resource Management	2,135	12,135	8,022

**What is this program and what does this funding level support?**

---

The System Planning and Resource Management (SPRM) activity leads the planning, coordination, development, presentation, and review of the FAA's research and development (R&D) portfolio. Its key programmatic outputs include the National Aviation Research Plan (NARP), the Annual Research and Development Review – both of which are annual statutory deliverables to Congress – and administration of the congressionally mandated (P.L. 100-591 Section 6 Advisory Committee) Research, Engineering and Development Advisory Committee (REDAC) and resultant reports. SPRM also provides program advocacy and outreach and maintains alignment with departmental R&D program planning and performance reporting guidance.

SPRM leads the portfolio planning, formulation, presentation and review activity to ensure the FAA meets the President's criteria for R&D, increases program efficiency, sustains and maintains management of the program within operating cost targets, and enables effective program review by the REDAC and the OST Office of Research and Technology.

Established pursuant to the Federal Advisory Committee Act (FACA), the REDAC reviews FAA research commitments annually and provides guidance for future R, E&D investments. The members of this committee and its associated subcommittees are subject matter experts drawn from various associations, user groups, corporations, government agencies, universities, and research centers. Their combined presence in the REDAC fulfills a congressional requirement for FAA R&D to be mindful of aviation community and stakeholder input.

SPRM also develops program guidance and conducts compliance reviews to ensure that departmental R&D program planning and performance reporting requirements specified in the Fixing America's Surface Transportation Act (Pub. L. No. 114-94) are satisfied. It also coordinates the establishment and administration of the Air Transportation Centers of Excellence Program and ensures compliance with related Financial Assistance and Grants Management departmental policy guidance.

Additionally, SPRM will provide funding and support of programs to provide grants supporting the education of future aircraft pilots, development of the aircraft pilot workforce, as well as the

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

education, recruitment and development of the aviation maintenance workforce. This work is as per guidance specified in Section 625 of the FAA Reauthorization Act of 2018 (Pub. L. No. 115-254). Funding will also provide for engineering, technical, and management support of overall research activities.

**Major Activities and Accomplishments Planned in FY 2021 Include:**

- Completion of annual Congressional deliverables (NARP, Annual Review).
- Coordination and completion of REDAC reports, guidance and transmittals.
- Development and dissemination of R&D Program Performance Reports.
- Development and submission of R&D investment portfolio.
- Development and coordination of OST R&D management deliverables (including the Annual Modal Research Plan).
- Provide funding and support per Section 625 of the FAA Reauthorization Act of 2018 (Pub. L. No. 115-254)

**Goals for FY 2021 Funding:**

Sustain and maintain program operation within specified operating cost targets as follows:

- Control expenditures of the REDAC to less than 1/10 of 1 percent of the total RE&D budget, and each year through FY 2021.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

This program provides the support for the FAA to formulate its annual RE&D portfolio and submit the mandatory R&D planning documents to Congress and to the Department of Transportation each year. Through the management of the FAA REDAC, this program facilitates an independent, expert review of the FAA's R&D portfolio that provides meaningful recommendations for the FAA to refine and improve its portfolio. This results in a more effective research program that will benefit the public by making aviation safer and smarter and enhancing the U.S. global leadership in aviation.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for A.v William J. Hughes Technical Center Laboratory Facility**

---

**FY 2021 – A.v William J. Hughes Technical Center Laboratory Facility - Budget Request  
(\$000)**

<b>Program Activity</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
A.v WJHTC Lab Facilities	4,571	3,500	2,921

**What is this program and what does this funding level support?**

---

Research and Development (R&D) programs require specialized facilities that provide flexible, high fidelity environments to conduct research and perform Human-In-the-Loop (HITL) simulations that evaluate advanced air traffic concepts. This program sustains the specialized and fully integrated research facilities located at the William J. Hughes Technical Center (WJHTC) that are utilized to support R&D program goals for current day capabilities, the Next Generation Air Transportation System (NextGen), and the transition to NextGen. The funding supports the sustainment of the existing laboratory infrastructure; project support; engineering support; R&D facility modifications and improvements; equipment and software/hardware licenses; and support tools.

The WJHTC R&D laboratories are comprised of the following:

**Simulation Facilities - Cockpit Simulation Facility (CSF) and Target Generation Facility (TGF)**

The Simulation Branch supports development and test programs at the WJHTC by generating realistic traffic for engineering, operational, and Human Factors (HF) evaluations of National Airspace System (NAS) equipment, procedures, and operations. The TGF is a dynamic controller-in-the-loop real time/fast time Air Traffic Control (ATC) simulation capability used to generate real time, interactive traffic in support of HITLs. Realistic aircraft trajectories and associated digital radar messages and maps for aircraft and controllers are generated in a simulated airspace environment. Simulation pilots are provided by the Simulation Branch and include a cadre of current and retired airline and commercial pilots who interact with air traffic controllers and dynamically control aircraft movement during HITL simulations. The Simulation Branch also maintains several cockpit simulators of transport category including B-737-800, A-321, Embraer 175, and several General Aviation (GA) aircraft. All cockpit simulators are integrated with TGF and are capable of acting as interactive targets in NAS simulations.

**Concepts and Systems Integration – RDHFL**

The RDHFL conducts research to acquire a better understanding of the role that a human plays in current and future aviation systems. This research environment is specifically designed to measure and assess human performance and workload. Additionally, the RDHFL investigates

how new technologies should be integrated into air traffic control and airway facilities systems. This research increases the overall safety of the NAS while also minimizing implementation costs by evaluating the effectiveness of air traffic concepts and requirements. The RDHFL has supported a number of legacy systems and NextGen projects in many areas of research including NextGen Terminal Radar Approach Control (TRACON) (Human Factors Division), En Route Data Communications, modular NextGen TRACON facilities, separation management, tower ground surveillance, unmanned aircraft systems (UAS), wildlife Human Factors mitigation simulation, weather simulations, virtual reality demonstrations, and many more. The RDHFL will continue to provide the resources to conduct robust and high fidelity HITL air traffic simulations.

#### Network Capabilities (NextGen Prototyping Network)

The WJHTC R&D laboratories are connected to each other and to other FAA and partner R&D facilities through the NextGen Prototyping Network (NPN). The NPN serves as the FAA's primary R&D network that provides a scalable and secure infrastructure that facilitates R&D activities. FAA WJHTC, Florida Test Bed, and Oklahoma City, OK laboratories as well as Government (Department of Defense Research Network, National Aerospace and Space Agency, National Weather Service) industry, and academia resources are accessible via the NPN private network. The NPN also has established connections to the FAA Telecommunications Infrastructure (FTI), which enables supportability of full lifecycle management of NAS Programs. The funding level supports network engineering and resources required to fulfill the planned network related major activities for FAA programs, such as cybersecurity, unmanned aircraft systems (UAS), Commercial Space, and other FAA related research and development.

Additionally, funding will provide for engineering, technical, and management support of overall research activities.

#### **Major Activities and Accomplishments Planned in FY 2021 Include:**

##### Simulation Facilities - (CSF & TGF)

- Upgrade the avionics in the CSF A320 simulator.
- Integrate the Intelligent Agent capability of the TGF with synthetic voice.

##### Concepts and Systems Integration – RDHFL

- Perform HITL simulations to support research into conceptual 4 Dimensional Trajectory (4DT) controller interface.
- Enhance the ATC simulation infrastructure with capabilities to support evaluation of coordinated trail planning and Time Based Operations.

##### Network Infrastructure - NPN

- Conduct initial cybersecurity exercise with Department of Defense (DoD).

**Goals for FY 2021 Funding:**

Simulation Facilities - (CSF & TGF)

- By 2021, implement intelligent agent-based capability for both En Route & Terminal environments into TGF for CONUS simulations in Tech Center R&D and field support laboratories as well as remotely located simulation facilities.
- By 2021, implement TBO improvements and connectivity capabilities to the B737 simulator to support integrated, high fidelity, multi-lab simulation.

Concepts and Systems Integration – RDHFL

- By 2021, support research into a conceptual 4DT controller interface to research TBO.
- By 2022, develop prototypes within the ATC simulation software that support research into coordinating conflict probe and trial planning with Time Based Operations.

Q22Network Infrastructure – NPN

- By 2021, support cybersecurity exercises and Whole of Nation Exercise with DoD.
- By 2023, integrate FAA and partner networks and facilities into the NPN baseline to expand the collaborative capabilities and position the FAA to best support NextGen research within the FAA, other government agencies, industry and academia partners.

**What benefits will be provided to the American public through this request and why is this program necessary?**

---

Having an efficient and flexible platform to evaluate future NextGen concepts and technologies enhances the safety and efficiency of air travel for the American public. Performing research in simulation rather than with live aircraft generates cost savings, is intrinsically safer, and allows the study of the extremes that would not be possible in live flight conditions. The implementation of new technologies, such as the intelligent agent-based capability, allow for a reduction in the number of test subject participants needed for a given study; again, maximizing cost savings and efficiencies. Finally, HF-related issues resolved prior to implementation result in cost savings and ensure that the FAA's safety standards for air traffic control operations are met.





**GRANTS-IN-AID FOR AIRPORTS**

(LIQUIDATION OF CONTRACT AUTHORIZATION)  
(LIMITATION ON OBLIGATIONS)  
(AIRPORT AND AIRWAY TRUST FUND)  
[(INCLUDING TRANSFER OF FUNDS)]

For liquidation of obligations incurred for grants-in-aid for airport planning and development, and noise compatibility planning and programs as authorized under subchapter I of chapter 471 and subchapter I of chapter 475 of title 49, United States Code, and under other law authorizing such obligations; for procurement, installation, and commissioning of runway incursion prevention devices and systems at airports of such title; for grants authorized under section 41743 of title 49, United States Code; and for inspection activities and administration of airport safety programs, including those related to airport operating certificates under section 44706 of title 49, United States Code, [\$3,000,000,000] \$3,350,000,000, to be derived from the Airport and Airway Trust Fund and to remain available until expended: Provided, That none of the funds under this heading shall be available for the planning or execution of programs the obligations for which are in excess of \$3,350,000,000 in fiscal year [2020] 2021, notwithstanding section 47117(g) of title 49, United States Code: *Provided further*, That none of the funds under this heading shall be available for the replacement of baggage conveyor systems, reconfiguration of terminal baggage areas, or other airport improvements that are necessary to install bulk explosive detection systems: [*Provided further*, That notwithstanding section 47109(a) of title 49, United States Code, the Government's share of allowable project costs under paragraph (2) for subgrants or paragraph (3) of that section shall be 95 percent for a project at other than a large or medium hub airport that is a successive phase of a multi-phased construction project for which the project sponsor received a grant in fiscal year 2011 for the construction project:] Provided further, That notwithstanding any other provision of law, of funds limited under this heading, not more than [\$116,500,000] \$119,402,000 shall be obligated for administration, not less than \$15,000,000 shall be available for the Airport Cooperative Research Program, and not less than [\$39,224,000] \$40,666,000 shall be available for Airport Technology Research [, and \$10,000,000, to remain available until expended, shall be available and transferred to "Office of the Secretary, Salaries and Expenses" to carry out the Small Community Air Service Development Program: *Provided further*, That in addition to airports eligible under section 41743 of title 49, United States Code, such program may include the participation of an airport that serves a community or consortium that is not larger than a small hub airport, according to FAA hub classifications effective at the time the Office of the Secretary issues a request for proposals].

**GRANTS-IN-AID FOR AIRPORTS**

[For an additional amount for "Grants-In-Aid for Airports", to enable the Secretary of Transportation to make grants for projects as authorized by subchapter 1 of chapter 471 and subchapter 1 of chapter 475 of title 49, United States Code, \$400,000,000, to remain available through September 30, 2022: *Provided*, That amounts made available under this heading shall be derived from the general fund, and such funds shall not be subject to apportionment formulas, special apportionment categories, or minimum percentages under chapter 471: *Provided further*, That the Secretary shall distribute funds provided under this heading as discretionary grants to airports: *Provided further*, That the amount made available under this heading shall not be subject to any limitation on obligations for the Grants-in-Aid for Airports program set forth in any Act: *Provided further*, That the Administrator of the Federal Aviation Administration may retain up to 0.5 percent of the funds provided under this heading to fund the award and oversight by the Administrator of grants made under this heading.]

*(Department of Transportation Appropriations Act, 2020.)*

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

**Program and Financing**  
(in millions of dollars)

	FY 2019 Actual	FY 2020 Estimate	FY 2021 Estimate
Identification code: 69-8106-0-7-402			
<b>Obligations by program activity:</b>			
0001 Grants-in-aid for airports .....	3,298	3,169	3,175
0002 Personnel and related expenses .....	112	117	119
0003 Airport technology research .....	33	39	41
0005 Small community air service .....	10	10	....
0006 Airport Cooperative Research .....	15	15	15
0007 Grants - General Fund Appropriation.....	262	398	....
0008 Administrative Expenses – General Fund	....	2	....
Appropriation			
0100 Total direct program .....	<u>3,730</u>	<u>3,750</u>	<u>3,350</u>
0799 Total direct obligations.....	3,730	3,750	3,350
0801 Grants-in-aid for Airports (Airport and Airway Trust			
Fund) Reimbursable .....	1	2	2
0900 Total new obligations, unexpired accounts .....	3,731	3,752	3,352
<b>Budgetary Resources:</b>			
Unobligated balance:			
1000 Unobligated balance carried forward, Oct 1 .....	814	1,055	1,055
1001 Discretionary unobligated balance brought fwd, Oct 1.	795	1,032	....
1021 Recoveries of prior year unpaid obligations.....	119	....	....
1050 Unobligated balance (total) .....	933	1,055	1,055
Budget Authority:			
Appropriations, discretionary:			
1101 Appropriation (special or trust fund).....	3,500	3,400	3,350
1138 Appropriation applied to liquidate contract authority ...	-3,000	-3,000	-3,350
1160 Appropriation, discretionary (total) .....	500	400	....
Contract authority, mandatory:			
1600 Contract authority (Reauthorization).....	3,350	3,350	3,350
Spending authority from offsetting coll.,			
Discretionary:			
1700 Collected.....	3	2	2
1900 Budget authority (total) .....	3,853	3,752	3,352
1930 Total Budgetary Resources Available.....	4,786	4,807	4,407
Memorandum (non-add) entries:			
1941 Unexpired unobligated balance, end of year .....	1,055	1,055	1,055
<b>Change in obligated balances:</b>			
Unpaid obligations:			
3000 Unpaid obligations, brought forward, Oct 1.....	6,073	6,218	6,495
3010 New Obligations, unexpired accounts.....	3,731	3,752	3,352
3020 Outlays (gross) .....	-3,467	-3,475	-3,557
3040 Recoveries of prior year unpaid obligations, unexpired	-119	....	....
3050 Unpaid obligations, end of year .....	<u>6,218</u>	<u>6,495</u>	<u>6,290</u>

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Memorandum (non-add) entries:				
3100	Obligated balance, start of year .....	6,073	6,218	6,459
3200	Obligated balance, end of year .....	6,218	6,459	6,290
Budget authority and outlays, net:				
Discretionary:				
4000	Budget authority, gross	503	402	2
Outlays, gross:				
4010	Outlays from new discretionary authority .....	264	499	456
4011	Outlays from discretionary balances .....	<u>3,203</u>	<u>2,976</u>	<u>3,101</u>
4020	Outlays, gross (total) .....	3,467	3,475	3,557
Offsets against gross budget authority and outlays:				
Offsetting collections (collected) from:				
4033	Non-federal sources .....	-3	-2	-2
4040	Offsets against gross budget authority and outlays (total)	-3	-2	-2
Mandatory:				
4090	Budget authority, gross .....	3,350	3,350	3,350
4180	Budget authority, net (total) .....	3,850	3,750	3,350
4190	Outlays, net (total) .....	3,464	3,473	3,555
Memorandum (non-add) entries:				
5052	Obligated balance, SOY: Contract authority .....	3,464	3,814	4,164
5053	Obligated balance, EOY: Contract authority .....	3,814	4,164	4,164
5061	Limitation on obligations (Highway Trust Funds)....	3,350	3,350	3,350

Subchapter I of chapter 471, title 49, U.S. Code provides for airport improvement grants, including those emphasizing capacity development, safety and security needs; and chapter 475 of title 49 provides for grants for aircraft noise compatibility planning and programs.

**Object Classification (in millions of dollars)**

		FY 2019	FY 2020	FY 2021
Identification code: 69-8106-0-7-402		Actual	Estimate	Estimate
Direct obligations:				
Personnel compensation				
11.1	Full-time permanent .....	68	79	81
11.3	Other than full-time permanent .....	1	1	1
11.5	Other personnel compensation .....	1	1	1
11.9	Total personnel compensation .....	70	81	83
12.1	Civilian personnel benefits .....	23	24	25
21.0	Travel and transportation of persons .....	4	3	3
23.2	Rental payments to others .....	1	1	1
25.1	Advisory and assistance services .....	27	33	33

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

25.2	Other services from non-Federal sources .....	2	2	2
25.3	Other services from Federal sources .....	21	23	24
25.7	Operation and maintenance of equipment .....	9	9	9
26.0	Supplies and materials .....	1	1	1
31.0	Equipment .....	1	1	1
32.0	Land and Structures .....	3	1	1
41.0	Grants, subsidies, and contributions .....	3,558	3,561	3,167
94.0	Financial Transfers .....	10	10	....
99.0	Direct obligations .....	3,730	3,750	3,350
41.0	Reimbursable obligations .....	1	2	2
99.9	Total new obligations, unexpired accounts .....	3,731	3,752	3,352

**Employment Summary**

		FY 2019	FY 2020	FY 2021
Identification code: 69-8106-0-7-402		Actual	Estimate	Estimate
1001	Direct: Civilian full-time equivalent employment ....	556	600	607
2001	Reimbursable: Civilian full-time equivalent employment .....	3	1	1

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**EXHIBIT III-1**

**GRANTS-IN-AID FOR AIRPORTS  
Summary by Program Activity  
Appropriations, Obligation Limitations, and Exempt Obligations  
(\$000)**

	<b>FY 2019 ACTUAL</b>	<b>FY 2020 ENACTED</b>	<b>FY 2021 REQUEST</b>
Grants-in-Aid for Airports	3,676,690	3,569,276	3,174,932
Personnel & Related Expenses	115,100	116,500	119,402
Airport Technology Research	33,210	39,224	40,666
Airport Cooperative Research	15,000	15,000	15,000
Small Community Air Service	10,000	10,000	-
<b>TOTAL</b>	<b>\$ 3,850,000</b>	<b>\$ 3,750,000</b>	<b>\$ 3,350,000</b>
FTEs			
Direct Funded	599	600	607
Reimbursable, allocated, other	2	2	2

**Program and Performance Statement**

This account provides funds for planning and developing a safe and efficient national airport system to satisfy the needs of the aviation interests of the United States, with due consideration for economics, environmental compatibility, local proprietary rights and safeguarding the public investment.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**EXHIBIT III-1a**

**GRANTS-IN-AID FOR AIRPORTS  
SUMMARY ANALYSIS OF CHANGE FROM FY 2020 TO FY 2021  
Appropriations, Obligation Limitations, and Exempt Obligations  
(\$000)**

<b><u>ITEM</u></b>	<b>Change from FY 2020 to FY 2021 (\$000)</b>	<b>Change from FY 2020 to FY 2021 FTE</b>
<b>FY 2020 Enacted Budget</b>	<b>3,750,000</b>	<b>600</b>
Annualization of FY 2020 FTE	168	2
Annualization of FY 2020 Pay Raise	811	
FY 2021 Pay Raise	785	
One less compensable day	(406)	
WCF Increase/Decrease	95	
FERS Increase	856	
<b>Subtotal, Adjustments to Base</b>	<b>2,309</b>	<b>2</b>

**PROGRAM REDUCTIONS**

Reductions to Grants program to offset the uncontrollable increases, to reduce the grants level by the supplemental funding in FY 2020 Enacted, and to offset program increases in Admin and ATR.	(394,345)	
Reducing SCASDP - no funding being requested for this program.	(10,000)	
Reduction to ACRP program to retain the \$15 million target amount.	(2)	
<b>SUBTOTAL, PROGRAM REDUCTIONS</b>	<b>(404,347)</b>	<b>0</b>

**NEW OR EXPANDED PROGRAMS**

8 new positions in Admin for revenue diversion compliance audits, airport noise activities, and UAS integration support.	672	4
2 new positions in ATR for UAS research and expertise in pavement materials testing.	168	1
Funding to conduct research and develop standards related to urban air mobility.	1,200	
<b>SUBTOTAL, NEW OR EXPANDED PROGRAMS</b>	<b>2,040</b>	<b>5</b>
<b>TOTAL FY 2021 REQUEST</b>	<b>3,350,000</b>	<b>607</b>

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

This page intentionally left blank.



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

## **Executive Summary**

### **What Is the Request and What Funds are Currently Spent on the Program?**

---

For FY 2021, the President's Budget requests \$3.35 billion to fund the Grants-in-Aid for Airports program, also known as the Airport Improvement Program (AIP). The Budget request will enable the FAA to continue providing capital funding to help airports preserve and maintain critical airport infrastructure. The Grants-in-Aid program enables FAA to advance important safety, capacity and efficiency projects at more than 500 airports supporting commercial service and more than 2,800 general aviation airports that provide critical functions at the national, regional, and local level. The AIP also helps airports address environmental concerns for neighboring communities, which may otherwise oppose or delay airport modernization projects.

### **What Is this Program and Why is it Necessary?**

---

The AIP provides grants to local and state airport authorities to help ensure the safety, capacity, and efficiency of U.S. airports. Through the AIP, the agency funds a range of activities to assist in airport development, including preservation and development of critical transportation infrastructure.

The FAA identifies public-use airports for the national transportation system and the National Plan of Integrated Airport Systems (NPIAS). These public-use airports support scheduled air carrier service at more than 500 commercial service airports. In addition to the scheduled passenger and cargo service, the airport system serves a diverse range of functions at approximately 2,800 general aviation airports that support emergency medical services and disaster response, flight training, law enforcement support, agricultural activities, and business/corporate activities.

### **Why Do We Want/Need To Fund The Program At The Requested Level?**

---

Every two years, as required by statute, the FAA publishes a report that looks five years into the future, identifying AIP-eligible development needs for the NPIAS airports. The latest NPIAS report, which was published in September 2018, identified approximately \$35.1 billion in capital needs over the 5-year period from 2019-2023.<sup>1</sup> The FAA will publish the next update in September 2020. The FAA funds capital projects that support system safety, capacity, and environmental projects and the highest priority needs in the NPIAS.

---

<sup>1</sup> Report to Congress National Plan of Integrated Airport Systems (NPIAS) 2019-2023. See [https://www.faa.gov/airports/planning\\_capacity/npias/reports/](https://www.faa.gov/airports/planning_capacity/npias/reports/)

**What Benefits will be Provided to the American Public Through This Request?**

---

The investment of AIP funds in the national system of airports is critical to helping maintain and improve the safety, capacity and efficiency of the U.S. system of airports. The FAA works closely with airports and the state aeronautical agencies to monitor the condition of critical airfield infrastructure, and can draw direct connections between our efforts and improvements in safety, capacity, efficiency, and reduction in environmental and community impacts. Through the AIP, the FAA helps ensure there is a safe and reliable system of airports to support the needs of the traveling public, the airlines and other aeronautical users (including businesses that depend upon aviation for time-critical delivery of goods and communications). AIP also contributes in efforts to ensure access to basic community needs such as emergency medical services and disaster response, flight training, law enforcement support, agricultural activities, and business/corporate activities.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for Grants-in-Aid for Airports**

**FY 2020 Grants-in-Aid for Airports Budget Request (\$000)**

<b>Program Activity</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Salaries and Expenses			
Program Costs	3,676,690	3,569,276	3,174,932
<b>Total</b>	<b>\$ 3,676,690</b>	<b>\$ 3,569,276</b>	<b>\$ 3,174,932</b>
<b>FTE</b>	<b>0</b>	<b>0</b>	<b>0</b>

**What is this program and what does this funding level support?**

---

For FY 2021, the President's Budget requests \$3.175 billion to fund the Grants-in-Aid for Airports program (AIP).

Through AIP, the agency funds a broad range of capital projects at eligible U.S. airports. As required by statute (49 U.S.C. §47103) the FAA maintains the National Plan of Integrated Airport Systems (NPIAS), which identifies airports eligible for AIP funding as well as the kind and estimated costs of eligible airport development projects under the AIP. Currently, there are more than 3,300 public use airports in the NPIAS, of which approximately 531 support scheduled air carrier service. In addition to the commercial service airports supporting scheduled passenger and cargo service, approximately 2,800 eligible airports in the NPIAS provide critical community access, support emergency medical services and disaster response, flight training, law enforcement support, agricultural activities, and business/corporate activities.

With this funding request, the FAA will continue to award AIP grants for eligible projects at NPIAS airports within four key focus areas:

**Safety:** Among the agency's long-term safety goals are to provide AIP funds to projects that eliminate outmoded airport conditions that contribute to accidents and enhance the margin of operating safety by ensuring that airport safety standards projects receive the highest funding priorities. This includes projects that will help reduce the risk of runway incursions or wrong-surface landings or departures; reduce the risks of injuries, fatalities and property damage when runway excursions occur; eliminate or mitigate obstructions; reduce risks associated with wildlife hazards; and other categories of safety enhancements.

**Capacity and Efficiency:** The FAA will continue its focus on enhancements throughout the system that will enhance capacity and increase efficiency. AIP will accomplish this by providing financial and technical support to regional and metropolitan system plans, airport master plans and environmental reviews, and by directing funding toward the

preservation or construction of runways, runway extensions, and airfield reconfigurations.

Environmental: The FAA will also continue to address environmental issues and community concerns to allow airport infrastructure improvements to proceed in a timely manner, including grants to help airports complete environmental review and permitting processes as expeditiously as possible.

Although not a primary FAA focus area, the AIP does provide funding for specific types of security projects required by statute or regulation. These projects carry a high priority for AIP funding, particularly those related to protecting the airport's "secured area." This includes airport perimeter fencing, security gates, lighting and closed circuit television cameras as part of access control to the secured area. The FAA continues to support infrastructure and facility modifications that allow the Transportation Security Administration (TSA) to optimize the layout and functionality of public screening areas, as well as works with TSA to consider other capital needs to determine whether AIP can support any aspect of those needs.

---

**What benefits will be provided to the American Public through this request and why is this program necessary?**

---

The U.S. aviation system plays a critical role in the success, strength, and growth of the U.S. economy. Approximately 584,000 active pilots, 210,000 general aviation aircraft, and more than 7,000 air carrier aircraft rely upon the U.S. airport system. The economic impacts of the air traffic control system are well documented in FAA's report on "The Economic Impact of Civil Aviation on the US Economy," published in January 2020.<sup>2</sup> It states that, in 2016, aviation accounted for 5.2 percent of our gross domestic product, contributed \$1.8 trillion in total economic activity, and supported 10.9 million jobs.<sup>3</sup> Since 2000, the AIP has funded infrastructure projects at 23 major airports to accommodate more than 2 million additional annual operations each year.

AIP funding in FY 2021 will support the following key infrastructure projects:

- To mitigate safety risks, enhance capacity, and increase efficiency, AIP will be used to fund reconstructed and rehabilitated runways, taxiways and aprons to preserve the nation's critical aviation infrastructure as well as mitigate the risk of foreign object debris damage to aircraft from cracked or broken pavement surfaces;

---

<sup>2</sup> The Economic Impact of Civil Aviation on the U.S. Economy – January 2020. See [https://www.faa.gov/about/plans\\_reports/media/2020\\_jan\\_economic\\_impact\\_report.pdf](https://www.faa.gov/about/plans_reports/media/2020_jan_economic_impact_report.pdf)

<sup>3</sup> The Economic Impact of Civil Aviation on the U.S. Economy – January 2020. Page 5. See [https://www.faa.gov/about/plans\\_reports/media/2020\\_jan\\_economic\\_impact\\_report.pdf](https://www.faa.gov/about/plans_reports/media/2020_jan_economic_impact_report.pdf)

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

- To reduce the risk of runway incursions, one of the agency's significant safety initiatives, AIP will fund projects to reconfigure taxiways, perimeter service roads and other airport facilities; and improve marking, lighting, and signage;
- To enhance safety, AIP will fund projects to conduct wildlife hazard assessments and develop wildlife hazard management plans;
- To modernize and enhance efficiency and capacity at airports using a safety risk model, AIP will fund Safety Management Systems (SMS) manual and implementation plans to expand the use of voluntary SMS across the system; and
- To improve environmental reviews and mitigation activities, the AIP will fund projects required to achieve compliance with existing noise, air quality, and water quality laws and policies, with the goals of reducing impacts and streamlining processes.

The Grants-in-Aid for Airports program is crucial to help support the FAA's mission to provide the safest and most efficient transportation system in the world. The AIP helps assure the American Public has a safe, reliable, and efficient system of airports to support and advance U.S. economic interests as well as technology, security, and safety at all levels of consumerism from next day air deliveries to emergency support services.

**Safety:** The AIP supports the FAA's safety focus by providing funding for safety-related development at airports that benefit U.S. aviation consumers at all levels, whether commercial service and general aviation operators and passengers, or recipients of goods transported via aircraft worldwide. For example, AIP provides funds to airports to make improvements that help reduce runway incursions caused by vehicle/pedestrian deviations or by pilot error due to complex or confusing geometry intersections, most of which were developed before modern airport design standards were established. The Runway Incursion Mitigation (RIM) Program is a key initiative that the Office of Airports is managing to reduce incursions at runway/taxiway intersections where at least 3 incursions have occurred in a year or that average at least one incursion a year, at various airports throughout the country. The FAA has begun and completed mitigation at many RIM locations and is currently developing an estimated schedule and cost estimates for FY 2021 through FY 2025. Additionally, ARP maintains an annual report on RIM projects to date.

AIP also provides support to accelerate improvements to Runway Safety Areas (RSA) that do not meet current standards and other similarly high priority projects that support safety through efforts to reduce the risks of air transportation-related injuries and fatalities. RSA improvements include the installation of Engineered Materials Arresting Systems at some airports. Other projects include pavement rehabilitation and geometric improvements to avoid pilot confusion and enhance safety.

**Capacity and Efficiency:** The AIP ensures maintenance of existing airport infrastructure as well as modernization of the national system of airports. The AIP also supports vital technical and financial assistance for planning, environmental analysis, engineering design, and the construction or rehabilitation of runways, taxiways, and aprons as well as other measures to expand capacity and make more efficient use of airports.

By providing grants to airport owners and operators to maintain critical facilities, including runways, taxiways, aircraft parking areas (aprons) as well as many other airport facilities, systems and equipment, the AIP helps ensure maximum capacity and efficiency. A significant part of the FAA's safety efforts also support capacity and efficiency. For example, the AIP helps ensure that the vast majority of runways at more than 3,300 NPIAS airports are maintained in excellent, good or fair condition. This reduces system delays by assuring capacity is not compromised due to pavement safety issues.

Other AIP-funded safety projects also serve to ensure system capacity and efficiency—for example, providing equipment to enable airports to keep runways and taxiways clear of snow, ice, and ponding water that can jeopardize aircraft directional control or braking action. Chemicals and plowing, as well as freeze-thaw cycles, all take a toll on runways, taxiways, and other paved areas, requiring careful environmental analysis and engineering planning to ensure adequate drainage. Additionally, AIP grants help fund expert professional planning, engineering and environmental consulting services, as well as pavement maintenance programs to ensure airports are maintained and operated in safe and serviceable conditions as required by statute (49 U.S.C. §47107).

Every other year, FAA is required to publish a five-year prospective analysis of AIP-eligible capital needs. The latest NPIAS, published in September 2018, identified \$35.1 billion in estimated capital needs over the 5-year period from 2019-2023.<sup>4</sup> This funding request will contribute to the immediate airport safety, capacity, efficiency, and environmental projects identified by the FAA and airport sponsors to maintain our existing airport infrastructure as well as modernize it to support the air transportation needs of the American public.

---

<sup>4</sup> Report to Congress National Plan of Integrated Airport Systems (NPIAS) 2019-2023. See [https://www.faa.gov/airports/planning\\_capacity/npias/reports/](https://www.faa.gov/airports/planning_capacity/npias/reports/)

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**GRANTS-IN-AID FOR AIRPORTS**

**Grants-in-Aid for Airports**  
(\$ in Thousands)

<b>Item Title</b>	<b>Dollars</b>	<b>FTP</b>	<b>FTE</b>
<b>FY 2020 Enacted</b>	<b>3,569,276</b>	<b>0</b>	<b>0</b>
<b>Adjustments to Base</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Program Level</b>			
1. Grants-in-Aid for Airports	-394,345		
<b>Increases/Decreases</b>	<b>-394,345</b>	<b>0</b>	<b>0</b>
<b>FY 2021 Request</b>	<b>3,174,932</b>	<b>0</b>	<b>0</b>

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for Personnel and Related Expenses**

**FY 2021 Personnel and Related Expenses Budget Request (\$000)**

<b>Program Activity</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Salaries and Expenses	92,749	100,624	103,432
Program Costs	22,351	15,876	15,970
<b>Total</b>	<b>\$ 115,100</b>	<b>\$ 116,500</b>	<b>\$ 119,402</b>
<b>FTE</b>	<b>573</b>	<b>574</b>	<b>580</b>

**What is this program and what does this funding level support?**

---

For FY 2021, the President's Budget requests \$119.4 million, 583 positions and 580 FTEs to cover the administrative expenses for the Office of Airports (ARP). The request supports ARP's legislatively directed mission of leadership to plan and develop a safe and efficient national airport system to satisfy the needs of the aviation interests of the United States, with consideration for economics, environmental compatibility, local proprietary rights, and safeguarding the public investment. (See 49 U.S.C. §47103).

This funding level will support eight additional positions in FY 2021—three noise-related positions, three additional financial and compliance positions, and two safety positions to support safe integration of Unmanned Aircraft Systems (UAS or “drones”) into airport operating environments.

The UAS safety-related positions are critical to enable the FAA to fulfill its regulatory oversight requirements ensuring airport compliance with safety regulations, as well as to support integration. These efforts would be coordinated with the FAA's broader and interagency approach, but there are unique issues specific to the airport operating environment. The workload for UAS is expanding exponentially with the number of drones being used (as well as the rapid proliferation of requests by airports to use drones for on-airport functions ranging from facility inspection and construction oversight to boundary surveillance and monitoring of wildlife hazards). Developing guidance, education, and communications with airports and their stakeholders on how best to safely integrate UAS operations in and around an airport has become one of the airport community's top priorities. Therefore, we are requesting these two additional positions.

