U.S. Department
of Transportation
**Federal Aviation
Administration**

Office of the Administrator

800 Independence Ave., S.W.
Washington, DC 20591

August 30, 2022

The Honorable Maria Cantwell
Chair, Committee on Commerce,
Science, and Transportation
United States Senate
Washington, DC 20510

Dear Chair Cantwell:

I am pleased to provide you with a report on the Federal Aviation Administration (FAA) Air Transportation Centers of Excellence (COE) program for Fiscal Year (FY) 2021 in accordance with Section 44513(f) of Title 49 *United States Code*.

Section 44513(f) requires the FAA to submit an annual report listing (1) the research projects that have been initiated by each center in the preceding year, (2) the amount of funding for each research project and the funding source, (3) the institutions participating in each research project and their shares of the overall funding for each research project, and (4) the level of cost-sharing for each research project. The enclosed report lists this information and also includes background information on each of the six active COEs.

A similar response has been sent to the Ranking Member of the Senate Committee on Commerce, Science, and Transportation, and the Chair and Ranking Member of the House Committee on Science, Space, and Technology.

Sincerely,

Billy Nolen
Acting Administrator

Enclosure

U.S. Department
of Transportation
**Federal Aviation
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Office of the Administrator

800 Independence Ave., S.W.
Washington, DC 20591

August 30, 2022

The Honorable Roger F Wicker
Ranking Member, Committee on Commerce,
Science, and Transportation
United States Senate
Washington, DC 20510

Dear Ranking Member Wicker:

I am pleased to provide you with a report on the Federal Aviation Administration (FAA) Air Transportation Centers of Excellence (COE) program for Fiscal Year (FY) 2021 in accordance with Section 44513(f) of Title 49 *United States Code*.

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800 Independence Ave., S.W.
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August 30, 2022

The Honorable Eddie Bernice Johnson
Chair, Committee on Science,
Space, and Technology
House of Representatives
Washington, DC 20515

Dear Chair Johnson:

I am pleased to provide you with a report on the Federal Aviation Administration (FAA) Air Transportation Centers of Excellence (COE) program for Fiscal Year (FY) 2021 in accordance with Section 44513(f) of Title 49 *United States Code*.

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800 Independence Ave., S.W.
Washington, DC 20591

August 30, 2022

The Honorable Frank D. Lucas
Ranking Member, Committee on
Science, Space, and Technology
House of Representatives
Washington, DC 20515

Dear Ranking Member Lucas:

I am pleased to provide you with a report on the Federal Aviation Administration (FAA) Air Transportation Centers of Excellence (COE) program for Fiscal Year (FY) 2021 in accordance with Section 44513(f) of Title 49 *United States Code*.

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Billy Nolen
Acting Administrator

Enclosure

Federal Aviation Administration

Air Transportation Centers of Excellence

Congressional Report

Fiscal Year 2021

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Federal Aviation Administration
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Legislative Mandate

The Federal Aviation Administration (FAA) submits this report on the FAA Air Transportation Centers of Excellence (COE) for Fiscal Year (FY) 2021 in response to the mandate in Section 44513(h) of Title 49 of the United States Code (49 U.S.C.):

(h)Annual Report.—The Administrator shall transmit annually to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate at the time of the President's budget request a report that lists—
(1) the research projects that have been initiated by each center in the preceding year;
(2) the amount of funding for each research project and the funding source;
(3) the institutions participating in each research project and their shares of the overall funding for each research project; and
(4) the level of cost-sharing for each research project.

Mission

The FAA COE program's mission is to help develop the nation's technology base while educating the next generation of aviation professionals. The program enables collaboration and coordination between government, academia, and industry to advance aviation technologies and expand FAA research capabilities through congressionally required matching contributions. Once selected, the core and affiliate university members and industry partners serve the FAA as a primary source of subject matter expertise for a 10-year period.

Selection Criteria

Section 44513(d) provides selection criteria that must be considered when designating members of each COE team. The FAA Administrator and the Secretary of Transportation have used these criteria to conduct an open and rigorous competitive process for selecting COE team members throughout the United States over the past two decades. Each COE member is required to match federal governmental grant awards dollar-for-dollar with contributions from non-federal sources in order to establish and operate the COE, and to conduct the research activities that the grant recipient carries out thereunder. 49 U.S.C. §44513(f).

Background

The FAA awarded the first COE grants in 1993. Since this time, the FAA has established 13 COE teams — including 92 core universities. COE partners and their non-federal affiliates were required to provide more than $454 million in matching contributions to augment FAA research grants since inception. Current and previous COE members have conducted mission-critical research in the following focus areas:

- Technical training and human performance
- Unmanned aircraft systems
- Alternative jet fuels and environment
- General aviation safety, accessibility, and sustainability
- Commercial space transportation
- Advanced materials
- Airliner cabin environment and intermodal transportation research
- Aircraft noise and aviation emissions mitigation
- General aviation research
- Airworthiness assurance
- Operations research
- Airport technology
- Computational modeling of aircraft structures

Through these long-term cost-sharing activities, the government and university-industry teams leveraged resources to advance the technological future of the nation's aviation industry. Furthermore, students have gained valuable hands-on educational experience applicable to aviation and aerospace careers, as evidenced by the more than 3,000 resulting doctoral dissertations and theses.

Determining Funding Levels

Each FAA sponsoring office commits to an annual minimum funding level over the 10-year period based on the sponsoring office’s budget and the forecasted research required in each critical area. The agency chose a 10-year timeframe to provide ample opportunity for COE teams to generate matching contributions and educate a pool of future aviation professionals. The FAA allows for an additional two-year period to ensure orderly closeout of all activities. Some COE teams have been extended beyond this 10-year period based on congressional direction. The FAA awards additional funding based on the current requirements for selected research areas and the needs of various sponsors.

Following the competitive process used to select each COE team, the FAA may also execute Indefinite Delivery Indefinite Quantity (IDIQ) contracts to procure deliverables for the government's sole benefit. Contract awards are shown in this report, as well as matching contributions when applicable. Matching contributions are negotiable when provided as cost-share for work performed under the contract vehicle for the FAA’s benefit.

Self-Sufficient National Resources

After completing the initial requirements, COE teams are ultimately positioned to establish themselves as a national resource capable of serving the aviation community and the nation. As a self-sufficient national aviation resource, a successful COE team will be able to exist without full reliance on the FAA and an annual FAA base funding commitment. Recognized for their superior expertise, COE members are expected to generate funding and compete for and conduct research activities for the aviation community and the FAA, as needed.

There are currently six active COE teams and seven centers deemed either self-sufficient, closed, or re-competed. The three centers that have satisfied their COE requirements and deemed self-sustaining national resources by the FAA are the National COE team for Aviation Operations Research, the COE team for Airport Technology Research, and the COE team for Airliner Cabin and Research in the Intermodal Transport Environment.

Closed and Re-competed COE

The COE team for Airworthiness Assurance (FY1997-2007) and the COE team for Computational Modeling of Aircraft Structures (FY1992-1996) have closed. The COE team for Aircraft Noise and Emissions Mitigation (FY2003-2014) was re-competed and replaced by the COE team for Alternative Jet Fuels and Environment. The COE team for General Aviation Research (FY2001-2013) was re-competed and replaced by the COE team for General Aviation Safety, Accessibility, and Sustainability.

Fiscal Year 2021 COE Activities

In FY 2021, the FAA supported six active COE public-private partnerships with academic institutions and their industry affiliates. Upon approval from the Secretary of Transportation, the FAA COE Program Management Office executed 147 grant awards for approximately $56.3 million during FY 2021 for years of funding 2019, 2020 and 2021. The FAA awarded these grants to 56 core universities in support of 142 projects.

Grant Federal Cost Share

Section 44513(f) requires matching contributions from COE grant recipients, and those matching contributions would provide a minimum of $42 million to offset the cost of conducting mission-critical research with COE partners.[1] However, §44513(f) also provides authority for an increase in the FAA's share of costs up to a maximum of seventy-five percent if the Administrator determines that the COE would otherwise be unable to carry out its work without additional funds.

Due to the challenges of unforeseen circumstances caused by the global economic downturn in fiscal years 2020 and 2021 resulting from the COVID-19 pandemic, the Administrator

[1] The $42 million offset cost is for FY 2021.

exercised his authority under §44513(f) after first ensuring that a new process was developed to determine and justify the need for providing any matching relief requested by a COE member university.

COE Narratives

The following sections contain descriptions for each of the active COEs. Attachments to this document list grant and contract awards executed during FY 2021 with current university members of each COE team. Required matching contributions are included in the attachments in accordance with § 44513(h)(4).