The three new noise positions will help support critical engagement between FAA, airports, airlines and community groups, and thus reduce the risk that noise concerns could impede or delay implementation of critical infrastructure improvements that will enhance safety, capacity or efficiency at the nation's airports.

The three new financial and compliance positions will enable FAA to accelerate the processing of complaints under 14 CFR Part 16. Part 16 complaints involve alleged



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

violations of grant assurances and other Federal obligations by airport sponsors, such as ensuring reasonable and nondiscriminatory access for aeronautical users and proper use of airport revenue. These complaints have increased markedly in recent years, with increasingly high-profile and precedential issues that need to be brought to closure swiftly and effectively. Two of the three new positions would be expert financial analysts with auditing experience, and the third would be an expert in a broad range of other airport grant assurances and other compliance matters.

**What benefits will be provided to the American Public through this request and why is this program necessary?**

---

Congress statutorily directed the FAA to plan and develop a safe and efficient national airport system to satisfy the needs of the aviation interests of the United States, with consideration for economics, environmental permitting, local proprietary rights, and safeguarding the public investment.

The FAA's Office of Airports has responsibility for maintaining this plan to include establishing standards for the safe planning, design, construction, operation and maintenance of the nation's airports. This is critical because the safe operation of air transportation requires nationwide, as well as international in some cases, consistency in design standards, construction standards, signage, marking, lighting and emergency response.

ARP personnel possess expertise in many professional and technical areas, as they regularly engage in opportunities to work collaboratively across government agencies, with industry, and with affected stakeholders. It is important to have the appropriate amount and technically competent staff to perform work on behalf of the American public to maintain the existing national airport system. These staff members must also work to modernize airports to meet safety, infrastructure, innovation and accountability requirements with the goals of ensuring our system of airports supports the safest, most efficient aerospace system in the world.

Airports and their tenants and customers are rapidly attempting to integrate UAS into the airport environment. Airport operators are also looking for FAA guidance on how to detect and mitigate UAS being flown near airports that could become hazards to air navigation. This has created challenges for both the airport's operations and the FAA's oversight. Many airports have requested additional visits and consultations with Airport Certification Safety Inspectors, as well as FAA experts in planning, compliance, and environmental impact as they integrate UAS operations into the Part 139 regulatory environment. UAS research can expand on ways to identify and evaluate the issues and requirements for using UAS for airport-centric operations, such as wildlife monitoring, aircraft rescue and firefighting operations, and pavement and infrastructure inspection. This research can lead to efficiencies and cost savings for airports. In addition, dedicated operations personnel with the knowledge and skills in safety, planning, and compliance are needed to deal with multiple policy development activities, operational issues, and

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

outreach requirements that airports face. All these factors are accelerating to a level beyond FY 2018 resources.

For the new requested noise positions, these positions would be strategically located in three of the FAA's Regional Offices to help support proactive and effective community engagement in close coordination with the FAA's regional noise ombudsman positions and other Lines of Business. The FAA would place these positions in the Eastern Region (New York), Great Lakes Region (Chicago) and Western-Pacific Region (Los Angeles). This would put a position in each of the three Service Areas of the FAA's Air Traffic Organization, but deliberately placing the new ARP positions in cities other than where those Service Areas are based. This will have the dual benefits of spreading out FAA's resources and thus making them more directly accessible and able to support some of the most complex noise-related issues in the New York, Chicago and L.A. areas.

For the new compliance positions, these would all be located at FAA's Washington Headquarters, assigned to the Office of Airport Compliance and Management Analysis. The two new financial and auditing experts would join four others, who together must monitor and respond to issues at over 500 airports nationwide. These new positions would perform the following: help reconcile financial information reported to the FAA in the sponsor's consolidated annual financial statements; analyze sponsor cost allocations to determine if they conform to the FAA Policy and Procedures Concerning the Use of Airport Revenues; resolve audit findings, including audit findings from the Office of Management and Budget Single Audit and Office of Inspector General (OIG) audits; coordinate audit resolution the OIG, individual airport managers, FAA Regional Offices and Airports District Offices; monitor aviation fuel tax proceeds and action plans; and conduct investigations and resolve complaints of a financial nature under the rules of practice at 14 CFR Part 16.

The single additional compliance specialist would join a team of eight others who help maintain policy and guidance, which requires frequent updates due to dynamic case law. Additionally, this specialist would help to adjudicate decisions under Part 16, which is experiencing a rapidly growing number and complexity of cases that must be carefully researched and investigated, coordinated with other FAA Offices (including extensive legal review), and coordinated with other Federal, state and local units of government. In many cases, these complaints are brought forward by major U.S. flag air carriers, one or more associations representing airlines, or other aviation user groups or stakeholders.

After extensive experimentation, the FAA concluded that none of this growing workload can be absorbed by existing staff without severe negative impacts to the various stakeholders like airports, airlines and other user-groups, neighboring and impacted communities, and the traveling public.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**GRANTS-IN-AID FOR AIRPORTS**

**Personnel and Related Expenses**  
(\$ in Thousands)

<b>Item Title</b>	<b>Dollars</b>	<b>FTP</b>	<b>FTE</b>
<b>FY 2020 Enacted</b>	<b>116,500</b>	<b>575.0</b>	<b>574.0</b>
<b>Adjustments to Base</b>			
1. Annualization of FY 2020 FTE	168		2.0
2. Annualization of FY 2020 Pay Raise	780		
3. FY 2021 Pay Raise	755		
4. Adjustment for number of compensable days	-391		
5. FERS Increase	824		
4. Adjustment to Working Capital Fund	95		
<b>Total Adjustments to Base</b>	<b>2,231</b>	<b>0.0</b>	<b>2.0</b>
<b>Other Adjustments</b>			
<b>Total Other Adjustments</b>	<b>0</b>	<b>0.0</b>	<b>0.0</b>
<b>New or Expanded Programs</b>			
1. 8 new positions (4 FTE) to support tax revenue diversion compliance audits, noise related activities, and UAS integration activities	672	8.0	4.0
<b>Total Discretionary Increases</b>	<b>672</b>	<b>8</b>	<b>4</b>
<b>FY 2021 Request</b>	<b>119,402</b>	<b>583.0</b>	<b>580.0</b>

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for Airport Technology Research**

**FY 2021 Airport Technology Research Budget Request (\$000)**

<b>Program Activity</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Salaries and Expenses	3,784	3,805	4,047
Program Costs	29,426	35,419	36,619
<b>Total</b>	<b>\$ 33,210</b>	<b>\$ 39,224</b>	<b>\$ 40,666</b>
<b>FTE</b>	<b>24</b>	<b>24</b>	<b>25</b>

**What is this program and what does this funding level support?**

---

For FY 2021, the President's Budget requests \$40.7 million and two new positions to fund the Airport Technology Research (ATR) program. This is required to support the execution and management of a program that has 19 research program areas and more than 125 on-going complex projects. The two new positions are required for two new research areas that are critical to the ATR program and the FAA. One position will be to conduct and support research activities of a new Unmanned Aircraft Systems (UAS) program specific to airports. The second position will be an Advanced Pavement Materials Laboratory Manager with expertise in new and innovative materials testing methods.

The \$1.2 million increase in the Budget request is to support ATR's increasing role in the Urban Air Mobility (UAM) program. This program focuses on integrating new electric vertical takeoff and landing (eVTOL) vehicles into the NAS. ATR has a critical role in this program, as it will be leveraging data collected from vehicle manufacturers during FY 2019 - FY 2020 to develop new design standards for landing facilities for eVTOL. ATR plans to refurbish its test helipad facility located at the FAA Technical Center in Atlantic City to meet these new design standards and then test against prototype eVTOL vehicles.

The ATR program activities will continue to support research in airport planning and design, runway incursion reduction, analysis of airport safety data, airport rescue and firefighting, wildlife hazard mitigation, visual guidance, runway surface technology, airport surveillance sensors, aircraft noise issues around airport, airport pavement design, airport pavement materials, wet runway aircraft braking tests, airport pavement long-term performance, and UAS integration at airports.

The program will also include funding for the innovative Airport Pavement Technology Program to perform short-term applied research in collaboration with the Portland cement and asphalt cement industries.

ATR findings are used in updating Advisory Circulars, manuals, and technical specifications that airports heavily rely on to maintain and expand their infrastructure in

the safest and most efficient manner. This includes all engineering standards for airport construction projects as well as specific safety guidance and requirements to assure safe aircraft and airport operations on the ground. For example, current research projects will advance ARP's ability to maintain the highest safety standards in areas with rapidly evolving technologies such as visual guidance, airport surveillance systems, pavement testing and materials research, and airport geometry enhancements to name a few. All ATR activities are designed to support ARP's mission to enhance the nation's system in its four focus areas: safety, infrastructure, innovation and accountability.

The success of the research is reflected in our ability to issue updated and new program guidance. For example, based on research and evaluation ARP has issued an Engineering Brief on bolts for light fixtures and a Certification Alert on the use of aqueous film-forming foams (AFFF) foam proportioning systems. Each research project is sponsored by a FAA headquarters engineer, or other specialist, that prepares the research requirements, reviews the research plan, and approves the completed deliverables.

---

**What benefits will be provided to the American Public through this request and why is this program necessary?**

---

The ATR program provides extensive tangible and intangible benefits to the American Public in the four focus areas that advance the mission of ARP: safety, infrastructure, innovation, and accountability.

Safety-related ATR programs provide fact-based assessments and complex analyses of safety and operational data to help the FAA and airport operators institute and maintain standard and proven practices at all NPIAS airports. To do so, the ATR program manages a number of research databases. In FY 2021, integration and support of the databases (bird strike, foreign object debris detection, Airport Pavement management systems) into one location will continue. This will ensure compliance with FAA standards, to improve the overall functionality of the databases, and promote public access and sharing of the data as well as enhancements to programs to advance public safety.

A key safety project with an environmental benefit is ATR's work investigating ways to reduce or eliminate chemicals that may pose either health or environmental hazards. Specifically, there has been a growing concern about the potential health and environmental impacts that perfluoroalkyl or polyfluoroalkyl substances (PFAS) may cause. PFAS can be found in a broad range of range of products, materials and systems, ranging from consumer and healthcare products to building materials and many other products. This includes aqueous film-forming foams (AFFF) used in aircraft rescue and firefighting. This research will help test the effectiveness of new firefighting extinguishing agents that do not contain PFAS. In FY 2021, ATR will continue the multi-year research effort at ATR's new ARFF Research Facility, which was completed in 2019. ATR will complete testing, that started in FY 2020, of numerous and selected fluorine-free foams (FFFs) and determine if any FFF can provide the same (or better) levels of fire extinguishment. In addition, ATR will continue with the development of

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

new firefighting performance requirements for the use of compressed air foam system technology in aircraft rescue and firefighting.

ATR will continue to use its facilities to test and conduct research on new pavement design and new pavement materials, which will provide longer life to the airport pavements. The FAA will use a new state-of-the-art material testing laboratory to establish material characterization of new pavement materials to prolong the life of the nation's newly constructed pavements. This new pavement laboratory will also be used to develop new and innovative material testing methods that will be more appropriate to test pavement materials of the future. Incorporating realistic material properties and specifications through this material research and testing will improve the pavement thickness design procedure and pavement life predictions thus reducing costs and increasing pavement life. The ATR program leads to airports using the same pavement design and construction standards all around the country, optimizing construction costs by helping companies of all sizes bid on airport projects. These increases in safety and efficiency netted positive impacts to the American public.

In FY 2021, an innovation project with an environmental benefit will be the evaluation of solar lighting systems for airports. Historically there have been challenges to using photovoltaic (PV) technology to power lighting systems in airfield environments. Recent developments relating to light-emitting diode, commonly referred to as light emitting diode (LED) lighting and solar technology have made solar powered lighting systems a practical alternative in certain airfield environments. Solar technology advancements present an opportunity for airports to produce on-site electricity and reduce long-term energy costs. In FY 2021, ATR will complete testing of prototype PV technologies at multiple airports across the United States as part of a program that will include testing at five airports in total. Each of the five airports are in areas of the country that experience different levels of 'solar irradiance' (output of light energy from the sun), temperature, and snow conditions. Researchers will analyze data from the three-year long effort, with the goal of developing standards and performance specifications for PV systems on airports.

In FY 2021, ATR will continue to research how UAS technologies can be utilized in five airport application areas: obstruction analysis, airfield pavement inspections, wildlife hazard management, perimeter security, and aircraft rescue and firefighting. ATR will create five unique research and development teams that will focus on each unique application area. The teams will consist of researchers, and subject matter experts who will work together to develop, concept of operations and performance specifications for the UAS sensors and UAS technologies and develop FAA guidance documents that will be available to airport operators with a desire to conduct those types of UAS operations.

ATR will continue a research effort in which they are working with vertical takeoff and landing (VTOL) aircraft manufacturers to develop new vertiport design standards to support the unique operational characteristics of these aircraft.

**Federal Aviation Administration**  
**FY 2021 President's Budget Submission**

---

Also in FY 2021, ATR will complete field testing of visual aids to reduce wrong surface landings, including the evaluation of proposed changes to lighted runway closure markers including a new LED lighted "X". The results of this research will be used to support revisions to existing FAA Advisory Circulars.

For FY 2021 airport safety and design research, ATR will complete the annual Runway Incursion Mitigation update to include an airfield geometry assessment of all towered airports that may have airport design features that are considered at risk for incursions. ATR will geo-reference all runway incursions that occurred in FY 2020 as well as mitigated incursion locations. Based on the addition of this data, ATR will conduct an analysis on the program's progress. ATR will also complete the development of "AppMap", which is a scalable, centralized, geospatial tool that will expedite and improve FAA's planning and environmental reviews. In the area of safety data analysis, ATR will conduct an analysis of all available safety data to identify top occurrences at airports and associated causal factors for the period of FY 2016-FY 2020.

Aircraft noise continues to be one of the principal obstacles to optimizing airport system capacity and reducing congestion and delays at the largest and busiest airports. In FY 2021, the ATR program will continue to research ways to reduce community noise impacts. Research projects include: evaluating and improving the accuracy of noise level reduction testing to develop guidelines for industry standards; and collecting nationally representative data on the relationship between aircraft noise exposure and residential sleep disturbance. Public demand for a quieter environment is putting increasing pressures on our National system of airports that undermine their ability to expand and to accommodate modernization initiatives that will enhance safety, capacity and efficiency. Another potentially limiting factor for airport system capacity is air quality. About 30 percent of U.S. commercial service airports are in either non-attainment areas or maintenance areas for Federal air quality standards. ATR projects in these areas will provide distinct benefits to the American public, on the ground and in the air, with more efficient routes, quieter communities, and enhanced capacity.

The research initiatives supported by this funding are crucial to continued maintenance and enhancement of safety for the traveling public. Communities of every size throughout the nation benefit from increased accessibility and competitive access. Environmental quality benefits both the traveling public and neighboring communities by enabling airports to be well positioned to support critical infrastructure projects and by helping airports minimize their environmental effects on surrounding areas.

ATR's research portfolio for FY 2021 has been briefed to the FAA's Research, Engineering and Development Advisory Committee's Subcommittee on Airports (REDAC). The REDAC reviews the ATR Program every six months. The Subcommittee has members from airports, aircraft manufacturers, Air Line Pilots Association, and airport associations. The Subcommittee is briefed on both ongoing research and planned research and offers recommendations to ensure the research program is responsive to the needs of FAA and the airport community.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**GRANTS-IN-AID FOR AIRPORTS**

**Airport Technology Research**  
(\$ in Thousands)

<b>Item Title</b>	<b>Dollars</b>	<b>FTP</b>	<b>FTE</b>
<b>FY 2020 Enacted</b>	<b>39,224</b>	<b>24</b>	<b>24.0</b>
<b>Adjustments to Base</b>			
1. Annualization of FY 2020 Pay Raise	29		
2. FY 2021 Pay Raise	29		
3. Adjustment for number of compensable days	-15		
4. FERS Increase	31		
<b>Total Adjustments to Base</b>	<b>74</b>	<b>0</b>	<b>0.0</b>
<b>Total Other Adjustments</b>	<b>0</b>	<b>0</b>	<b>0.0</b>
1. Two new positions to conduct and support UAS research, and provide expertise in innovative pavement materials testing	168	2	1.0
2. Additional \$1.2 million to conduct research and develop standards related to urban air mobility	1,200		
<b>Total Discretionary Increases</b>	<b>1,368</b>	<b>2</b>	<b>1.0</b>
<b>FY 2021 Request</b>	<b>40,666</b>	<b>26</b>	<b>25.0</b>



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Detailed Justification for Airport Cooperative Research Program**

**FY 2021 Airport Cooperative Research Program (\$000)**

<b>Program Activity</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Salaries and Expenses	176	176	178
Program Costs	14,824	14,824	14,822
<b>Total</b>	<b>\$ 15,000</b>	<b>\$ 15,000</b>	<b>\$ 15,000</b>
<b>FTE</b>	<b>2</b>	<b>2</b>	<b>2</b>

**What is this program and what does this funding level support?**

---

The Airport Cooperative Research Program (ACRP) is an industry driven research program managed by the Transportation Research Board (TRB) of the National Academies of Sciences, Engineering, and Medicine. It was authorized by section 712 of Vision 100 – Century of Aviation Reauthorization Act. The Secretary of Transportation maintains a Memorandum of Agreement among Department of Transportation, FAA, and National Academy of Sciences to implement the ACRP. The Secretary also appoints the 13 members of the ACRP Oversight Committee.

The ACRP's mission is to develop near-term, practical solutions to problems faced by airport operators. ACRP uses contractors, selected in a competitive process, to conduct the research, which is overseen by industry experts and a designated FAA subject matter expert. The results of the research are published in the form of handbooks and best practices. To date, the vast library of publications includes areas of safety, airport management, airport financing, airport environmental quality, airport compliance, and airport planning. These publications are available to the general public on the ACRP website and for purchase in hard copy.

For FY 2021, the President's Budget requests \$15 million for the program. Pay inflation will be absorbed within the requested level. As with previous years, approximately 15 research topics will be funded under this request in FY 2021. ACRP is designed to address needs that are not being addressed by other federal research programs and that cannot be undertaken cost-effectively by individual airports.

**What benefits will be provided to the American Public through this request and why is this program necessary?**

---

ACRP is a national resource for the airport industry, providing valuable information, guidance and practical tools to airport owners and operators (as well as consultants and contractors) by providing industry-driven research identified as critical or crucial by airport operators, industry, and users. This community has continually submitted over

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

100 topics for research each year. After 11 years in operation, ACRP has engaged thousands of public- and private-sector airport practitioners, academia, consultants, advocates, and students to address the airport industry's most pressing challenges.

The 13-member ACRP Oversight Committee reviews the topics selected each year. This Committee, appointed by the Secretary of Transportation meets every six months to review progress and select additional topics to fund. This assures the aviation tax dollar is utilized in the most efficient and beneficial manner to the American public, mitigating wasteful delays, unreasonable contract terms, and unneeded proposals. The ACRP Oversight Committee selects the highest rated topics, and ensures that proposed studies will not duplicate other federal research. The TRB appoints expert technical panels for each selected project. The technical panels convert the topics into requests for proposals to select contractors to perform the research. The panels also monitor each project to ensure it stays on track and meets project deliverables.

ACRP's broad mission is to provide resources to support applied research on a wide variety of issues faced by airport practitioners, including all levels of professional staff within the airport community, from CEOs, airport managers, executive directors to mid-level managers, nonsupervisory technical and professional staff, trainees, students, and interns. These professionals represent airports, suppliers, public safety agencies, airlines, airport tenants, local and regional government authorities, industry associations, and many other stakeholders in the airport community. Each of these practitioners has different interests and responsibilities, and each is an integral part of this cooperative research effort.

In addition to publishing reports on industry-driven research priorities, ACRP works to ensure that these products reach those who need them most. These efforts have reached several thousand stakeholders through e-videos, webinars, workshops, speaker presentations, and publications on applied results. The benefits to the American public are a more cohesive and educated cadre of airport sponsors, armed with the knowledge and tools through ACRP's efforts, to implement the AIP more consistently and compliantly, which results in a safer and more efficient National system of airports.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**GRANTS-IN-AID FOR AIRPORTS**

**Airport Cooperative Research**

(\$ in Thousands)

<b>Item Title</b>	<b>Dollars</b>	<b>FTP</b>	<b>FTE</b>
<b>FY 2020 Enacted</b>	<b>15,000</b>	<b>2</b>	<b>2.0</b>
<b>Adjustments to Base</b>			
1. Annualization of FY 2020 Pay Raise	1		
2. FY 2021 Pay Raise	1		
3. Adjustment for number of compensable days	-1		
4. FERS Increase	1		
<b>Total Adjustments to Base</b>	<b>2</b>	<b>0</b>	<b>0.0</b>
<b>Discretionary Increases/ Decreases</b>			
1. Discretionary increase of offset uncontrollable adjustments	-2		
<b>Total Discretionary Adjustments</b>	<b>-2</b>	<b>0</b>	<b>0.0</b>
<b>FY 2021 Request</b>	<b>15,000</b>	<b>2</b>	<b>2.0</b>

[This page intentionally left blank.]

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

**AIRPORT IMPROVEMENT PROGRAM**  
Grants-in-Aid to Airports Planned Distribution  
\$000

	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
<b>Formula Grants</b>			
Primary Airports	885,765	909,220	909,220 <b>2/</b>
Cargo Service Airports	111,272	110,925	111,123
Alaska	21,345	21,345	21,345
States (General Aviation)	635,838	633,855	634,986
Carryover (from Formula Grants)	762,933	718,988	718,149 <b>3/</b>
Subtotal, Formula Grants	2,417,153	2,394,333	2,394,823
<b>Discretionary Grants</b>			
Discretionary Set-Aside: Noise Compatibility	74,565	73,380	75,188
Discretionary Set-Aside: Reliever	1,406	1,384	1,417
Discretionary Set-Aside: Military Airport Program	8,522	8,386	8,593
C/S/S/N (Capacity/Safety/Security/Noise)	96,412	94,879	97,218
Discretionary -- AATF	32,137	31,627	32,406
Discretionary -- General Fund	497,500 <b>1/</b>	400,000 <b>4/</b>	0
Subtotal, Discretionary Grants	710,542	609,656	214,822
Small Airport Fund	548,995	565,287	565,287
<b>Total Grants</b>	<b>3,676,690</b>	<b>3,569,276</b>	<b>3,174,932</b>

1/ FY-2019 Funding provided by the Consolidated Appropriations Act, 2019. This act provides Supplemental Discretionary funding of \$497.5 million to Grants-in Aid for Airports and \$2.5 million is retained for Airport Administration.

2/ FY-2021 Primary Entitlements reflect the same forecast activity levels for FY-2020, because we do not yet have sufficient updated information to warrant any significant change.

3/ FY 2021 carryover figures are estimated based on a five-year rolling average.

4/ FY-2020 Funding provided by the Consolidated Appropriations Act, 2020. This act provides Supplemental Discretionary funding of \$400 million to Grants-in Aid for Airports and \$2 million is retained for Airport Administration.

The FY 2021 Budget request assumes the Passenger Facility Charge (PFC) at current maximum allowable level of \$4.50 per ticket sold, under Public Law 106-181, enacted in 2000.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Passenger Facility Charge (PFC) Approved Locations  
As of December 31, 2019  
(Whole Dollars)  
**PFC APPROVED LOCATIONS**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Anchorage	AK	Ted Stevens Anchorage International	ANC	M	\$3.00	10/1/2000	12/1/2026	106,043,173
Fairbanks	AK	Fairbanks International	FAI	S	\$3.00	10/1/2000	4/1/2004	
Fairbanks	AK	Fairbanks International	FAI	S	\$4.50	4/1/2004	10/1/2026	38,413,252
Juneau	AK	Juneau International	JNU	N	\$3.00	10/1/1998	2/1/2001	
Juneau	AK	Juneau International	JNU	N	\$4.50	8/1/2001	7/1/2026	26,084,549
Ketchikan	AK	Ketchikan International	KTN	N	\$3.00	2/1/1999	8/1/2001	
Ketchikan	AK	Ketchikan International	KTN	N	\$4.50	8/1/2001	6/1/2018	
Ketchikan	AK	Ketchikan International	KTN	N	\$4.50	4/1/2019	8/1/2028	10,587,010
Sitka	AK	Sitka Rocky Gutierrez	SIT	N	\$4.50	7/1/2007	9/1/2013	
Sitka	AK	Sitka Rocky Gutierrez	SIT	N	\$4.50	5/1/2018	5/1/2038	8,073,347
Birmingham	AL	Birmingham Shuttlesworth International	BHM	S	\$3.00	8/1/1997	11/1/2003	
Birmingham	AL	Birmingham-Shuttlesworth International	BHM	S	\$3.00	12/1/2003	10/1/2008	
Birmingham	AL	Birmingham-Shuttlesworth International	BHM	S	\$4.50	10/1/2008	2/1/2031	212,563,127
Dothan	AL	Dothan Regional	DHN	N	\$3.00	2/1/1998	8/1/2001	
Dothan	AL	Dothan Regional	DHN	N	\$4.50	8/1/2001	12/1/2020	5,515,948
Huntsville	AL	Huntsville International-Carl T Jones Field	HSV	S	\$3.00	6/1/1992	9/1/2004	

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Huntsville	AL	Huntsville International-Carl T Jones Field	HSV	S	\$4.50	9/1/2004	8/1/2025	61,431,541
Mobile	AL	Mobile Downtown	BFM	GA	\$4.50	1/1/2020	11/1/2026	988,418
Mobile	AL	Mobile Regional	MOB	N	\$3.00	12/1/1997	7/1/2004	
Mobile	AL	Mobile Regional	MOB	N	\$3.00	3/1/2005	5/1/2013	
Mobile	AL	Mobile Regional	MOB	N	\$3.00	6/1/2013	10/1/2017	
Mobile	AL	Mobile Regional	MOB	N	\$4.50	10/1/2017	11/1/2020	19,431,999
Montgomery	AL	Montgomery Regional (Dannelly Field)	MGM	N	\$4.50	5/1/2005	1/1/2027	28,599,933
Muscle Shoals	AL	Northwest Alabama Regional	MSL	CS	\$3.00	6/1/1992	10/1/2003	
Muscle Shoals	AL	Northwest Alabama Regional	MSL	CS	\$3.00	12/1/2004	4/1/2009	
Muscle Shoals	AL	Northwest Alabama Regional	MSL	CS	\$4.50	4/1/2009	7/1/2027	583,538
Fayetteville/ Springdale/ Rogers	AR	Northwest Arkansas Regional	XNA	S	\$3.00	12/1/1998	4/1/2001	
Fayetteville/ Springdale/ Rogers	AR	Northwest Arkansas Regional	XNA	S	\$4.50	4/1/2001	9/1/2047	119,872,895
Fayetteville	AR	Drake Field	FYV	GA	\$3.00	1/1/1996	1/1/2001	2,221,887
Fort Smith	AR	Fort Smith Regional	FSM	N	\$3.00	8/1/1994	2/1/2008	
Fort Smith	AR	Fort Smith Regional	FSM	N	\$4.50	2/1/2008	6/1/2022	8,605,594
Little Rock	AR	Bill and Hillary Clinton	LIT	S	\$3.00	5/1/1995	9/1/2001	

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
		National/Adams Field						
Little Rock	AR	Bill and Hillary Clinton National/Adams Field	LIT	S	\$4.50	9/1/2001	7/1/2020	114,146,711
Texarkana	AR	Texarkana Regional-Webb Field	TXK	N	\$3.00	2/1/1995	9/1/2001	
Texarkana	AR	Texarkana Regional-Webb Field	TXK	N	\$4.50	9/1/2001	3/1/2005	
Texarkana	AR	Texarkana Regional-Webb Field	TXK	N	\$4.50	7/1/2008	5/1/2014	
Texarkana	AR	Texarkana Regional-Webb Field	TXK	N	\$4.50	4/1/2015	11/1/2017	
Texarkana	AR	Texarkana Regional-Webb Field	TXK	N	\$4.50	10/1/2019	9/1/2025	3,018,493
Pago Pago	AS	Pago Pago International	PPG	N	\$3.00	7/1/1995	6/1/2000	
Pago Pago	AS	Pago Pago International	PPG	N	\$4.50	9/1/2001	9/1/2005	
Pago Pago	AS	Pago Pago International	PPG	N	\$4.50	6/1/2006	12/1/2020	7,563,954
Bullhead City	AZ	Laughlin/Bullhead International	IFP	N	\$2.00	5/1/2008	10/1/2012	
Bullhead City	AZ	Laughlin/Bullhead International	IFP	N	\$2.00	1/1/2014	1/1/2025	2,951,578
Flagstaff	AZ	Flagstaff Pulliam	FLG	N	\$3.00	12/1/1992	9/1/2012	
Flagstaff	AZ	Flagstaff Pulliam	FLG	N	\$4.50	9/1/2012	1/1/2021	4,298,800
Phoenix	AZ	Phoenix-Mesa Gateway	IWA	S	\$4.50	11/1/2008	8/1/2029	49,154,314
Peach Springs	AZ	Grand Canyon West	1G4	GA	\$3.00	9/1/2004	9/1/2006	



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Peach Springs	AZ	Grand Canyon West	1G4	GA	\$3.00	6/1/2008	1/1/2024	9,922,946
Phoenix	AZ	Phoenix Sky Harbor International	PHX	L	\$3.00	4/1/1996	4/1/2002	
Phoenix	AZ	Phoenix Sky Harbor International	PHX	L	\$4.50	7/1/2002	1/1/2037	3,022,194,014
Tucson	AZ	Tucson International	TUS	S	\$3.00	2/1/1998	10/1/2006	
Tucson	AZ	Tucson International	TUS	S	\$4.50	10/1/2006	2/1/2027	179,290,015
Yuma	AZ	Yuma MCAS/Yuma International	NYL	N	\$3.00	12/1/1993	10/1/2005	
Yuma	AZ	Yuma MCAS/Yuma International	NYL	N	\$4.50	10/1/2005	4/1/2007	
Yuma	AZ	Yuma MCAS/Yuma International	NYL	N	\$4.50	11/1/2007	5/1/2024	6,159,412
Arcata/Eureka	CA	California Redwood Coast-Humboldt County	ACV	N	\$3.00	2/1/1993	3/1/1994	
Arcata/Eureka	CA	California Redwood Coast-Humboldt County	ACV	N	\$3.00	11/1/1994	11/1/1997	
Arcata/Eureka	CA	California Redwood Coast-Humboldt County	ACV	N	\$3.00	4/1/1998	6/1/2003	
Arcata/Eureka	CA	California Redwood Coast-Humboldt County	ACV	N	\$4.50	6/1/2003	3/1/2005	

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Arcata/Eureka	CA	California Redwood Coast-Humboldt County	ACV	N	\$4.50	7/1/2005	10/1/2005	
Arcata/Eureka	CA	California Redwood Coast-Humboldt County	ACV	N	\$4.50	12/1/2005	8/1/2011	
Arcata/Eureka	CA	California Redwood Coast-Humboldt County	ACV	N	\$4.50	10/1/2011	5/1/2022	7,073,764
Bakersfield	CA	Meadows Field	BFL	N	\$3.00	6/1/1995	5/1/2002	
Bakersfield	CA	Meadows Field	BFL	N	\$4.50	5/1/2002	2/1/2024	13,781,709
Burbank	CA	Bob Hope	BUR	M	\$3.00	9/1/1994	4/1/2003	
Burbank	CA	Bob Hope	BUR	M	\$4.50	4/1/2003	8/1/2017	
Burbank	CA	Bob Hope	BUR	M	\$3.00	8/1/2017	12/1/2017	
Burbank	CA	Bob Hope	BUR	M	\$4.50	12/1/2017	3/1/2021	237,854,208
Carlsbad	CA	McClellan-Palomar	CRQ	CS	\$4.50	1/1/2009	2/1/2043	4,947,065
Chico	CA	Chico Municipal	CIC	GA	\$3.00	12/1/1993	9/1/1998	
Chico	CA	Chico Municipal	CIC	GA	\$3.00	6/1/1999	2/1/2001	
Chico	CA	Chico Municipal	CIC	GA	\$3.00	11/1/2001	12/1/2009	
Chico	CA	Chico Municipal	CIC	GA	\$4.50	12/1/2010	12/1/2014	707,290
Crescent City	CA	Jack McNamara Field	CEC	CS	\$3.00	9/1/1998	6/1/2000	
Crescent City	CA	Jack McNamara Field	CEC	CS	\$3.00	1/1/2001	6/1/2003	

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Crescent City	CA	Jack McNamara Field	CEC	CS	\$4.50	6/1/2003	10/1/2014	
Crescent City	CA	Jack McNamara Field	CEC	CS	\$4.50	12/1/2014	2/1/2021	899,295
Fresno	CA	Fresno Yosemite International	FAT	S	\$3.00	12/1/1996	12/1/2004	
Fresno	CA	Fresno Yosemite International	FAT	S	\$4.50	12/1/2004	3/1/2022	66,471,529
Imperial	CA	Imperial County	IPL	CS	\$4.50	4/1/2003	4/1/2030	892,781
Inyokern	CA	Inyokern	IYK	GA	\$3.00	3/1/1993	3/1/2003	
Inyokern	CA	Inyokern	IYK	GA	\$3.00	4/1/2004	10/1/2004	
Inyokern	CA	Inyokern	IYK	GA	\$4.50	9/1/2006	2/1/2009	
Inyokern	CA	Inyokern	IYK	GA	\$4.50	3/1/2009	3/1/2019	994,460
Long Beach	CA	Long Beach /Daugherty Field/	LGB	S	\$3.00	8/1/2003	5/1/2008	
Long Beach	CA	Long Beach /Daugherty Field/	LGB	S	\$4.50	5/1/2008	4/1/2034	178,418,777
Los Angeles	CA	Los Angeles International	LAX	L	\$3.00	7/1/1993	1/1/1996	
Los Angeles	CA	Los Angeles International	LAX	L	\$3.00	2/1/1998	7/1/2003	
Los Angeles	CA	Los Angeles International	LAX	L	\$4.50	7/1/2003	1/1/2029	4,267,378,368
Mammoth Lakes	CA	Mammoth Yosemite	MMH	N	\$3.00	9/1/1995	9/1/2005	
Mammoth Lakes	CA	Mammoth Yosemite	MMH	N	\$4.50	11/1/2009	9/1/2019	1,017,131
Modesto	CA	Modesto City County- Harry Sham Field	MOD	GA	\$3.00	8/1/1994	3/1/2005	
Modesto	CA	Modesto City County- Harry Sham Field	MOD	GA	\$4.50	8/1/2008	4/1/2015	

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
								1,034,802
Monterey	CA	Monterey Regional	MRY	N	\$3.00	1/1/1994	7/1/2003	
Monterey	CA	Monterey Regional	MRY	N	\$4.50	7/1/2003	4/1/2006	
Monterey	CA	Monterey Regional	MRY	N	\$4.50	5/1/2006	12/1/2023	23,382,956
Oakland	CA	Metropolitan Oakland International	OAK	M	\$3.00	9/1/1992	6/1/1999	
Oakland	CA	Metropolitan Oakland International	OAK	M	\$3.00	9/1/1999	5/1/2003	
Oakland	CA	Metropolitan Oakland International	OAK	M	\$4.50	5/1/2003	12/1/2035	907,425,991
Ontario	CA	Ontario International	ONT	M	\$3.00	7/1/1993	12/1/1996	
Ontario	CA	Ontario International	ONT	M	\$3.00	7/1/1998	11/1/2007	
Ontario	CA	Ontario International	ONT	M	\$4.50	11/1/2007	1/1/2013	
Ontario	CA	Ontario International	ONT	M	\$2.00	1/1/2013	4/1/2016	
Ontario	CA	Ontario International	ONT	M	\$4.50	4/1/2016	11/1/2024	291,622,635
Oxnard	CA	Oxnard	OXR	GA	\$4.50	1/1/2002	3/1/2011	631,115
Palm Springs	CA	Palm Springs International	PSP	S	\$3.00	9/1/1992	1/1/2002	
Palm Springs	CA	Palm Springs International	PSP	S	\$4.50	1/1/2002	10/1/2037	140,310,796
Redding	CA	Redding Municipal	RDD	N	\$3.00	4/1/1997	4/1/2002	
Redding	CA	Redding Municipal	RDD	N	\$4.50	4/1/2002	4/1/2007	
Redding	CA	Redding Municipal	RDD	N	\$4.50	8/1/2007	2/1/2025	4,719,848
Sacramento	CA	Sacramento International	SMF	M	\$3.00	4/1/1993	1/1/2002	
Sacramento	CA	Sacramento International	SMF	M	\$4.50	1/1/2002	2/1/2003	

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Sacramento	CA	Sacramento International	SMF	M	\$3.00	2/1/2003	9/1/2003	
Sacramento	CA	Sacramento International	SMF	M	\$4.50	9/1/2003	11/1/2034	953,252,732
San Diego	CA	San Diego International	SAN	L	\$3.00	10/1/1995	8/1/2003	
San Diego	CA	San Diego International	SAN	L	\$4.50	8/1/2003	2/1/2040	1,589,293,933
San Francisco	CA	San Francisco International	SFO	L	\$4.50	10/1/2001	3/1/2029	2,111,686,690
San Jose	CA	Norman Y Mineta San Jose International	SJC	M	\$3.00	9/1/1992	4/1/2001	
San Jose	CA	Norman Y Mineta San Jose International	SJC	M	\$4.50	4/1/2001	1/1/2030	1,023,860,590
San Luis Obispo	CA	San Luis County Regional	SBP	N	\$3.00	2/1/1993	2/1/1995	
San Luis Obispo	CA	San Luis County Regional	SBP	N	\$3.00	6/1/1995	9/1/2002	
San Luis Obispo	CA	San Luis County Regional	SBP	N	\$4.50	9/1/2002	6/1/2011	
San Luis Obispo	CA	San Luis County Regional	SBP	N	\$3.00	6/1/2011	6/1/2014	
San Luis Obispo	CA	San Luis County Regional	SBP	N	\$4.50	6/1/2014	12/1/2022	16,945,162
Santa Ana	CA	John Wayne Airport-Orange County	SNA	M	\$4.50	7/1/2006	1/1/2022	311,602,130
Santa Barbara	CA	Santa Barbara Municipal	SBA	N	\$3.00	1/1/1998	11/1/2003	
Santa Barbara	CA	Santa Barbara Municipal	SBA	N	\$4.50	11/1/2003	7/1/2039	36,388,365

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Santa Maria	CA	Santa Maria Public/Capt G Allan Hancock Field	SMX	N	\$4.50	10/1/2007	10/1/2028	5,380,346
Santa Rosa	CA	Charles M Schulz - Sonoma County	STS	N	\$3.00	5/1/1993	4/1/2005	
Santa Rosa	CA	Charles M Schulz - Sonoma County	STS	N	\$4.50	5/1/2008	4/1/2013	
Santa Rosa	CA	Charles M Schulz - Sonoma County	STS	N	\$4.50	7/1/2013	4/1/2049	21,925,017
South Lake Tahoe	CA	Lake Tahoe	TVL	GA	\$3.00	8/1/1992	3/1/2007	169,838
Stockton	CA	Stockton Metropolitan	SCK	N	\$4.50	2/1/2007	8/1/2009	
Stockton	CA	Stockton Metropolitan	SCK	N	\$4.50	9/1/2009	9/1/2012	
Stockton	CA	Stockton Metropolitan	SCK	N	\$4.50	9/1/2013	9/1/2025	7,293,646
Alamosa	CO	San Luis Valley Regional/Ber gman Field	ALS	CS	\$3.00	3/1/1997	7/1/2016	
Alamosa	CO	San Luis Valley Regional/Ber gman Field	ALS	CS	\$4.50	7/1/2016	7/1/2034	714,140
Aspen	CO	Aspen-Pitkin County/Sardy Field	ASE	N	\$3.00	7/1/1995	5/1/2003	
Aspen	CO	Aspen-Pitkin County/Sardy Field	ASE	N	\$4.50	5/1/2003	8/1/2004	

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Aspen	CO	Aspen-Pitkin County/Sardy Field	ASE	N	\$4.50	1/1/2005	9/1/2021	17,997,279
Colorado Springs	CO	City of Colorado Springs Municipal	COS	S	\$3.00	3/1/1993	8/1/2016	
Colorado Springs	CO	City of Colorado Springs Municipal	COS	S	\$4.50	8/1/2016	12/1/2021	89,661,330
Cortez	CO	Cortez Municipal	CEZ	CS	\$3.00	11/1/1999	3/1/2008	
Cortez	CO	Cortez Municipal	CEZ	CS	\$4.50	3/1/2008	6/1/2030	701,694
Denver	CO	Denver International	DEN	L	\$3.00	7/1/1992	4/1/2001	
Denver	CO	Denver International	DEN	L	\$4.50	4/1/2001	10/1/2030	3,461,934,131
Durango	CO	Durango-La Plata County	DRO	N	\$3.00	2/1/1995	8/1/1997	
Durango	CO	Durango-La Plata County	DRO	N	\$3.00	9/1/1997	3/1/2003	
Durango	CO	Durango-La Plata County	DRO	N	\$4.50	6/1/2005	4/1/2011	
Durango	CO	Durango-La Plata County	DRO	N	\$4.50	11/1/2011	8/1/2012	
Durango	CO	Durango-La Plata County	DRO	N	\$4.50	9/1/2013	8/1/2037	24,838,266
Eagle	CO	Eagle County Regional	EGE	N	\$3.00	9/1/1993	4/1/2001	
Eagle	CO	Eagle County Regional	EGE	N	\$4.50	4/1/2001	6/1/2009	
Eagle	CO	Eagle County Regional	EGE	N	\$3.00	6/1/2009	7/1/2009	
Eagle	CO	Eagle County Regional	EGE	N	\$4.50	7/1/2009	5/1/2036	22,869,216

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Fort Collins/Lovel and	CO	Northern Colorado Regional	FNL	CS	\$3.00	10/1/1993	5/1/1999	
Fort Collins/Lovel and	CO	Northern Colorado Regional	FNL	CS	\$4.50	8/1/2004	12/1/2011	
Fort Collins/Lovel and	CO	Northern Colorado Regional	FNL	CS	\$4.50	2/1/2012	3/1/2015	1,593,522
Grand Junction	CO	Grand Junction Regional	GJT	N	\$3.00	4/1/1993	9/1/2006	
Grand Junction	CO	Grand Junction Regional	GJT	N	\$4.50	9/1/2006	10/1/2036	32,267,359
Gunnison	CO	Gunnison-Crested Butte Regional	GUC	N	\$3.00	11/1/1993	4/1/2001	
Gunnison	CO	Gunnison-Crested Butte Regional	GUC	N	\$4.50	4/1/2001	8/1/2023	4,214,518
Hayden	CO	Yampa Valley	HDN	N	\$3.00	11/1/1993	7/1/2001	
Hayden	CO	Yampa Valley	HDN	N	\$4.50	7/1/2001	9/1/2039	16,063,641
Montrose	CO	Montrose Regional	MTJ	N	\$3.00	11/1/1993	8/1/2003	
Montrose	CO	Montrose Regional	MTJ	N	\$4.50	8/1/2003	6/1/2006	
Montrose	CO	Montrose Regional	MTJ	N	\$4.50	8/1/2006	8/1/2010	
Montrose	CO	Montrose Regional	MTJ	N	\$4.50	11/1/2010	5/1/2020	6,771,780
Pueblo	CO	Pueblo Memorial	PUB	N	\$3.00	11/1/1993	12/1/2014	
Pueblo	CO	Pueblo Memorial	PUB	N	\$4.50	3/1/2015	4/1/2036	1,229,111
Steamboat Springs	CO	Steamboat Springs/Bob Adams Field	SBS	GA	\$3.00	4/1/1993	6/1/1997	159,576
Telluride	CO	Telluride Regional	TEX	GA	\$3.00	2/1/1993	4/1/2002	



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Telluride	CO	Telluride Regional	TEX	GA	\$4.50	4/1/2002	1/1/2019	
Telluride	CO	Telluride Regional	TEX	GA	\$4.50	2/1/2020	3/1/2030	7,547,037
New Haven	CT	Tweed-New Haven	HVN	N	\$3.00	12/1/1993	4/1/1998	
New Haven	CT	Tweed-New Haven	HVN	N	\$4.50	10/1/2001	7/1/2005	
New Haven	CT	Tweed-New Haven	HVN	N	\$4.50	5/1/2006	1/1/2025	5,017,187
Windsor Locks	CT	Bradley International	BDL	M	\$3.00	10/1/1993	12/1/1995	
Windsor Locks	CT	Bradley International	BDL	M	\$3.00	7/1/1996	1/1/1997	
Windsor Locks	CT	Bradley International	BDL	M	\$3.00	9/1/1997	8/1/2000	
Windsor Locks	CT	Bradley International	BDL	M	\$4.50	5/1/2001	3/1/2020	
Windsor Locks	CT	Bradley International	BDL	M	\$3.00	3/1/2020	7/1/2020	
Windsor Locks	CT	Bradley International	BDL	M	\$4.50	7/1/2020	12/1/2021	321,060,686
Wilmington	DE	New Castle	ILG	R	\$4.50	7/1/2014	5/1/2025	1,810,089
Daytona Beach	FL	Daytona Beach International	DAB	N	\$3.00	7/1/1993	8/1/2001	
Daytona Beach	FL	Daytona Beach International	DAB	N	\$3.00	2/1/2002	11/1/2005	
Daytona Beach	FL	Daytona Beach International	DAB	N	\$4.50	11/1/2005	7/1/2020	29,469,817
Fort Lauderdale	FL	Fort Lauderdale/Hollywood International	FLL	L	\$3.00	1/1/1995	10/1/2005	
Fort Lauderdale	FL	Fort Lauderdale/Hollywood International	FLL	L	\$4.50	10/1/2005	2/1/2032	1,901,125,162

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Fort Myers	FL	Southwest Florida International	RSW	M	\$3.00	11/1/1992	11/1/2003	
Fort Myers	FL	Southwest Florida International	RSW	M	\$4.50	11/1/2003	11/1/2039	908,293,745
Gainesville	FL	Gainesville Regional	GNV	N	\$3.00	7/1/2000	2/1/2002	
Gainesville	FL	Gainesville Regional	GNV	N	\$4.50	1/1/2003	2/1/2013	
Gainesville	FL	Gainesville Regional	GNV	N	\$4.50	1/1/2014	9/1/2015	
Gainesville	FL	Gainesville Regional	GNV	N	\$4.50	3/1/2016	10/1/2023	13,645,529
Jacksonville	FL	Jacksonville International	JAX	M	\$3.00	4/1/1994	5/1/2003	
Jacksonville	FL	Jacksonville International	JAX	M	\$4.50	5/1/2003	3/1/2026	363,462,178
Key West	FL	Key West International	EYW	N	\$3.00	3/1/1993	8/1/1996	
Key West	FL	Key West International	EYW	N	\$3.00	12/1/1997	6/1/2003	
Key West	FL	Key West International	EYW	N	\$4.50	6/1/2003	7/1/2005	
Key West	FL	Key West International	EYW	N	\$4.50	10/1/2005	8/1/2027	38,513,175
Marathon	FL	The Florida Keys Marathon International	MTH	GA	\$3.00	3/1/1993	6/1/1998	390,001
Melbourne	FL	Melbourne International	MLB	N	\$3.00	5/1/1997	12/1/2009	
Melbourne	FL	Melbourne International	MLB	N	\$4.50	12/1/2009	5/1/2018	
Melbourne	FL	Melbourne International	MLB	N	\$4.50	7/1/2018	4/1/2030	25,913,291
Miami	FL	Miami International	MIA	L	\$3.00	11/1/1994	1/1/2002	
Miami	FL	Miami International	MIA	L	\$4.50	1/1/2002	10/1/2037	2,597,130,503
Naples	FL	Naples Municipal	APF	GA	\$3.00	2/1/1995	2/1/2001	

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Naples	FL	Naples Municipal	APF	GA	\$3.00	2/1/2002	5/1/2004	991,336
Orlando	FL	Orlando International	MCO	L	\$3.00	2/1/1993	4/1/2007	
Orlando	FL	Orlando International	MCO	L	\$4.50	4/1/2007	1/1/2046	5,030,693,530
Orlando	FL	Orlando Sanford International	SFB	S	\$1.00	3/1/2001	12/1/2003	
Orlando	FL	Orlando Sanford International	SFB	S	\$2.00	12/1/2003	9/1/2011	
Orlando	FL	Orlando Sanford International	SFB	S	\$4.00	9/1/2011	10/1/2024	76,336,385
Panama City	FL	Northwest Florida Beaches International	ECP	S	\$3.00	2/1/1994	5/1/2004	
Panama City	FL	Northwest Florida Beaches International	ECP	S	\$4.50	5/1/2004	4/1/2039	48,700,720
Pensacola	FL	Pensacola International	PNS	S	\$3.00	2/1/1993	12/1/2002	
Pensacola	FL	Pensacola International	PNS	S	\$4.50	12/1/2002	10/1/2031	144,489,392
Punta Gorda	FL	Punta Gorda	PGD	S	\$2.00	8/1/2017	1/1/2019	
Punta Gorda	FL	Punta Gorda	PGD	S	\$4.50	1/1/2019	6/1/2023	12,103,198
Sarasota/Bradenton	FL	Sarasota/Bradenton International	SRQ	S	\$3.00	9/1/1992	5/1/2002	
Sarasota/	FL	Sarasota/Bradenton International	SRQ	S	\$4.50	5/1/2002	1/1/2025	83,313,937
St Petersburg-Clearwater	FL	St Pete-Clearwater International	PIE	S	\$3.00	5/1/2005	11/1/2006	
St Petersburg-Clearwater	FL	St Pete-Clearwater International	PIE	S	\$4.50	11/1/2006	6/1/2023	44,012,548

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Tallahassee	FL	Tallahassee International	TLH	N	\$3.00	2/1/1993	10/1/2002	
Tallahassee	FL	Tallahassee International	TLH	N	\$4.50	10/1/2002	7/1/2028	56,306,718
Tampa	FL	Tampa International	TPA	L	\$3.00	10/1/1993	6/1/2002	
Tampa	FL	Tampa International	TPA	L	\$4.50	6/1/2002	10/1/2037	1,687,138,071
Valparaiso/ Destin-Ft Walton Beach	FL	Eglin AFB/Destin- Ft Walton Beach	VPS	S	\$3.00	1/1/2001	6/1/2002	
Valparaiso/ Destin-Ft Walton Beach	FL	Eglin AFB/Destin- Ft Walton Beach	VPS	S	\$4.50	6/1/2002	1/1/2031	65,499,335
West Palm Beach	FL	Palm Beach International	PBI	M	\$3.00	4/1/1994	7/1/2008	
West Palm Beach	FL	Palm Beach International	PBI	M	\$4.50	7/1/2008	8/1/2022	271,710,708
Albany	GA	Southwest Georgia Regional	ABY	N	\$3.00	9/1/1995	6/1/1998	
Albany	GA	Southwest Georgia Regional	ABY	N	\$3.00	6/1/1999	2/1/2003	
Albany	GA	Southwest Georgia Regional	ABY	N	\$4.50	2/1/2003	2/1/2008	
Albany	GA	Southwest Georgia Regional	ABY	N	\$4.50	7/1/2008	8/1/2016	
Albany	GA	Southwest Georgia Regional	ABY	N	\$4.50	10/1/2017	3/1/2020	2,856,060
Athens	GA	Athens/Ben Epps	AHN	GA	\$3.00	8/1/1997	1/1/2002	165,615
Atlanta	GA	Hartsfield - Jackson Atlanta International	ATL	L	\$3.00	5/1/1997	4/1/2001	
Atlanta	GA	Hartsfield - Jackson	ATL	L	\$4.50	4/1/2001	10/1/2031	

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
		Atlanta International						6,012,626,559
Augusta	GA	Augusta Regional at Bush Field	AGS	N	\$3.00	9/1/1999	7/1/2001	
Augusta	GA	Augusta Regional at Bush Field	AGS	N	\$4.50	7/1/2001	12/1/2028	32,792,767
Brunswick	GA	Brunswick Golden Isles	BQK	N	\$3.00	5/1/2001	11/1/2003	
Brunswick	GA	Brunswick Golden Isles	BQK	N	\$4.50	11/1/2003	4/1/2017	
Brunswick	GA	Brunswick Golden Isles	BQK	N	\$4.50	4/1/2018	11/1/2026	3,068,946
Columbus	GA	Columbus	CSG	N	\$3.00	12/1/1993	9/1/1995	
Columbus	GA	Columbus	CSG	N	\$3.00	8/1/2000	6/1/2003	
Columbus	GA	Columbus	CSG	N	\$4.50	6/1/2003	11/1/2006	
Columbus	GA	Columbus	CSG	N	\$4.50	2/1/2010	4/1/2012	
Columbus	GA	Columbus	CSG	N	\$4.50	8/1/2012	3/1/2015	
Columbus	GA	Columbus	CSG	N	\$4.50	3/1/2016	6/1/2018	
Columbus	GA	Columbus	CSG	N	\$4.50	2/1/2020	4/1/2029	5,286,485
Macon	GA	Middle Georgia Regional	MCN	N	\$4.50	3/1/2002	5/1/2011	561,716
Savannah	GA	Savannah/Hilton Head International	SAV	S	\$3.00	7/1/1992	4/1/2001	
Savannah	GA	Savannah/Hilton Head International	SAV	S	\$4.50	4/1/2001	2/1/2010	
Savannah	GA	Savannah/Hilton Head International	SAV	S	\$3.00	2/1/2010	5/1/2010	
Savannah	GA	Savannah/Hilton Head International	SAV	S	\$4.50	5/1/2010	11/1/2028	148,358,515
Valdosta	GA	Valdosta Regional	VLD	N	\$3.00	3/1/1993	10/1/1999	
Valdosta	GA	Valdosta Regional	VLD	N	\$3.00	4/1/2000	6/1/2001	
Valdosta	GA	Valdosta Regional	VLD	N	\$4.50	6/1/2001	9/1/2004	

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Valdosta	GA	Valdosta Regional	VLD	N	\$3.00	2/1/2006	5/1/2006	
Valdosta	GA	Valdosta Regional	VLD	N	\$3.00	11/1/2006	1/1/2007	
Valdosta	GA	Valdosta Regional	VLD	N	\$3.00	8/1/2009	7/1/2010	
Valdosta	GA	Valdosta Regional	VLD	N	\$4.50	6/1/2011	1/1/2014	
Valdosta	GA	Valdosta Regional	VLD	N	\$4.50	4/1/2014	4/1/2016	
Valdosta	GA	Valdosta Regional	VLD	N	\$4.50	7/1/2016	11/1/2016	1,906,275
Guam	GU	Guam International	GUM	S	\$3.00	2/1/1993	11/1/2002	
Guam	GU	Guam International	GUM	S	\$4.50	11/1/2002	3/1/2025	258,370,758
Hilo	HI	Hilo International	ITO	S	\$3.00	2/1/2007	11/1/2008	
Hilo	HI	Hilo International	ITO	S	\$4.50	11/1/2008	1/1/2010	
Hilo	HI	Hilo International	ITO	S	\$4.50	2/1/2014	7/1/2029	5,458,541
Honolulu	HI	Daniel K Inouye International	HNL	L	\$3.00	10/1/2004	11/1/2008	
Honolulu	HI	Daniel K Inouye International	HNL	L	\$4.50	11/1/2008	7/1/2029	609,268,277
Kahului	HI	Kahului	OGG	M	\$3.00	10/1/2004	11/1/2008	
Kahului	HI	Kahului	OGG	M	\$4.50	11/1/2008	7/1/2029	162,934,821
Kailua/Kona	HI	Ellison Onizuka Kona International at Keahole	KOA	S	\$3.00	10/1/2004	11/1/2008	
Kailua/Kona	HI	Ellison Onizuka Kona International at Keahole	KOA	S	\$4.50	11/1/2008	7/1/2029	54,788,824
Lihue	HI	Lihue	LIH	S	\$3.00	10/1/2004	11/1/2008	

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Lihue	HI	Lihue	LIH	S	\$4.50	11/1/2008	7/1/2029	44,993,449
Burlington	IA	Southeast Iowa Regional	BRL	CS	\$3.00	7/1/1997	9/1/2001	
Burlington	IA	Southeast Iowa Regional	BRL	CS	\$4.50	9/1/2001	11/1/2028	941,789
Cedar Rapids	IA	The Eastern Iowa	CID	S	\$3.00	1/1/1995	6/1/2002	
Cedar Rapids	IA	The Eastern Iowa	CID	S	\$4.50	6/1/2002	3/1/2004	
Cedar Rapids	IA	The Eastern Iowa	CID	S	\$4.50	5/1/2004	9/1/2025	60,866,105
Des Moines	IA	Des Moines International	DSM	S	\$3.00	3/1/1994	8/1/2001	
Des Moines	IA	Des Moines International	DSM	S	\$4.50	8/1/2001	10/1/2026	102,744,219
Dubuque	IA	Dubuque Regional	DBQ	N	\$3.00	1/1/1993	5/1/2001	
Dubuque	IA	Dubuque Regional	DBQ	N	\$4.50	5/1/2001	2/1/2033	7,568,350
Fort Dodge	IA	Fort Dodge Regional	FOD	CS	\$3.00	3/1/1995	9/1/2001	
Fort Dodge	IA	Fort Dodge Regional	FOD	CS	\$4.50	1/1/2002	4/1/2011	414,736
Mason City	IA	Mason City Municipal	MCW	CS	\$3.00	2/1/1996	10/1/2001	
Mason City	IA	Mason City Municipal	MCW	CS	\$4.50	10/1/2001	4/1/2003	
Mason City	IA	Mason City Municipal	MCW	CS	\$4.50	8/1/2003	12/1/2022	1,310,907
Sioux City	IA	Sioux Gateway/Bri g Gen Bud Day Field	SUX	N	\$3.00	6/1/1993	6/1/1994	
Sioux City	IA	Sioux Gateway/Bri g Gen Bud Day Field	SUX	N	\$3.00	2/1/1995	3/1/2002	
Sioux City	IA	Sioux Gateway/Bri	SUX	N	\$4.50	3/1/2002	1/1/2004	

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
		g Gen Bud Day Field						
Sioux City	IA	Sioux Gateway/Bri g Gen Bud Day Field	SUX	N	\$4.50	11/1/2004	10/1/2044	8,385,459
Spencer	IA	Spencer Municipal	SPW	GA	\$3.00	9/1/1995	3/1/2006	77,638
Waterloo	IA	Waterloo Regional	ALO	N	\$3.00	6/1/1994	6/1/1998	
Waterloo	IA	Waterloo Regional	ALO	N	\$3.00	9/1/1999	7/1/2001	
Waterloo	IA	Waterloo Regional	ALO	N	\$4.50	7/1/2001	7/1/2020	3,298,315
Boise	ID	Boise Air Terminal/Gowen Field	BOI	S	\$3.00	8/1/1994	8/1/2001	
Boise	ID	Boise Air Terminal/Gowen Field	BOI	S	\$4.50	8/1/2001	9/1/2015	109,930,856
Hailey	ID	Friedman Memorial	SUN	N	\$3.00	9/1/1993	10/1/1994	
Hailey	ID	Friedman Memorial	SUN	N	\$3.00	3/1/1995	6/1/2005	
Hailey	ID	Friedman Memorial	SUN	N	\$4.50	6/1/2005	7/1/2028	6,987,776
Idaho Falls	ID	Idaho Falls Regional	IDA	N	\$3.00	1/1/1993	1/1/1998	
Idaho Falls	ID	Idaho Falls Regional	IDA	N	\$3.00	2/1/1998	4/1/2001	
Idaho Falls	ID	Idaho Falls Regional	IDA	N	\$4.50	4/1/2001	11/1/2020	12,927,861
Lewiston	ID	Lewiston-Nez Perce County	LWS	N	\$3.00	5/1/1994	5/1/2001	
Lewiston	ID	Lewiston-Nez Perce County	LWS	N	\$4.50	5/1/2001	11/1/2018	
Lewiston	ID	Lewiston-Nez Perce County	LWS	N	\$4.50	2/1/2019	4/1/2022	5,828,269
Pocatello	ID	Pocatello Regional	PIH	N	\$3.00	9/1/1994	5/1/2001	



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Pocatello	ID	Pocatello Regional	PIH	N	\$4.50	5/1/2001	7/1/2020	3,256,261
Twin Falls	ID	Joslin Field - Magic Valley Regional	TWF	N	\$3.00	11/1/1992	6/1/2001	
Twin Falls	ID	Joslin Field - Magic Valley Regional	TWF	N	\$4.50	6/1/2001	6/1/2007	
Twin Falls	ID	Joslin Field - Magic Valley Regional	TWF	N	\$4.50	7/1/2007	6/1/2022	3,390,352
Belleville	IL	Scott AFB/Mid-america	BLV	N	\$3.00	11/1/2005	3/1/2047	7,000,000
Bloomington/Normal	IL	Central IL Regional Airport at Bloomington -Normal	BMI	N	\$3.00	11/1/1994	4/1/2001	
Bloomington/Normal	IL	Central IL Regional Airport at Bloomington -Normal	BMI	N	\$4.50	4/1/2001	11/1/2030	29,245,583
Champaign/Urbana	IL	University of Illinois-Willard	CMI	N	\$3.00	12/1/1995	2/1/2004	
Champaign/Urbana	IL	University of Illinois-Willard	CMI	N	\$4.50	10/1/2005	5/1/2025	10,386,451
Chicago	IL	Chicago Midway International	MDW	L	\$3.00	9/1/1993	1/1/2007	
Chicago	IL	Chicago Midway International	MDW	L	\$4.50	1/1/2007	6/1/2060	2,507,672,657
Chicago	IL	Chicago O'Hare International	ORD	L	\$3.00	9/1/1993	4/1/2001	
Chicago	IL	Chicago O'Hare International	ORD	L	\$4.50	4/1/2001	7/1/2041	6,926,705,514

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Decatur	IL	Decatur	DEC	CS	\$4.50	6/1/2006	5/1/2030	732,628
Marion	IL	Veterans Airport of Southern Illinois	MWA	N	\$4.50	9/1/2005	4/1/2019	
Marion	IL	Veterans Airport of Southern Illinois	MWA	N	\$4.50	9/1/2019	9/1/2026	804,602
Moline	IL	Quad City International	MLI	N	\$3.00	12/1/1994	1/1/2002	
Moline	IL	Quad City International	MLI	N	\$4.50	1/1/2002	7/1/2037	55,655,811
Peoria	IL	General Downing - Peoria International	PIA	N	\$3.00	12/1/1994	7/1/2001	
Peoria	IL	General Downing - Peoria International	PIA	N	\$4.50	7/1/2001	8/1/2008	
Peoria	IL	General Downing - Peoria International	PIA	N	\$4.50	11/1/2008	9/1/2023	28,880,056
Quincy	IL	Quincy Regional- Baldwin Field	UIN	N	\$3.00	10/1/1994	7/1/1997	
Quincy	IL	Quincy Regional- Baldwin Field	UIN	N	\$3.00	11/1/1997	6/1/2005	
Quincy	IL	Quincy Regional- Baldwin Field	UIN	N	\$3.00	11/1/2005	1/1/2008	
Quincy	IL	Quincy Regional- Baldwin Field	UIN	N	\$4.50	1/1/2008	12/1/2021	902,993

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Chicago/Rockford	IL	Chicago/Rockford International	RFD	N	\$3.00	10/1/1992	10/1/1996	
Chicago/Rockford	IL	Chicago/Rockford International	RFD	N	\$3.00	5/1/1997	6/1/2007	
Chicago/Rockford	IL	Chicago/Rockford International	RFD	N	\$4.50	6/1/2007	3/1/2038	16,080,225
Springfield	IL	Abraham Lincoln Capital	SPI	N	\$3.00	6/1/1992	5/1/2002	
Springfield	IL	Abraham Lincoln Capital	SPI	N	\$4.50	5/1/2002	9/1/2034	13,808,301
Evansville	IN	Evansville Regional	EVV	N	\$4.50	8/1/2007	11/1/2008	
Evansville	IN	Evansville Regional	EVV	N	\$4.50	12/1/2008	4/1/2026	13,705,101
Fort Wayne	IN	Fort Wayne International	FWA	N	\$3.00	7/1/1993	12/1/2005	
Fort Wayne	IN	Fort Wayne International	FWA	N	\$4.50	12/1/2005	4/1/2021	31,289,010
Indianapolis	IN	Indianapolis International	IND	M	\$3.00	9/1/1993	4/1/2001	
Indianapolis	IN	Indianapolis International	IND	M	\$4.50	4/1/2001	9/1/2022	
Indianapolis	IN	Indianapolis International	IND	M	\$3.00	9/1/2022	10/1/2022	524,907,605
South Bend	IN	South Bend International	SBN	N	\$3.00	11/1/1994	7/1/2011	
South Bend	IN	South Bend International	SBN	N	\$4.50	7/1/2011	7/1/2029	40,172,802
Garden City	KS	Garden City Regional	GCK	N	\$4.50	10/1/2013	10/1/2022	770,628
Hays	KS	Hays Regional	HYS	N	\$4.50	4/1/2015	5/1/2020	207,045
Manhattan	KS	Manhattan Regional	MHK	N	\$3.00	10/1/1998	3/1/2002	
Manhattan	KS	Manhattan Regional	MHK	N	\$4.50	3/1/2002	5/1/2025	4,499,903
Topeka	KS	Topeka Regional	FOE	CS	\$4.50	8/1/2007	3/1/2023	823,720

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Wichita	KS	Wichita Dwight D Eisenhower National	ICT	S	\$3.00	12/1/1994	5/1/2005	
Wichita	KS	Wichita Dwight D Eisenhower National	ICT	S	\$4.50	5/1/2005	6/1/2007	
Wichita	KS	Wichita Dwight D Eisenhower National	ICT	S	\$4.50	7/1/2007	9/1/2009	
Wichita	KS	Wichita Dwight D Eisenhower National	ICT	S	\$4.50	11/1/2010	4/1/2046	199,528,281
Covington	KY	Cincinnati/Northern Kentucky International	CVG	M	\$3.00	6/1/1994	8/1/2000	
Covington	KY	Cincinnati/Northern Kentucky International	CVG	M	\$3.00	7/1/2001	8/1/2003	
Covington	KY	Cincinnati/Northern Kentucky International	CVG	M	\$4.50	8/1/2003	5/1/2009	
Covington	KY	Cincinnati/Northern Kentucky International	CVG	M	\$3.00	5/1/2009	1/1/2013	
Covington	KY	Cincinnati/Northern Kentucky International	CVG	M	\$4.50	1/1/2013	11/1/2023	650,580,441
Lexington	KY	Blue Grass	LEX	S	\$3.00	11/1/1993	6/1/2001	
Lexington	KY	Blue Grass	LEX	S	\$4.50	6/1/2001	6/1/2003	
Lexington	KY	Blue Grass	LEX	S	\$3.00	8/1/2003	12/1/2003	
Lexington	KY	Blue Grass	LEX	S	\$4.50	12/1/2003	5/1/2041	110,820,029
Louisville	KY	Louisville Muhammad	SDF	S	\$3.00	5/1/1997	3/1/2006	

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
		Ali International						
Louisville	KY	Louisville Muhammad Ali International	SDF	S	\$4.50	3/1/2006	10/1/2006	
Louisville	KY	Louisville Muhammad Ali International	SDF	S	\$3.00	10/1/2006	9/1/2008	
Louisville	KY	Louisville Muhammad Ali International	SDF	S	\$4.50	9/1/2008	10/1/2008	
Louisville	KY	Louisville Muhammad Ali International	SDF	S	\$3.00	10/1/2008	12/1/2010	
Louisville	KY	Louisville Muhammad Ali International	SDF	S	\$4.50	12/1/2010	8/1/2015	
Louisville	KY	Louisville Muhammad Ali International	SDF	S	\$3.00	8/1/2015	10/1/2016	
Louisville	KY	Louisville Muhammad Ali International	SDF	S	\$1.00	10/1/2016	10/1/2017	
Louisville	KY	Louisville Muhammad Ali International	SDF	S	\$3.00	10/1/2017	5/1/2019	
Louisville	KY	Louisville Muhammad Ali International	SDF	S	\$4.50	5/1/2019	9/1/2021	131,155,602
Paducah	KY	Barkley Regional	PAH	N	\$3.00	3/1/1994	5/1/2014	