Narratives follow for each of the six active COE teams:

- COE for Technical Training and Human Performance
- COE for Unmanned Aircraft Systems
- COE for Alternative Jet Fuels and Environment
- COE for General Aviation Safety, Accessibility, and Sustainability
- COE for Commercial Space Transportation
- Joint COE for Advanced Materials

For more information, see: http://www.faa.gov/go/coe

Attachment I: COE Summary Table

Attachment II: Fiscal Year 2021 Grant Awards

Appendix A - COE for Technical Training and Human Performance
Appendix B - COE for Unmanned Aircraft Systems
Appendix C - COE for Alternative Jet Fuels and Environment
Appendix D - COE for General Aviation Safety, Accessibility and Sustainability
Appendix E - COE for Commercial Space Transportation
Appendix F - Joint COE for Advanced Materials

Attachment III: Fiscal Year 2021 Contract Awards

Appendix A - COE for Unmanned Aircraft Systems
Appendix B - COE for General Aviation Safety, Accessibility and Sustainability

COE for Technical Training and Human Performance

The FAA Administrator and Secretary of Transportation selected the Technical Training and Human Performance (TTHP) COE team in August 2016. The COE team's mission is to establish and manage a consortium among government, academia, and industry to evaluate and create solutions to enhance air transportation personnel training and operational performance. The team conducts research predominantly on topics of critical interest that seek solutions in the following training and human performance areas:

- Workforce development and training
- Human factors
- Safety
- Analytics

Sponsored by the FAA's Air Traffic Organization, research efforts include human factors training, modular curriculum design, virtual training delivery, simulation, applied game theory, visual search patterns, and learner data management, as well as other techniques aimed at understanding best practices, applying lessons learned, and advancing the state of technical training and human performance. The results of the research will inform future technical training for aviation professions across the FAA.

In five years of operation, the center has expanded the number of research efforts and sponsoring organizations throughout the FAA and added additional industry partners. The center comprises 15 core universities, 11 affiliate universities, and more than 40 industry partners.

Under the leadership of The University of Oklahoma, Embry-Riddle Aeronautical University, and Wichita State University, the following universities serve as core members of the team: Auburn University, Drexel University, Inter-American University, The Ohio State University, Oklahoma State University, Purdue University, Tulsa State Community College, University of Akron, University of Nebraska-Omaha, University of North Dakota, University of Wisconsin-Madison, and Western Michigan University.

During FY 2021, the FAA awarded grants to five core members totaling approximately $0.9 million (see Attachment II, Appendix A). Due to the impacts of the COVID-19 pandemic on the ability of COEs to generate matching contributions, the FAA provided relief on the one-to-one matching requirements to four core members, resulting in the core members providing a 25 percent match share to the FAA's 75 percent federal share. The other member matched grant awards dollar-for-dollar from non-federal sources. The FAA is also planning to execute IDIQ contracts to procure deliverables for the government's sole benefit.

The COE TTHP team's research projects align with the Department of Transportation (DOT) strategic goals of Safety, Transformation, and Organizational Excellence.

For additional information, see http://www.coetthp.org

COE for Unmanned Aircraft Systems

The FAA Administrator and Secretary of Transportation selected the Alliance for System Safety of Unmanned Aircraft Systems (UAS) through Research Excellence (ASSURE) as the COE team for UAS in FY 2015. The COE team's mission is to help the UAS market safely grow while providing the FAA with the research needed to integrate UAS into the National Airspace System (NAS) with minimal changes to current operations, quickly, safely, and efficiently. The COE team focuses research efforts on the following topic areas:

- Air traffic control interoperability
- Airport ground operations
- Control and communication
- Detect and avoid
- Human factors
- Low altitude operations safety
- Noise reduction
- Spectrum management
- UAS crew training and certification, including pilots
- UAS traffic management
- UAS wake separation standards for UAS integration into the NAS

Led by Mississippi State University, the following universities also serve on the core team: Drexel University, Embry-Riddle Aeronautical University, Kansas State University, Montana State University, New Mexico State University, North Carolina State University, The Ohio State University, Oregon State University, University of Alabama-Huntsville, University of Alaska-Fairbanks, University of California-Davis, University of Kansas, University of North Dakota, and Wichita State University.

Affiliate members of the COE team include Auburn University, Concordia University, Indiana State University, Louisiana Tech University, University of Southampton, Technion-Israel Institute of Technology, Tuskegee University, Sinclair Community College, and Nanyang Technological University.

During FY 2021, the FAA awarded grants to 13 of the core members totaling approximately $19.1 million (see Attachment II, Appendix B). Due to the impacts of the COVID-19 pandemic on the ability to generate matching contributions, the FAA provided relief on the one-to-one matching requirements to 13 core members, resulting in the core members providing a 25 percent match share to the FAA's 75 percent federal share. The FAA also executed IDIQ contracts to procure deliverables for the government's sole benefit. In FY 2021, the UAS COE awarded $324,477 under one IDIQ task order. Of that amount, $320,000 was from FY20 appropriation funds and $4,477 was from FY 2021 appropriation funds.

The COE UAS team's research projects align with the DOT strategic goals of Safety, Transformation, and Organizational Excellence, see: http://www.assureuas.org

COE for Alternative Jet Fuels and Environment

The FAA Administrator and Secretary of Transportation selected the COE team for Alternative Jet Fuels and Environment (AJFE), also known as the Aviation Sustainability Center or ASCENT, in September 2013. The COE team's mission is to help the aviation industry overcome the environmental and energy challenges facing aviation by developing science-based, cost-effective solutions that reduce noise, improve air quality, reduce climate impacts, and improve energy efficiency. A major focus of the COE team is to explore ways to produce sustainable aviation fuels at commercial scale, thus creating an industry with substantial environmental benefit that also provides large-scale economic development and job creation, especially in rural areas. The COE team's research and development efforts address the following major topic areas:

- Feedstock development, processing, and conversion to alternative jet fuels
- Regional supply and refining infrastructure for alternative jet fuels
- Environmental benefits analysis of alternative jet fuel use
- Aircraft component deterioration and wear assessment due to alternative jet fuel use
- Fuel performance testing of alternative jet fuels
- Aviation noise and impacts
- Aviation emissions and impacts
- Aircraft technology assessment
- Environmentally and energy-efficient gate-to-gate aircraft operations
- Aviation modeling and analysis

The COE AJFE team research projects align with the DOT strategic goals of Transformation, Climate and Sustainability, Safety, and Economic Strength & Global Competitiveness. Innovation is required to develop the technological, operational, and fuels-related measures required to reduce aviation's environmental impact. New aircraft and engine technologies that reduce noise, emissions, and fuel burn, as well as updated policies and regulatory frameworks that better reflect our improved understanding of environmental and energy impacts are necessary to improve the efficiency, effectiveness, and accountability of the airspace system. These advancements will promote aviation growth, including integrating new entrants such as supersonic aircraft, unmanned aerial systems, urban air mobility vehicles, and commercial space vehicles.

Under the joint leadership of Washington State University and the Massachusetts Institute of Technology, the following universities also serve on this core team: Boston University, Georgia Institute of Technology, Missouri University of Science and Technology, Oregon State University, Pennsylvania State University, Purdue University, Stanford University, University of Dayton, University of Hawaii, University of Illinois, University of North Carolina, University of Pennsylvania, University of Tennessee, and the University of Washington.

During FY 2021, the FAA awarded grants to 13 core members totaling approximately $14.4 million (see Attachment II, Appendix C). Due to the impacts of the COVID-19 pandemic on the ability to generate matching contributions, the FAA provided relief on the one-to-one matching requirements to five core members, resulting in the core members providing a 25 percent match share to the FAA's 75 percent federal share. For additional information, see: http://ascent.aero/

COE for General Aviation Safety, Accessibility, and Sustainability

The FAA Administrator and Secretary of Transportation selected a team of universities in 2013 to lead a COE team for General Aviation Safety, Accessibility, and Sustainability, also known as PEGASUS. The COE team performs projects that support the FAA's needs across diverse areas of general aviation (GA). The COE teams past research efforts included:

- Airport safety
- Airport pavements
- Software and systems
- Human factors
- Weather technology on the flight deck
- Structures and propulsion
- Electric vertical take-off and landing
- Urban air mobility

Additional research included GA flight safety with projects examining how to use recorded flight data to improve aviation safety for fixed-wing aircraft and rotorcraft. The team has also examined how pilots use flight deck information such as angle of attack indicators, weather information, and advanced sensor displays. These efforts included flight testing, algorithm development, and human factors research. Results from the projects helped the FAA provide guidance, and develop or update advisory circulars. This improves overall aviation safety since many COE GA team projects are also applicable to commercial operations.

Under Purdue University's leadership, the following universities serve as core members of the team: Florida Institute of Technology, Georgia Institute of Technology, Iowa State University, The Ohio State University, and Texas A&M University.

During FY 2021, the FAA awarded grants to all six of its core members totaling approximately $0.7 million (see Attachment II, Appendix D). Members matched grant awards dollar-for-dollar from non-federal sources. The FAA also executed IDIQ contracts to procure deliverables for the government's sole benefit. In FY 2021, the FAA awarded no task orders to COE members through the IDIQ contract vehicle (see Attachment III, Appendix B).

The COE GA team’s research projects align with the DOT strategic goals of Safety, Economic Strength & Global Competitiveness, and Transformation.

For additional information, see: https://www.pegasas.aero/

COE for Commercial Space Transportation

The FAA Administrator and Secretary of Transportation selected the COE team for Commercial Space Transportation (CST) in FY 2010. CST research focuses on four areas aligned with DOT and National Space Council priorities. These include safe integration of commercial space operations into the NAS, spaceport infrastructure, systemic safety initiatives, and regulatory reform. The mission of the FAA's Office of Commercial Space Transportation (AST) is to regulate commercial space launch and reentry operations, only to the extent necessary, to ensure compliance with international obligations of the U.S., and to protect the public health and safety, the safety of property, and the national security and foreign policy interests of the United States.

In addition, AST's mission includes encouraging, facilitating, and promoting commercial space launches and reentries performed by the private sector. More recently, Congress tasked AST with promoting the continuous improvement of the safety of launch vehicles designed to carry humans. AST will facilitate U.S. global leadership in CST by researching solutions that optimize safety and efficiency through innovation, collaborative research, and prototype development. AST's R&D portfolio is designed to optimize AST's mission execution by developing improved regulations, safety assessment tools, and public safety technologies. Funding supports regulatory research to address lessons learned and to keep pace with the dynamic CST industry.

Research and development has four major areas. Each research area has multiple goals that correspond to the AST mission goals of public safety and industry promotion.

Aerospace Access and Operations

- **Public Safety Goals:**
  - Improve analytical and computational methods to evaluate uninvolved public and property safety
  - Situational awareness and understanding of risks posed by resident space objects

- **Industry Promotion Goals:**
  - Safe and equitable sharing of the NAS by air and space transportation operators, with minimal disruption caused by commercial space traffic (outbound and inbound)
  - Improve spaceport interoperability and development of necessary spaceport industry infrastructure resources

Aerospace Vehicles

- **Public Safety Goals:**
  - Improve vehicle safety and risk analyses and management, including knowledge of all safety-critical components and systems of the space vehicles and their operations

- **Industry Promotion Goals:**
  - Improve the manufacturability, assembly, and operational efficiencies of space transportation vehicles, systems, and subsystems

Human Operations and Spaceflight

- **Public Safety Goals:**
  - Identification and reduction of avoidable risks of human spaceflight

- **Industry Promotion Goals:**
  - Facilitate the continuous improvement of human-carrying vehicles' operational safety (during both launch and reentry) and spaceports

Industry Innovation

- **Public Safety Goals:**
  - Develop improved criteria for evaluating public safety, such as performance-based requirements for protecting public property and critical assets

- **Industry Promotion Goals:**
  - Encourage the growth of evolving space industry sectors through relevant economic, legal, legislative, regulatory, and market analyses and modeling
  - Support effective policy decision-making
  - Provide a better understanding of the relationship of governmental policy, innovation adoption, and industry growth

The following universities serve as core members under the leadership of the University of Colorado-Boulder: New Mexico State University, New Mexico Institute of Mining and Technology, Florida Institute of Technology, Florida State University, Stanford University, University of Central Florida, University of Florida, Baylor College of Medicine, and the University of Texas Medical Branch at Galveston.

During FY 2021, the FAA did not award grants to its core members.

Ongoing research projects conducted by the COE CST team align with DOT strategic goals of Safety, Economic Strength & Global Competitiveness, Equity, Climate & Sustainability, Transformation and Organizational Excellence. The COE CST team's research tasks are scheduled to be completed between May and August 2022.

For additional information, see: http://www.coe-cst.org/

Joint COE for Advanced Materials

The Joint Centers of Excellence for Advanced Materials (JAMS) was established by the FAA in January 2004 to assist in ensuring the safe and reliable application of composites and advanced materials to commercial aircraft. In compliance with Section 762 of the FAA Reauthorization Act of 2018, the FAA continues to operate the Joint Centers JAMS universities conducts applied research on the following topics:

- Damage tolerance of advanced composite structures
- Durability of adhesively bonded structure
- Additive manufacturing technologies
- Crashworthiness of composite airframes and seating systems
- Environmental and aging effects on in-service composite structures
- Lightning strike on composite airframe
- Emerging material systems and innovative production technologies
- Maintenance and inspection of advanced composites

The Composite Materials Handbook-17 (CMH-17), previously known as MIL-HANDBOOK-17, is a source of public information on strength properties, design values and statistical methodologies for advanced material technologies such as fiber reinforced composites, ceramic matrix composites, thermoplastics and additive manufacturing. Technical information published by the handbook is generally accepted as meeting the FAA validation and certification requirements for aviation products because of its thorough standard procedures for development of data and information.

CMH-17 has evolved significantly over the years. Primary sponsorship of the CHM-17 as a not-for-profit consensus-based international industry standards organization was transitioned to the FAA from the DOD in 2006. Currently, the National Institute for Aviation Research at the Wichita State University is maintaining and publishing the handbook for the FAA. The funding for that effort is provided by the FAA through the JAMS framework. The FAA considers that the handbook is critically important to the FAA mission in certification and continued airworthiness of advanced aviation materials.

The FAA will continue working closely with the industry and other government agencies to develop the CHM-17 and to provide periodic updates. Under the University of Washington and Wichita State University's joint leadership, the following universities currently serve as core members: Florida International University, Oregon State University, University of Utah, Washington State University, Mississippi State University, Auburn University, and the University of California - San Diego.

During FY 2021, the FAA awarded grants to four core members totaling approximately $21.2 million (see Attachment II, Appendix F). Members match grant awards dollar-for-dollar from non-federal sources. The JAMS COE team's research projects align with DOT strategic goals of Safety, Equity, Transformation and Organizational Excellence.

For additional information, see: http://www.jams-coe.org/

Attachment I - Summary Table
Centers of Excellence Grant and Contracts Awards
FY 2020 – FY 2021
(In dollars)

CENTER OF EXCELLENCE	Grants		Contracts	
	FY 2020	FY 2021	FY 2020	FY 2021
Technical Training and Human Performance (TTHP)	298,709	854,996	0	0
Unmanned Aircraft Systems (UAS)	13,363,638	19,144,548	0	324,477
Alternative Jet Fuels and Environment (AJFE)	34,159,355	14,438,292	0	0
General Aviation (GA)	779,207	706,937	0	0
Commercial Space Transportation (CST)	3,429,113	0	0	0
Joint Center of Excellence for Advanced Materials (JAMS)	14,923,227	21,198,809	0	0
TOTAL	**66,953,249**	**56,343,582**	**0**	**324,477**

FY 2020 Funding Source

Funding Year	RE&D	Operations	Total
2018	22,043,345	0	22,043,345
2019	30,412,687	0	30,412,687
2020	14,198,508	298,837	14,497,345
			66,953,377

FY 2021 Funding Source

Funding Year	RE&D	Operations	Total
2019	13,145,635	230,000	13,375,635
2020	22,952,035	0	22,952,035
2021	19,390,915	624,996	20,015,911
			56,343,582

Attachment II - Fiscal Year 2021 Grant Awards

Appendix A - COE for Technical Training and Human Performance
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FAA Centers of Excellence (COE)
Technical Training and Human Performance Grant Awards
Fiscal Year 2021
(In dollars)
Core Members: 3 Industry Members: Approximately 40
Cooperative Agreement Period of Performance: 2016–2021

Grant Number	Research Projects	Center of Excellence Award Recipients	FAA Grant Award - Subject to Matching Requirement	Total Sub-Award Amount	Non-Federal Organizations Providing Match (Source of Matching Contribution)	Amount/Value of Contribution (FY 2021)	Total Matching Amount
16-C-TTHP-UA-016	**Human Factors Awareness Training for FAA Safety Specialists within Aircraft Certification – HF016**	**University of Akron**	**30,000**	**0**	**University of Akron**	**30,000**	**10,000**
16-C-TTHP-ERAU-054	**Human Factors Training for FAA Aviation Safety Specialists within Aircraft Certification and Flight Standards – HF018**	**Embry-Riddle Aeronautical University**	**70,000**	**0**	**Embry-Riddle Aeronautical University**	**70,000**	**23,333**
16-C-TTHP-OK-047	**FAA Aviation Safety Human Factors Technical Lead Support – Wichita State Univ., University of Akron, Embry-Riddle Aeronautical University, Kent State – PM029**	**The University of Oklahoma**	**19,778**	**0**	**The University of Oklahoma**	**19,778**	**6,805**
16-C-TTHP-OK-048	**Technical Program Management and Support (Year 6) – PM028**	**The University of Oklahoma**	**149,765**	**0**	**The University of Oklahoma**	**149,765**	**52,226**
16-C-TTHP-OSU-013	**FAA External Flight Safety Study (Phase II) – SA004**	**The Ohio State University**	**250,231**	**0**	**The Ohio State University**	**250,231**	**88,439**
16-C-TTHP-WISU-027	**Review and Analysis of Human Error Methodologies, Frameworks, and Taxonomies – HF017**	**Wichita State University**	**100,000**	**0**	**Wichita State University**	**100,000**	**100,000**
16-C-TTHP-WISU-028	**FAA Aviation Safety Human Factors Administrative Support – PM030**	**Wichita State University**	**10,222**	**7,673**	**Wichita State University**	**10,222**	**10,222**
16-C-TTHP-WISU-029	**External Flight Safety Study (Phase II) Administrative Support – SA004A**	**Wichita State University**	**25,000**	**18,750**	**Wichita State University**	**25,000**	**25,000**
16-C-TTHP-WISU-030	**Administrative Program Management Year 6 – PM027**	**Wichita State University**	**200,000**	**174,372**	**Wichita State University**	**200,000**	**200,000**
		Total	**854,996**	**200,795**		**854,996**	**516,025**

Please note: Due to the impact of COVID-19 pandemic on the ability to generate matching contributions previously committed, the Administrator exercised his authority to grant relief from the

statutory one-to-one matching funds requirements, providing up to a 75 percent federal share on a case- by-case basis to requesting COE grant recipients.