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Paducah	KY	Barkley Regional	PAH	N	\$4.50	5/1/2014	8/1/2024	2,107,439
Alexandria	LA	Alexandria International	AEX	N	\$3.00	5/1/1999	1/1/2002	
Alexandria	LA	Alexandria International	AEX	N	\$4.50	1/1/2002	12/1/2025	12,262,615
Baton Rouge	LA	Baton Rouge Metropolitan, Ryan Field	BTR	N	\$3.00	12/1/1992	10/1/2005	
Baton Rouge	LA	Baton Rouge Metropolitan, Ryan Field	BTR	N	\$4.50	10/1/2005	7/1/2031	81,359,236
Lafayette	LA	Lafayette Regional/Paul Fournet Field	LFT	N	\$3.00	9/1/1995	9/1/1998	
Lafayette	LA	Lafayette Regional/Paul Fournet Field	LFT	N	\$3.00	4/1/2001	4/1/2002	
Lafayette	LA	Lafayette Regional/Paul Fournet Field	LFT	N	\$4.50	4/1/2002	1/1/2005	
Lafayette	LA	Lafayette Regional/Paul Fournet Field	LFT	N	\$4.50	5/1/2005	4/1/2008	
Lafayette	LA	Lafayette Regional/Paul Fournet Field	LFT	N	\$4.50	8/1/2008	12/1/2014	
Lafayette	LA	Lafayette Regional/Paul Fournet Field	LFT	N	\$4.50	10/1/2017	1/1/2041	33,371,033
Lake Charles	LA	Lake Charles Regional	LCH	N	\$3.00	3/1/2001	5/1/2005	
Lake Charles	LA	Lake Charles Regional	LCH	N	\$4.50	5/1/2005	5/1/2017	

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Lake Charles	LA	Lake Charles Regional	LCH	N	\$4.50	2/1/2018	12/1/2022	4,557,531
Monroe	LA	Monroe Regional	MLU	N	\$4.50	4/1/2003	9/1/2007	
Monroe	LA	Monroe Regional	MLU	N	\$4.50	11/1/2008	6/1/2036	17,759,504
New Orleans	LA	Louis Armstrong New Orleans International	MSY	M	\$3.00	6/1/1993	4/1/2002	
New Orleans	LA	Louis Armstrong New Orleans International	MSY	M	\$4.50	4/1/2002	8/1/2034	965,553,986
Shreveport	LA	Shreveport Regional	SHV	N	\$3.00	2/1/1994	11/1/2002	
Shreveport	LA	Shreveport Regional	SHV	N	\$4.50	11/1/2002	9/1/2014	
Shreveport	LA	Shreveport Regional	SHV	N	\$4.50	2/1/2015	3/1/2020	29,841,354
Boston	MA	General Edward Lawrence Logan International	BOS	L	\$3.00	11/1/1993	10/1/2005	
Boston	MA	General Edward Lawrence Logan International	BOS	L	\$4.50	10/1/2005	12/1/2027	1,808,470,847
Hyannis	MA	Barnstable Municipal-Boardman/Polando Field	HYA	N	\$2.00	3/1/2011	10/1/2024	2,573,600
Vineyard Haven	MA	Martha's Vineyard	MVY	N	\$3.00	1/1/1998	2/1/1998	
Vineyard Haven	MA	Martha's Vineyard	MVY	N	\$4.50	10/1/2017	7/1/2021	820,069

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Nantucket	MA	Nantucket Memorial	ACK	N	\$4.50	7/1/2014	5/1/2024	6,940,740
Worcester	MA	Worcester Regional	ORH	N	\$3.00	10/1/1992	10/1/1997	
Worcester	MA	Worcester Regional	ORH	N	\$3.00	9/1/1999	12/1/2011	1,635,753
Baltimore	MD	Baltimore/Washington International Thurgood Marshall	BWI	L	\$3.00	10/1/1992	6/1/2002	
Baltimore	MD	Baltimore/Washington International Thurgood Marshall	BWI	L	\$4.50	6/1/2002	5/1/2037	1,631,460,182
Hagerstown	MD	Hagerstown Regional-Richard A Henson Field	HGR	N	\$3.00	8/1/1999	3/1/2002	
Hagerstown	MD	Hagerstown Regional-Richard A Henson Field	HGR	N	\$4.50	3/1/2002	8/1/2007	429,244
Salisbury	MD	Salisbury-Ocean City Wicomico Regional	SBY	N	\$3.00	2/1/2002	3/1/2008	
Salisbury	MD	Salisbury-Ocean City Wicomico Regional	SBY	N	\$4.50	3/1/2008	9/1/2026	5,477,714
Cumberland Heights	MD	Greater Cumberland Regional	CBE	GA	\$3.00	7/1/1994	7/1/1999	
Cumberland Heights	MD	Greater Cumberland Regional	CBE	GA	\$3.00	10/1/1999	6/1/2006	144,345
Bangor	ME	Bangor International	BGR	N	\$3.00	6/1/1995	9/1/2010	



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Bangor	ME	Bangor International	BGR	N	\$4.50	12/1/2010	5/1/2018	15,084,254
Portland	ME	Portland International Jetport	PWM	S	\$3.00	2/1/1994	2/1/2009	
Portland	ME	Portland International Jetport	PWM	S	\$4.50	2/1/2009	4/1/2040	165,807,186
Presque Isle	ME	Presque Isle International	PQI	N	\$4.50	9/1/2004	6/1/2009	
Presque Isle	ME	Presque Isle International	PQI	N	\$4.50	8/1/2010	6/1/2018	
Presque Isle	ME	Presque Isle International	PQI	N	\$4.50	2/1/2019	8/1/2029	1,053,437
Rockland	ME	Knox County Regional	RKD	N	\$4.50	1/1/2012	8/1/2022	329,549
Alpena	MI	Alpena County Regional	APN	N	\$3.00	8/1/2001	12/1/2005	
Alpena	MI	Alpena County Regional	APN	N	\$4.50	12/1/2005	4/1/2022	632,191
Detroit	MI	Coleman A Young Municipal	DET	GA	\$3.00	1/1/2000	3/1/2004	240,053
Detroit	MI	Detroit Metropolitan Wayne County	DTW	L	\$3.00	1/1/1993	10/1/2001	
Detroit	MI	Detroit Metropolitan Wayne County	DTW	L	\$4.50	10/1/2001	2/1/2034	3,134,966,084
Escanaba	MI	Delta County	ESC	N	\$3.00	2/1/1993	11/1/1997	
Escanaba	MI	Delta County	ESC	N	\$3.00	8/1/1998	7/1/2000	
Escanaba	MI	Delta County	ESC	N	\$3.00	10/1/2001	3/1/2004	
Escanaba	MI	Delta County	ESC	N	\$4.50	3/1/2004	1/1/2006	
Escanaba	MI	Delta County	ESC	N	\$4.50	4/1/2006	1/1/2016	
Escanaba	MI	Delta County	ESC	N	\$4.50	6/1/2018	10/1/2020	1,081,232
Flint	MI	Bishop International	FNT	N	\$3.00	9/1/1993	10/1/2001	

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Flint	MI	Bishop International	FNT	N	\$4.50	10/1/2001	8/1/2020	42,304,023
Grand Rapids	MI	Gerald R Ford International	GRR	S	\$3.00	12/1/1992	11/1/2005	
Grand Rapids	MI	Gerald R Ford International	GRR	S	\$4.50	11/1/2005	1/1/2026	120,165,695
Hancock	MI	Houghton County Memorial	CMX	N	\$3.00	7/1/1993	3/1/1996	
Hancock	MI	Houghton County Memorial	CMX	N	\$3.00	7/1/1996	7/1/1999	
Hancock	MI	Houghton County Memorial	CMX	N	\$3.00	10/1/1999	7/1/2005	
Hancock	MI	Houghton County Memorial	CMX	N	\$4.50	7/1/2005	8/1/2016	
Hancock	MI	Houghton County Memorial	CMX	N	\$4.50	11/1/2018	8/1/2024	2,006,856
Iron Mountain Kingsford	MI	Ford	IMT	N	\$3.00	9/1/1995	6/1/2004	
Iron Mountain Kingsford	MI	Ford	IMT	N	\$4.50	5/1/2019	3/1/2023	475,705
Ironwood	MI	Gogebic-Iron County	IWD	CS	\$3.00	8/1/1993	10/1/2006	
Ironwood	MI	Gogebic-Iron County	IWD	CS	\$4.50	6/1/2007	6/1/2025	385,248
Kalamazoo	MI	Kalamazoo/Battle Creek International	AZO	N	\$3.00	4/1/1997	6/1/2000	
Kalamazoo	MI	Kalamazoo/Battle Creek International	AZO	N	\$3.00	1/1/2001	1/1/2005	
Kalamazoo	MI	Kalamazoo/Battle Creek International	AZO	N	\$4.50	1/1/2005	8/1/2006	
Kalamazoo	MI	Kalamazoo/Battle Creek International	AZO	N	\$4.50	10/1/2006	4/1/2008	

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Kalamazoo	MI	Kalamazoo/Battle Creek International	AZO	N	\$4.50	9/1/2008	3/1/2019	
Kalamazoo	MI	Kalamazoo/Battle Creek International	AZO	N	\$4.50	9/1/2019	7/1/2020	13,944,005
Lansing	MI	Capital Region International	LAN	N	\$3.00	10/1/1993	7/1/2002	
Lansing	MI	Capital Region International	LAN	N	\$4.50	7/1/2002	4/1/2028	30,496,100
Manistee	MI	Manistee Co-Blacker	MBL	GA	\$4.50	6/1/2008	11/1/2040	388,986
Marquette	MI	Sawyer International	SAW	N	\$3.00	12/1/1992	12/1/1996	
Marquette	MI	Sawyer International	SAW	N	\$3.00	4/1/1998	7/1/2002	
Marquette	MI	Sawyer International	SAW	N	\$4.50	7/1/2002	9/1/2006	
Marquette	MI	Sawyer International	SAW	N	\$4.50	10/1/2006	5/1/2008	
Marquette	MI	Sawyer International	SAW	N	\$4.50	8/1/2008	8/1/2011	
Marquette	MI	Sawyer International	SAW	N	\$4.50	3/1/2012	3/1/2015	
Marquette	MI	Sawyer International	SAW	N	\$4.50	5/1/2015	5/1/2017	
Marquette	MI	Sawyer International	SAW	N	\$4.50	5/1/2019	9/1/2020	4,450,601
Muskegon	MI	Muskegon County	MKG	N	\$3.00	5/1/1994	5/1/2004	
Muskegon	MI	Muskegon County	MKG	N	\$4.50	5/1/2004	11/1/2020	5,013,088
Pellston	MI	Pellston Regional Airport of Emmet County	PLN	N	\$3.00	3/1/1993	9/1/1997	
Pellston	MI	Pellston Regional Airport of	PLN	N	\$3.00	12/1/1997	7/1/2011	

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
		Emmet County						
Pellston	MI	Pellston Regional Airport of Emmet County	PLN	N	\$4.50	7/1/2011	4/1/2021	2,435,849
Saginaw	MI	MBS International	MBS	N	\$3.00	2/1/1997	7/1/2007	
Saginaw	MI	MBS International	MBS	N	\$4.50	7/1/2007	11/1/2029	16,480,946
Sault Ste. Marie	MI	Chippewa County International	CIU	N	\$4.50	11/1/2005	7/1/2020	1,050,115
Traverse City	MI	Cherry Capital	TVC	N	\$3.00	1/1/1997	1/1/2002	
Traverse City	MI	Cherry Capital	TVC	N	\$4.50	1/1/2002	12/1/2010	
Traverse City	MI	Cherry Capital	TVC	N	\$4.50	2/1/2011	2/1/2016	
Traverse City	MI	Cherry Capital	TVC	N	\$4.50	2/1/2017	6/1/2026	20,527,383
Bemidji	MN	Bemidji Regional	BJI	N	\$3.00	11/1/1996	2/1/2002	
Bemidji	MN	Bemidji Regional	BJI	N	\$4.50	2/1/2002	8/1/2005	
Bemidji	MN	Bemidji Regional	BJI	N	\$4.50	6/1/2006	2/1/2022	2,158,956
Brainerd	MN	Brainerd Lakes Regional	BRD	N	\$3.00	8/1/1993	7/1/2001	
Brainerd	MN	Brainerd Lakes Regional	BRD	N	\$4.50	7/1/2001	8/1/2033	2,147,011
Duluth	MN	Duluth International	DLH	N	\$3.00	10/1/1994	4/1/2002	
Duluth	MN	Duluth International	DLH	N	\$4.50	4/1/2002	11/1/2004	
Duluth	MN	Duluth International	DLH	N	\$4.50	4/1/2005	7/1/2020	12,501,378

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Grand Rapids	MN	Grand Rapids/Itasca County Airport-Gordon Newstrom Field	GPZ	GA	\$3.00	12/1/1997	10/1/2001	
Grand Rapids	MN	Grand Rapids/Itasca County Airport-Gordon Newstrom Field	GPZ	GA	\$4.50	10/1/2001	1/1/2007	151,263
Hibbing	MN	Range Regional	HIB	N	\$3.00	6/1/1996	7/1/2003	
Hibbing	MN	Range Regional	HIB	N	\$4.50	7/1/2003	2/1/2029	1,322,734
International Falls	MN	Falls International-Einarson Field	INL	N	\$3.00	12/1/1994	6/1/2002	
International Falls	MN	Falls International-Einarson Field	INL	N	\$4.50	6/1/2002	6/1/2005	
International Falls	MN	Falls International-Einarson Field	INL	N	\$4.50	11/1/2005	4/1/2048	3,111,127
Minneapolis	MN	Minneapolis-St Paul International/Wold-Chamberlain	MSP	L	\$3.00	6/1/1992	4/1/2001	
Minneapolis	MN	Minneapolis-St Paul International/Wold-Chamberlain	MSP	L	\$4.50	4/1/2001	6/1/2026	2,075,669,615
Rochester	MN	Rochester International	RST	N	\$3.00	5/1/1996	3/1/2002	

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Rochester	MN	Rochester International	RST	N	\$4.50	3/1/2002	11/1/2022	12,253,172
St. Cloud	MN	St. Cloud Regional	STC	N	\$3.00	2/1/2000	7/1/2002	
St. Cloud	MN	St. Cloud Regional	STC	N	\$4.50	7/1/2002	3/1/2060	4,375,081
Thief River Falls	MN	Thief River Falls Regional	TVF	CS	\$4.50	6/1/2003	6/1/2023	636,828
Columbia	MO	Columbia Regional	COU	N	\$4.50	11/1/2002	3/1/2016	
Columbia	MO	Columbia Regional	COU	N	\$4.50	6/1/2016	1/1/2025	5,406,981
Joplin	MO	Joplin Regional	JLN	N	\$4.50	4/1/2003	6/1/2026	2,117,227
Kansas City	MO	Kansas City International	MCI	M	\$3.00	3/1/1996	8/1/2005	
Kansas City	MO	Kansas City International	MCI	M	\$4.50	8/1/2005	6/1/2020	475,028,880
Springfield	MO	Springfield-Branson National	SGF	S	\$3.00	11/1/1993	5/1/1997	
Springfield	MO	Springfield-Branson National	SGF	S	\$3.00	7/1/1998	5/1/2001	
Springfield	MO	Springfield-Branson National	SGF	S	\$4.50	5/1/2001	1/1/2004	
Springfield	MO	Springfield-Branson National	SGF	S	\$4.50	5/1/2004	8/1/2005	
Springfield	MO	Springfield-Branson National	SGF	S	\$4.50	9/1/2005	3/1/2006	
Springfield	MO	Springfield-Branson National	SGF	S	\$4.50	1/1/2007	1/1/2036	96,200,309
St. Louis	MO	St Louis Lambert International	STL	M	\$3.00	12/1/1992	12/1/2001	
St. Louis	MO	St Louis Lambert International	STL	M	\$4.50	12/1/2001	5/1/2025	

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
St. Louis	MO	St Louis Lambert International	STL	M	\$3.00	5/1/2025	11/1/2026	
St. Louis	MO	St Louis Lambert International	STL	M	\$4.50	11/1/2026	2/1/2027	1,103,222,961
Rota Island	MP	Benjamin Taisacan Manglona International	GRO	N	\$4.50	1/1/2005	5/1/2021	1,934,363
Saipan Island	MP	Francisco C Ada/Saipan International	GSN	S	\$4.50	1/1/2005	5/1/2021	33,063,493
Tinian Island	MP	Tinian International	TNI	N	\$4.50	1/1/2005	5/1/2021	2,039,660
Columbus/W Point/Starkville	MS	Golden Triangle Regional	GTR	N	\$3.00	8/1/1992	4/1/2001	
Columbus/W Point/Starkville	MS	Golden Triangle Regional	GTR	N	\$4.50	4/1/2001	10/1/2023	4,976,436
Greenville	MS	Greenville Mid-Delta	GLH	CS	\$3.00	10/1/1998	2/1/2003	
Greenville	MS	Greenville Mid-Delta	GLH	CS	\$3.00	4/1/2003	4/1/2005	
Greenville	MS	Greenville Mid-Delta	GLH	CS	\$4.50	4/1/2005	8/1/2011	
Greenville	MS	Greenville Mid-Delta	GLH	CS	\$4.50	9/1/2012	7/1/2018	453,780
Gulfport	MS	Gulfport-Biloxi International	GPT	N	\$3.00	7/1/1992	8/1/2001	
Gulfport	MS	Gulfport-Biloxi International	GPT	N	\$3.00	12/1/2001	5/1/2003	
Gulfport	MS	Gulfport-Biloxi International	GPT	N	\$4.50	5/1/2003	1/1/2028	66,424,061
Hattiesburg-Laurel	MS	Hattiesburg-Laurel Regional	PIB	CS	\$3.00	7/1/1992	6/1/2001	

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Hattiesburg-Laurel	MS	Hattiesburg-Laurel Regional	PIB	CS	\$4.50	6/1/2001	12/1/2024	1,363,015
Jackson	MS	Jackson-Medgar Wiley Evers International	JAN	S	\$3.00	5/1/1993	10/1/2003	
Jackson	MS	Jackson-Medgar Wiley Evers International	JAN	S	\$4.50	10/1/2003	4/1/2021	61,174,821
Meridian	MS	Key Field	MEI	N	\$3.00	11/1/1992	8/1/1996	
Meridian	MS	Key Field	MEI	N	\$3.00	3/1/1997	12/1/2001	
Meridian	MS	Key Field	MEI	N	\$4.50	12/1/2001	5/1/2004	
Meridian	MS	Key Field	MEI	N	\$4.50	10/1/2005	7/1/2024	2,213,664
Tupelo	MS	Tupelo Regional	TUP	N	\$3.00	11/1/1994	4/1/2003	
Tupelo	MS	Tupelo Regional	TUP	N	\$4.50	4/1/2003	11/1/2019	1,416,175
Billings	MT	Billings Logan International	BIL	N	\$3.00	4/1/1994	9/1/2014	
Billings	MT	Billings Logan International	BIL	N	\$3.00	11/1/2016	10/1/2019	
Billings	MT	Billings Logan International	BIL	N	\$4.50	10/1/2019	3/1/2042	61,248,003
Bozeman	MT	Bozeman Yellowstone International	BZN	S	\$3.00	8/1/1993	3/1/2009	
Bozeman	MT	Bozeman Yellowstone International	BZN	S	\$4.50	3/1/2009	4/1/2023	38,044,326
Butte	MT	Bert Mooney	BTM	N	\$3.00	7/1/1994	6/1/2006	
Butte	MT	Bert Mooney	BTM	N	\$3.00	7/1/2006	8/1/2007	
Butte	MT	Bert Mooney	BTM	N	\$3.00	11/1/2007	3/1/2010	
Butte	MT	Bert Mooney	BTM	N	\$4.50	3/1/2010	3/1/2036	4,358,765
Great Falls	MT	Great Falls International	GTF	N	\$3.00	11/1/1992	7/1/2002	



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Great Falls	MT	Great Falls International	GTF	N	\$4.50	7/1/2002	2/1/2022	17,754,080
Helena	MT	Helena Regional	HLN	N	\$3.00	4/1/1993	8/1/2002	
Helena	MT	Helena Regional	HLN	N	\$4.50	8/1/2002	6/1/2023	7,980,758
Kalispell	MT	Glacier Park International	GPI	N	\$3.00	12/1/1993	4/1/2005	
Kalispell	MT	Glacier Park International	GPI	N	\$4.50	4/1/2005	1/1/2021	17,519,118
Missoula	MT	Missoula International	MSO	N	\$3.00	9/1/1992	4/1/2001	
Missoula	MT	Missoula International	MSO	N	\$4.50	4/1/2001	5/1/2038	59,763,526
West Yellowstone	MT	Yellowstone	WYS	N	\$4.50	6/1/2011	6/1/2025	277,202
Asheville	NC	Asheville Regional	AVL	S	\$3.00	12/1/1994	10/1/2002	
Asheville	NC	Asheville Regional	AVL	S	\$4.50	10/1/2002	11/1/2006	
Asheville	NC	Asheville Regional	AVL	S	\$4.50	4/1/2007	9/1/2007	
Asheville	NC	Asheville Regional	AVL	S	\$4.50	10/1/2007	4/1/2024	29,552,251
Charlotte	NC	Charlotte/Douglas International	CLT	L	\$3.00	11/1/2004	1/1/2046	3,163,232,548
Fayetteville	NC	Fayetteville Regional/Grannis Field	FAY	N	\$3.00	11/1/2000	2/1/2006	
Fayetteville	NC	Fayetteville Regional/Grannis Field	FAY	N	\$4.00	7/1/2009	10/1/2012	
Fayetteville	NC	Fayetteville Regional/Grannis Field	FAY	N	\$4.00	3/1/2013	6/1/2013	
Fayetteville	NC	Fayetteville Regional/Grannis Field	FAY	N	\$4.00	5/1/2015	3/1/2019	

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Fayetteville	NC	Fayetteville Regional/ Grannis Field	FAY	N	\$4.50	3/1/2019	2/1/2022	10,888,149
Greensboro	NC	Piedmont Triad International	GSO	S	\$4.50	9/1/2011	5/1/2022	43,872,158
Greenville	NC	Pitt-Greenville	PGV	N	\$3.00	10/1/1997	4/1/2001	
Greenville	NC	Pitt-Greenville	PGV	N	\$4.50	4/1/2001	1/1/2016	
Greenville	NC	Pitt-Greenville	PGV	N	\$4.50	7/1/2016	4/1/2022	4,922,840
Jacksonville	NC	Albert J Ellis	OAJ	N	\$3.00	1/1/1996	10/1/1998	
Jacksonville	NC	Albert J Ellis	OAJ	N	\$3.00	9/1/1999	8/1/2000	
Jacksonville	NC	Albert J Ellis	OAJ	N	\$3.00	3/1/2005	1/1/2009	
Jacksonville	NC	Albert J Ellis	OAJ	N	\$3.00	2/1/2009	2/1/2012	
Jacksonville	NC	Albert J Ellis	OAJ	N	\$4.50	2/1/2012	5/1/2028	11,329,661
New Bern	NC	Coastal Carolina Regional	EWN	N	\$3.00	2/1/1997	11/1/2003	
New Bern	NC	Coastal Carolina Regional	EWN	N	\$4.50	11/1/2003	10/1/2025	11,200,275
Raleigh/Durham	NC	Raleigh-Durham International	RDU	M	\$3.00	4/1/2003	10/1/2004	
Raleigh/Durham	NC	Raleigh-Durham International	RDU	M	\$4.50	10/1/2004	9/1/2032	772,690,405
Wilmington	NC	Wilmington International	ILM	S	\$3.00	2/1/1994	9/1/1996	
Wilmington	NC	Wilmington International	ILM	S	\$3.00	6/1/1998	5/1/2003	
Wilmington	NC	Wilmington International	ILM	S	\$4.50	5/1/2003	8/1/2028	50,167,931
Bismarck	ND	Bismarck Municipal	BIS	N	\$3.00	7/1/1996	7/1/1997	
Bismarck	ND	Bismarck Municipal	BIS	N	\$3.00	6/1/1998	4/1/2002	
Bismarck	ND	Bismarck Municipal	BIS	N	\$4.50	4/1/2002	6/1/2042	46,068,291

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Dickinson	ND	Dickinson - Theodore Roosevelt Regional	DIK	N	\$4.50	4/1/2014	6/1/2020	714,384
Fargo	ND	Hector International	FAR	N	\$3.00	1/1/1997	8/1/2002	
Fargo	ND	Hector International	FAR	N	\$4.50	8/1/2002	3/1/2020	28,810,476
Grand Forks	ND	Grand Forks International	GFK	N	\$3.00	2/1/1993	8/1/1996	
Grand Forks	ND	Grand Forks International	GFK	N	\$3.00	5/1/1997	4/1/2001	
Grand Forks	ND	Grand Forks International	GFK	N	\$4.50	4/1/2001	6/1/2003	
Grand Forks	ND	Grand Forks International	GFK	N	\$4.50	5/1/2004	10/1/2008	
Grand Forks	ND	Grand Forks International	GFK	N	\$4.50	1/1/2009	7/1/2021	10,202,624
Jamestown	ND	Jamestown Regional	JMS	N	\$4.50	8/1/2018	5/1/2034	830,000
Minot	ND	Minot International	MOT	N	\$3.00	3/1/1994	7/1/1998	
Minot	ND	Minot International	MOT	N	\$3.00	3/1/1999	2/1/2002	
Minot	ND	Minot International	MOT	N	\$4.50	2/1/2002	10/1/2020	16,760,900
Williston	ND	Williston Basin International	XWA	N	\$4.50	4/1/2013	12/1/2034	8,874,709
Grand Island	NE	Central Nebraska Regional	GRI	N	\$3.00	2/1/1999	4/1/2001	
Grand Island	NE	Central Nebraska Regional	GRI	N	\$4.50	5/1/2001	1/1/2030	5,248,737
Kearney	NE	Kearney Regional	EAR	CS	\$4.00	11/1/2005	9/1/2007	
Kearney	NE	Kearney Regional	EAR	CS	\$4.50	9/1/2007	7/1/2011	
Kearney	NE	Kearney Regional	EAR	CS	\$4.50	10/1/2011	11/1/2037	1,749,744
Lincoln	NE	Lincoln	LNK	N	\$4.50	11/1/2016	11/1/2025	5,411,638

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Omaha	NE	Eppley Airfield	OMA	M	\$4.50	2/1/2018	9/1/2023	43,013,145
Scottsbluff	NE	Western Nebraska Regional/Wil liam B Heilig Field	BFF	N	\$3.00	3/1/2000	3/1/2003	
Scottsbluff	NE	Western Nebraska Regional/Wil liam B Heilig Field	BFF	N	\$4.50	7/1/2004	7/1/2024	1,299,534
Lebanon	NH	Lebanon Municipal	LEB	N	\$3.00	8/1/1995	8/1/2002	
Lebanon	NH	Lebanon Municipal	LEB	N	\$4.50	11/1/2003	5/1/2006	
Lebanon	NH	Lebanon Municipal	LEB	N	\$4.50	10/1/2007	5/1/2014	
Lebanon	NH	Lebanon Municipal	LEB	N	\$4.50	10/1/2014	10/1/2023	1,186,558
Manchester	NH	Manchester	MHT	S	\$3.00	1/1/1993	1/1/2008	
Manchester	NH	Manchester	MHT	S	\$4.50	1/1/2008	1/1/2023	198,491,244
Atlantic City	NJ	Atlantic City International	ACY	S	\$3.00	10/1/1999	12/1/2005	
Atlantic City	NJ	Atlantic City International	ACY	S	\$4.50	12/1/2005	8/1/2014	
Atlantic City	NJ	Atlantic City International	ACY	S	\$4.50	9/1/2014	3/1/2025	57,765,575
Newark	NJ	Newark Liberty International	EWR	L	\$3.00	10/1/1992	4/1/2006	
Newark	NJ	Newark Liberty International	EWR	L	\$4.50	4/1/2006	6/1/2025	1,896,293,628
Trenton	NJ	Trenton Mercer	TTN	N	\$3.00	1/1/2001	5/1/2004	
Trenton	NJ	Trenton Mercer	TTN	N	\$4.50	5/1/2004	11/1/2021	12,977,901
Albuquerque	NM	Albuquerque International Sunport	ABQ	M	\$3.00	7/1/1996	7/1/2011	

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Albuquerque	NM	Albuquerque International Sunport	ABQ	M	\$4.50	7/1/2011	11/1/2020	208,372,197
Farmington	NM	Four Corners Regional	FMN	GA	\$3.00	6/1/2003	5/1/2023	661,102
Roswell	NM	Roswell International Air Center	ROW	N	\$3.00	4/1/1999	2/1/2004	
Roswell	NM	Roswell International Air Center	ROW	N	\$4.50	2/1/2004	6/1/2004	
Roswell	NM	Roswell International Air Center	ROW	N	\$3.00	6/1/2004	6/1/2005	
Roswell	NM	Roswell International Air Center	ROW	N	\$4.50	6/1/2005	2/1/2008	
Roswell	NM	Roswell International Air Center	ROW	N	\$4.50	3/1/2008	9/1/2027	3,637,712
Elko	NV	Elko Regional	EKO	N	\$3.00	9/1/1998	11/1/2003	
Elko	NV	Elko Regional	EKO	N	\$4.50	11/1/2003	2/1/2021	6,790,017
Las Vegas	NV	McCarran International	LAS	L	\$3.00	6/1/1992	11/1/2004	
Las Vegas	NV	McCarran International	LAS	L	\$4.50	11/1/2004	9/1/2006	
Las Vegas	NV	McCarran International	LAS	L	\$3.00	9/1/2006	1/1/2007	
Las Vegas	NV	McCarran International	LAS	L	\$4.00	1/1/2007	10/1/2008	
Las Vegas	NV	McCarran International	LAS	L	\$4.50	10/1/2008	11/1/2053	4,563,146,058
Reno	NV	Reno/Tahoe International	RNO	S	\$3.00	1/1/1994	2/1/2001	
Reno	NV	Reno/Tahoe International	RNO	S	\$4.50	8/1/2001	6/1/2002	
Reno	NV	Reno/Tahoe International	RNO	S	\$3.00	6/1/2002	2/1/2003	
Reno	NV	Reno/Tahoe International	RNO	S	\$4.50	2/1/2003	10/1/2004	

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Reno	NV	Reno/Tahoe International	RNO	S	\$3.00	10/1/2004	4/1/2005	
Reno	NV	Reno/Tahoe International	RNO	S	\$4.50	4/1/2005	7/1/2007	
Reno	NV	Reno/Tahoe International	RNO	S	\$3.00	7/1/2007	12/1/2007	
Reno	NV	Reno/Tahoe International	RNO	S	\$4.50	12/1/2007	11/1/2021	215,863,110
Albany	NY	Albany International	ALB	S	\$3.00	3/1/1994	9/1/2009	
Albany	NY	Albany International	ALB	S	\$4.50	9/1/2009	2/1/2021	116,740,338
Binghamton	NY	Greater Binghamton/ Edwin A Link Field	BGM	N	\$3.00	11/1/1993	9/1/2002	
Binghamton	NY	Greater Binghamton/ Edwin A Link Field	BGM	N	\$4.50	9/1/2002	2/1/2008	
Binghamton	NY	Greater Binghamton/ Edwin A Link Field	BGM	N	\$4.50	5/1/2008	12/1/2021	9,952,802
Buffalo	NY	Buffalo Niagara International	BUF	M	\$3.00	8/1/1992	8/1/2007	
Buffalo	NY	Buffalo Niagara International	BUF	M	\$4.50	8/1/2007	11/1/2026	279,555,694
Elmira/Corning	NY	Elmira/Corning Regional	ELM	N	\$3.00	12/1/2004	1/1/2008	
Elmira/Corning	NY	Elmira/Corning Regional	ELM	N	\$4.50	5/1/2008	8/1/2035	15,413,811
New York	NY	Long Island MacArthur	ISP	S	\$3.00	12/1/1994	9/1/2005	
New York	NY	Long Island MacArthur	ISP	S	\$4.50	9/1/2005	10/1/2023	81,876,430
Ithaca	NY	Ithaca Tompkins Regional	ITH	N	\$3.00	1/1/1993	3/1/2009	

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Ithaca	NY	Ithaca Tompkins Regional	ITH	N	\$4.50	3/1/2009	7/1/2022	8,990,405
Jamestown	NY	Chautauqua County/Jamestown	JHW	GA	\$3.00	6/1/1993	8/1/2002	
Jamestown	NY	Chautauqua County/Jamestown	JHW	GA	\$4.50	9/1/2004	3/1/2018	781,130
Massena	NY	Massena International-Richards Field	MSS	CS	\$3.00	4/1/1996	4/1/2061	163,429
New York	NY	John F Kennedy International	JFK	L	\$3.00	10/1/1992	4/1/2006	
New York	NY	John F Kennedy International	JFK	L	\$4.50	4/1/2006	7/1/2025	2,597,929,162
New York	NY	Laguardia	LGA	L	\$3.00	10/1/1992	4/1/2006	
New York	NY	Laguardia	LGA	L	\$4.50	4/1/2006	7/1/2025	1,515,722,260
New York	NY	New York Stewart International	SWF	N	\$3.00	11/1/1995	3/1/2002	
New York	NY	New York Stewart International	SWF	N	\$4.50	3/1/2002	11/1/2005	
New York	NY	New York Stewart International	SWF	N	\$4.50	5/1/2007	9/1/2007	
New York	NY	New York Stewart International	SWF	N	\$4.50	7/1/2010	8/1/2026	22,254,000
Niagara Falls	NY	Niagara Falls International	IAG	N	\$4.50	11/1/2017	7/1/2024	3,662,905
Ogdensburg	NY	Ogdensburg International	OGS	N	\$3.00	4/1/1996	7/1/2016	
Ogdensburg	NY	Ogdensburg International	OGS	N	\$4.50	7/1/2016	4/1/2022	865,512
Plattsburgh	NY	Plattsburgh International	PBG	N	\$3.00	7/1/1993	3/1/2001	