Technical Training and Human Performance
Funding by Fiscal Year
(In millions)

Fiscal Year	Funding Level
FY 2016	5.0
FY 2017	1.5
FY 2018	0.0
FY 2019	2.0
FY 2020	0.3
FY 2021	0.9
Total	**9.7**

FAA Centers of Excellence
Unmanned Aircraft Systems (UAS) Grant Awards
Fiscal Year 2021
(In dollars)
Core Members: 15 Industry Members: Approximately 40
Cooperative Agreement Period of Performance: 2016–2021

Grant Number	Research Projects	Center of Excellence Award Recipients	FAA Grant Award - Subject to Matching Requirement	Total Sub-Award Amount	Non-Federal Organizations Providing Match (Source of Matching Contribution)	Amount/Value of Contribution (FY 2021)	Total Matching Amount
15-C-UAS-DU-010	**Best Engineering Practices for Automated Systems**	**Drexel University**	**617,165**	**0**	**Drexel University**	**617,165**	**206,256**
15-C-UAS-ERAU-019	**Mitigating GPS and ADS-B risks for UAS**	**Embry-Riddle Aeronautical University**	**135,000**	**0**	**Embry-Riddle Aeronautical University**	**135,000**	**45,000**
15-C-UAS-ERAU-020	**Shielded UAS Operations - Detect and Avoid**	**Embry-Riddle Aeronautical University**	**150,000**	**0**	**Embry-Riddle Aeronautical University**	**150,000**	**50,000**
15-C-UAS-ERAU-021	**sUAS Mid-Air Collision (MAC) Likelihood**	**Embry-Riddle Aeronautical University**	**215,000**	**0**	**Embry-Riddle Aeronautical University**	**215,000**	**71,667**
15-C-UAS-ERAU-022	**UAS Flight Data Research in Support of ASIAS**	**Embry-Riddle Aeronautical University**	**75,569**	**0**	**Embry-Riddle Aeronautical University**	**75,569**	**25,190**
15-C-UAS-ERAU-026	**Small Unmanned Aerial Systems (UAS) Traffic Analysis**	**Embry-Riddle Aeronautical University**	**1,876,501**	**0**	**Embry-Riddle Aeronautical University**	**1,876,501**	**625,501**
15-C-UAS-ERAU-028	**Identify Flight Recorder Requirements for Unmanned Aircraft Systems (UAS) Integration into the NAS**	**Embry-Riddle Aeronautical University**	**298,145**	**0**	**Embry-Riddle Aeronautical University**	**298,145**	**99,664**
15-C-UAS-ERAU-029	**Propose UAS Right-of-Way Rules for Unmanned Aircraft Systems (UAS) Operations and Safety Recommendations**	**Embry-Riddle Aeronautical University**	**330,000**	**0**	**Embry-Riddle Aeronautical University**	**330,000**	**165,000**
15-C-UAS-KSU-017	**UAS Cargo Operations - From Manned Cargo to UAS Cargo Operations: Future Trends, Performance, Reliability, and Safety Characteristics**	**Kansas State University**	**125,000**	**0**	**Kansas State University**	**125,000**	**41,667**
15-C-UAS-KSU-018	**Air Carrier Operations - Investigate and Identify the Key Differences Between Commercial Air Carrier Operations and Unmanned Transport**	**Kansas State University**	**220,000**	**0**	**Kansas State University**	**220,000**	**73,334**

FAA Centers of Excellence
Unmanned Aircraft Systems (UAS) Grant Awards
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(In dollars)
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Grant Number	Research Projects	Center of Excellence Award Recipients	FAA Grant Award - Subject to Matching Requirement	Total Sub-Award Amount	Non-Federal Organizations Providing Match (Source of Matching Contribution)	Amount/Value of Contribution (FY 2021)	Total Matching Amount
15-C-UAS-KSU-019	**Mitigating GPS and ADS-B risks for UAS**	**Kansas State University**	**135,000**	**0**	**Kansas State University**	**135,000**	**45,000**
15-C-UAS-KSU-020	**Shielded UAS Operations - DAA**	**Kansas State University**	**110,000**	**0**	**Kansas State University**	**110,000**	**36,667**
15-C-UAS-KSU-021	**Validation of Visual Operation Standards for sUAS**	**Kansas State University**	**190,000**	**0**	**Kansas State University**	**190,000**	**63,334**
15-C-UAS-KSU-022	**sUAS MAC Likelihood**	**Kansas State University**	**220,000**	**0**	**Kansas State University**	**220,000**	**73,334**
15-C-UAS-KSU-024	**sUAS Traffic Analysis**	**Kansas State University**	**250,000**	**0**	**Kansas State University**	**250,000**	**83,333**
15-C-UAS-KSU-025	**Disaster Preparedness and Emergency Response Phase II**	**Kansas State University**	**58,000**	**0**	**Kansas State University**	**58,000**	**19,333**
15-C-UAS-KU-06	**sUAS MAC Likelihood**	**University of Kansas**	**160,000**	**0**	**University of Kansas**	**160,000**	**108,086**
15-C-UAS-KU-08	**Best Engineering Practices for Automated Systems**	**University of Kansas**	**357,681**	**0**	**University of Kansas**	**357,681**	**314,406**
15-C-UAS-KU-09	**Propose UAS Right-of-Way Rules for UAS Operations and Safety Recommendations**	**University of Kansas**	**494,525**	**0**	**University of Kansas**	**494,525**	**247,263**
15-C-UAS-MSU-053	**Validation of Visual Operation Standards for sUAS**	**Mississippi State University**	**70,000**	**0**	**Mississippi State University**	**70,000**	**23,334**
15-C-UAS-MSU-057	**Disaster Preparedness and Emergency Response Phase II**	**Mississippi State University**	**164,285**	**0**	**Mississippi State University**	**164,285**	**54,762**

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Grant Number	Research Projects	Center of Excellence Award Recipients	FAA Grant Award - Subject to Matching Requirement	Total Sub-Award Amount	Non-Federal Organizations Providing Match (Source of Matching Contribution)	Amount/Value of Contribution (FY 2021)	Total Matching Amount
15-C-UAS-MSU-058	**Program Management of the ASSURE COE for UAS**	**Mississippi State University – Sci. & Tech Ctr.**	**1,292,674**	**0**	**Mississippi State University – Sci. & Tech Ctr.**	**1,292,674**	**430,892**
15-C-UAS-MSU-059	**Advanced Materials Investigation – Composite Material Analysis for UAS**	**Mississippi State University**	**157,000**	**0**	**Mississippi State University**	**157,000**	**157,000**
15-C-UAS-NCSU-011	**Disaster Preparedness and Emergency Response Phase II**	**North Carolina State University**	**142,286**	**0**	**North Carolina State University**	**142,286**	**47,429**
15-C-UAS-NCSU-07	**Air Carrier Operations – Investigate and Identify the Key Differences Between Commercial Air Carrier Operations and Unmanned Transport**	**North Carolina State University**	**150,000**	**0**	**North Carolina State University**	**150,000**	**50,000**
15-C-UAS-NCSU-08	**UAS Cargo Operations – From Manned Cargo to UAS Cargo Operations: Future Trends, Performance, Reliability, and Safety Characteristics**	**North Carolina State University**	**125,000**	**0**	**North Carolina State University**	**125,000**	**41,667**
15-C-UAS-NCSU-09	**Shielded UAS Operations – DAA**	**North Carolina State University**	**95,000**	**0**	**North Carolina State University**	**95,000**	**31,667**
15-C-UAS-NMSU-033	**Shielded UAS Operations – DAA**	**The Regents of New Mexico State Univ. MSC PSL**	**140,000**	**0**	**The Regents of New Mexico State Univ. MSC PSL**	**140,000**	**46,667**
15-C-UAS-NMSU-034	**Validation of Visual Operation Standards for sUAS**	**The Regents of New Mexico State Univ. MSC PSL**	**120,000**	**0**	**The Regents of New Mexico State Univ. MSC PSL**	**120,000**	**40,000**
15-C-UAS-NMSU-038	**Disaster Preparedness and Emergency Response Phase II**	**The Regents of New Mexico State Univ. MSC PSL**	**663,941**	**0**	**The Regents of New Mexico State Univ. MSC PSL**	**663,941**	**221,314**
15-C-UAS-ORSU-07	**Mitigating GPS and ADS-B risks for UAS**	**Oregon State University**	**100,000**	**0**	**Oregon State University**	**100,000**	**33,334**