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Plattsburgh	NY	Plattsburgh International	PBG	N	\$3.00	6/1/2001	4/1/2003	
Plattsburgh	NY	Plattsburgh International	PBG	N	\$4.50	1/1/2009	12/1/2043	39,561,720
Rochester	NY	Greater Rochester International	ROC	S	\$3.00	12/1/1997	9/1/2004	
Rochester	NY	Greater Rochester International	ROC	S	\$4.50	9/1/2004	5/1/2033	159,989,895
Saranac Lake	NY	Adirondack Regional	SLK	CS	\$3.00	8/1/1994	9/1/2007	
Saranac Lake	NY	Adirondack Regional	SLK	CS	\$4.50	2/1/2011	6/1/2033	591,574
Syracuse	NY	Syracuse Hancock International	SYR	S	\$3.00	10/1/1995	1/1/2002	
Syracuse	NY	Syracuse Hancock International	SYR	S	\$4.50	10/1/2002	8/1/2005	
Syracuse	NY	Syracuse Hancock International	SYR	S	\$4.50	11/1/2005	2/1/2007	
Syracuse	NY	Syracuse Hancock International	SYR	S	\$4.50	4/1/2007	8/1/2026	126,921,592
Utica	NY	Oneida County	UCA	GA	\$3.00	8/1/1997	6/1/2010	119,867
Watertown	NY	Watertown International	ART	N	\$4.50	4/1/2017	4/1/2023	605,205
White Plains	NY	Westchester County	HPN	S	\$3.00	2/1/1993	12/1/2001	
White Plains	NY	Westchester County	HPN	S	\$4.50	12/1/2001	5/1/2014	
White Plains	NY	Westchester County	HPN	S	\$4.50	8/1/2016	3/1/2022	69,683,663
Akron	OH	Akron-Canton Regional	CAK	N	\$3.00	9/1/1992	9/1/2002	
Akron	OH	Akron-Canton Regional	CAK	N	\$4.50	9/1/2002	12/1/2030	83,958,123



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Cleveland	OH	Cleveland-Hopkins International	CLE	M	\$3.00	11/1/1992	3/1/2002	
Cleveland	OH	Cleveland-Hopkins International	CLE	M	\$4.50	3/1/2002	9/1/2023	592,180,666
Columbus	OH	John Glenn Columbus International	CMH	M	\$3.00	10/1/1992	4/1/2002	
Columbus	OH	John Glenn Columbus International	CMH	M	\$4.50	4/1/2002	11/1/2020	353,675,428
Dayton	OH	James M Cox Dayton International	DAY	S	\$3.00	10/1/1994	9/1/2001	
Dayton	OH	James M Cox Dayton International	DAY	S	\$4.50	9/1/2001	2/1/2027	139,057,961
Toledo	OH	Toledo Express	TOL	N	\$3.00	9/1/1993	9/1/1996	
Toledo	OH	Toledo Express	TOL	N	\$3.00	7/1/1997	7/1/2001	
Toledo	OH	Toledo Express	TOL	N	\$4.50	7/1/2001	10/1/2023	18,881,393
Youngstown/ Warren	OH	Youngstown-Warren Regional	YNG	CS	\$3.00	5/1/1994	7/1/1996	
Youngstown/ Warren	OH	Youngstown-Warren Regional	YNG	CS	\$3.00	8/1/1997	2/1/2002	
Youngstown/ Warren	OH	Youngstown-Warren Regional	YNG	CS	\$4.50	4/1/2007	12/1/2027	5,467,796
Lawton	OK	Lawton-Fort Sill Regional	LAW	N	\$2.00	8/1/1992	1/1/1994	
Lawton	OK	Lawton-Fort Sill Regional	LAW	N	\$3.00	1/1/1994	4/1/1996	
Lawton	OK	Lawton-Fort Sill Regional	LAW	N	\$3.00	1/1/1998	8/1/2000	
Lawton	OK	Lawton-Fort Sill Regional	LAW	N	\$4.50	6/1/2002	3/1/2004	
Lawton	OK	Lawton-Fort Sill Regional	LAW	N	\$4.50	9/1/2004	10/1/2005	

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Lawton	OK	Lawton-Fort Sill Regional	LAW	N	\$4.50	11/1/2007	10/1/2037	7,948,230
Oklahoma City	OK	Will Rogers World	OKC	S	\$3.00	7/1/1997	4/1/2010	
Oklahoma City	OK	Will Rogers World	OKC	S	\$4.50	4/1/2010	10/1/2035	262,452,615
Tulsa	OK	Tulsa International	TUL	S	\$3.00	8/1/1992	3/1/1996	
Tulsa	OK	Tulsa International	TUL	S	\$3.00	1/1/1997	12/1/2010	
Tulsa	OK	Tulsa International	TUL	S	\$4.50	12/1/2010	8/1/2033	199,417,324
Eugene	OR	Mahlon Sweet Field	EUG	S	\$3.00	11/1/1993	6/1/2001	
Eugene	OR	Mahlon Sweet Field	EUG	S	\$4.50	6/1/2001	2/1/2024	49,276,564
Klamath Falls	OR	Crater Lake-Klamath Regional	LMT	GA	\$3.00	3/1/2000	4/1/2001	
Klamath Falls	OR	Crater Lake-Klamath Regional	LMT	GA	\$4.50	4/1/2001	12/1/2011	
Klamath Falls	OR	Crater Lake-Klamath Regional	LMT	GA	\$4.50	4/1/2012	10/1/2023	2,132,265
Medford	OR	Rogue Valley International - Medford	MFR	S	\$3.00	7/1/1993	4/1/2001	
Medford	OR	Rogue Valley International - Medford	MFR	S	\$4.50	4/1/2001	8/1/2025	39,592,547
North Bend	OR	Southwest Oregon Regional	OTH	N	\$3.00	2/1/1994	8/1/2001	
North Bend	OR	Southwest Oregon Regional	OTH	N	\$4.50	8/1/2001	8/1/2020	2,900,608
Pendleton	OR	Eastern Oregon Regional at Pendleton	PDT	CS	\$3.00	12/1/1995	10/1/2009	
Pendleton	OR	Eastern Oregon	PDT	CS	\$4.50	10/1/2009	5/1/2018	

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
		Regional at Pendleton						
Pendleton	OR	Eastern Oregon Regional at Pendleton	PDT	CS	\$4.50	12/1/2018	2/1/2033	902,869
Portland	OR	Portland International	PDX	L	\$3.00	7/1/1992	10/1/2001	
Portland	OR	Portland International	PDX	L	\$4.50	10/1/2001	7/1/2036	1,200,914,626
Redmond	OR	Roberts Field	RDM	N	\$3.00	10/1/1993	11/1/2001	
Redmond	OR	Roberts Field	RDM	N	\$4.50	11/1/2001	12/1/2006	
Redmond	OR	Roberts Field	RDM	N	\$4.50	3/1/2007	7/1/2040	33,531,050
Allentown	PA	Lehigh Valley International	ABE	N	\$3.00	11/1/1992	2/1/2001	
Allentown	PA	Lehigh Valley International	ABE	N	\$3.00	6/1/2001	11/1/2001	
Allentown	PA	Lehigh Valley International	ABE	N	\$4.50	11/1/2001	1/1/2003	
Allentown	PA	Lehigh Valley International	ABE	N	\$4.50	9/1/2003	6/1/2033	68,356,718
Altoona	PA	Altoona-Blair County	AOO	CS	\$3.00	5/1/1993	2/1/1996	
Altoona	PA	Altoona-Blair County	AOO	CS	\$3.00	1/1/1997	10/1/1999	
Altoona	PA	Altoona-Blair County	AOO	CS	\$3.00	7/1/2000	12/1/2008	
Altoona	PA	Altoona-Blair County	AOO	CS	\$4.50	12/1/2008	4/1/2021	716,045
Bradford	PA	Bradford Regional	BFD	CS	\$3.00	8/1/1995	5/1/2003	
Bradford	PA	Bradford Regional	BFD	CS	\$4.50	5/1/2003	6/1/2030	548,588
DuBois	PA	DuBois Regional	DUJ	CS	\$3.00	6/1/1995	4/1/2001	
DuBois	PA	DuBois Regional	DUJ	CS	\$4.50	4/1/2001	11/1/2003	

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
DuBois	PA	DuBois Regional	DUJ	CS	\$4.50	4/1/2004	12/1/2030	988,067
Erie	PA	Erie International/ Tom Ridge Field	ERI	N	\$3.00	10/1/1992	6/1/1997	
Erie	PA	Erie International/ Tom Ridge Field	ERI	N	\$3.00	12/1/1997	5/1/2001	
Erie	PA	Erie International/ Tom Ridge Field	ERI	N	\$4.50	8/1/2003	1/1/2005	
Erie	PA	Erie International/ Tom Ridge Field	ERI	N	\$4.50	7/1/2005	2/1/2025	15,928,448
Harrisburg	PA	Harrisburg International	MDT	S	\$3.00	2/1/1997	1/1/2003	
Harrisburg	PA	Harrisburg International	MDT	S	\$4.50	1/1/2003	7/1/2034	136,117,114
Johnstown	PA	John Murtha Johnstown- Cambria County	JST	CS	\$3.00	11/1/1993	12/1/1996	
Johnstown	PA	John Murtha Johnstown- Cambria County	JST	CS	\$3.00	12/1/1997	5/1/2001	
Johnstown	PA	John Murtha Johnstown- Cambria County	JST	CS	\$4.50	5/1/2001	1/1/2007	
Johnstown	PA	John Murtha Johnstown- Cambria County	JST	CS	\$4.50	7/1/2007	5/1/2023	1,083,114
Lancaster	PA	Lancaster	LNS	CS	\$3.00	2/1/1995	2/1/2009	
Lancaster	PA	Lancaster	LNS	CS	\$4.50	7/1/2013	6/1/2024	695,464
Latrobe	PA	Arnold Palmer Regional	LBE	N	\$3.00	3/1/1996	8/1/2012	

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Latrobe	PA	Arnold Palmer Regional	LBE	N	\$4.50	8/1/2012	2/1/2022	6,515,818
Philadelphia	PA	Philadelphia International	PHL	L	\$3.00	9/1/1992	4/1/2001	
Philadelphia	PA	Philadelphia International	PHL	L	\$4.50	4/1/2001	2/1/2013	
Philadelphia	PA	Philadelphia International	PHL	L	\$3.00	2/1/2013	3/1/2013	
Philadelphia	PA	Philadelphia International	PHL	L	\$4.50	3/1/2013	6/1/2023	1,564,269,848
Pittsburgh	PA	Pittsburgh International	PIT	M	\$3.00	10/1/2001	12/1/2004	
Pittsburgh	PA	Pittsburgh International	PIT	M	\$4.50	12/1/2004	1/1/2034	565,792,196
Reading	PA	Reading Regional/Carl A Spaatz Field	RDG	GA	\$3.00	12/1/1994	7/1/2008	1,006,653
State College	PA	University Park	UNV	N	\$3.00	11/1/1992	11/1/2003	
State College	PA	University Park	UNV	N	\$4.50	11/1/2003	10/1/2036	20,963,444
Wilkes-Barre/Scranton	PA	Wilkes-Barre/Scranton International	AVP	N	\$3.00	12/1/1993	6/1/1997	
Wilkes-Barre/Scranton	PA	Wilkes-Barre/Scranton International	AVP	N	\$3.00	12/1/1997	5/1/2001	
Wilkes-Barre/Scranton	PA	Wilkes-Barre/Scranton International	AVP	N	\$4.50	5/1/2001	8/1/2025	25,986,567
Williamsport	PA	Williamsport Regional	IPT	N	\$3.00	5/1/1997	11/1/1998	
Williamsport	PA	Williamsport Regional	IPT	N	\$4.50	11/1/2013	9/1/2028	1,857,488
Aguadilla	PR	Rafael Hernandez	BQN	N	\$3.00	3/1/1993	5/1/1996	
Aguadilla	PR	Rafael Hernandez	BQN	N	\$4.50	12/1/2005	4/1/2015	3,994,020

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Ponce	PR	Mercedita	PSE	N	\$3.00	3/1/1993	9/1/1998	866,000
San Juan	PR	Luis Munoz Marin International	SJU	M	\$3.00	3/1/1993	12/1/2005	
San Juan	PR	Luis Munoz Marin International	SJU	M	\$4.50	12/1/2005	9/1/2027	594,010,551
Providence	RI	Theodore Francis Green State	PVD	S	\$3.00	2/1/1994	9/1/2006	
Providence	RI	Theodore Francis Green State	PVD	S	\$4.50	9/1/2006	1/1/2030	292,278,967
Charleston	SC	Charleston AFB/International	CHS	S	\$4.50	3/1/2010	7/1/2039	189,546,679
Columbia	SC	Columbia Metropolitan	CAE	S	\$3.00	11/1/1993	12/1/2001	
Columbia	SC	Columbia Metropolitan	CAE	S	\$4.50	12/1/2001	10/1/2028	70,528,884
Florence	SC	Florence Regional	FLO	N	\$3.00	12/1/1995	11/1/1999	
Florence	SC	Florence Regional	FLO	N	\$3.00	12/1/1999	2/1/2000	
Florence	SC	Florence Regional	FLO	N	\$4.50	12/1/2014	6/1/2020	1,777,480
Hilton Head Island	SC	Hilton Head	HXD	N	\$3.00	2/1/1994	6/1/2000	
Hilton Head Island	SC	Hilton Head	HXD	N	\$3.00	12/1/2000	10/1/2007	
Hilton Head Island	SC	Hilton Head	HXD	N	\$4.50	5/1/2012	4/1/2022	5,934,148
Myrtle Beach	SC	Myrtle Beach International	MYR	S	\$3.00	10/1/1996	8/1/2001	
Myrtle Beach	SC	Myrtle Beach International	MYR	S	\$4.50	8/1/2001	8/1/2007	
Myrtle Beach	SC	Myrtle Beach International	MYR	S	\$4.50	6/1/2010	2/1/2029	127,116,927
Aberdeen	SD	Aberdeen Regional	ABR	N	\$3.00	1/1/2000	1/1/2002	
Aberdeen	SD	Aberdeen Regional	ABR	N	\$4.50	1/1/2002	10/1/2023	2,282,913

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Pierre	SD	Pierre Regional	PIR	N	\$4.50	2/1/2003	7/1/2009	
Pierre	SD	Pierre Regional	PIR	N	\$4.50	9/1/2009	4/1/2042	2,070,789
Rapid City	SD	Rapid City Regional	RAP	N	\$3.00	8/1/1997	1/1/2000	
Rapid City	SD	Rapid City Regional	RAP	N	\$3.00	6/1/2000	6/1/2006	
Rapid City	SD	Rapid City Regional	RAP	N	\$4.50	6/1/2006	6/1/2033	34,628,990
Sioux Falls	SD	Joe Foss Field	FSD	S	\$4.50	1/1/2017	4/1/2025	17,612,920
Watertown	SD	Watertown Regional	ATY	N	\$4.50	10/1/2019	4/1/2031	688,896
Bristol/Johnson/Kingsport	TN	Tri-Cities	TRI	N	\$3.00	2/1/1997	7/1/2007	
Bristol/Johnson/Kingsport	TN	Tri-Cities	TRI	N	\$4.50	7/1/2007	10/1/2023	18,954,523
Chattanooga	TN	Lovell Field	CHA	S	\$3.00	7/1/1994	4/1/2001	
Chattanooga	TN	Lovell Field	CHA	S	\$4.50	4/1/2001	11/1/2004	
Chattanooga	TN	Lovell Field	CHA	S	\$3.00	11/1/2004	2/1/2005	
Chattanooga	TN	Lovell Field	CHA	S	\$4.50	2/1/2005	10/1/2022	35,073,749
Jackson	TN	McKellar-Sipes Regional	MKL	CS	\$4.50	10/1/2002	6/1/2025	332,248
Knoxville	TN	McGhee Tyson	TYS	S	\$3.00	1/1/1994	10/1/2003	
Knoxville	TN	McGhee Tyson	TYS	S	\$4.50	10/1/2003	9/1/2023	103,771,921
Memphis	TN	Memphis International	MEM	S	\$3.00	8/1/1992	1/1/1997	
Memphis	TN	Memphis International	MEM	S	\$4.50	9/1/2018	5/1/2029	152,778,627
Nashville	TN	Nashville International	BNA	M	\$3.00	1/1/1993	12/1/2009	
Nashville	TN	Nashville International	BNA	M	\$4.50	12/1/2009	9/1/2010	
Nashville	TN	Nashville International	BNA	M	\$3.00	9/1/2010	5/1/2015	
Nashville	TN	Nashville International	BNA	M	\$4.50	5/1/2015	3/1/2036	946,938,055

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Abilene	TX	Abilene Regional	ABI	N	\$3.00	1/1/1998	9/1/2002	
Abilene	TX	Abilene Regional	ABI	N	\$4.50	9/1/2002	10/1/2022	7,176,261
Amarillo	TX	Rick Husband Amarillo International	AMA	N	\$4.50	1/1/2009	8/1/2023	19,200,000
Austin	TX	Austin-Bergstrom International	AUS	M	\$2.00	11/1/1993	2/1/1994	
Austin	TX	Austin-Bergstrom International	AUS	M	\$3.00	2/1/1994	2/1/1995	
Austin	TX	Austin-Bergstrom International	AUS	M	\$3.00	7/1/1995	4/1/2004	
Austin	TX	Austin-Bergstrom International	AUS	M	\$4.50	4/1/2004	11/1/2034	831,089,379
Beaumont/Port Arthur	TX	Jack Brooks Regional	BPT	N	\$3.00	9/1/1994	3/1/2002	
Beaumont/Port Arthur	TX	Jack Brooks Regional	BPT	N	\$4.50	3/1/2002	3/1/2029	4,901,113
Brownsville	TX	Brownsville/South Padre Island International	BRO	N	\$3.00	10/1/1997	5/1/2003	
Brownsville	TX	Brownsville/South Padre Island International	BRO	N	\$4.50	5/1/2003	2/1/2024	8,178,196
College Station	TX	Easterwood Field	CLL	N	\$3.00	7/1/1996	4/1/2001	
College Station	TX	Easterwood Field	CLL	N	\$4.50	4/1/2001	12/1/2028	8,067,085
Corpus Christi	TX	Corpus Christi International	CRP	N	\$3.00	3/1/1994	3/1/2003	



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Corpus Christi	TX	Corpus Christi International	CRP	N	\$4.50	3/1/2003	1/1/2027	49,700,114
Dallas	TX	Dallas Love Field	DAL	M	\$3.00	2/1/2008	2/1/2010	
Dallas	TX	Dallas Love Field	DAL	M	\$4.50	2/1/2010	7/1/2024	
Dallas	TX	Dallas Love Field	DAL	M	\$3.00	7/1/2024	2/1/2025	
Dallas	TX	Dallas Love Field	DAL	M	\$4.50	2/1/2025	8/1/2027	507,477,926
Dallas-Fort Worth	TX	Dallas-Fort Worth International	DFW	L	\$3.00	5/1/1994	6/1/1996	
Dallas-Fort Worth	TX	Dallas-Fort Worth International	DFW	L	\$3.00	2/1/1997	7/1/2002	
Dallas-Fort Worth	TX	Dallas-Fort Worth International	DFW	L	\$4.50	7/1/2002	10/1/2038	5,655,256,130
Del Rio	TX	Del Rio International	DRT	CS	\$4.50	2/1/2010	6/1/2020	403,739
El Paso	TX	El Paso International	ELP	S	\$3.00	1/1/1997	8/1/2010	
El Paso	TX	El Paso International	ELP	S	\$4.50	8/1/2010	5/1/2013	
El Paso	TX	El Paso International	ELP	S	\$4.50	6/1/2013	12/1/2024	147,935,120
Harlingen	TX	Valley International	HRL	N	\$3.00	11/1/1998	12/1/2007	
Harlingen	TX	Valley International	HRL	N	\$4.50	12/1/2007	7/1/2009	
Harlingen	TX	Valley International	HRL	N	\$4.50	8/1/2009	11/1/2024	31,083,290
Houston	TX	William P Hobby	HOU	M	\$3.00	11/1/2006	3/1/2015	
Houston	TX	William P Hobby	HOU	M	\$4.50	3/1/2015	9/1/2038	736,300,640
Houston	TX	George Bush Intercontinental/Houston	IAH	L	\$3.00	12/1/2008	3/1/2015	

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Houston	TX	George Bush Intercontinental/Houston	IAH	L	\$4.50	3/1/2015	1/1/2028	1,372,445,143
Fort Hood/Killeen	TX	Robert Gray AAF	GRK	N	\$3.00	1/1/1993	11/1/1994	
Fort Hood/Killeen	TX	Robert Gray AAF	GRK	N	\$3.00	4/1/1995	5/1/2001	
Fort Hood/Killeen	TX	Robert Gray AAF	GRK	N	\$4.50	5/1/2001	8/1/2003	
Fort Hood/Killeen	TX	Robert Gray AAF	GRK	N	\$4.50	12/1/2003	1/1/2006	
Fort Hood/Killeen	TX	Robert Gray AAF	GRK	N	\$4.50	6/1/2006	5/1/2024	14,756,983
Laredo	TX	Laredo International	LRD	N	\$3.00	10/1/1993	6/1/2009	
Laredo	TX	Laredo International	LRD	N	\$4.50	6/1/2009	4/1/2040	20,779,276
Longview	TX	East Texas Regional	GGG	N	\$3.00	9/1/1996	4/1/2002	
Longview	TX	East Texas Regional	GGG	N	\$3.00	9/1/2002	9/1/2012	
Longview	TX	East Texas Regional	GGG	N	\$4.50	9/1/2012	9/1/2023	2,350,343
Lubbock	TX	Lubbock Preston Smith International	LBB	S	\$3.00	10/1/1993	2/1/2005	
Lubbock	TX	Lubbock Preston Smith International	LBB	S	\$2.00	2/1/2005	2/1/2007	
Lubbock	TX	Lubbock Preston Smith International	LBB	S	\$3.00	2/1/2007	6/1/2008	
Lubbock	TX	Lubbock Preston Smith International	LBB	S	\$4.50	6/1/2008	9/1/2033	71,845,049
McAllen	TX	McAllen Miller International	MFE	N	\$3.00	4/1/1998	6/1/2011	

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
McAllen	TX	McAllen Miller International	MFE	N	\$4.50	6/1/2011	6/1/2023	30,517,304
Midland	TX	Midland International Air And Space Port	MAF	S	\$3.00	1/1/1993	9/1/2004	
Midland	TX	Midland International Air And Space Port	MAF	S	\$4.50	9/1/2004	1/1/2014	
Midland	TX	Midland International Air And Space Port	MAF	S	\$3.00	1/1/2014	11/1/2014	
Midland	TX	Midland International Air And Space Port	MAF	S	\$4.50	11/1/2014	3/1/2022	51,534,192
San Angelo	TX	San Angelo Regional/Mat his Field	SJT	N	\$3.00	5/1/1993	4/1/2002	
San Angelo	TX	San Angelo Regional/Mat his Field	SJT	N	\$4.50	4/1/2002	1/1/2030	8,010,053
San Antonio	TX	San Antonio International	SAT	M	\$3.00	11/1/2001	10/1/2007	
San Antonio	TX	San Antonio International	SAT	M	\$4.50	10/1/2007	8/1/2032	463,710,203
Tyler	TX	Tyler Pounds Regional	TYR	N	\$3.00	3/1/1994	9/1/2003	
Tyler	TX	Tyler Pounds Regional	TYR	N	\$4.50	9/1/2003	10/1/2037	11,668,802
Victoria	TX	Victoria Regional	VCT	CS	\$3.00	12/1/1994	8/1/1998	
Victoria	TX	Victoria Regional	VCT	CS	\$3.00	1/1/1999	1/1/2002	
Victoria	TX	Victoria Regional	VCT	CS	\$4.50	1/1/2002	8/1/2016	828,792
Waco	TX	Waco Regional	ACT	N	\$3.00	11/1/1995	10/1/2001	
Waco	TX	Waco Regional	ACT	N	\$4.50	10/1/2001	1/1/2023	6,373,838

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Wichita Falls	TX	Sheppard AFB/Wichita Falls Municipal	SPS	N	\$4.50	10/1/2008	8/1/2058	9,607,509
Cedar City	UT	Cedar City Regional	CDC	N	\$4.50	2/1/2007	10/1/2011	
Cedar City	UT	Cedar City Regional	CDC	N	\$4.50	2/1/2012	5/1/2044	1,891,336
Salt Lake City	UT	Salt Lake City International	SLC	L	\$3.00	12/1/1994	4/1/2001	
Salt Lake City	UT	Salt Lake City International	SLC	L	\$4.50	4/1/2001	10/1/2035	2,067,702,396
St. George	UT	St George Regional	SGU	N	\$3.00	5/1/1998	9/1/2002	
St. George	UT	St George Regional	SGU	N	\$4.50	6/1/2003	6/1/2031	6,604,984
Wendover	UT	Wendover	ENV	GA	\$3.00	8/1/1996	10/1/1999	142,300
Arlington	VA	Ronald Reagan Washington National	DCA	L	\$3.00	11/1/1993	5/1/2001	
Arlington	VA	Ronald Reagan Washington National	DCA	L	\$4.50	5/1/2001	2/1/2023	1,019,820,276
Dulles	VA	Washington Dulles International	IAD	L	\$3.00	1/1/1994	5/1/2001	
Dulles	VA	Washington Dulles International	IAD	L	\$4.50	5/1/2001	12/1/2038	2,442,302,508
Charlottesville	VA	Charlottesville-Albemarle	CHO	N	\$2.00	9/1/1992	10/1/1993	
Charlottesville	VA	Charlottesville-Albemarle	CHO	N	\$3.00	4/1/1995	1/1/2005	
Charlottesville	VA	Charlottesville-Albemarle	CHO	N	\$4.50	1/1/2005	1/1/2010	
Charlottesville	VA	Charlottesville-Albemarle	CHO	N	\$4.50	8/1/2010	9/1/2021	21,881,327

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Lynchburg	VA	Lynchburg Regional/Preston Glenn Field	LYH	N	\$3.00	7/1/1995	7/1/1996	
Lynchburg	VA	Lynchburg Regional/Preston Glenn Field	LYH	N	\$3.00	9/1/2000	6/1/2002	
Lynchburg	VA	Lynchburg Regional/Preston Glenn Field	LYH	N	\$4.50	6/1/2002	9/1/2031	8,364,446
Newport News	VA	Newport News/Williamsburg International	PHF	N	\$3.00	10/1/2006	7/1/2007	
Newport News	VA	Newport News/Williamsburg International	PHF	N	\$4.50	7/1/2010	5/1/2031	26,346,720
Norfolk	VA	Norfolk International	ORF	S	\$3.00	5/1/1997	1/1/2010	
Norfolk	VA	Norfolk International	ORF	S	\$4.50	9/1/2010	1/1/2023	150,029,994
Richmond	VA	Richmond International	RIC	S	\$3.00	5/1/1994	1/1/2005	
Richmond	VA	Richmond International	RIC	S	\$4.50	1/1/2005	3/1/2031	224,133,065
Roanoke	VA	Roanoke-Blacksburg Regional/Woodrum Field	ROA	N	\$3.00	9/1/1998	12/1/2001	
Roanoke	VA	Roanoke-Blacksburg Regional/Woodrum Field	ROA	N	\$4.50	12/1/2001	6/1/2021	27,451,220
Staunton/Waynesboro/Harrisonburg	VA	Shenandoah Valley Regional	SHD	N	\$3.00	12/1/2001	12/1/2006	
Staunton/Waynesboro/Harrisonburg	VA	Shenandoah Valley Regional	SHD	N	\$4.50	6/1/2007	4/1/2020	642,846

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Charlotte Amalie	VI	Cyril E King	STT	N	\$3.00	3/1/1993	8/1/1995	
Charlotte Amalie	VI	Cyril E King	STT	N	\$3.00	12/1/1995	12/1/2002	
Charlotte Amalie	VI	Cyril E King	STT	N	\$3.00	8/1/2004	4/1/2012	
Charlotte Amalie	VI	Cyril E King	STT	N	\$4.50	4/1/2012	1/1/2021	43,297,862
Christiansted	VI	Henry E Rohlsen	STX	N	\$3.00	3/1/1993	4/1/1996	
Christiansted	VI	Henry E Rohlsen	STX	N	\$3.00	12/1/1996	7/1/2003	
Christiansted	VI	Henry E Rohlsen	STX	N	\$3.00	10/1/2011	7/1/2016	9,339,163
Burlington	VT	Burlington International	BTV	S	\$3.00	4/1/1997	9/1/2003	
Burlington	VT	Burlington International	BTV	S	\$4.50	9/1/2003	10/1/2009	
Burlington	VT	Burlington International	BTV	S	\$4.50	12/1/2009	8/1/2021	52,013,046
Bellingham	WA	Bellingham International	BLI	N	\$3.00	7/1/1993	8/1/1998	
Bellingham	WA	Bellingham International	BLI	N	\$3.00	3/1/1999	7/1/2002	
Bellingham	WA	Bellingham International	BLI	N	\$4.50	7/1/2002	7/1/2010	
Bellingham	WA	Bellingham International	BLI	N	\$4.50	10/1/2010	10/1/2027	38,188,548
Friday Harbor	WA	Friday Harbor	FHR	N	\$3.00	2/1/2001	7/1/2016	
Friday Harbor	WA	Friday Harbor	FHR	N	\$4.50	4/1/2018	11/1/2028	1,060,107
Moses Lake	WA	Grant County International	MWH	GA	\$3.00	3/1/1999	11/1/2005	
Moses Lake	WA	Grant County International	MWH	GA	\$4.50	11/1/2005	2/1/2017	162,124
Pasco	WA	Tri-Cities	PSC	N	\$3.00	11/1/1993	10/1/2001	
Pasco	WA	Tri-Cities	PSC	N	\$4.50	10/1/2001	11/1/2036	58,406,668
Port Angeles	WA	William R Fairchild International	CLM	GA	\$3.00	8/1/1993	5/1/1995	

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Port Angeles	WA	William R Fairchild International	CLM	GA	\$3.00	9/1/1996	10/1/2011	
Port Angeles	WA	William R Fairchild International	CLM	GA	\$3.00	7/1/2012	4/1/2022	1,000,156
Pullman	WA	Pullman/Moscow Regional	PUW	N	\$3.00	6/1/1994	2/1/1996	
Pullman	WA	Pullman/Moscow Regional	PUW	N	\$3.00	2/1/2000	1/1/2002	
Pullman	WA	Pullman/Moscow Regional	PUW	N	\$4.50	1/1/2002	9/1/2013	
Pullman	WA	Pullman/Moscow Regional	PUW	N	\$4.50	11/1/2013	1/1/2070	11,352,608
Seattle	WA	Seattle-Tacoma International	SEA	L	\$3.00	11/1/1992	10/1/2001	
Seattle	WA	Seattle-Tacoma International	SEA	L	\$4.50	10/1/2001	1/1/2043	3,841,864,375
Spokane	WA	Spokane International	GEG	S	\$3.00	6/1/1993	4/1/2003	
Spokane	WA	Spokane International	GEG	S	\$4.50	4/1/2003	9/1/2021	164,224,198
Walla Walla	WA	Walla Walla Regional	ALW	N	\$3.00	11/1/1993	10/1/2001	
Walla Walla	WA	Walla Walla Regional	ALW	N	\$4.50	10/1/2001	11/1/2024	3,745,775
Wenatchee	WA	Pangborn Memorial	EAT	N	\$3.00	8/1/1993	10/1/1995	
Wenatchee	WA	Pangborn Memorial	EAT	N	\$3.00	6/1/1998	7/1/2002	
Wenatchee	WA	Pangborn Memorial	EAT	N	\$4.50	7/1/2002	2/1/2003	
Wenatchee	WA	Pangborn Memorial	EAT	N	\$4.50	5/1/2003	4/1/2010	
Wenatchee	WA	Pangborn Memorial	EAT	N	\$4.50	5/1/2010	4/1/2023	5,099,700
Yakima	WA	Yakima Air Terminal/McAllister Field	YKM	N	\$3.00	2/1/1993	2/1/1999	

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Yakima	WA	Yakima Air Terminal/Mc Allister Field	YKM	N	\$3.00	5/1/1999	4/1/2011	
Yakima	WA	Yakima Air Terminal/Mc Allister Field	YKM	N	\$4.50	4/1/2011	10/1/2021	6,022,751
Appleton	WI	Appleton International	ATW	N	\$3.00	7/1/1994	6/1/2006	
Appleton	WI	Appleton International	ATW	N	\$4.50	6/1/2006	4/1/2008	
Appleton	WI	Appleton International	ATW	N	\$3.00	4/1/2008	9/1/2008	
Appleton	WI	Appleton International	ATW	N	\$4.50	9/1/2008	8/1/2036	41,406,402
Eau Claire	WI	Chippewa Valley Regional	EAU	N	\$3.00	2/1/1996	12/1/2001	
Eau Claire	WI	Chippewa Valley Regional	EAU	N	\$4.50	12/1/2001	1/1/2006	
Eau Claire	WI	Chippewa Valley Regional	EAU	N	\$4.50	8/1/2006	6/1/2024	2,147,974
Green Bay	WI	Green Bay-Austin Straubel International	GRB	N	\$3.00	3/1/1993	3/1/2002	
Green Bay	WI	Green Bay-Austin Straubel International	GRB	N	\$4.50	3/1/2002	10/1/2020	46,299,787
La Crosse	WI	La Crosse Regional	LSE	N	\$3.00	7/1/1994	4/1/2001	
La Crosse	WI	La Crosse Regional	LSE	N	\$4.50	4/1/2001	4/1/2028	12,741,825
Madison	WI	Dane County Regional-Truax Field	MSN	S	\$3.00	9/1/1993	11/1/2001	
Madison	WI	Dane County Regional-Truax Field	MSN	S	\$4.50	11/1/2001	10/1/2023	92,211,569



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Milwaukee	WI	General Mitchell International	MKE	M	\$3.00	5/1/1995	11/1/2012	
Milwaukee	WI	General Mitchell International	MKE	M	\$4.50	11/1/2012	6/1/2026	383,421,695
Mosinee	WI	Central Wisconsin	CWA	N	\$3.00	11/1/1993	9/1/2007	
Mosinee	WI	Central Wisconsin	CWA	N	\$4.50	9/1/2007	2/1/2031	18,073,943
Rhineland	WI	Rhineland- Oneida County	RHI	N	\$3.00	1/1/1994	4/1/1996	
Rhineland	WI	Rhineland- Oneida County	RHI	N	\$3.00	6/1/1996	9/1/2001	
Rhineland	WI	Rhineland- Oneida County	RHI	N	\$4.50	9/1/2001	3/1/2022	2,750,883
Beckley	WV	Raleigh County Memorial	BKW	GA	\$4.50	8/1/2017	8/1/2039	285,965
Charleston	WV	Yeager	CRW	N	\$3.00	8/1/1993	11/1/2001	
Charleston	WV	Yeager	CRW	N	\$4.50	11/1/2001	4/1/2030	33,336,516
Clarksburg	WV	North Central West Virginia	CKB	N	\$3.00	4/1/1994	10/1/1995	
Clarksburg	WV	North Central West Virginia	CKB	N	\$4.50	4/1/2001	8/1/2002	
Clarksburg	WV	North Central West Virginia	CKB	N	\$4.50	5/1/2004	5/1/2054	3,101,233
Huntington	WV	Tri- State/Milton J Ferguson Field	HTS	N	\$3.00	12/1/1995	12/1/2008	
Huntington	WV	Tri- State/Milton	HTS	N	\$3.00	5/1/2009	6/1/2012	

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
		J Ferguson Field						
Huntington	WV	Tri-State/Milton J Ferguson Field	HTS	N	\$4.50	7/1/2012	12/1/2020	6,921,434
Lewisburg	WV	Greenbrier Valley	LWB	N	\$4.50	4/1/2011	1/1/2025	1,104,958
Morgantown	WV	Morgantown Municipal-Walter L Bill Hart Field	MGW	CS	\$2.00	12/1/1992	1/1/1994	
Morgantown	WV	Morgantown Municipal-Walter L Bill Hart Field	MGW	CS	\$2.00	12/1/1994	1/1/2002	
Morgantown	WV	Morgantown Municipal-Walter L Bill Hart Field	MGW	CS	\$4.50	1/1/2002	3/1/2008	
Morgantown	WV	Morgantown Municipal-Walter L Bill Hart Field	MGW	CS	\$4.50	6/1/2009	1/1/2026	1,170,454
Parkersburg	WV	Mid-Ohio Valley Regional	PKB	CS	\$3.00	5/1/1999	8/1/2002	
Parkersburg	WV	Mid-Ohio Valley Regional	PKB	CS	\$4.50	8/1/2003	10/1/2027	798,612
Casper	WY	Casper/Natrona County International	CPR	N	\$3.00	9/1/1993	4/1/2001	
Casper	WY	Casper/Natrona County International	CPR	N	\$4.50	4/1/2001	3/1/2012	
Casper	WY	Casper/Natrona County International	CPR	N	\$3.00	3/1/2012	10/1/2019	
Casper	WY	Casper/Natrona County International	CPR	N	\$4.50	10/1/2019	7/1/2031	10,100,378

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Cheyenne	WY	Cheyenne Regional/Jerry Olson Field	CYS	CS	\$3.00	11/1/1993	4/1/2001	
Cheyenne	WY	Cheyenne Regional/Jerry Olson Field	CYS	CS	\$4.50	4/1/2001	9/1/2012	
Cheyenne	WY	Cheyenne Regional/Jerry Olson Field	CYS	CS	\$4.50	9/1/2014	9/1/2024	1,804,637
Cody	WY	Yellowstone Regional	COD	N	\$3.00	8/1/1997	7/1/2001	
Cody	WY	Yellowstone Regional	COD	N	\$4.50	7/1/2001	4/1/2005	
Cody	WY	Yellowstone Regional	COD	N	\$4.50	9/1/2005	6/1/2018	
Cody	WY	Yellowstone Regional	COD	N	\$4.50	7/1/2018	2/1/2020	2,269,020
Gillette	WY	Gillette-Campbell County	GCC	N	\$3.00	9/1/1993	12/1/2001	
Gillette	WY	Gillette-Campbell County	GCC	N	\$4.50	12/1/2001	6/1/2004	
Gillette	WY	Gillette-Campbell County	GCC	N	\$4.50	1/1/2005	5/1/2020	2,196,785
Jackson	WY	Jackson Hole	JAC	N	\$3.00	8/1/1993	4/1/2001	
Jackson	WY	Jackson Hole	JAC	N	\$4.50	4/1/2001	9/1/2041	39,383,556
Laramie	WY	Laramie Regional	LAR	N	\$3.00	8/1/1996	10/1/2000	
Laramie	WY	Laramie Regional	LAR	N	\$3.00	12/1/2000	8/1/2001	
Laramie	WY	Laramie Regional	LAR	N	\$4.50	12/1/2006	4/1/2013	
Laramie	WY	Laramie Regional	LAR	N	\$4.50	6/1/2013	2/1/2024	847,142
Riverton	WY	Riverton Regional	RIW	N	\$3.00	5/1/1995	4/1/2001	
Riverton	WY	Riverton Regional	RIW	N	\$4.50	4/1/2001	11/1/2036	1,180,133

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

Associated City	State	Airport Name	LOC ID	Hub size	Level	Start Date	Expiration Date	Total PFC Approved
Rock Springs	WY	Southwest Wyoming Regional	RKS	N	\$3.00	4/1/1995	4/1/2006	
Rock Springs	WY	Southwest Wyoming Regional	RKS	N	\$4.50	4/1/2006	11/1/2023	2,009,268
Sheridan	WY	Sheridan County	SHR	N	\$3.00	3/1/1996	12/1/2001	
Sheridan	WY	Sheridan County	SHR	N	\$4.50	12/1/2001	9/1/2008	
Sheridan	WY	Sheridan County	SHR	N	\$4.50	10/1/2008	8/1/2035	1,388,712
Worland	WY	Worland Municipal	WRL	GA	\$4.50	1/1/2003	3/1/2008	
Worland	WY	Worland Municipal	WRL	GA	\$4.50	8/1/2008	7/1/2022	265,060
								110,530,078,034

# unique locations approved    401

NOTES: Total PFC approved includes all the collections at the location

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Letter of Intent (LOI) Commitments by Fiscal Year**

<b>State</b>	<b>City</b>	<b>Airport Name</b>	<b>Discretionary 2020</b>	<b>Entitlement 2020</b>	<b>Discretionary 2021</b>	<b>Entitlement 2021</b>
FL	Fort Lauderdale	Fort Lauderdale/Hollywood International	20,000,000	0	20,000,000	0
IL	Chicago	Chicago O'Hare International (Ph 1)	20,000,000	0	0	0
IL	Chicago	Chicago O'Hare International (Ph 2)	45,000,000	0	25,000,000	0
OH	Cleveland	Cleveland-Hopkins International	0	2,059,960	0	2,074,885
TX	Dallas-Fort Worth	Dallas-Fort Worth International	15,000,000	9,000,000	15,000,000	9,000,000
Total			110,000,000	11,059,960	100,000,000	11,074,885

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Letter of Intent (LOI) Commitments by Fiscal Year (Cont'd)**

<b>State</b>	<b>City</b>	<b>Airport Name</b>	<b>Discretionary 2022</b>	<b>Entitlement 2022</b>	<b>Discretionary 2023</b>	<b>Entitlement 2023</b>
FL	Fort Lauderdale	Fort Lauderdale/Hollywood International	10,000,000	0	0	0
IL	Chicago	Chicago O'Hare International (Ph 1)	0	0	0	0
IL	Chicago	Chicago O'Hare International (Ph 2)	30,000,000	0	30,000,000	0
OH	Cleveland	Cleveland-Hopkins International	0	400,248	0	0
TX	Dallas- Fort Worth	Dallas-Fort Worth International	25,000,000	9,000,000	25,000,000	9,000,000
Total			65,000,000	9,400,248	55,000,000	9,000,000

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Letter of Intent (LOI) Commitments by Fiscal Year (Cont'd)**

<b>State</b>	<b>City</b>	<b>Airport Name</b>	<b>Discretionary 2024</b>	<b>Entitlement 2024</b>	<b>Discretionary 2025</b>	<b>Entitlement 2025</b>
FL	Fort Lauderdale	Fort Lauderdale/Hollywood International	0	0	0	0
IL	Chicago	Chicago O'Hare International (Ph 1)	0	0	0	0
IL	Chicago	Chicago O'Hare International (Ph 2)	30,000,000	0	30,000,000	0
OH	Cleveland	Cleveland-Hopkins International	0	0	0	0
TX	Dallas- Fort Worth	Dallas-Fort Worth International	25,000,000	9,000,000	0	0
Total			55,000,000	9,000,000	30,000,000	0

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Letter of Intent (LOI) Commitments by Fiscal Year (Cont'd)**

<b>State</b>	<b>City</b>	<b>Airport Name</b>	<b>Discretionary 2026</b>	<b>Entitlement 2026</b>	<b>Discretionary Beyond</b>	<b>Entitlement Beyond</b>
FL	Fort Lauderdale	Fort Lauderdale/Hollywood International	0	0	0	0
IL	Chicago	Chicago O'Hare International (Ph 1)	0	0	0	0
IL	Chicago	Chicago O'Hare International (Ph 2)	20,000,000	0	0	0
OH	Cleveland	Cleveland-Hopkins International	0	0	0	0
TX	Dallas- Fort Worth	Dallas-Fort Worth International	0	0	0	0
Total			20,000,000	0	0	0



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Letter of Intent (LOI) Commitments by Fiscal Year (Cont'd)**

<b>State</b>	<b>City</b>	<b>Airport Name</b>	<b>Discretionary Totals</b>	<b>Entitlement Totals</b>
FL	Fort Lauderdale	Fort Lauderdale/Hollywood International	50,000,000	0
IL	Chicago	Chicago O'Hare International (Ph 1)	20,000,000	0
IL	Chicago	Chicago O'Hare International (Ph 2)	210,000,000	0
OH	Cleveland	Cleveland-Hopkins International	0	4,535,093
TX	Dallas- Fort Worth	Dallas-Fort Worth International	105,000,000	45,000,000

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Letter of Intent (LOI) Commitments by Fiscal Year (Cont'd)**

<b>State</b>	<b>City</b>	<b>Airport Name</b>			<b>Discretionary Total</b>	<b>Entitlement Total</b>
CA	Los Angeles	Los Angeles International			22,000,000.00	0
FL	Fort Lauderdale	Fort Lauderdale/Hollywood International			90,000,000.00	0
IL	Chicago	Chicago O'Hare International			360,000,000.00	0
OH	Cleveland	Cleveland-Hopkins International			0	0
Total					472,000,000.00	8,611,107.00



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

**PAYMENT TO GRANTS-IN-AID FOR AIRPORTS**

**Program and Financing**  
(in millions of dollars)

		FY2019	FY 2020	FY 2021
		Actual	Estimate	Request
Identification code: 069-2813-0-1-402				
<b>Obligations by program activity:</b>				
0001	Direct Program Activity .....	500	400	.....
0900	Total new obligations, unexpired accounts (object class 94.0) .....	500	400	.....
<b>Budgetary resources:</b>				
Budget Authority:				
Appropriations, discretionary:				
1100	Appropriation .....	500	400	.....
1930	Total budgetary resources available .....	500	400	.....
<b>Change in obligated balance:</b>				
Unpaid obligations:				
3010	New Obligations, unexpired accounts .....	500	400	.....
3020	Outlays (gross) .....	-500	-400	.....
<b>Budget authority and outlays, net:</b>				
Discretionary:				
4000	Budget authority, gross .....	500	400	.....
Outlay, gross:				
4190	Outlays, net (total) .....	500	400	.....

The Consolidated Appropriations Act of 2019 provided \$500 million and the Further Consolidated Appropriations Act of 2020 provided \$400 million of funding for Grants-in-Aid for Airports. Funds are appropriated from the General Fund of the U.S. Treasury. The FY 2019 funds are available for obligation through September 30, 2021 and the FY 2020 funds are available through September 30, 2022. Discretionary grants are being awarded to qualified airports, with up to 0.5 percent of the funds provided applied to the administrative costs of awarding grants under the program.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

**AVIATION USER FEES**

**Special and Trust Fund Receipts**  
(in millions of dollars)

Identification code: 69-5422-0-2-402	FY 2019 Actual	FY 2020 Estimate	FY 2021 Estimate
0100 Balance, start of year.....	12	13	13
Receipts:			
Current Law:			
1110 Aviation User Fees, Overflight Fees .....	146	149	153
1130 Property Disposal or Lease Proceeds, Aviation User Fee .....	2	.....	.....
1199 Total Current Law Receipts .....	148	149	153
1999 Total Receipts .....	148	149	153
2000 Total: Balances and Receipts .....	160	162	166
Appropriations:			
Current Law:			
2101 Aviation User Fees .....	-148	-149	-153
2103 Essential Air Service and Rural Airport Improvement Fund .....	-9	-9	.....
2132 Essential Air Service and Rural Airport Improvement Fund .....	10	9	.....
2199 Total current law appropriations .....	-147	-149	-153
2999 Total appropriations.....	-147	-149	-153
5099 Balance, end of year .....	13	13	13

**Program and Financing**  
(in millions of dollars)

Identification code: 69-5422-0-2-402	FY 2019 Actual	FY 2020 Estimate	FY 2021 Estimate
<b>Obligations by program activity:</b>			
0001 Land Proceeds .....	1	.....	.....
0002 Settlement & Misc. Receipts .....	3	.....	.....
0100 Direct program activities, subtotal .....	4	.....	.....
0900 Total new obligations, unexpired accounts .....	4	.....	.....
<b>Budgetary resources:</b>			
Unobligated balance:			
1000 Unobligated balance brought forward, Oct 1....	23	21	21
1201 Appropriations (special or trust fund).....	148	149	153
1220 Appropriations Transferred to other accounts [069-5423] .....	-146	-149	-153

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

1260	Appropriations, mandatory (total).....	2	.....	.....
1900	Budget authority (total).....	2	.....	.....
1930	Total budgetary resources available .....	25	21	21
	Memorandum (non-add) entries:			
1941	Unexpired unobligated balance, end of year.....	21	21	21
	<b>Change in obligated balance:</b>			
	Unpaid obligations:			
3000	Unpaid Obligations, brought forward, Oct 1 .....	1	2	2
3010	New Obligations, unexpired accounts .....	4	.....	.....
3020	Outlays (gross) .....	-3	.....	.....
3050	Unpaid Obligations, end of the year .....	2	2	2
	Memorandum (non-add) entries:			
3100	Obligated balance, start of the year .....	1	2	2
3200	Obligated balance, end of the year .....	2	2	2
	<b>Budget authority and outlays, net:</b>			
	Mandatory:			
4090	Budget authority, gross .....	2	.....	.....
	Outlays, gross:			
4101	Outlays from mandatory balances .....	1	.....	.....
4110	Outlays, gross, net (total) .....	3	.....	.....
4180	Budget authority, net (total) .....	2	.....	.....
4190	Outlays, net (total) .....	3	.....	.....

The Federal Aviation Reauthorization Act of 1996 (P.L. 104–264) authorized the collection of user fees for air traffic control and related services provided by the Federal Aviation Administration to aircraft that neither take off nor land in the United States, commonly known as overflight fees. The Budget estimates that \$153 million in overflight fees will be collected in 2021.

**Object Classification**  
(in millions of dollars)

	FY 2019 Actual	FY 2020 Estimate	FY 2021 Request
Identification code: 69-5422-0-2-402			
Direct obligations:			
25.2 Other Services from Non-Federal sources .....	1	.....	.....
25.4 Operations and maintenance of facilities .....	3	.....	.....
99.9 Total new obligations, unexpired accounts .....	4	.....	.....

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

**AVIATION INSURANCE REVOLVING FUND**

**Program and Financing**  
(in millions of dollars)

	FY2019 Actual	FY 2020 Estimate	FY 2021 Request
Identification code: 69-4120-0-3-402			
<b>Obligations by program activity:</b>			
0801 Program administration.....	1	1	1
0802 Insurance Claims.....	.....	1	1
0900 Total new obligations, unexpired accounts.....	1	2	2
<b>Budget resources:</b>			
Unobligated balance:			
1000 Unobligated balance brought forward, Oct. 1 .....	2,231	2,271	2,307
<b>Budget authority:</b>			
Spending authority form offsetting collections, mandatory:			
1800 Collected .....	41	38	39
1930 Total budgetary resources available.....	2,272	2,307	2,344
Memorandum (non-add) entries:			
1941 Unexpired unobligated balance, end of year.....	2,271	2,307	2,344
<b>Change in obligated balance:</b>			
Unpaid obligations:			
3000 Unpaid obligations, brought forward, Oct. 1 .....	1	1	1
3010 New Obligations, unexpired accounts .....	1	2	2
3020 Outlays (gross) .....	-1	-2	-2
3050 Unpaid obligations, end of year .....	1	1	1
Memorandum (non-add) entries:			
3100 Obligated balance, start of year .....	1	1	1
3200 Obligated balance, end of year.....	1	1	1
<b>Budget authority and outlays net:</b>			
Mandatory:			
4090 Budget authority, gross .....	41	38	39
Outlay, gross:			
4100 Outlays from new mandatory authority .....	1	2	2
<b>Offsets against gross budget authority and outlays:</b>			
Offsetting collections (collected) from:			
4120 Federal Sources .....	-1	-2	-2
4121 Interest on Federal securities .....	-40	-36	-37
4130 Offsets against gross budget authority and outlays (total) .....	-41	-38	-39
4170 Outlays, net (mandatory) .....	-40	-36	-37
4180 Budget authority, net (total).....	.....	.....	.....
4190 Outlays, net (total) .....	-40	-36	-37

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

<b>Memorandum (non-add) entries:</b>				
5000	Total investments, SOY: Federal securities: Par value.....	2,250	2,293	2,318
5001	Total investments, EOY: Federal securities: Par value.....	2,293	2,318	2,357

The fund provides direct support for the aviation insurance program (chapter 443 of title 49, U.S. Code). In December 2014, Congress sunset part of the aviation insurance program. Specifically, Congress returned U.S. air carriers to the commercial aviation market for all of their war risk insurance coverage by ending the FAA's authority to provide war risk insurance for a premium. Pursuant to 49 USC 44305, the FAA may provide insurance without premium at the request of the Secretary of Defense, or the head of a department, agency, or instrumentality designated by the President when the Secretary of Defense or the designated agency head agrees to indemnify the Secretary of Transportation against all losses covered by the insurance. The "non-premium" aviation insurance program is authorized through September 30, 2023.

**Object Classification**  
(in millions of dollars)

		FY 2019 Actual	FY 2020 Estimate	FY 2021 Request
Identification code: 69-4120-0-3-402				
Reimbursable obligations:				
25.2	Other Services from Non-Federal sources .....	1	1	1
42.0	Projected insurance claims and indemnities .....		1	1
99.9	Total new obligations, unexpired accounts .....	1	2	2

**Employment Summary**

		FY 2019 Actual	FY 2020 Estimate	FY 2021 Request
Identification code: 69-4120-0-3-402				
Reimbursable Civilian full-time equivalent				
2001	employment .....	2	4	4



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

**ADMINISTRATIVE SERVICES FRANCHISE FUND**

**Program and Financing**  
(in millions of dollars)

	FY 2019 Actual	FY 2020 Estimate	FY 2021 Estimate
Identification code: 69-4562-0-4-402			
<b>Obligations by program activity:</b>			
0801 Accounting Services .....	37	50	51
0804 Information Services .....	106	155	157
0806 Multi Media .....	13	3	3
0807 FLLI (formerly CMEL/Training) .....	11	8	9
0808 International Training .....	2	3	2
0810 Logistics .....	295	249	274
0811 Aircraft Maintenance .....	53	53	53
0812 Acquisition .....	4	4	4
0900 Total new obligations, unexpired accounts .....	521	525	554
<b>Budgetary Resources:</b>			
Unobligated balance:			
1000 Unobligated balance brought forward, Oct 1 .....	220	246	266
1021 Recoveries of prior year unpaid obligations .....	31	36	36
1050 Unobligated balance (total) .....	251	282	257
<b>Budget authority:</b>			
Spending authority from offsetting collections, discretionary:			
1700 Collected .....	516	509	509
1930 Total budgetary resources available .....	767	791	811
Memorandum (non-add) entries:			
1941 Unexpired unobligated balance, end of year .....	246	266	257
<b>Change in obligated balances:</b>			
Unpaid obligations:			
3000 Unpaid obligations, brought forward, Oct 1 .....	191	161	125
3010 New obligations, unexpired accounts .....	521	525	554
3020 Outlays (gross) .....	-520	-525	-529
3040 Recoveries of prior year unpaid obligations unexpired .....	-31	-36	-36
3050 Unpaid obligations, end of year .....	161	125	114
Memorandum (non-add) entries:			
3100 Obligated balance, start of year .....	191	161	125
3200 Obligated balance, end of year .....	161	125	114
<b>Budget authority and Outlays, net:</b>			
Discretionary:			
4000 Budget authority, gross .....	516	509	509
Outlays gross:			

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

4010	Outlays from new discretionary authority .....	393	346	346
4011	Outlays from discretionary balances.....	127	179	183
4020	Outlays, gross (total).....	520	525	529
<b>Offsets against gross budget authority and outlays:</b>				
Offsetting collections (collected) from:				
4030	Federal sources.....	-514	-507	-507
4033	Non-Federal sources .....	-2	-2	-2
4040	Offsets against gross budget authority and outlays (total) .....	-516	-509	-509
4080	Outlays, net (discretionary).....	4	16	20
4180	Budget authority, net (total) .....	.....	.....	.....
4190	Outlays, net (total) .....	4	16	20

In 1997, the Federal Aviation Administration (FAA) established a franchise fund to finance operations where the costs for goods and services provided are charged to the users on a fee-for-service basis. The fund improves organizational efficiency and provides better support to FAA's internal and external customers. The activities included in this franchise fund are: training, accounting, travel, duplicating services, multi-media services, information technology, materiel management (logistics), and aircraft maintenance.

**Object Classification**  
(in millions of dollars)

		FY 2019 Actual	FY 2020 Estimate	FY 2021 Estimate
Identification code: 69-4562-0-4-402				
Reimbursable obligations:				
11.1	Personnel compensation: Full-time permanent.....	126	135	140
12.1	Civilian personnel benefits .....	45	47	49
21.0	Travel and transportation of persons.....	5	6	5
22.0	Transportation of things .....	8	6	6
23.3	Communications, utilities, and miscellaneous charges .....	13	12	13
25.2	Other services from non-Federal sources .....	194	231	235
26.0	Supplies and materials .....	107	79	97
31.0	Equipment .....	7	7	5
42.0	Insurance claims and indemnities .....	16	2	4
99.9	Total new obligations, unexpired accounts.....	521	525	554

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Employment Summary**

		FY 2019	FY 2020	FY 2021
Identification code: 69-4562-0-4-402		Actual	Estimate	Estimate
2001	Reimbursable civilian full-time equivalent employment.....	1,463	1,607	1,559

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

**AIRPORT AND AIRWAY TRUST FUND**

**Program and Financing**  
(in millions of dollars)

	FY 2019 Actual	FY 2020 Estimate	FY 2021 Estimate
Identification code: 69-8103-0-7-402			
<b>Memorandum (non-add) entries:</b>			
5000 Total investments, start of year: Federal securities: Par value.....	14,212	15,018	15,028
5001 Total investments, end of year: Federal securities: Par value.....	15,018	15,028	15,414

Section 9502 of Title 26, U.S. Code provides for amounts equivalent to the funds received in the Treasury for the passenger ticket tax, and certain other taxes paid by airport and airway users, to be transferred to the Airport and Airway Trust Fund. In turn, appropriations are authorized from this fund to meet obligations for airport improvement grants, Federal Aviation Administration facilities and equipment; research, operations, and payment to air carriers; and for the Bureau of Transportation Statistics Office of Airline Information.

**Status of Funds (in millions of dollars)**

	FY 2019 Actual	FY 2020 Estimate	FY 2021 Estimate
Identification code: 69-8103-0-7-402			
<b>Unexpended balance, start of year:</b>			
0100 Balance, start of year.....	16,982	17,916	17,668
0999 Total balance, start of year.....	16,982	17,916	17,668
<b>Cash Income during the year:</b>			
Current law:			
Receipts			
1110 Excise Taxes, Airport and Airway Trust Fund ....	15,976	17,040	17,987
1130 Grants-in-aid for Airports (Airport and Airway Trust Fund).....	3	2	2
1130 Facilities and Equipment (Airport and Airway and Airport Trust Fund) .....	27	50	50
1150 Interest, Airport and Airway Trust Fund .....	0	0	0
1150 Interest, Airport and Airway Trust Fund .....	343	426	375
1160 General Fund Payment, Grant-in-Aid for Airports.	500	400	0
1160 Grant-in-Aid for Airports (Airport and Airway Trust Fund).....	49	39	39

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

1160	Facilities and Equipment (Airport and Airway Trust Fund).....	25	0	0
1160	Research, Engineering and Development (Airport and Airway Trust Fund) .....	11	9	9
1199	Income under present law .....	16,934	17,966	18,462
1999	Total cash income .....	16,934	17,966	18,462
<b>Cash outgo during year:</b>				
Current law:				
2100	Payments to Air Carriers (021-04-8304-0) .....	-197	-131	-150
2100	Trust Fund Share of FAA Activities (Airport and Airway Trust Fund) (021-12-8104-0).....	-9,250	-11,137	-11,002
2100	Grants-in-aid for Airports (Airport and Airway Trust Fund) (021-12-8106-0) .....	-3,476	-3,475	-3,557
2100	Facilities and Equipment (Airport and Airway Trust Fund) (021-12-8107-0) .....	-2,924	-3,295	-3,384
2100	Research, Engineering and Development (Airport and Airway Trust Fund) (021-12-8108-0) .....	-162	-176	-224
2199	Outgo under current law (-) .....	-16,000	-18,214	-18,317
2999	Total Cash outgo (-) .....	-16,000	-18,214	-18,317
Surplus Deficit:				
3110	Excluding interest .....	591	-674	-230
3120	Interest .....	343	426	375
3199	Subtotal, surplus or deficit .....	934	-248	145
<b>Manual Adjustments:</b>				
3298	Reconciliation adjustment.....	0	0	0
3299	Total adjustments.....	0	0	0
3999	Total change in balance.....	934	-248	145
<b>Unexpended balance, end of year:</b>				
4100	Uninvested balance (net), end of year.....	2,898	2,640	2,399
4200	Airport and Airway Trust Fund .....	15,018	15,028	15,414
4999	Total balance, end of year.....	17,916	17,668	17,813

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

**TRUST FUND SHARE OF FAA ACTIVITIES  
(AIRPORT AND AIRWAY TRUST FUND)**

**Program and Financing**  
(in millions of dollars)

		FY 2019	FY 2020	FY 2021
		Actual	Estimate	Estimate
Identification code: 69-8104-0-7-402				
<b>Obligations by program activity:</b>				
0001	Payment to Operations .....	9,833	10,519	11,002
0900	Total new obligations, unexpired accounts (object class 94.0) .....	9,833	10,519	11,002
<b>Budgetary resources:</b>				
Appropriations, discretionary:				
Budge authority:				
1101	Appropriations (special or trust) .....	9,833	10,519	11,002
1930	Total budgetary resources available.....	9,833	10,519	11,002
<b>Change in obligated balance:</b>				
Unpaid obligations:				
3000	Unpaid obligations, brought forward, Oct 1	35	618	.....
3010	New obligations, unexpired accounts .....	9,833	10,519	11,002
3020	Outlays (gross) .....	-9,250	-11,137	-11,002
3050	Unpaid obligations, end of year	618	.....	.....
Memorandum (non-add) entries:				
3100	Obligated balance, start of year .....	35	618	.....
3200	Obligated balance, end of year.....	618	.....	.....
<b>Budget authority and outlays, net:</b>				
Discretionary:				
4000	Budget authority, gross .....	9,833	10,519	11,002
Outlays, gross:				
4010	Outlays from new discretionary authority .....	9,250	10,519	11,002
4011	Outlays from discretionary balances.....	.....	618	.....
4020	Outlays, gross (total)	9,250	11,137	11,002
4180	Budget authority, net (total).....	9,833	10,519	11,002
4190	Outlays, net (total) .....	9,250	11,137	11,002

The 2021 Budget proposes \$11.002 billion for Federal Aviation Administration Operations, which would be provided entirely from the Airport and Airway Trust Fund.

**FAA ADMINISTRATIVE PROVISIONS - REQUESTED**

Sec. 110. The Administrator of the Federal Aviation Administration may reimburse amounts made available to satisfy 49 U.S.C. 41742(a)(1) from fees credited under 49 U.S.C. 45303 and any amount remaining in such account at the close of that fiscal year may be made available to satisfy section 41742(a)(1) for the subsequent fiscal year.

- ❖ In order to satisfy 49 U.S.C. 41742(a)(1), at the beginning of each fiscal year FAA makes available to the Essential Air Services (EAS) program funding from the Facilities & Equipment (F&E) account. This provision ensures that the F&E account is reimbursed from the over-flight fees collected and is needed in order to continue the practice in FY 2021.

Sec. 111. Amounts collected under section 40113(e) of title 49, United States Code, shall be credited to the appropriation current at the time of collection, to be merged with and available for the same purposes of such appropriation.

- ❖ As authorized under 49 USC 40113(e), the FAA may provide safety-related training and operational services to foreign aviation authorities with or without reimbursement. While FAA generally enforces a prepayment policy for reimbursable goods and services provided to foreign countries or international organizations, many have laws or regulations similar to the U.S. that prohibit advance payments. In those instances, FAA often receives payments for services provided during a fiscal year after that year has ended. This provision allows FAA to use the funds for additional technical assistance work that cannot be prepaid, instead of returning the funds to a lapsed appropriation.

Sec. 112. None of the funds in this Act shall be available for paying premium pay under subsection 5546(a) of title 5, United States Code, to any Federal Aviation Administration employee unless such employee actually performed work during the time corresponding to such premium pay.

- ❖ The provision stems from past legal action taken by air traffic controllers to receive premium pay for a full shift, even if only part of the shift was eligible for premium pay. The FAA recommends retaining this provision as a GP that would apply to all FAA accounts. FAA also recommends keeping this provision for FY 2021 in order to minimize potential payroll liability.

Sec. 113. None of the funds in this Act may be obligated or expended for an employee of the Federal Aviation Administration to purchase a store gift card or gift certificate through use of a Government-issued credit card.

- ❖ This provision prohibits FAA employees from using a government-issued credit card to purchase a store gift card or gift certificate. FAA recommends retaining this provision as a GP that would apply to all FAA accounts.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

Sec. 114. None of the funds in this Act may be obligated or expended for retention bonuses for an employee of the Federal Aviation Administration without the prior written approval of the Assistant Secretary for Administration of the Department of Transportation.

- ❖ The FY 2021 budget proposes to retain the provision that all FAA retention bonuses continue to be approved by the Assistant Secretary for Administration.

SEC. 115. Notwithstanding any other transfer restriction under this Act, not to exceed 10 percent of any appropriation made available for the current fiscal year for the Federal Aviation Administration by this Act or provided by previous appropriations Acts may be transferred between such appropriations for the Federal Aviation Administration, but no such appropriation except as otherwise specifically provided, shall be increased by more than 10 percent by any such transfer: Provided, That funds transferred under this section shall be treated as a reprogramming of funds under section 404 of this Act and shall not be available for obligation unless the Committees on Appropriations of the Senate and the House of Representatives are notified 15 days in advance of such transfer: Provided further, That any transfer from an amount made available for obligation as discretionary grants-in-aid for airports pursuant to section 47117(f) of title 49, United States Code shall be deemed as obligated for grants-in-aid for airports under part B of subtitle VII of title 49, United States Code for the purposes of complying with the limitation on incurring obligations in this appropriations Act or any other appropriations Act under the heading "Grants-in-Aid for Airports."

- ❖ The FY 2021 budget requests additional budget flexibility. While the FAA has long benefited from the ability to seek congressional approval to reprogram limited amounts within budget accounts contained in Section 404(a), there has traditionally been no flexibility at the account level. This new authority in Section 404(b) will allow the FAA to request the transfer of up to 10 percent of any appropriation across accounts, provided that no account is increased by more than 10 percent. Such a transfer would be subject to approval by both congressional Committees on Appropriations.



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

[This page intentionally left blank]



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

**EXHIBIT IV-1  
RESEARCH, DEVELOPMENT & TECHNOLOGY  
DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
BUDGET AUTHORITY  
(In Thousands of dollars)**

Account	Program	Line Item	Classification (R,D, F, or A)	FY 2019 Actual	FY 2020 Enacted	FY 2021 Request	Annual Modal Research Plan
<b>Research, Engineering and Development</b>				<b>191,100</b>	<b>192,665</b>	<b>170,000</b>	
	a.	Fire Research and Safety	R	7,200	7,200	7,136	X
	b.	Propulsion and Fuel Systems	R	2,100	2,100	4,215	X
	c.	Advanced Materials/Structural Safety	R	14,720	14,720	1,003	X
	d.	Aircraft Icing/Digital System Safety	R	9,253	9,000	6,426	X
	e.	Continued Airworthiness	R	11,269	10,269	9,642	X
		Aircraft Catastrophic Failure Prevention Research	R	1,570	1,565	0	
	f.	Flightdeck/Maintenance/System Integration Human Factors	R	7,305	7,300	7,469	X
	g.	System Safety Management	R	5,500	4,500	5,485	X
	h.	Air Traffic Control/Technical Operations Human Factors	R	5,800	5,800	5,685	X
	i.	Aeromedical Research	R	9,080	7,919	10,235	X
	j.	Weather Program	R	15,476	12,911	6,236	X
	k.	Unmanned Aircraft Systems Research	R	24,035	24,035	24,035	X
	l.	Alternative Fuels for General Aviation	R	1,900	1,900	2,524	
	m.	Commercial Space Transportation Safety	R	2,500	2,500	5,840	X
	n.	NextGen - Wake Turbulence	R	6,831	5,000	3,698	X
	o.	NextGen - Air Ground Integration Human Factors	R	6,757	5,300	6,757	X
	p.	NextGen - Weather Technology in the Cockpit	R	3,644	3,144	1,982	X
	q.	Information Technology/Cyber Security	R	1,232	2,675	4769	
	r.	NextGen - Flight Data Exchange	R	1,035	1,005	1,000	X
	s.	Environment and Energy	R	18,013	18,013	17,911	X
		Airliner Cabin Environment Research	R	0	1,000	0	
	t.	NextGen - Environmental Research - Aircraft Technologies, and Fuels	R	29,174	29,174	27,009	X
	u.	System Planning and Resource Management	R	2,135	12,135	8,022	X
	v.	William J. Hughes Technical Center Laboratory Facility	R	4,571	3,500	2,921	X
<b>Facilities &amp; Equipment</b>				<b>251,300</b>	<b>275,100</b>	<b>210,600</b>	
	a.	Advanced Technology Development and Prototype	D	33,000	40,900	26,600	X
	b.	William J. Hughes Technical Center Laboratory/Infrastructure Sustainmen	F	36,000	35,000	26,900	
	c.	Center for Advanced Aviation System Development (CAASD)	D	57,000	57,000	57,000	X
	d.	NextGen Research & Development	D	125,300	142,200	100,100	X
<b>Grants-In-Aid for Airports</b>				<b>48,210</b>	<b>54,224</b>	<b>55,666</b>	
	a.	Airport Technology Research	R	33,210	39,224	40,666	X
	b.	Airport Cooperative Research	R	15,000	15,000	15,000	X
<b>Operations</b>				<b>11,297</b>	<b>10,909</b>	<b>10,678</b>	
		Subtotal, Applied Research	R	239,310	246,889	225,666	
		Subtotal, Development Research	D	215,300	240,100	183,700	
		Subtotal, Research and Development Facilities	F	36,000	35,000	26,900	
		Subtotal, Administration	A	11,297	10,909	10,678	
<b>Total FAA</b>				<b>501,907</b>	<b>532,898</b>	<b>446,944</b>	

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

[This page intentionally left blank]



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Federal Aviation Administration  
Information Technology Budget Narrative  
(Budget Authority in Thousands)**

<b>Budget Account</b>	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
Operations (OPS)	<b>\$1,544,048</b>	<b>\$1,520,174</b>	<b>\$1,554,087</b>
<i>Commodity IT SS WCF</i>	<i>\$11,060</i>	<i>\$11,755</i>	<i>\$9,466</i>
<i>Programmatic IT SS WCF</i>	<i>\$0</i>	<i>\$0</i>	<i>\$0</i>
<i>Modal IT</i>	<i>\$1,532,988</i>	<i>\$1,508,419</i>	<i>\$1,544,621</i>
Facilities & Equipment (F&E)	<b>\$1,642,280</b>	<b>\$1,444,121</b>	<b>\$1,467,960</b>
<i>Commodity IT SS WCF</i>	<i>\$0</i>	<i>\$0</i>	<i>\$0</i>
<i>Programmatic IT SS WCF</i>	<i>\$0</i>	<i>\$0</i>	<i>\$0</i>
<i>Modal IT</i>	<i>\$1,642,280</i>	<i>\$1,444,121</i>	<i>\$1,467,960</i>
<b>Total</b>	<b>\$3,186,328</b>	<b>\$2,964,295</b>	<b>\$3,022,047</b>

The President's budget requests \$3.0 billion in FY 2021 for the Federal Aviation Administration's (FAA) information technologies (IT) that support the full spectrum of FAA programs as well as the Department's initiative to transform and consolidate the management of certain IT solutions centrally by the Office of the Chief Information Officer (OCIO).