FAA Centers of Excellence
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Fiscal Year 2021
(In dollars)
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Grant Number	Research Projects	Center of Excellence Award Recipients	FAA Grant Award - Subject to Matching Requirement	Total Sub-Award Amount	Non-Federal Organizations Providing Match (Source of Matching Contribution)	Amount/Value of Contribution (FY 2021)	Total Matching Amount
15-C-UAS-ORSU-011	**Best Engineering Practices for Automated Systems**	**Oregon State University**	**1,782,450**	**0**	**Oregon State University**	**1,782,450**	**594,150**
15-C-UAS-ORSU-012	**Airborne Collision Severity Evaluation – Engine Ingestion**	**Oregon State University**	**199,286**	**0**	**Oregon State University**	**199,286**	**66,429**
15-C-UAS-OSU-027	**Air Carrier Operations – Investigate and Identify the Key Differences Between Commercial Air Carrier Operations and Unmanned Transport**	**The Ohio State University**	**149,745**	**0**	**The Ohio State University**	**149,745**	**49,915**
15-C-UAS-OSU-028	**UAS Cargo Operations – From Manned Cargo to UAS Cargo Operations: Future Trends, Performance, Reliability, and Safety Characteristics**	**The Ohio State University**	**124,996**	**0**	**The Ohio State University**	**124,996**	**41,665**
15-C-UAS-OSU-029	**High-Bypass UAS Engine Ingestion Test**	**The Ohio State University**	**340,000**	**0**	**The Ohio State University**	**340,000**	**113,333**
15-C-UAS-OSU-031	**Best Engineering Practices for Automated Systems**	**The Ohio State University**	**593,405**	**0**	**The Ohio State University**	**593,405**	**197,802**
15-C-UAS-UAF-019	**Mitigating GPS and ADS-B risks for UAS**	**University of Alaska-Fairbanks**	**135,000**	**0**	**University of Alaska-Fairbanks**	**135,000**	**45,000**
15-C-UAS-UAF-020	**Air Carrier Operations – Investigate and Identify the Key Differences Between Commercial Air Carrier Operations and Unmanned Transport**	**University of Alaska-Fairbanks**	**150,000**	**0**	**University of Alaska-Fairbanks**	**150,000**	**50,000**
15-C-UAS-UAF-021	**UAS Cargo Operations - From Manned Cargo to UAS Cargo Operations: Future Trends, Performance, Reliability, and Safety Characteristics**	**University of Alaska-Fairbanks**	**240,000**	**0**	**University of Alaska-Fairbanks**	**240,000**	**80,000**

FAA Centers of Excellence
Unmanned Aircraft Systems (UAS) Grant Awards
Fiscal Year 2021
(In dollars)
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Grant Number	Research Projects	Center of Excellence Award Recipients	FAA Grant Award - Subject to Matching Requirement	Total Sub-Award Amount	Non-Federal Organizations Providing Match (Source of Matching Contribution)	Amount/Value of Contribution (FY 2021)	Total Matching Amount
15-C-UAS-UAF-024	**Disaster Preparedness and Emergency Response Phase II**	**University of Alaska-Fairbanks**	**753,746**	**0**	**University of Alaska-Fairbanks**	**753,746**	**251,249**
15-C-UAS-UAH-020	**UAS Cargo Operations – From Manned Cargo to UAS Cargo Operations: Future Trends, Performance, Reliability, and Safety Characteristics**	**University of Alabama in Huntsville**	**124,987**	**0**	**University of Alabama in Huntsville**	**124,987**	**41,663**
15-C-UAS-UAH-025	**Disaster Preparedness and Emergency Response Phase II ASIAS**	**University of Alabama-Huntsville**	**1,297,107**	**0**	**University of Alabama-Huntsville**	**1,297,107**	**432,369**
15-C-UAS-UND-028	**UAS Flight Data Research in Support of ASIAS**	**University of North Dakota**	**393,693**	**0**	**University of North Dakota**	**393,693**	**131,231**
15-C-UAS-UND-029	**Air Carrier Operations – Investigate and Identify the Key Differences Between Commercial Air Carrier Operations and Unmanned Transport**	**University of North Dakota**	**130,000**	**0**	**University of North Dakota**	**130,000**	**43,333**
15-C-UAS-UND-030	**Mitigating GPS and ADS-B risks for UAS**	**University of North Dakota**	**325,000**	**0**	**University of North Dakota**	**325,000**	**108,333**
15-C-UAS-UND-031	**Shielded UAS Operations – DAA**	**University of North Dakota**	**430,000**	**0**	**University of North Dakota**	**430,000**	**143,333**
15-C-UAS-UND-032	**UAS Cargo Operations – From Manned Cargo to UAS Cargo Operations: Future Trends, Performance, Reliability, and Safety Characteristics**	**University of North Dakota**	**60,000**	**0**	**University of North Dakota**	**60,000**	**20,000**
15-C-UAS-UND-038	**Best Engineering Practices for Automated Systems**	**University of North Dakota**	**271,215**	**0**	**University of North Dakota**	**271,215**	**90,405**
15-C-UAS-UND-039	**Propose UAS Right-of-Way Rules for UAS Operations and Safety Recommendations**	**University of North Dakota**	**569,242**	**0**	**University of North Dakota**	**569,242**	**284,623**

FAA Centers of Excellence
Unmanned Aircraft Systems (UAS) Grant Awards
Fiscal Year 2021
(In dollars)
Core Members: 15 Industry Members: Approximately 40
Cooperative Agreement Period of Performance: 2016–2021

Grant Number	Research Projects	Center of Excellence Award Recipients	FAA Grant Award - Subject to Matching Requirement	Total Sub-Award Amount	Non-Federal Organizations Providing Match (Source of Matching Contribution)	Amount/Value of Contribution (FY 2021)	Total Matching Amount
15-C-UAS-UND-040	**Identify Flight Recorder Requirements for UAS Integration into the NAS**	**University of North Dakota**	**390,945**	**0**	**University of North Dakota**	**390,945**	**195,473**
15-C-UAS-WISU-017	**High-Bypass UAS Engine Ingestion Test**	**Wichita State University**	**100,000**	**0**	**Wichita State University**	**100,000**	**100,000**
15-C-UAS-WISU-018	**Visual Operation Standards for UAS**	**Wichita State University**	**120,000**	**0**	**Wichita State University**	**120,000**	**120,000**
15-C-UAS-WISU-019	**sUAS MAC Likelihood**	**Wichita State University**	**464,000**	**0**	**Wichita State University**	**464,000**	**464,000**
15-C-UAS-WISU-022	**sUAS Traffic Analysis**	**Wichita State University**	**200,000**	**0**	**Wichita State University**	**200,000**	**200,000**
15-C-UAS-WISU-023	**Identify Flight Recorder Requirements for UAS Integration into the NAS**	**Wichita State University**	**400,000**	**0**	**Wichita State University**	**400,000**	**400,000**
15-C-UAS-WISU-024	**Advanced Materials Investigation – Composite Material Analysis for UAS**	**Wichita State University**	**161,958**	**0**	**Wichita State University**	**161,958**	**161,958**
		Total	**19,144,547**	**0**		**19,144,547**	**7,998,365**

Please note: Due to the impact of COVID-19 on the ability to generate matching contributions previously committed, the Administrator exercised his authority to grant relief to the one-to- one matching requirements and to provide up to 75 percent federal share as requested by COE grant recipients on a case-by-case basis.

Unmanned Aircraft Systems
Total Funding Awarded by Fiscal Year
(In Millions of Dollars)

Fiscal Year	Funding Level
FY 2015	4.8
FY 2016	3.4
FY 2017	3.8
FY 2018	6.1
FY 2019	3.5
FY 2020	13.4
FY 2021	19.1
Total	**54.1**

FAA Centers of Excellence
Alternative Jet Fuels and Environment Grant Awards
Fiscal Year 2021
(In dollars)
Core Members: 16 Industry Members: Approximately 60
Cooperative Agreement Period of Performance: 2013–2021

Grant Number	Research Projects	Center of Excellence Award Recipients	FAA Grant Award – Subject to Matching Requirement	Total Sub-Award Amount	Non-Federal Organizations Providing Match (Source of Matching Funds)	Amount/Value of Contribution (FY 2021)	Total Matching Amount
13-C-AJFE-UI-038	**Alternative Fuels Test Database Library – 33**	**Board of Trustees of the Univ. of Illinois**	**150,000**	**0**	**Board of Trustees of the Univ. of Illinois**	**150,000**	**163,410**
13-C-AJFE-UI-039	**Fuel Testing Approaches for Rapid Jet Fuel Prescreening – 65b**	**Board of Trustees of the Univ. of Illinois**	**150,000**	**0**	**Board of Trustees of the Univ. of Illinois**	**150,000**	**180,000**
13-C-AJFE-UI-040	**Evaluation of FAA Climate Tools – 22**	**Board of Trustees of the Univ. of Illinois**	**150,000**	**0**	**Board of Trustees of the Univ. of Illinois**	**150,000**	**150,000**
13-C-AJFE-UI-041	**Modeling Supersonic Jet Noise Reduction with Global Resolvent Modes – 59C**	**Board of Trustees of the Univ. of Illinois**	**199,999**	**0**	**Board of Trustees of the Univ. of Illinois**	**199,999**	**50,000**
13-C-AJFE-SU-031	**Chemical Kinetics Combustion Experiments – 25**	**Board of Trustees of Leland Stanford Jr Univ. CS**	**200,000**	**0**	**Board of Trustees of Leland Stanford Jr Univ. CS**	**200,000**	**200,000**
13-C-AJFE-SU-032	**Jet Noise Modeling to Support Low Noise Supersonic Aircraft Technology Development – 59D**	**Board of Trustees of Leland Stanford Jr Univ. CS**	**200,000**	**0**	**Board of Trustees of Leland Stanford Jr Univ. CS**	**200,000**	**66,666.67**
12-C-AJFE-GIT-0100	**Predictive Simulation of Nonvolatile Particulate Matter (nvPM) Emissions in Aircraft Combustors – 71**	**Georgia Tech Research Corporation**	**500,000**	**0**	**Georgia Tech Research Corporation**	**500,000**	**500,000**
12-C-AJFE-GIT-0101	**Alternative Design Configurations to meet Future Demand – 64**	**Georgia Tech Research Corporation**	**1,199,999**	**0**	**Georgia Tech Research Corporation**	**1,199,999**	**400,000**
12-C-AJFE-GIT-102	**Low Emission Premixed Combustion Technology for Supersonic Civil Transport – 74**	**Georgia Tech Research Corporation**	**999,995**	**0**	**Georgia Tech Research Corporation**	**999,995**	**1,000,000**
12-C-AJFE-GIT-103	**Improved Open Rotor Noise Prediction Capabilities – 76**	**Georgia Tech Research Corporation**	**300,000**	**0**	**Georgia Tech Research Corporation**	**300,000**	**75,000**
12-C-AJFE-GIT-104	**Analytical Methods for Expanding the Aviation Environmental Design Tool (AEDT) Aircraft Fleet Database – 60**	**Georgia Tech Research Corporation**	**150,001**	**0**	**Georgia Tech Research Corporation**	**150,001**	**150,000**

FAA Centers of Excellence
Alternative Jet Fuels and Environment Grant Awards
Fiscal Year 2021
(In dollars)
Core Members: 16 Industry Members: Approximately 60
Cooperative Agreement Period of Performance: 2013–2021

Grant Number	Research Projects	Center of Excellence Award Recipients	FAA Grant Award – Subject to Matching Requirement	Total Sub-Award Amount	Non-Federal Organizations Providing Match (Source of Matching Funds)	Amount/Value of Contribution (FY 2021)	Total Matching Amount
12-C-AJFE-GIT-105	**Reduction of nvPM emissions from aero-engine fuel injectors – 70**	**Georgia Tech Research Corporation**	**500,000**	**0**	**Georgia Tech Research Corporation**	**500,000**	**500,000**
12-C-AJFE-GIT-106	**Noise Model Validation for AEDT – 62**	**Georgia Tech Research Corporation**	**235,000**	**0**	**Georgia Tech Research Corporation**	**235,000**	**235,000**
12-C-AJFE-GIT-107	**Geospatially Driven Noise Estimation Module – 9**	**Georgia Tech Research Corporation**	**249,999**	**0**	**Georgia Tech Research Corporation**	**249,999**	**83,333**
12-C-AJFE-GIT-108	**Aircraft Technology Modeling and Assessment – 10**	**Georgia Tech Research Corporation**	**700,000**	**0**	**Georgia Tech Research Corporation**	**700,000**	**233,333**
12-C-AJFE-GIT-109	**Noise Certification Streamlining – 61**	**Georgia Tech Research Corporation**	**250,000**	**0**	**Georgia Tech Research Corporation**	**250,000**	**83,333**
12-C-AJFE-GIT-110	**Modeling and Measurements of Supersonic Civil Transport Jet Noise – 59b**	**Georgia Tech Research Corporation**	**250,000**	**0**	**Georgia Tech Research Corporation**	**250,000**	**250,000**
12-C-AJFE-GIT-111	**Jet noise modeling to support low noise supersonic aircraft technology development – 59A**	**Georgia Tech Research Corporation**	**100,000**	**0**	**Georgia Tech Research Corporation**	**100,000**	**33,333**
13-C-AJFE-MIT-086	**Contrail Avoidance Decision Support and Evaluation – 78**	**Massachusetts Institute of Technology**	**550,000**	**0**	**Massachusetts Institute of Technology**	**550,000**	**550,000**
13-C-AJFE-MIT-087	**Analysis to Support the Development of an Engine nvPM Emissions Standard – 48**	**Massachusetts Institute of Technology**	**200,000**	**0**	**Massachusetts Institute of Technology**	**200,000**	**200,000**
13-C-AJFE-MIT-088	**Alternative Jet Fuels Supply Chain Analysis – 1**	**Massachusetts Institute of Technology**	**450,000**	**0**	**Massachusetts Institute of Technology**	**450,000**	**450,000**
13-C-AJFE-MIT-089	**Improving Policy Analysis Tools to Evaluate Higher-Altitude Aircraft Operations – 58**	**Massachusetts Institute of Technology**	**150,000**	**0**	**Massachusetts Institute of Technology**	**150,000**	**150,000**

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13-C-AJFE-MIT-090	**Clean Sheet Supersonic Engine Design and Performance – 47**	**Massachusetts Institute of Technology**	**200,000**	**0**	**Massachusetts Institute of Technology**	**200,000**	**200,000**
13-C-AJFE-MIT-091	**Hydrogen and Power to Liquid (PtL) Concepts for SAF Production – 80**	**Massachusetts Institute of Technology**	**150,000**	**0**	**Massachusetts Institute of Technology**	**150,000**	**150,000**
13-C-AJFE-PSU-078	**Combustor Wall Cooling Concepts for Dirt Mitigation – 68**	**Pennsylvania State University**	**150,000**	**0**	**Pennsylvania State University**	**150,000**	**50,000**
13-C-AJFE-PSU-079	**Novel Noise Liner Development Enabled by Advanced Manufacturing – 79**	**Pennsylvania State University**	**299,867**	**0**	**Pennsylvania State University**	**299,867**	**322,821**
13-C-AJFE-PSU-080	**Measurements to Support Noise Certification for UAS/UAM Vehicles and Identify Noise Reduction – 77**	**Pennsylvania State University**	**500,000**	**0**	**Pennsylvania State University**	**500,000**	**500,491**
13-C-AJFE-PSU-081	**Rotorcraft Noise Abatement Procedures Development – 38**	**Pennsylvania State University**	**150,000**	**0**	**Pennsylvania State University**	**150,000**	**75,000**
13-C-AJFE-PSU-082	**Urban Air Mobility Noise Reduction Modeling – 49**	**Pennsylvania State University**	**280,000**	**0**	**Pennsylvania State University**	**280,000**	**93,334**
13-C-AJFE-PSU-083	**Noise Model Validation for AEDT – 62**	**Pennsylvania State University**	**140,000**	**0**	**Pennsylvania State University**	**140,000**	**46,667**
13-C-AJFE-PSU-084	**Jet noise modeling to support low noise supersonic aircraft technology development – 59E**	**Pennsylvania State University**	**100,000**	**0**	**Pennsylvania State University**	**100,000**	**33,335**
13-C-AJFE-PU-045	**Impact of Fuel Heating on Combustion Performance and Emissions – 67**	**Purdue University**	**250,000**	**0**	**Purdue University**	**250,000**	**250,000**
13-C-AJFE-PU-046	**Alternative Jet fuel supply Chain Analysis – CORSIA Fuel Support – 1**	**Purdue University**	**350,000**	**0**	**Purdue University**	**350,000**	**350,000**