***Commodity IT Shared Services (SS) through the Working Capital Fund***

OCIO will continue to provide all modes Commodity IT Shared Services in FY 2021 to achieve economies of scale and increase consistency of cybersecurity protections across the Department. Commodity IT Shared Services include IT functions and activities dedicated to basic support services, including network operations, end-user computing, telecommunications services, and server operations.

- The budget requests **\$9.47 million** from the Operations account for Commodity IT Shared Services. FAA's share was based on actual commodity IT consumption in prior years as well as planned future consumption. OCIO, in collaboration with FAA, assumed a one-to-one cost estimate to transition all commodity IT to OCIO. FAA will only be charged for services rendered.

***Modal IT***

The following major mission-critical IT systems will be maintained by FAA in FY 2021. This list is only a subset of all IT systems that support FAA and are reported in the Office of Management and Budget's Corporate Investment Management System.

- **Automatic Dependent Surveillance – Broadcast (ADS-B) National Airspace System (NAS) Wide Implementation** – The budget requests **\$174.3 million** in the Facilities and Equipment (F&E) account to support the sustainment and

enhancement of ADS-B services. ADS-B reduces delays and enhances safety by using an aircraft's broadcasted position instead of position information from traditional radar. It benefits the American public by providing more efficient use of airspace capacity, fewer flight delays, and more optimal routing for aircraft.

- **Data Communications (Data Comm) in Support of NextGen** – The budget requests **\$92.4 million** in the F&E account for the deployment of additional Data Comm phases and services. Data Comm improves air traffic controller efficiency and will improve NAS capacity and reduce delays resulting in estimated passenger value of time (PVT) savings of \$11.3 billion for Tower and Initial En Route Services over the program life cycle. The addition of Full Services capabilities will add another \$734 million of PVT savings over the program life cycle.
- **Terminal Flight Data Manager (TFDM)** – The budget requests **\$78.7 million** in the F&E account for the Implementation of TFDM Build 1 and the continued System Development of TFDM Build 2. TFDM is expected to improve the efficiency of individual flights and optimize runway availability. This will make travel safer for the public, help reduce passenger delays, and contribute to less pollution.
- **En Route Automation Modernization (ERAM) System Enhancements and Technology Refresh** - The budget requests **\$66.5 million** in the F&E account to replace equipment that is approaching the end-of-life and hardware being discontinued by the manufacturer, which will sustain the safety critical Air Traffic operations as well as lower system life cycle cost. The ERAM System is the main tool used by air traffic controllers to separate aircraft in the En Route sector and it improves the efficiency and effectiveness of En Route section operations.
- **Air Traffic Management Implementation Portfolio** - The budget requests **\$52.3 million** in the F&E account to sustain the system and improve the accuracy of demand predictions, which helps avoid gridlock and minimize delays. TFMS is used to maintain near real-time situational awareness and predict areas that may experience congestion due to capacity reductions or unusual demand increases.

**Information Technology System Support** – The President's budget requests **\$2.55 billion** for maintenance of nearly 324 Federal Information Security Management Act reportable systems, which include 64 mission critical systems. Funding will also be used to migrate and modernize legacy systems to provide risk management, security, and common information management capabilities and services across the FAA; to include the airspace, navigation facilities and airports of the United States along with their

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

associated information, services, rules, regulations, policies, procedures, personnel and equipment.



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

[This page intentionally left blank]



## **Next Generation Air Transportation System (NextGen)**

For FY 2021, the Federal Aviation Administration (FAA) is requesting a total of \$996.5 million for the Next Generation Air Transportation System (NextGen). The FY 2021 request will allow FAA to continue efforts towards full Trajectory Based Operations, while operationalizing NextGen into the National Airspace System (NAS) infrastructure and addressing new entrants and technology.

### **Introduction**

NextGen is critical to ensuring that the NAS can safely accommodate anticipated growth and new types of aircraft as well as protect aviation's \$1.8 trillion<sup>1</sup> contribution to the U.S. economy. NextGen is not a single program, rather a transformative change in the management and operation of how we fly. NextGen encompasses many programs, systems, and procedures, at different levels of maturity, and supports investments to develop new capabilities and infrastructure. The FAA is working closely with the NextGen Advisory Committee (NAC), made up of industry stakeholders, to bring the NextGen vision to pass.

NextGen has delivered infrastructure platforms for the modernization of the airspace system. TBO will help the FAA to accomplish the goal to operationalize NextGen into the Air Traffic Management (ATM) system. TBO is an ATM method for strategically planning, managing, and optimizing flights throughout the operation. TBO uses time-based management, information exchange between air and ground systems, and the aircraft's ability to fly precise paths in time and space. TBO leverages the NextGen investments made in Performance-Based Navigation (PBN), surveillance, communications, and automation systems for decision support, flight data management, and information sharing.

TBO is being implemented in a continuum of evolutionary stages. The initial implementation is happening today, which includes the deployment of the basic capabilities and procedures at a limited number of sites. During this phase, the FAA will ensure appropriate integration of capabilities and procedures while ensuring that all stakeholders are informed and trained to accomplish the transformation. The next stage (Full TBO) includes additional capabilities and procedures that further improve efficiency of operations and enhance the ability of NAS stakeholders to collaboratively perform strategic planning. This stage includes additional deployment of capabilities at sites and geographical areas. The final stage (Dynamic TBO) includes the deployment of more capabilities and procedures that will make use of advanced aircraft and ground automation to enable flight-specific, time-based solutions for reroutes, aircraft sequencing and aircraft-based pairwise trajectory solutions. This stage includes the deployment of all planned sites and geographical areas.

---

<sup>1</sup> Federal Aviation Administration. (January 2020). The Economic Impact of Civil Aviation in the U.S. Economy. Page 14. [https://www.faa.gov/about/plans\\_reports/media/2020\\_jan\\_economic\\_impact\\_report.pdf](https://www.faa.gov/about/plans_reports/media/2020_jan_economic_impact_report.pdf)

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

The table below shows the programs under each account that comprise the FAA's NextGen program. Detailed funding and program requirements for these line items can be found in the budget narrative, Section 3.

**NextGen Program Summary**

(Dollars in Millions)

	<b>FY 2019 Actual</b>	<b>FY 2020 Enacted</b>	<b>FY 2021 Request</b>
<b>Facilities and Equipment</b>	<b>\$913.3</b>	<b>\$1,031.6</b>	<b>\$800.9</b>
NextGen – Separation Management Portfolio	16.0	20.5	21.2
NextGen – Traffic Flow Management Portfolio	14.0	19.8	8.0
NextGen – On Demand NAS Portfolio	21.0	8.5	10.5
NextGen – NAS Infrastructure Portfolio	20.0	11.5	15.0
NextGen – Support (NIEC, Test Bed) Portfolio	12.8	11.0	8.4
NextGen – System Safety Management Portfolio	14.2	24.5	21.5
NextGen – Unmanned Aircraft System (UAS)	25.0	51.9	22.0
NextGen – Enterprise, Concept Development, Human Factors and Demonstration Portfolio	16.5	19.0	15.0
Performance Based Navigation (PBN) Support Portfolio	20.0	5.0	8.0
Unmanned Aircraft Systems (UAS) Implementation	0.0	28.4	26.6
Enterprise Information Platform	0.0	10.0	10.5
Data Communications in Support of NextGen	118.9	136.2	99.8
En Route Automation Modernization (ERAM) - System Enhancements	115.3	106.0	66.9
System Wide Information Management (SWIM)	55.3	81.8	31.1
ADS - B NAS Wide Implementation	139.2	159.4	170.0
Collaborative Air Traffic Management (CATMT) Portfolio	17.7	0.0	0.0
Air Traffic Management Implementation Portfolio	0.0	50.0	56.0
Terminal Flight Data Manager (TFDM)	119.3	135.5	79.1
Time Based Flow Management (TBFM)	28.2	20.0	16.3
Next Generation Weather Processor (NWP)	28.7	24.3	24.3
NAS Voice System (NVS)	43.2	0.0	0.0
Reduced Oceanic Separation	17.5	32.3	10.5
Aeronautical Information Management Program (AIM)	5.0	5.3	7.5
Cross Agency NextGen Management	1.0	0.0	0.0
Activity 5 F&E PCBT - NextGen Staffing*	64.8	70.7	72.9
<b>Research Engineering and Development (RE&amp;D)</b>	<b>\$74.6</b>	<b>\$72.2</b>	<b>\$69.3</b>
NextGen – Alternative Fuels for General Aviation	1.9	1.9	0.0
NextGen – Flight Deck Data Exchange Requirements	1.0	1.0	1.0
NextGen – Information Security	1.2	2.7	4.8
NextGen – Wake Turbulence	6.8	5.0	3.7
NextGen – Air Ground Integration	6.8	5.3	6.8
NextGen – Weather in the Cockpit	3.6	3.1	2.0
NextGen – Environmental Research, Aircraft Technologies, Fuels and Metrics	29.2	29.2	27.0
Unmanned Aircraft Systems Research	24.0	24.0	24.0
<b>Operations</b>	<b>\$112.5</b>	<b>\$122.7</b>	<b>\$126.3</b>
NextGen Staffing	38.4	38.7	39.9
NextGen Unmanned Aircraft System	56.0	63.1	65.3
Performance Based Navigation (PBN) Activities	18.1	20.9	21.1
<b>Total NextGen Programs</b>	<b>\$1,100.4</b>	<b>\$1,226.5</b>	<b>\$996.5</b>

## **NextGen Planned Accomplishments – Building on Investments**

The FAA's modernization effort encompasses innovative and transformative technologies with programs segmented under the following groupings: Automation, Communication, Navigation, Surveillance, Integration and Information Management, and Weather. A high-level description of the technologies and planned accomplishments are listed below.

### **Automation**

- **Terminal Flight Data Manager (TFDM)** - Streamlines the movement and sequencing of aircraft on the airport surface and improves efficiency of departing aircraft. Tower air traffic controllers are the primary users of this system and the information from the system is shared with the airport operators to assist in strategic planning. The deployment of TFDM will begin for 89 airports from FY 2020-2029. TFDM is currently in the development and testing phase and starting the implementation activities. The FAA will receive and analyze technical transfer artifacts from NASA's Air Traffic Management Demonstration 2 (ATD-2), which will serve as a risk mitigation for the successful integration of information from TBFM, TFMS and TFDM.
- **Time Based Flow Management (TBFM)** - Improves efficiency and optimizes capacity by assisting air traffic controllers to sequence and space aircraft using time-based metering during arrival and departure operations. In FY 2021, the FAA will continue to implement the latest TBFM tool known as the Terminal Sequencing and Spacing (TSAS) decision support tool for use in airport terminal environments.
- **En Route Automation Modernization (ERAM)** – Functions as the primary automation system to manage and separate aircraft used by En Route air traffic controllers. In FY 2021, ERAM will complete implementation for the Phase I (Infrastructure) and continue software development with testing of Phase II for the automated handoff to Canada capability. Additionally, FAA will complete requirement and design for conflict probe and Aircraft Trajectory Modeling Enhancements.
- **Traffic Flow Management System (TFMS)** – Enables air traffic managers to make flight and flow decisions to improve efficiency of operations. In FY 2021, TFMS will provide greater system reliability, dependability and availability, enabling TFMS to achieve and sustain its full benefits of avoiding delay as well as retain TFMS users trust. FAA will decrease maintenance and repair activities, thereby reducing time to repair which will reduce the impact of outages as well as avoid increased TFMS operational and support costs.

### **Communications**

- **Data Communications (Data Comm)** - Enables controllers and pilots to communicate using digitally delivered messages, rather than relying solely on radio voice communications. In FY 2021, the Initial Operating Capacity (IOC) assessment will

be conducted for the Data Communications program's last site installation for En Route services. The very High Frequency (VHF) Data Link (VDL) Mode 2 air ground network service provides connectivity between the controllers and the cockpit. This capability will reduce operational errors associated with voice communication thereby enhancing safety and efficiency.

## **Navigation**

- NextGen Distance Measuring Equipment (DME) – Provides a resilient navigation service to enable commercial aircraft to continue PBN operations during Global Navigation Satellite System disruptions. The program will add DMEs to the existing network to eliminate single points of failure and fill coverage gaps to enable aircraft without Inertial Reference Unit to continue PBN operations. In FY 2021, the NextGen DME Program will complete Segment 1 to provide Area Navigation (RNAV) coverage to En Route airspace. The program will discontinue existing DME facilities that are not needed for RNAV, thereby reducing maintenance costs for equipment, facilities, and instrument flight procedures.

## **Surveillance**

- Automatic Dependent Surveillance-Broadcast (ADS-B) – Serves as the successor to radar. It uses the Global Positioning System (GPS) for the determination of an aircraft's location, ground speed, and other data. ADS-B ground stations have been fully deployed throughout the U.S. All aircraft operators are mandated to equip their aircraft with ADS-B. Applications for ADS-B In will be in continued development during this timeframe. A portion of the existing of the legacy ground radar infrastructure will remain in place to serve as a backup system for surveillance in the event of a GPS outage.

## **Integration and Information Management**

- System Wide Information Management (SWIM) - Enables stakeholders to share and receive information in real time to improve flight operations. Shared information includes flight data and other aeronautical information such as weather, special activity airspace restrictions, etc. Deployment of enhanced aeronautical and weather data over the SWIM network will continue through FY 2021.
- Aeronautical Information Management Modernization Enhancement 1 - Provides users with digital aeronautical information to consumers involved in airspace system decision support, flight planning, and pilot briefing. After achieving Final Investment Decision in FY 2020, development activities will be underway for the deployment of improved or enhanced aeronautical information.
- Aviation Safety Information Analysis and Sharing (ASIAS) – Provides the ability to share and analyze data among flight operators and other stakeholders to proactively discover safety concerns before accidents or incidents occur. This will lead to timely

mitigation, prevention, and monitoring efforts. In FY 2021, ASIAs will deliver enhanced data-fusion metrics based on radar surveillance data merged with digital flight data and aircrew safety reports, infused with additional data sources to provide improved safety analyses and discovery of aviation-related hazards. FAA will also develop the initial capability of a new generation/ASIAS portal that disseminates relevant ASIAs information to appropriate stakeholders in a more efficient and timely manner. The ASIAs program will develop safety analyses to proactively reduce aviation accidents and fatalities.

## **Weather**

- **NextGen Weather Processor (NWP)** - Provides weather products, the translation of the products, and a display for aviation weather users. The NWP replaces legacy weather processor systems (e.g., Weather and Radar Processor, Integrated Terminal Weather System, Corridor Integrated Weather System). NWP combines similar kinds of products that the legacy systems provided into a single controller display known as the Aviation Weather Display. NWP enhanced weather products include: 1) 0 to 8-hour aviation weather products 2) Real-time weather radar information, 3) Convective Weather Avoidance Fields, and 4) Wind Shear Alerts. FY 2021 activities include definition of enhancements in NWP as well as continued International coordination of aviation weather products.
- **Common Support Services Weather (CSS-Wx)** - Provides a means to publish weather products through SWIM for dissemination to other decision support tools (e.g., TFMS, TBFM and Terminal Flow Data Management) as well as to external stakeholders. CSS-Wx also enables airspace systems (e.g., ERAM, Advanced Technologies and Oceanic Procedures) to access high-resolution, aviation weather data from a variety of producing systems. FY 2021, activities include definition of enhancements in CSS-Wx as well as continued International coordination of aviation weather products.

## **NextGen Pre-Implementation**

NextGen includes pre-implementation activities that are conducted through several investment portfolios. These portfolios include Separation Management, Traffic Flow Management, NSA Infrastructure, On Demand NAS Information and Enterprise Concept Development which directly support the work efforts within each major program. Portfolio activities include the mission shortfall validation, initial investment analyses, pre-acquisition engineering, human-in-the-loop simulations and demonstrations. Future TBO stages are planned as a part of the pre-implementation activities.

## **Unmanned Aircraft Systems (UAS) Integration**

Pre-implementation activities include those to integrate UASs in airspace system operations. Over the past several years, the FAA has been highly engaged in the safe and efficient integration of UAS in the NAS, regardless of whether the operations are

recreational or commercial in nature. NextGen is involved in multiple areas of research and collaboration with other government agencies (e.g., National Aeronautics and Space Administration, Department of Homeland Security), industry, international partners to accomplish this goal. FY 2021 activities include completing UAS shortfall analyses and generating operational requirements for a Concept and Requirements Definition Readiness Decision for UAS integration. Other activities include the development of a proposal for an Unmanned Traffic Management system in support of small UASs.

### **Industry Partnership and Commitments**

The FAA and the aviation industry work together through the NAC to identify high-benefit, high-readiness NextGen capabilities for implementation in the near term. In 2014, this government/industry partnership identified four focus areas: Multiple Runway Operations, PBN, Surface Operations and Data Sharing and Data Comm. The FAA and industry monitor progress against these commitments through the NAC and jointly agree to adjust commitments to better suit the airspace system's needs. The FAA and the NAC are working together to define future stages of TBO and how to better serve the Northeast Corridor, which encompasses the area from Washington D.C. to Boston, Massachusetts, initiative with improved technology and procedures.



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

**Next Generation Air Transportation System (NextGen)  
Budget Narrative Reference Guide  
NextGen Index of Programs**

Specific funding and program requirements can be found as indicated below in Table 2.

		<b>Amount (\$M)</b>	<b>Page</b>
	<b>Facilities and Equipment (F&amp;E)</b>		<b>Section 3B</b>
1A04	NextGen – Separation Management Portfolio	\$21.2	30
1A05	NextGen – Traffic Flow Management Portfolio	\$8.0	34
1A06	NextGen – On Demand NAS Portfolio	\$10.5	37
1A07	NextGen – NAS Infrastructure Portfolio	\$15.0	40
1A08	NextGen – Support Portfolio	\$8.4	43
1A09	NextGen – Unmanned Aircraft System (UAS)	\$22.0	45
1A10	Enterprise, Concept Development, Human Factors and Demonstration Portfolio	\$15.0	48
2A01	En Route Automation Modernization System Enhancements and Technology Refresh	\$66.9	51
2A09	System-Wide Information Management (SWIM)	\$31.1	69
2A10	ADS-B NAS Wide Implementation (ADS-B)	\$170.0	71
2A12	Air Traffic Management Implementation Portfolio	\$56.0	76
2A13	Time Based Flow Management (TBFM) Portfolio	\$16.3	79
2A14	Next Generation Weather Processor (NWP)	\$24.3	82
2A16	Data Communications in Support of NextGen	\$99.8	86
2A17	Reduced Oceanic Separation	\$10.5	90
2B07	Terminal Flight Data Manager (TFDM)	\$79.1	110
2B08	Performance Based Navigation (PBN) Support Portfolio	\$8.0	114
2B09	Unmanned Aircraft Systems (UAS) Implementation	\$26.6	116
2B13	Implementation of Flight Objects Exchange Enterprise (FOXs) and EIM Cloud	\$10.5	129
3A09	NextGen – System Safety Management Portfolio	\$21.5	205
4A09	Aeronautical Information Management Program (AIM)	\$7.5	240
5A01	Personnel and Related Expenses - NextGen Staffing	\$72.9	242
	<b>Total, Facilities and Equipment</b>	<b>\$800.9</b>	
	<b>Research, Engineering, and Development</b>		<b>Section 3C</b>
A.k	Unmanned Aircraft Systems Research	\$24.0	49
A.n	NextGen – Wake Turbulence	\$3.7	59
A.o	NextGen – Air/Ground Integration Human Factors	\$6.8	62
A.p	NextGen – Weather Technology in the Cockpit	\$2.0	66
A.q	Information/Cyber Security	\$4.8	69
A.r	NextGen - Flight Deck Data Exchange Requirements	\$1.0	72
A.t	NextGen – Environmental Research, Aircraft Technologies and Fuels	\$27.0	79
	<b>Total, Research, Engineering, and Development</b>	<b>\$69.3</b>	
	<b>Operations</b>		<b>Section 3A</b>
	NextGen Staffing	\$39.9	ANG/ATO
	NextGen Unmanned Aircraft Systems	\$65.3	ANG/ATO
	Performance Based Navigation (PBN) Metroplex Activities	\$21.1	ANG/ATO
	<b>Total, Operations</b>	<b>\$126.3</b>	
	<b>Total, NextGen Programs</b>	<b>\$996.5</b>	

(Totals may not add due to rounding)

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

[This page intentionally left blank]



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Federal Aviation Administration  
Abbreviated National Airspace System Capital Investment Plan  
for Fiscal Years 2021–2025**

**Background**

The Further Consolidated Appropriations Act, 2020 became Public Law 116-94 on December 20, 2019 and provides the appropriation amounts and other direction for the Federal Aviation Administration within DIVISION H — TRANSPORTATION, HOUSING AND URBAN DEVELOPMENT, AND RELATED AGENCIES APPROPRIATIONS ACT, 2020 under Title I—Department of Transportation. For FAA's Facilities and Equipment (F&E) appropriation, the following direction was provided regarding the Five Year Capital Investment Plan for the National Airspace System:

*Provided further, That no later than 60 days after the submission of the budget request, the Secretary of Transportation shall transmit to the Congress an investment plan for the Federal Aviation Administration which includes funding for each budget line item for fiscal years 2021 through 2025, with total funding for each year of the plan constrained to the funding targets for those years as estimated and approved by the Office of Management and Budget.*

To comply with the Congressional direction above, this Abbreviated National Airspace System (NAS) Capital Investment Plan (CIP) for Fiscal Years (FY) 2021-2025 has been included within the FAA's FY 2021 President's Budget.

**Summary**

The Abbreviated five-year NAS CIP fulfills the Secretary's commitment, complies with the language in the Further Consolidated Appropriations Act, 2020, and addresses the following topics:

- Strategic Goals and the CIP;
- Important Factors Affecting Planning for the Future and Key Considerations in Capital Planning;
- Next Generation Air Transportation System (NextGen), NAS Modernization, and Sustaining Systems and Infrastructure;
- Five-year F&E funding table by budget line item for FY 2021 through FY 2025; and
- Information for Major Capital Programs.

**Strategic Goals and the CIP**

FAA's capital programs are aligned and contribute to the four strategic goals in the Department of Transportation's (DOT) 2018 Strategic Plan. The four DOT Strategic Goals for the capital programs are:

- **SAFETY: Reduce Transportation-Related Fatalities and Serious Injuries Across the Transportation System.**
  - Safety has consistently been DOT's top strategic and organizational goal. To improve transportation safety, DOT seeks to work effectively with State, local, Tribal, and private partners; address human behaviors to reduce safety risks; improve safety data analysis to guide decisions; continue to employ safety countermeasures; ensure that automation brings significant safety benefits; and pursue performance-based rather than prescriptive regulations.
- **INFRASTRUCTURE: Invest in Infrastructure to Ensure Safety, Mobility and Accessibility and to Stimulate Economic Growth, Productivity and Competitiveness for American Workers and Businesses.**
  - DOT seeks to work effectively with State, local, Tribal, and private partners to guide investments that stimulate economic growth, improve the condition of transportation infrastructure, and enable the efficient and safe movement of people and goods.
- **INNOVATION: Lead in the Development and Deployment of Innovative Practices and Technologies that Improve the Safety and Performance of the Nation's Transportation System.**
  - Emerging technologies are transforming our transportation system. DOT seeks to continue its leadership role guiding research investments and facilitating the deployment of beneficial transportation technologies. By engaging with the private and public sectors, DOT can leverage Federal resources to support technology transfer and ensure the safety and security of new technologies.
- **ACCOUNTABILITY: Serve the Nation with Reduced Regulatory Burden and Greater Efficiency, Effectiveness and Accountability.**
  - DOT will streamline regulations and improve organizational effectiveness of the Department. DOT will raise accountability standards that improve the efficient use of taxpayer funds. By streamlining business processes and investing in workforce development, DOT will enhance its responsiveness and adaptability to the demands of a rapidly evolving industry.

### **Important Factors Affecting Planning for the Future**

Access to a reliable worldwide aviation network is essential to the health of the U.S. economy. Both domestic and international commerce rely heavily on ready access to aviation services for carrying passengers and freight to the cities around the world, which helps to sustain economic growth. According to the most recent available study on *The Economic Impact of Civil Aviation*

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

on the U.S. Economy<sup>1</sup>, economic activity attributed to civil aviation-related goods and services during 2014 totaled \$1.6 trillion, generating 10.6 million jobs, and \$447 billion in earnings. In total, U.S. aviation contributed 5.1 percent to the U.S. Gross Domestic Product. Other aviation related economic activity highlighted in the November 2016 report includes:

- Air carriers operating in U.S. airspace transported 871.8 million passengers with over 1,230.8 billion revenue passenger miles.
- In support of commercial activities, more than 64.1 billion revenue ton-miles of freight passed through U.S. airports.
- It is estimated that commercial airline operations enabled \$310 billion of visitor expenditures on goods and services.
- Civil aircraft manufacturing, a top U.S. net exporter, had a positive trade balance of \$59.9 billion.

### **Key Considerations in Capital Planning**

The development of the CIP requires significant time to plan, define, and prioritize expected program outcomes for review and approval by decision makers. Maintaining a balanced portfolio of FAA's capital investments is critical to the long-term sustainment and modernization of the NAS to meet projected demand, deliver new services and capabilities, and improve system safety and efficiency. Program offices and sponsors must develop a business case to justify the need for the program, define the technical approach and requirements, develop a lifecycle cost and schedule estimate, and identify interdependencies with other programs.

In accordance with FAA's Acquisition Management System, proposed capital investments are presented to the Joint Resources Council for review and approval to initiate the program. Once approved, a program will enter the investment analysis process, be added to the Enterprise Architecture and the CIP, and be included in the President's Budget to request funds from Congress. Once funds are appropriated, program offices must then manage risk during program execution to deliver planned outcomes on schedule and on budget. In addition, new systems or capabilities must demonstrate compliance with all applicable FAA reliability and safety standards before receiving final approval to operate in the NAS.

Addressing real-time changes in air traffic demand and anticipated future growth may require increases in NAS safety, capacity, efficiency, reliability, and system flexibility. Other variables affecting capital planning include periodic changes in economic conditions, scheduled expansion projects at major airports, and ongoing sustainment needs for mission critical Air Traffic Control (ATC) systems, facilities, and other NAS infrastructure. By statute, each year of the CIP must

---

<sup>1</sup> Sources: Air Traffic Organization, Office of Performance Analysis, "The Impact of Civil Aviation on the U.S. Economy," November 2016; Matthew Russell, "Economic Productivity in the Air Transportation Industry: Multifactor and Labor Productivity Trends, 1990-2014," *Monthly Labor Review*, March 2017.

balance to the most recent F&E funding target for that year as issued to FAA by the Office of Management and Budget. In the CIP development process, the FAA allocates funding to capital programs to support the implementation of operational changes for NextGen, programs sustaining and modernizing current NAS systems and infrastructure, and mission support. This approach to planning ensures that current NAS performance and safety standards are maintained or improved.

### **NextGen, NAS Modernization, and Sustaining Systems and Infrastructure**

The air traffic control infrastructure is a complex system made up of several thousand components that control air traffic approaching, landing, and departing from airports. ATC infrastructure includes 21 Air Route Traffic Control Centers housing the automation equipment used by air traffic controllers to control en route air traffic, over 500 Air Traffic Control Towers, and over 150 Terminal Radar Approach Control facilities. This daily flow of air traffic is dependent upon several hundred surveillance and weather radars, navigation systems for en route and airport approach guidance, and thousands of radios that allow pilots and air traffic controllers to stay in contact during all phases of an aircraft's flight.

The air traffic control system requires automation, communication, navigation, surveillance, and weather systems to maintain safe separation of aircraft operating in controlled airspace and on the airport surface. Each of these systems has a high degree of redundancy to support system reliability and availability to minimize the risk of service disruptions. Before these systems reach the end of their service life, planning for their replacement must be well underway to reduce the risk of performance degradation or outages in the event that replacement parts become obsolete or are otherwise difficult to obtain.

NextGen is implementing operational improvements to ensure the NAS is prepared to meet future capacity, safety, and environmental requirements and is supported by many capital programs. Operationalizing NextGen will provide greater access and flexibility for users to choose route options that best meet their needs. By combining new technologies for surveillance, navigation, weather, and communications with automation system enhancements, workforce training, procedural changes, and airfield development, NextGen is fundamentally changing the way air traffic is managed.

Key investments include:

- **En Route Automation** – The En Route Automation Modernization (ERAM) Enhancements include improvements to trajectory modeling, increased conflict detection and resolution capabilities to support separation management, and expanding the automated coordination of flight data and aircraft control with the Canadian Air Navigation Service Provider (BLI 2A01);
- **System Wide Information Management (SWIM)** – SWIM Segment 2B completes the implementation of the SWIM Terminal Data Distribution System (STDDS) that provides access to terminal-related data. STDDS implements track and flight plan data, real-time

status/alerts from tower and airport systems, and other system enhancements in standard formats utilizing the SWIM infrastructure (BLI 2A09);

- **Automatic Dependent Surveillance – Broadcast (ADS-B) NAS Wide Implementation (ADS-B)** – The program will sustain baseline services and applications, including continuing leased ADS-B services, and implement mitigations for spectrum congestion (BLI 2A10);
- **Air Traffic Management Implementation Portfolio** – Traffic Flow Management System (TFMS) Enhancement 4 will implement Improved Demand Prediction, which is a set of enhancements aimed at improving the TFMS demand predictions of NAS resources. The program will also implement Integrated Departure Route Planning (IDRP), which is a tool that provides strategic/tactical forecasts of departure route and fix status due to convective weather and traffic volume for specific terminals. IDRP also provides traffic managers with a semi-automated resolution algorithm to “solve” departure constraints (BLI 2A12);
- **Time Based Flow Management (TBFM)** – TBFM Enhancement 1 will implement Terminal Sequencing and Spacing to provide efficient sequencing and runway assignment by making the metering plan visible to terminal Air Traffic Control and extending time-based metering to the runway (BLI 2A13);
- **NextGen Weather Processor (NWP)** – NWP will establish a common weather processing platform which use sophisticated algorithms to create high-quality, aviation-specific current, and predicted weather information (BLI 2A14);
- **Data Communications in support of NextGen** – Data Comm provides data link communications services between the controller and pilot. Data Comm Initial En Route Services includes transfer of communication/initial check-in, airborne reroutes, altimeter settings and altitudes, initial controller initiated reroutes, initial speeds, initial direct-to-fix messages, and initial crossing restrictions. Data Comm Full En Route Services includes full controller initiated reroutes, full crossing restrictions, full direct-to-fix, full speeds, advisory messages, and holding instructions (BLI 2A16);
- **Commercial Space Integration** – The Space Data Integrator program will deploy an operational prototype, known as the Minimal Viable Product (MVP), to ingest real-time space vehicle information from Launch/Reentry Operators and display it for operational use. The MVP will move the FAA from manual to automatic data exchange to produce hazard areas for the Office of Commercial Space Transportation. (BLI 2A19);
- **Terminal Automation** – Older Standard Terminal Automation Replacement Systems have reached their end-of-life and key components must be replaced to maintain the operation of the systems (BLI 2B01);



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

- **Terminal Flight Data Manager (TFDM)** – Will automate manual flight data processes to enable enhanced data sharing between the Tower, En Route, Approach Control, Traffic Flow Management, and Flight/Airline Operations Centers. The program will implement Electronic Flight Data exchange and Electronic Flight Strips in the tower to replace printed flight strips. The program will also implement enhanced traffic flow management data integration with Time Based Flow Management and Traffic Flow Management System to enable airlines, controllers, and airports to share and exchange real-time data (BLI 2B07);
- **Unmanned Aircraft Systems (UAS)** – The FAA DroneZone is a cloud-based Information Technology platform which hosts several Beta applications that provide the supporting infrastructure to improve the user experience of public interactions and increases the efficiency of internal business processes required for the operation of sUAS. Under the Small UAS Implementation program, the Low Altitude Authorization and Notification Capability supports collaboration between the FAA and private UAS Service Suppliers to automate the FAA's ability to grant authorizations to Title 14 CFR Part 107 operators, and allows Recreational Flyers to obtain authorization to fly in controlled airspace (BLI 2B09);
- **Terminal and En Route Surveillance Portfolio** – Sustainment of en route and terminal radars will require upgrade or replacement of older unsupportable components and systems (BLI 2B11);
- **Terminal and En Route Voice Switch and Recorder Portfolio** – The Terminal Voice Switch Sustainment 2 program replaces and sustains obsolete voice switches in Tower and Terminal Radar Approach Control facilities. The Voice Switching and Control System Sustainment 4 program will design and install replacement components to ensure continued operation of aging en route voice switching equipment. The NAS Voice Recorder program will replace the aging digital voice recorders and provide improved digital voice recording functionality to meet new validated safety and audit requirements (BLI 2B12);
- **Navigation/Landing** – The Wide Area Augmentation System program will design and develop enhancements to support the implementation of Dual Frequency Operations and continue to develop Localizer Performance with Vertical guidance/Localizer Performance approach procedures for all remaining qualified runways. Aging Instrument Landing Systems, Navaids, and visual Navaids will be replaced if systems become unsupportable due to parts obsolescence (BLI 2D02 and 2D04); and
- **Aeronautical Information Management (AIM) Programs** – AIM provides digital aeronautical information to NAS users. Future AIM Enhancements will incorporate additional types of aeronautical information in a digital format for machine-to-machine exchange with NAS automation systems (BLI 4A09).