FAA Centers of Excellence
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Grant Number	Research Projects	Center of Excellence Award Recipients	FAA Grant Award – Subject to Matching Requirement	Total Sub-Award Amount	Non-Federal Organizations Providing Match (Source of Matching Funds)	Amount/Value of Contribution (FY 2021)	Total Matching Amount
13-C-AJFE-MST-019	**Ambient Conditions Corrections for Non-volatile PM Emissions Measurements – 2**	**The Curators of the Univ. of Missouri - Rolla**	**521,246**	**0**	**The Curators of the Univ. of Missouri - Rolla**	**521,246**	**521,246**
13-C-AJFE-MST-020	**Transitioning a Research nvPM Mass Calibration Procedure to Operations – 69**	**The Curators of the Univ. of Missouri - Rolla**	**100,853**	**0**	**The Curators of the Univ. of Missouri - Rolla**	**100,853**	**100,853**
13-C-AJFE-BU-025	**Improved Engine Fan Broadband Noise Prediction Capabilities – 75**	**Trustees of Boston University, BUMC**	**300,000**	**0**	**Trustees of Boston University, BUMC**	**300,000**	**300,000**
13-C-AJFE-BU-026	**Community Measurements of Aviation Emissions Contribution to Ambient Air Quality – 18**	**Trustees of Boston University, BUMC**	**599,371**	**0**	**Trustees of Boston University, BUMC**	**599,371**	**599,371**
13-C-AJFE-UD-038	**Alternative Jet Fuels Test and Evaluation – 31**	**University of Dayton Research Institute**	**499,784**	**0**	**University of Dayton Research Institute**	**499,784**	**499,784**
13-C-AJFE-UD-039	**Evaluation of High Thermal Stability Fuels – 66**	**University of Dayton Research Institute**	**100,000**	**0**	**University of Dayton Research Institute**	**100,000**	**21,291**
13-C-AJFE-UD-040	**Fuel Composition Impact on Combustor Durability – 73**	**University of Dayton Research Institute**	**199,865**	**0**	**University of Dayton Research Institute**	**199,865**	**199,865**
13-C-AJFE-UH-017	**Alternative Jet Fuel Supply Chain Analysis – Tropical Region Analysis – 1**	**University of Hawaii**	**100,000**	**0**	**University of Hawaii**	**100,000**	**100,000**
13-C-AJFE-UNC-016	**Development of Aviation Air Quality Tools for Airport-Specific Impact Assessment – 19**	**University of North Carolina at Chapel Hill**	**650,000**	**0**	**University of North Carolina at Chapel Hill**	**650,000**	**650,000**
13-C-AJFE-UTENN-016	**Techno Market Analysis of US Biorefinery Supply Chains from Feedstock to Alternative Jet Fuels – 1**	**University of Tennessee**	**100,000**	**0**	**University of Tennessee**	**100,000**	**100,000**
13-C-AJFE-WASU-030	**Alternative Jet Fuel Supply Chain Analysis – 1**	**Washington State University**	**412,313**	**0**	**Washington State University**	**412,313**	**137,438**

FAA Centers of Excellence
Alternative Jet Fuels and Environment Grant Awards
Fiscal Year 2021
(In dollars)
Core Members: 16 Industry Members: Approximately 60
Cooperative Agreement Period of Performance: 2013–2021

Grant Number	Research Projects	Center of Excellence Award Recipients	FAA Grant Award – Subject to Matching Requirement	Total Sub-Award Amount	Non-Federal Organizations Providing Match (Source of Matching Funds)	Amount/Value of Contribution (FY 2021)	Total Matching Amount
13-C-AJFE-WASU-031	**Hydrogen production alternatives for Sustainable Aviation Fuel (SAF) production – 80**	**Washington State University**	**450,000**	**0**	**Washington State University**	**450,000**	**150,000**
		Total	**14,438,292**	**0**		**14,438,292**	**11,154,905**

Please note: Due to the impact of COVID-19 on the ability to generate matching contributions previously committed, the Administrator exercised his authority to grant relief to the one-to- one matching requirements and to provide up to 75 percent federal share as requested by COE grant recipients on a case-by-case basis.

Alternative Jet Fuels and Environment
Total Funding Awarded by Fiscal Year
(In Millions of Dollars)

Fiscal Year	Funding Level
FY 2013	0.1
FY 2014	9.3
FY 2015	10.6
FY 2016	9.4
FY 2017	9.8
FY 2018	3.1
FY 2019	7.7
FY 2020	34.2
FY 2021	14.4
Total	**98.6**

FAA Centers of Excellence
General Aviation Safety, Accessibility, and Sustainability Grant Awards
Fiscal Year 2021
(In dollars)
Core Members: 6 Industry Members: Approximately 35
Cooperative Agreement Period of Performance: 2012–2020

Grant Number	Research Projects	Center of Excellence Award Recipients	FAA Grant Award - Subject to Matching Requirement	Total Sub-Award Amount	Non-Federal Organizations Providing Match (Source of Matching Contribution)	Amount/Value of Contribution (FY 2021)	Total Matching Amount
12-C-GA-FIT-045	**Rotorcraft Wire Strike – 32**	**Florida Institute of Technology**	**15,000**	**0**	**Florida Institute of Technology**	**15,000**	**15,000**
12-C-GA-FIT-048	**Management and Administration of COE – 0**	**Florida Institute of Technology**	**5,000**	**0**	**Florida Institute of Technology**	**5,000**	**5,000**
12-C-GA-FIT-049	**Augmented Weather Interfaces Project (AWIP) – 33**	**Florida Institute of Technology**	**36,713**	**0**	**Florida Institute of Technology**	**36,713**	**36,713**
12-C-GA-GIT-053	**Rotorcraft Wire Strike – 32**	**Georgia Tech Research Corporation**	**170,000**	**0**	**Georgia Tech Research Corporation**	**170,000**	**170,000**
12-C-GA-GIT-055	**Management and Administration of COE – 0**	**Georgia Tech Research Corporation**	**5,000**	**0**	**Georgia Tech Research Corporation**	**5,000**	**5,000**
12-C-GA-GIT-056	**Rotorcraft Aviation Safety Information Analysis & Sharing**	**Georgia Tech Research Corporation**	**167,500**	**0**	**Georgia Tech Research Corporation**	**167,500**	**167,500**
12-C-GA-ISU-046	**Rotorcraft Wire Strike – 32**	**Iowa State University of Science and Technology**	**130,000**	**0**	**Iowa State University of Science and Technology**	**130,000**	**130,000**
12-C-GA-ISU-048	**Management and Administration of COE – 0**	**Iowa State University of Science and Technology**	**5,000**	**0**	**Iowa State University of Science and Technology**	**5,000**	**5,000**
12-C-GA-OSU-067	**Management and Administration of COE – 0**	**The Ohio State University**	**5,000**	**0**	**The Ohio State University**	**5,000**	**5,000**
12-C-GA-PU-102	**Augmented Weather Interfaces Project (AWIP) – 33**	**Purdue University**	**27,724**	**0**	**Purdue University**	**27,724**	**27,724**
12-C-GA-PU-103	**Management and Administration of COE – 0**	**Purdue University**	**135,000**	**0**	**Purdue University**	**135,000**	**135,000**
12-C-GA-TEES-039	**Management and Administration of COE – 0**	**Texas A&M Engineering Experiment Station**	**5,000**	**0**	**Texas A&M Engineering Experiment Station**	**5,000**	**5,000**
		Total	**706,937**	**0**		**706,937**	**706,937**

Please note: Due to the impact of COVID-19 on the ability to generate matching contributions previously committed, the Administrator exercised his authority to grant relief to the one-to- one matching requirements and to provide up to 75 percent federal share as requested by COE grant recipients on a case-by-case basis.

General Aviation Safety, Accessibility, and Sustainability
Total Funding Awarded by Fiscal Year
(In Millions of Dollars)

Fiscal Year	Funding Level
FY 2012	0.5
FY 2013	1.7
FY 2014	3.2
FY 2015	3.1
FY 2016	3.7
FY 2017	3.3
FY 2018	0.3
FY 2019	2.0
FY 2020	0.8
FY 2021	0.7
Total	**19.3**

FAA Centers of Excellence
Commercial Space Transportation (CST) Grant Awards
Fiscal Year 2020
(In dollars)
Core Members: 10 Industry Members: Approximately 35
Cooperative Agreement Period of Performance: 2010–2020

Grant Number	Research Projects	Center of Excellence Award Recipients	FAA Grant Award	Total Sub-Award Amount	Non-Federal Organizations Providing Match (Source of Matching Contribution)	Amount/Value of Contribution (FY20)	Total Matching Amount
15-C-CST-UC-026	**CubeSat Cluster Deployment Tracking**	**University of Colorado Boulder**	**173,653**	**0**	**University of Colorado Boulder**	**173,653**	**173,653**
15-C-CST-UTMB-023	**Development of Commercial Space Occupational Medicine Health Standards**	**University of Texas Medical Branch At Galveston**	**191,803**	**0**	**University of Texas Medical Branch At Galveston**	**191,803**	**191,803**
15-C-CST-UC-27	**FAA COE CST Executive Director and Administration**	**University of Colorado Boulder**	**716,667**	**0**	**University of Colorado Boulder**	**716,667**	**716,667**
15-C-CST-FSU-010	**High Temp Pressure Sensor**	**Florida State University**	**203,313**	**0**	**Florida State University**	**203,313**	**203,313**
15-C-CST-FIT-013	**Human Input Systems for Commercial Space Transportation**	**Florida Institute of Technology**	**160,000**	**0**	**Florida Institute of Technology**	**160,000**	**160,000**
15-C-CST-UCF-012	**LED-based Low Cost Gas Sensor for Crew and Vehicle Safety**	**University of Central Florida**	**178,800**	**0**	**University of Central Florida**	**178,800**	**178,800**
15-C-CST-UC-25	**Mapping Life Support System Functions and Technologies to Commercial Spaceflight Applications**	**University of Colorado Boulder**	**149,799**	**0**	**University of Colorado Boulder**	**149,799**	**149,799**
15-C-CST-FIT-015	**Measurements of Thunderstorm Electrical Parameters For Improvement of the Lightning Flight Commit Criteria**	**Florida Institute of Technology**	**163,822**	**0**	**Florida Institute of Technology**	**163,822**	**163,822**
15-C-CST-UCF-011	**Novel Techniques for Efficient Uncertainty Quantification, Probability of Collision and Benchmarking in Space**	**University of Central Florida**	**87,414**	**0**	**University of Central Florida**	**87,414**	**87,414**
15-C-CST-NMT-021	**OMIS Integration and COE Program Support**	**New Mexico Institute of Mining and Technology**	**150,000**	**0**	**New Mexico Institute of Mining and Technology**	**150,000**	**150,000**
15-C-CST-FSU-09	**Optical Measurements of Rocket Nozzle Thrust and Noise**	**Florida State University**	**198,984**	**0**	**Florida State University**	**198,984**	**198,984**
15-C-CST-UC-24	**Resident Space Object System Mechanics**	**University of Colorado Boulder**	**89,185**	**0**	**University of Colorado Boulder**	**89,185**	**89,185**