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

---

**Conclusion**

The FAA's FY 2021-2025 CIP provides a balanced portfolio of capital programs for the modernization and sustainment of systems and critical NAS infrastructure, integration of UAS operations into the NAS, and the operationalization of NextGen.

**Estimated Funding by Budget Line Item (dollars in Millions)**

The following table shows funding by BLI with dollars in millions for the capital programs in the FY 2021 to FY 2025 time frame. The FY 2021 funding amounts in this table are consistent with this budget submission. The FY 2022 through FY 2025 total year funds are constrained to the F&E targets issued by the Office of Management and Budget.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

BLI Number	Capital Budget Line Item (BLI) Program	FY 2021 Budget	FY 2022 Est.	FY 2023 Est.	FY 2024 Est.	FY 2025 Est.
	<b>Activity 1: Engineering, Development, Test and Evaluation</b>	<b>\$153.60</b>	<b>\$172.60</b>	<b>\$170.10</b>	<b>\$167.20</b>	<b>\$159.60</b>
1A01	Advanced Technology Development and Prototyping (ATDP)	\$26.60	\$31.70	\$30.70	\$32.70	\$32.70
1A02	William J. Hughes Technical Center Laboratory Sustainment	\$16.90	\$16.90	\$16.90	\$16.90	\$16.90
1A03	William J. Hughes Technical Center Infrastructure Sustainment	\$10.00	\$10.00	\$10.00	\$10.00	\$10.00
1A04	NextGen – Separation Management Portfolio	\$21.20	\$27.50	\$29.50	\$23.70	\$18.00
1A05	NextGen – Traffic Flow Management (TFM) Portfolio	\$8.00	\$10.00	\$10.00	\$10.00	\$9.00
1A06	NextGen – On Demand NAS Portfolio	\$10.50	\$10.00	\$7.50	\$7.50	\$10.00
1A07	NextGen – NAS Infrastructure Portfolio	\$15.00	\$14.50	\$14.50	\$14.40	\$14.50
1A08	NextGen – Support Portfolio	\$8.40	\$10.00	\$10.00	\$10.00	\$11.00
1A09	NextGen – Unmanned Aircraft Systems (UAS)	\$22.00	\$27.00	\$26.00	\$27.00	\$24.00
1A10	NextGen – Enterprise, Concept Development, Human Factors, and Demonstrations Portfolio	\$15.00	\$15.00	\$15.00	\$15.00	\$13.50
	<b>Activity 2: Procurement and Modernization of Air Traffic Control Facilities and Equipment</b>	<b>\$1,794.10</b>	<b>\$1,802.70</b>	<b>\$1,833.50</b>	<b>\$1,840.70</b>	<b>\$1,855.50</b>
	<b>A. En Route Programs</b>	<b>\$667.00</b>	<b>\$687.00</b>	<b>\$667.00</b>	<b>\$618.70</b>	<b>\$620.20</b>
2A01	NextGen – En Route Automation Modernization (ERAM) – System Enhancements and Technology Refresh	\$66.90	\$104.40	\$110.30	\$79.50	\$85.60
2A02	En Route Communications Gateway (ECG)	\$2.35	\$0.00	\$0.00	\$0.00	\$0.00
2A03	Next Generation Weather Radar (NEXRAD)	\$3.60	\$5.40	\$7.50	\$7.50	\$5.60
2A04	Air Route Traffic Control Center (ARTCC) and Combined Control Facility (CCF) Building Sustainment	\$101.20	\$101.50	\$96.50	\$99.50	\$107.50
2A05	Air/Ground Communications Infrastructure	\$7.85	\$8.20	\$8.20	\$7.20	\$7.20
2A06	Air Traffic Control En Route Radar Facilities Improvements	\$7.50	\$6.20	\$6.20	\$6.20	\$6.20
2A07	Oceanic Automation System	\$9.15	\$10.00	\$11.90	\$17.90	\$16.20
2A08	Next Generation Very High Frequency Air/Ground Communications System	\$40.00	\$50.00	\$50.00	\$43.50	\$20.60
2A09	NextGen – System-Wide Information Management (SWIM)	\$31.05	\$21.40	\$12.00	\$13.60	\$15.00
2A10	NextGen – Automatic Dependent Surveillance - Broadcast (ADS-B) NAS Wide Implementation	\$170.00	\$167.60	\$186.20	\$172.40	\$171.50
2A11	Wind Shear Detection Service (WSDS)	\$2.50	\$3.00	\$2.00	\$0.00	\$0.00
2A12	NextGen – Air Traffic Management Implementation Portfolio	\$56.00	\$51.60	\$40.20	\$32.70	\$32.90
2A13	NextGen – Time Based Flow Management (TBFM) Portfolio	\$16.25	\$12.90	\$11.60	\$25.00	\$26.40

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

BLI Number	Capital Budget Line Item (BLI) Program	FY 2021 Budget	FY 2022 Est.	FY 2023 Est.	FY 2024 Est.	FY 2025 Est.
2A14	NextGen – Next Generation Weather Processor (NWP)	\$24.30	\$16.00	\$12.00	\$21.00	\$20.00
2A15	Airborne Collision Avoidance System X (ACAS X)	\$5.10	\$0.00	\$0.00	\$0.00	\$1.70
2A16	NextGen – Data Communication in support of NextGen	\$99.80	\$103.80	\$89.40	\$73.70	\$78.80
2A17	NextGen – Reduced Oceanic Separation	\$10.45	\$7.00	\$7.00	\$7.00	\$5.00
2A18	En Route Improvements	\$2.00	\$2.00	\$2.00	\$2.00	\$2.00
2A19	Commercial Space Integration	\$11.00	\$16.00	\$14.00	\$10.00	\$18.00
	<b>B. Terminal Programs</b>	<b>\$553.80</b>	<b>\$546.80</b>	<b>\$588.40</b>	<b>\$637.60</b>	<b>\$653.80</b>
2B01	Standard Terminal Automation Replacement System (STARS)	\$74.90	\$48.40	\$54.00	\$58.00	\$73.00
2B02	Terminal Automation Program	\$3.90	\$4.00	\$5.00	\$5.10	\$5.10
2B03	Terminal Air Traffic Control Facilities – Replace	\$55.00	\$82.00	\$95.00	\$100.00	\$100.00
2B04	Air Traffic Control Tower (ATCT)/Terminal Radar Approach Control (TRACON) Facilities – Improve	\$84.60	\$76.00	\$71.00	\$73.34	\$77.70
2B05	NAS Facilities Occupational Safety and Health Administration (OSHA) and Environmental Standards Compliance	\$28.90	\$42.00	\$42.00	\$42.00	\$42.00
2B06	Integrated Display System (IDS)	\$30.00	\$40.00	\$45.00	\$55.00	\$44.60
2B07	NextGen – Terminal Flight Data Manager (TFDM)	\$79.05	\$47.90	\$39.40	\$35.80	\$45.60
2B08	NextGen – Performance Based Navigation (PBN) Support Portfolio	\$8.00	\$8.00	\$8.00	\$9.70	\$9.50
2B09	NextGen – Unmanned Aircraft Systems (UAS) Implementation	\$26.60	\$31.30	\$25.00	\$10.00	\$10.00
2B10	Surface Surveillance Portfolio Sustain 1	\$30.35	\$25.00	\$27.00	\$21.00	\$20.00
2B11	Terminal and En Route Surveillance Portfolio	\$78.60	\$55.40	\$80.50	\$101.86	\$88.10
2B12	Terminal and En Route Voice Switch and Recorder Portfolio	\$43.40	\$73.20	\$83.50	\$98.40	\$111.20
2B13	NextGen – Enterprise Information Platform	\$10.50	\$13.60	\$13.00	\$27.40	\$27.00
	<b>C. Flight Service Programs</b>	<b>\$26.45</b>	<b>\$17.40</b>	<b>\$13.20</b>	<b>\$12.70</b>	<b>\$11.70</b>
2C01	Aviation Surface Weather Observation System	\$5.00	\$11.00	\$10.00	\$9.00	\$8.00
2C02	Future Flight Services Program (FFSP)	\$17.80	\$3.00	\$0.00	\$0.00	\$0.00
2C03	Alaska Flight Service Facility Modernization (AFSFM)					
2C04	Juneau Airport Wind System (JAWS) – Technology Refresh	\$1.00	\$0.70	\$0.50	\$2.70	\$1.00

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

BLI Number	Capital Budget Line Item (BLI) Program	FY 2021 Budget	FY 2022 Est.	FY 2023 Est.	FY 2024 Est.	FY 2025 Est.
	<b>D. Landing and Navigation Aids Programs</b>	<b>\$183.65</b>	<b>\$181.80</b>	<b>\$180.30</b>	<b>\$189.60</b>	<b>\$186.20</b>
2D01	VHF Omnidirectional Radio Range (VOR) Minimum Operating Network (MON)	\$19.00	\$19.40	\$19.40	\$19.40	\$14.80
2D02	Wide Area Augmentation System (WAAS) for GPS	\$83.90	\$91.50	\$91.80	\$92.10	\$97.30
2D03	Runway Safety Areas (RSA) – Navigational Mitigation	\$1.80	\$0.80	\$0.00	\$0.00	\$0.00
2D04	Landing and Lighting Portfolio	\$68.95	\$62.10	\$59.10	\$68.10	\$64.10
2D05	Distance Measuring Equipment (DME), VHF Omni-Directional Range (VOR), Tactical Air Navigation (TACAN) (DVT) Portfolio	\$10.00	\$8.00	\$10.00	\$10.00	\$10.00
	<b>E. Other ATC Facilities Programs</b>	<b>\$363.20</b>	<b>\$369.70</b>	<b>\$384.60</b>	<b>\$382.10</b>	<b>\$383.60</b>
2E01	Fuel Storage Tank Replacement and Management	\$32.40	\$33.00	\$28.00	\$32.00	\$32.00
2E02	Unstaffed Infrastructure Sustainment (UIS)	\$60.20	\$56.50	\$56.50	\$52.50	\$52.50
2E03	Aircraft Replacement and Related Equipment Program	\$36.10	\$33.10	\$44.10	\$44.10	\$44.10
2E04	Airport Cable Loop Systems – Sustained Support	\$9.00	\$10.00	\$10.00	\$10.00	\$10.00
2E05	Alaskan Satellite Telecommunication Infrastructure (ASTI)	\$1.00	\$0.00	\$0.00	\$0.00	\$0.00
2E06	Real Property Disposition	\$4.80	\$10.00	\$10.00	\$10.00	\$10.00
2E07	Electrical Power Systems – Sustain/Support	\$149.40	\$145.00	\$150.00	\$150.00	\$155.00
2E08	Energy Management and Compliance (EMC)	\$7.40	\$3.00	\$5.00	\$5.00	\$4.00
2E09	Child Care Center Sustainment	\$1.00	\$1.00	\$1.00	\$1.00	\$1.00
2E10	FAA Enterprise Network Services (FENS)	\$34.70	\$47.00	\$52.00	\$54.00	\$45.00
2E11	National Airspace System Risk and Performance Portfolio	\$15.90	\$12.60	\$9.50	\$4.50	\$6.00
2E12	Time-Division Multiplexing to Internet Protocol (TDM-to-IP) Migration	\$11.30	\$15.00	\$15.00	\$15.00	\$20.00
2E13X	Independent Operational Assessment	\$0.00	\$3.50	\$3.50	\$4.00	\$4.00
	<b>Activity 3: Non-Air Traffic Control Facilities and Equipment</b>	<b>\$264.60</b>	<b>\$238.20</b>	<b>\$211.40</b>	<b>\$194.70</b>	<b>\$173.00</b>
	<b>A. Support Programs</b>	<b>\$249.60</b>	<b>\$223.20</b>	<b>\$196.40</b>	<b>\$179.70</b>	<b>\$158.00</b>
3A01	Hazardous Materials Management	\$27.50	\$31.00	\$31.00	\$31.00	\$31.00
3A02	Aviation Safety Analysis System (ASAS)	\$23.50	\$22.00	\$19.10	\$20.00	\$20.00
3A03	National Airspace System Recovery Communications (RCOM)	\$12.00	\$12.00	\$12.00	\$12.00	\$12.00
3A04	Facility Security Risk Management	\$24.40	\$20.10	\$22.00	\$22.00	\$22.00
3A05	Information Security	\$18.50	\$18.20	\$17.00	\$17.00	\$12.00
3A06	System Approach for Safety Oversight (SASO)	\$29.20	\$35.40	\$35.00	\$32.00	\$23.00

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

BLI Number	Capital Budget Line Item (BLI) Program	FY 2021 Budget	FY 2022 Est.	FY 2023 Est.	FY 2024 Est.	FY 2025 Est.
3A07	Aviation Safety Knowledge Management Environment (ASKME)	\$9.70	\$9.80	\$12.00	\$0.00	\$0.00
3A08	Aerospace Medical Equipment Needs (AMEN)	\$28.30	\$6.90	\$2.30	\$0.10	\$0.00
3A09	NextGen – System Safety Management Portfolio	\$21.50	\$15.00	\$15.00	\$15.00	\$15.00
3A10	National Test Equipment Program	\$3.00	\$3.00	\$3.00	\$3.00	\$3.00
3A11	Mobile Assets Management Program	\$2.50	\$2.00	\$2.00	\$2.00	\$0.00
3A12	Aerospace Medicine Safety Information System (AMSIS)	\$20.20	\$21.10	\$11.50	\$9.80	\$10.00
3A13	Configuration, Logistics, and Maintenance Resource Solutions (CLMRS)	\$29.30	\$26.70	\$14.50	\$15.80	\$10.00
	<b>B. Training, Equipment and Facilities</b>	<b>\$15.00</b>	<b>\$15.00</b>	<b>\$15.00</b>	<b>\$15.00</b>	<b>\$15.00</b>
3B01	Aeronautical Center Infrastructure Sustainment	\$14.00	\$14.00	\$14.00	\$14.00	\$14.00
3B02	Distance Learning	\$1.00	\$1.00	\$1.00	\$1.00	\$1.00
	<b>Activity 4: Facilities and Equipment Mission Support</b>	<b>\$237.70</b>	<b>\$236.50</b>	<b>\$234.00</b>	<b>\$239.40</b>	<b>\$247.90</b>
4A01	System Engineering and Development Support	\$39.10	\$38.00	\$38.00	\$38.00	\$38.00
4A02	Program Support Leases	\$48.00	\$48.00	\$45.00	\$45.00	\$45.00
4A03	Logistics and Acquisition Support Services	\$12.00	\$12.00	\$12.00	\$12.00	\$12.00
4A04	Mike Monroney Aeronautical Center Lease	\$21.10	\$21.50	\$22.00	\$22.40	\$22.90
4A05	Transition Engineering Support	\$17.00	\$19.00	\$19.00	\$19.00	\$19.00
4A06	Technical Support Services Contract (TSSC)	\$28.00	\$28.00	\$28.00	\$28.00	\$28.00
4A07	Resource Tracking Program (RTP)	\$8.00	\$8.00	\$8.00	\$8.00	\$8.00
4A08	Center for Advanced Aviation System Development (CAASD)	\$57.00	\$57.00	\$57.00	\$57.00	\$57.00
4A09	NextGen – Aeronautical Information Management Program	\$7.50	\$5.00	\$5.00	\$10.00	\$18.00
	<b>Activity 5: Personnel Compensation, Benefits and Travel</b>	<b>\$550.00</b>	<b>\$550.00</b>	<b>\$551.00</b>	<b>\$558.00</b>	<b>\$564.00</b>
5A01	Personnel and Related Expenses	\$550.00	\$550.00	\$551.00	\$558.00	\$564.00
	Note: BLI numbers with X represent outyear programs not requested in the FY 2021 President's Budget.					
	<div> <div>Total Year Funding</div> <div>\$3,000.00</div> </div> <div> <div>\$3,000.00</div> <div>\$3,000.00</div> </div> <div> <div>\$3,000.00</div> <div>\$3,000.00</div> </div> <div> <div>\$3,000.00</div> <div>\$3,000.00</div> </div> <div> <div>\$3,000.00</div> <div>\$3,000.00</div> </div> <div> <div>\$3,000.00</div> <div>\$3,000.00</div> </div>					
	<div> <div>Targets</div> <div>\$3,000.00</div> </div> <div> <div>\$3,000.00</div> <div>\$3,000.00</div> </div> <div> <div>\$3,000.00</div> <div>\$3,000.00</div> </div> <div> <div>\$3,000.00</div> <div>\$3,000.00</div> </div> <div> <div>\$3,000.00</div> <div>\$3,000.00</div> </div> <div> <div>\$3,000.00</div> <div>\$3,000.00</div> </div>					

## **Information for Major Capital Programs**

Due to the criticality of on-budget and on-time acquisitions to support the efficient transition to NextGen, the Government Accountability Office (GAO) was directed to determine the status of Air Traffic Organization's performance in acquiring ATC systems.

In response to a prior GAO recommendation to identify regular reporting to Congress and the public on FAA's overall performance in acquiring ATC systems, the table below provides the most recent information on FAA's major capital programs.

FAA's major programs are typically programs defined as those classified as Acquisition Category (ACAT) 1, 2, 3, or are of strategic importance to the agency. These are typically programs with total F&E costs greater than \$100 million and/or those that have significant impact, complexity, risk, sensitivity, safety, or security issues. For more information on ACATs see: [http://fast.faa.gov/NFFCA\\_Acquisition\\_Categories.cfm](http://fast.faa.gov/NFFCA_Acquisition_Categories.cfm)

Programs that have completed their acquisition phase since the last publication of the CIP appear on the final page of this section, Major Programs with Completed or Cancelled acquisition phase, but will not be shown in subsequent years.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

**FAA Capital Programs  
Current Information for Major Programs**

Programs	Original Baseline			Rebaseline			Current Estimate*		Comments
	Original APB Date	Completion Date	Budget \$M	Rebaseline e-APB Date	Revised Completion Date	Revised Budget \$M	Completion Date	Budget \$M	
Automatic Dependent Surveillance Broadcast (ADS-B) – Baseline Services & Applications ACAT 1 New Investment (NI)	May-12	Sep-20	\$960.4				Sep-20	\$987.2	<b>Current Estimate vs. Original Baseline:</b> The cost increase of \$26.8M (-2.8% variance) is associated with additional funds provided to support the General Aviation (GA) aircraft incentive program to address "key barriers" to ADS-B out equipage identified by the Equip 2020 team, changes to scope, and new requirements for Airport Surface Surveillance Capability (ASSC). <b>New Add</b>
Automatic Dependent Surveillance Broadcast (ADS-B) – Baseline Services Future Segments ACAT 1 NI	May-19	Jan-26	\$718.3				Jan-26	\$718.3	
Advanced Technologies and Oceanic Procedures (ATOP) Enhancement 1 ACAT 3 NI	Apr-19	May-25	\$81.7				May-25	\$81.7	<b>New Add</b>
Common Support Services Weather (CSS-Wx) ACAT 1	Mar-15	Aug-22	\$120.1				Sep-20	\$165.7	<b>Current Estimate vs Original Baseline:</b> The program is undergoing a replan. These estimates are preliminary and will be updated over the next year. The schedule delay of 25 months (-28.1% variance) and cost increase of \$45.6M (-38.0% variance) is associated with underestimating software development efforts, interface changes, integration issues, underestimated hardware requirements and platform changes, and vendor performance on development and test. Program Office is conducting alternative assessments and executing short term not to exceed tasking to resolve issues until Joint Resource Council Strategy Decision is provided.

\*Program impacted by the break in non-essential operations that occurred from December 22, 2018 to January 25, 2019. The current estimates provided in this table are as of January 2020.



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

**FAA Capital Programs  
Current Information for Major Programs**

Programs	Original Baseline			Rebaseline			Current Estimate*		Comments
	Original APB Date	Completion Date	Budget \$M	Rebaseline e-APB Date	Revised Completion Date	Revised Budget \$M	Completion Date	Budget \$M	
Data Communications (Data Comm) Segment 1, Phase 2 (S1P2), Full En Route Services* ACAT 1 NI	Aug-16	Dec-23	\$421.4				Dec-23	\$421.4	
Data Communications (Data Comm) Segment 1, Phase 2 (S1P2), Initial En Route Services* ACAT 1 NI	Oct-14	Feb-21	\$816.7				Sep-21	841.4	<b>Current Estimate vs Original Baseline:</b> The schedule delay of 7 months (-9.2% variance) and the cost increase of \$24.7M (-3.0% variance) is associated with the break in non-essential operations that occurred December 22, 2018 through January 25, 2019. Prior to the break, the program was projecting to complete the deployment ahead of the baseline schedule. The break caused all sites testing and training activities to stop. Air Traffic Controller training certification expired and require re-training. In addition, the original deployment schedule was carefully choreographed to deconflict with other on-going activities impacting the facilities. This deployment strategy was replanned and deconflicted with all other agency initiatives impacting the Air Route Traffic Control Centers (ARTCCs). Further, the lack of Air Traffic Organization (ATO) - Air Traffic Services (ATS) Subject Matter Expert availability and latent avionics defects also contributed to the schedule delay and cost increase.

\*Program impacted by the break in non-essential operations that occurred from December 22, 2018 to January 25, 2019. The current estimates provided in this table are as of January 2020.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

**FAA Capital Programs  
Current Information for Major Programs**

Programs	Original Baseline		Rebaseline		Current Estimate*		Comments
	Original APB Date	Completion Date	Budget \$M	Rebaseline e-APB Date	Revised Completion Date	Revised Budget \$M	
En Route Automation Modernization (ERAM) Enhancement 2 ACAT 1	Dec-16	Dec-23	\$253.6	Dec-18	Dec-24	\$192.9	<b>Rebaseline vs. Original Baseline:</b> The schedule delay of 12 months (-14.3% variance) is associated with budget uncertainty and reductions, technical changes, and adjusting priorities. The cost under run of \$60.7M (23.9% variance) is due to reduced scope as a result of a reprioritization of enhancements to include only mature capabilities validated through engineering and development activities.
ERAM Sustainment 2* ACAT 4 TR	Dec-16	Sep-20	\$279.2		Apr-21	\$279.2	<b>Current Estimate vs Original Baseline:</b> The schedule delay of 7 months (-15.6% variance) is associated with the break in non-essential operations that occurred December 22, 2018 through January 25, 2019. Prior to the break, the program projected to complete the baseline on schedule. Due to the lack of government oversight to perform required training reviews, Operational Evaluation testing, and key site transition coordination during the break in non-essential operations, the deployment waterfall was delayed. The program restarted coordination with the sites, the software test team, and prime contractor to replan program activities. The program renegotiated dates with each facility that already rescheduled site activities such as controller training and the year-end holiday moratorium. In addition, the program coordinated the updated waterfall with other FAA programs deploying to the ARTCCs.
ERAM Sustainment 3 ACAT 4 TR	Dec-19	Sep-26	\$332.9		Sep-26	\$332.9	New Add

\*Program impacted by the break in non-essential operations that occurred from December 22, 2018 to January 25, 2019. The current estimates provided in this table are as of January 2020.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

**FAA Capital Programs  
Current Information for Major Programs**

Programs	Original Baseline			Rebaseline			Current Estimate*		Comments
	Original APB Date	Completion Date	Budget \$M	Rebaseline e-APB Date	Revised Completion Date	Revised Budget \$M	Completion Date	Budget \$M	
Logistics Center Support System (LCSS) ACAT 2	Apr-10	Apr-14	\$67.4	Apr-14	Apr-16	\$79.4	Jan-22	\$132.0	Rebaseline vs. Original Baseline: The schedule delay of 24 months (-50% variance) and cost increase of \$12M (-17.8% variance) is associated with the following factors: 1) Business processes developed during the Business Process Reengineering (BPR) phase did not address system interactions between functional areas; 2) delays in developing interfaces with legacy systems; 3) complexity of the tool integration required for interfaces; and 4) changes in contract and program management. In Apr-14, the JRC approved a Baseline Change Decision (BCD) for LCSS.  Current Estimate vs Rebaseline: The program is working to validate the schedule and cost estimates. These estimates are preliminary and will be updated over the next year. The schedule delay of 69 months (-95.8% variance) and cost increase of \$52.6M (-66.2% variance) are associated with: 1) user and system requirements that were identified after the Initial Operational Capability (IOC) remain to be developed; 2) workarounds as a result of unmet requirements that did not have documentation to support the remaining development; 3) related work processes and system interfaces that were not fully defined or documented that resulted in additional requirements to be developed to meet user needs; and 4) efforts to stabilize defects found during initial production.
MODE S Beacon Replacement System (MSBRS) Phase 1A ACAT 4 TR	Nov-19	Apr-27	\$209.2				Apr-27	\$209.2	New Add

\*Program impacted by the break in non-essential operations that occurred from December 22, 2018 to January 25, 2019. The current estimates provided in this table are as of January 2020.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

**FAA Capital Programs  
Current Information for Major Programs**

Programs	Original Baseline		Rebaseline		Current Estimate*		Comments
	Original APB Date	Original Completion Date	Budget \$M	Rebaseline e-APB Date	Revised Completion Date	Revised Budget \$M	
NextGen Weather Processor (NWP) ACAT 1	Mar-15	Aug-22	\$189.3		Sep-24	\$210.5	<b>Current Estimate vs Original Baseline:</b> The schedule delay of 25 months (-28.1% variance) is associated with the CSS-Wx delays. NWP and CSS-Wx are highly integrated programs and NWP cannot go operational without CSS-Wx. The cost increase of \$21.2M (-11.2% variance) is associated with interface changes and underestimated Integrated Logistics Support Transition costs. In addition, prime contractor rate changed due to a corporate reorganization contributed to the cost variance. Program Office is conducting CSS-Wx alternative assessments. Joint Resource Council Strategy Decision will be provided to determine a path forward.
Next-Generation VHF/UHF Air to Ground Communication System (NEXCOM) Phase 2 ACAT 2 NI	Aug-17	Dec-26	\$334.2		Dec-26	\$334.2	
System Approach for Safety Oversight (SASO) Phase 3 ACAT 3 NI	Feb-16	May-23	\$135.7		May-23	\$135.7	
System Wide Information Management (SWIM) Segment 2B* ACAT 2	Oct-15	Sep-21	\$119.6		Sep-21	\$124.9	<b>Current Estimate vs. Original Baseline:</b> The cost increase of \$5.3M (-4.4% variance) is associated with under estimated costs for Transitioning to Operations & Maintenance (TOM) and additional costs for system development for SWIM capabilities partially impacted by the break in non-essential operations that occurred December 22, 2018 through January 25, 2019.

\*Program impacted by the break in non-essential operations that occurred from December 22, 2018 to January 25, 2019. The current estimates provided in this table are as of January 2020.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

**FAA Capital Programs  
Current Information for Major Programs**

Programs	Original Baseline			Rebaseline			Current Estimate*		Comments
	Original APB Date	Completion Date	Budget \$M	Rebaseline e-APB Date	Revised Completion Date	Revised Budget \$M	Completion Date	Budget \$M	
Standard Terminal Automation Replacement System (STARS) Sustainment 1* ACAT 2	Sep-12	Feb-20	\$531.5				Jul-20	\$531.5	Current Estimate vs. Original Baseline: The schedule delay of 5 months (-5.6% variance) is associated with the break in non-essential operations that occurred December 22, 2018 through January 25, 2019. Prior to the break, the program was projecting to complete on schedule. During the break, all equipment deliveries to the sites were stopped. Further, all pre-Initial Operational Capability (IOC) activities (controller training, dry runs, shutdown testing, etc.) at the sites stopped due to the lack of government oversight and support. The program restarted working with the remaining sites and prime contractor to replan program activities. The program renegotiated dates with each facility that required working around already scheduled site activities such as controller training and the year-end holiday moratorium. The program conducted a replan of the deployment waterfall for the remaining sites coordinating with all the internal and external stakeholders.
Standard Terminal Automation Replacement System (STARS) Sustainment 2 ACAT 4 TR	Sep-17	May-22	\$102.1				May-22	\$102.1	

\*Program impacted by the break in non-essential operations that occurred from December 22, 2018 to January 25, 2019. The current estimates provided in this table are as of January 2020.

## FAA Capital Programs Current Information for Major Programs

Programs	Original Baseline		Rebaseline		Current Estimate*		Comments
	Original APB Date	Completion Date	Budget \$M	Rebaselin e-APB Date	Revised Completion Date	Revised Budget \$M	
Terminal Automation Modernization Replacement (TAMR), Phase 4* ACAT 2	Sep-12	Aug-19	\$462.5				Current Estimate vs. Original Baseline: The schedule delay of 7 months (-8.4% variance) is associated with the break in non-essential operations that occurred December 22, 2018 through January 25, 2019. Prior to the break, the program was projecting to complete on schedule. During the break, all equipment deliveries to the sites were stopped. Further, all pre-Initial Operational Capability (IOC) activities (controller training, dry runs, shutdown testing, etc.) at the sites stopped due to the lack of government oversight and support. The program restarted working with the remaining sites and prime contractor to replan program activities. The program renegotiated dates with each facility that required working around already scheduled site activities such as controller training and the year-end holiday moratorium. The program conducted a replan of the deployment waterfall for the remaining sites coordinating with all the internal and external stakeholders. The cost increase of \$24.3M (-5.3% variance) is associated with the impact of higher prime contractor costs.

\*Program impacted by the break in non-essential operations that occurred from December 22, 2018 to January 25, 2019. The current estimates provided in this table are as of January 2020.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

**FAA Capital Programs  
Current Information for Major Programs**

Programs	Original Baseline			Rebaseline			Current Estimate*		Comments
	Original APB Date	Completion Date	Budget \$M	Rebaseline e-APB Date	Revised Completion Date	Revised Budget \$M	Completion Date	Budget \$M	
Terminal Flight Data Manager (TFDM)* ACAT 1 NI	Jun-16	Sep-28	\$795.2				Dec-28	\$805.10	<b>Current Estimate vs. Original Baseline:</b> The schedule delay of 3 months (-2.0% variance) and cost increase of \$9.9M (-1.2% variance) is associated with the break in non-essential operations that occurred December 22, 2018 through January 25, 2019. Prior to the break, the program was projecting to complete on schedule and on budget. During the break, all contract activities scheduled for the Development Test (DT) program requiring Government oversight were canceled. This resulted in a ripple effect to the schedule and delayed the overall deployment waterfall.
Time Based Flow Management (TBFM) Enhancement 1* ACAT 3 NI	Apr-15	Sep-22	\$188.3				Sep-23	\$195.3	<b>Current Estimate vs. Original Baseline:</b> The schedule delay of 12 months (-13.5% variance) is associated with the following: 1) A replan of the TBFM Enhancement 1 baseline to address high priority North East Corridor improvements; and 2) the break in non-essential operations that occurred December 22, 2018 through January 25, 2019. The cost increase of \$7.0M (-3.7% variance) is associated with funding to support design, development, and implementation of adaptations required for the expansion of TBFM into terminal areas or deeper integration across center boundaries.

\*Program impacted by the break in non-essential operations that occurred from December 22, 2018 to January 25, 2019. The current estimates provided in this table are as of January 2020.

**Federal Aviation Administration  
FY 2021 President's Budget Submission**

**FAA Capital Programs  
Current Information for Major Programs**

Programs	Original Baseline		Rebaseline		Current Estimate*		Comments
	Original APB Date	Original Completion Date	Budget \$M	Rebaseline e-APB Date	Revised Completion Date	Revised Budget \$M	
Traffic Flow Management System (TFMS) Enhancement 4* ACAT 3 NI	Jun-17	Sep-22	\$78.6				<p>Current Estimate vs. Original Baseline: The schedule delay of 14 months (-22.2% variance) is associated with the following: 1) Addressing near term issues related to the TFMS architecture and system stability has delayed the Impact Demand Prediction (IDP) planned enhancement; and 2) The break in non-essential operations that occurred December 22, 2018 through January 25, 2019. Work stopped due to lack of government oversight of the prime contractor's activities. The break disrupted the planned deployment of TFMS releases forcing the TFMS Enhancement 4 program to work deployment around the severe weather season and the year-end holiday moratorium. The cost increase of \$6.5M (-8.3% variance) is due to delaying the Impact Demand Prediction (IDP) enhancement in order to address near term issues related to the TFMS architecture and system stability.</p>

\*Program impacted by the break in non-essential operations that occurred from December 22, 2018 to January 25, 2019. The current estimates provided in this table are as of January 2020.



**Federal Aviation Administration  
FY 2021 President's Budget Submission**

Programs that have completed their acquisition phase since the last publication of the CIP appear below, Major Programs with Completed or Cancelled acquisition phase, and will not be shown in subsequent years.

<b>FAA Capital Programs Major Programs - Completed or Cancelled</b>									
Programs	Original Baseline		Rebaseline			Actual Results		Comments	
	Original APB Date	Completion Date	Budget \$M	Rebaseline APB Date	Revised Completion Date	Revised Budget \$M	Completion Date	Budget \$M	
Facility Security and Risk Management (FSRM) Sustainment 2 ACAT 2	Jun-11	Sep-22	\$182.5				Sep-19	\$142.4	<b>Actual Results vs. Original Baseline:</b> The program completed 36 months early (26.7% schedule variance) and \$40.1M under budget (22.0% cost variance). The positive variances are a result of the program's security requirement changes based on evolving security standards.
Wide Area Augmentation System (WAAS) Phase 4A ACAT 1	May-14	Sep-19	\$603.2				Jul-19	\$609.6	<b>Actual Results vs. Original Baseline:</b> The program completed 2 months early (3.1% schedule variance) and with a cost increase of \$6.4M (-1.1% cost variance). The cost variance is associated with additional funding provided in the FY18 appropriation which was used to accelerate Geostationary (GEO) 7 satellite activities in addition to the program funding NAV LEAN efforts.

The current estimates provided in this table are as of January 2020.