FAA Centers of Excellence
Commercial Space Transportation (CST) Grant Awards
Fiscal Year 2020
(In dollars)
Core Members: 10 Industry Members: Approximately 35
Cooperative Agreement Period of Performance: 2010–2020

Grant Number	Research Projects	Center of Excellence Award Recipients	FAA Grant Award	Total Sub-Award Amount	Non-Federal Organizations Providing Match (Source of Matching Contribution)	Amount/Value of Contribution (FY20)	Total Matching Amount
15-C-CST-FIT-012	**Small Launch Vehicle Sector (SLVS): Industry Dynamics and Public Policy**	**Florida Institute of Technology**	**149,734**	**0**	**Florida Institute of Technology**	**149,734**	**149,734**
15-C-CST-NMSU-08	**Space Object Database**	**The Regents New Mexico State University**	**204,533**	**0**	**The Regents New Mexico State University**	**204,533**	**204,533**
15-C-CST-NMSU-08	**Spaceport Operations Online Reference Guide: Spaceport Industry Study**	**The Regents New Mexico State University**	**101,908**	**0**	**The Regents New Mexico State University**	**101,908**	**101,908**
15-C-CST-NMSU-07	**Spaceport Ops Online Reference Guide**	**The Regents New Mexico State University**	**101,589**	**0**	**The Regents New Mexico State University**	**101,589**	**101,589**
15-C-CST-FIT-014	**Streamlined Export Control for Commercial Space Transportation**	**Florida Institute of Technology**	**160,000**	**0**	**Florida Institute of Technology**	**160,000**	**160,000**
15-C-CST-NMT-022	**Structural Health Monitoring Framework**	**New Mexico Institute of Mining and Technology**	**200,000**	**0**	**New Mexico Institute of Mining and Technology**	**200,000**	**200,000**
15-C-CST-UCF-010	**Ultra High Temperature Composites Thermal Protection Systems**	**University of Central Florida**	**47,909**	**0**	**University of Central Florida**	**47,909**	**47,909**
		Total	**3,429,113**	**0**		**3,429,113**	**3,429,113**

Please note: Due to the impact of COVID-19 on the ability to generate matching contributions previously committed, the Administrator exercised his authority to grant relief to the one-to- one matching requirements and to provide up to 75% federal share as requested by COE grant recipients on a case-by-case basis.

Commercial Space Transportation
Total Funding Awarded by Fiscal Year
(In millions of dollars)

Fiscal Year	Funding Level
FY 2010	2.0
FY 2011	1.1
FY 2012	1.1
FY 2013	1.1
FY 2014	1.1
FY 2015	1.3
FY 2016	1.2
FY 2017	1.3
FY 2018	0.8
FY 2019	0.0
FY 2020	3.4
FY 2021	0.0
Total	**14.4**

FAA Centers of Excellence
Joint COE for Advanced Materials (JAMS) Grant Awards
Fiscal Year 2021
(In dollars)
Core Members: 9 Industry Members: Approximately 50
Cooperative Agreement Period of Performance: 2004–2021

Grant Number	Research Projects	Center of Excellence Award Recipients	FAA Grant Award - Subject to Matching Requirement	Total Sub-Award Amount	Non-Federal Organizations Providing Match (Source of Matching Contribution)	Amount/Value of Contribution (FY21)	Total Matching Amount
12-AM-MSU-007	**Technology Readiness Assessment for Stitched and Unstitched Resin Infused Composites**	**Mississippi State University**	**1,500,000**	**0**	**Mississippi State University**	**1,500,000**	**1,500,000**
12-AM-MSU-008	**Effects of New Jet Fuel Exposure & Post-Crash Fire Forensic Analysis on Aerospace Composites**	**Mississippi State University**	**499,999**	**0**	**Mississippi State University**	**499,999**	**499,999**
12-AM-WISU-154	**Additive Manufacturing Guidance for Aircraft Design and Certification**	**Wichita State University**	**4,500,000**	**0**	**Wichita State University**	**4,500,000**	**4,500,000**
12-AM-WISU-155	**Adhesive Bond Qualification Guidance for Aircraft Design and Certification**	**Wichita State University**	**900,000**	**0**	**Wichita State University**	**900,000**	**900,000**
12-AM-WISU-156	**Advanced Fiber Reinforced Polymer Composite Materials Guidance for Aircraft Design, Certification, and Process Control**	**Wichita State University**	**700,000**	**0**	**Wichita State University**	**700,000**	**700,000**
12-AM-WISU-157	**Development of Higher-Level Building Block Testing Standards**	**Wichita State University**	**700,000**	**0**	**Wichita State University**	**700,000**	**700,000**
12-AM-WISU-158	**Thermoplastic Welding Process Qualification Protocols for Aircraft Design and Certification**	**Wichita State University**	**350,000**	**0**	**Wichita State University**	**350,000**	**350,000**
12-AM-WISU-159	**Investigation of Static Strength Variability between Composites and Metallic with respect to Overload Factors**	**Wichita State University**	**100,000**	**0**	**Wichita State University**	**100,000**	**100,000**
12-C-AM-AU-005	**Surface Integrity of Additively Manufactured Ti-6A1-4V Parts**	**Auburn University**	**1,500,000**	**0**	**Auburn University**	**1,500,000**	**1,500,000**
12-C-AM-MSU-009	**Technology Readiness Assessment for Stitched and Unstitched Resin Infused Composites – Phase II**	**Mississippi State University**	**2,000,000**	**0**	**Mississippi State University**	**2,000,000**	**2,000,000**
12-C-AM-UW-054	**Characterizing Mechanical Property Variability in Ti6A14V produced by Laser Powder Bed Fusion (LPBF) Additive Manufacturing**	**University of Washington**	**753,440**	**0**	**University of Washington**	**753,440**	**753,440**
12-C-AM-WISU-161	**Airframe Crashworthiness Testing and Simulation**	**Wichita State University**	**36,500**	**0**	**Wichita State University**	**36,500**	**36,500**

FAA Centers of Excellence
Joint COE for Advanced Materials (JAMS) Grant Awards
Fiscal Year 2021
(In dollars)
Core Members: 9 Industry Members: Approximately 50
Cooperative Agreement Period of Performance: 2004–2021

Grant Number	Research Projects	Center of Excellence Award Recipients	FAA Grant Award - Subject to Matching Requirement	Total Sub-Award Amount	Non-Federal Organizations Providing Match (Source of Matching Contribution)	Amount/Value of Contribution (FY21)	Total Matching Amount
12-C-AM-WISU-162	**Effects of the use of cleaning and disinfectants chemicals/processes in the mechanical and flammability characteristics of aircraft interior**	**Wichita State University**	**239,386**	**0**	**Wichita State University**	**239,386**	**239,386**
12-C-AM-WISU-165	**Wind Tunnel Testing Services**	**Wichita State University**	**32,634**	**0**	**Wichita State University**	**32,634**	**32,634**
12-C-AM-WISU-166	**Effects of the use of cleaning and disinfectants chemicals/processes in the mechanical and flammability characteristics of aircraft interior**	**Wichita State University**	**84,227**	**0**	**Wichita State University**	**84,227**	**84,227**
12-C-AM-WISU-167	**Electric Vertical Takeoff and Landing (eVTOL) Crashworthiness: An Integrated Safety Approach**	**Wichita State University**	**249,883**	**0**	**Wichita State University**	**249,883**	**249,883**
12-C-AM-WISU-168	**Evaluation of Aged Structural Bonds on Rotor Blades**	**Wichita State University**	**650,000**	**0**	**Wichita State University**	**650,000**	**650,000**
12-C-AM-WISU-169	**Development for Process Specification and Quality Assurance of Slit Tape for Automated Fiber Placement**	**Wichita State University**	**400,000**	**0**	**Wichita State University**	**400,000**	**400,000**
12-C-AM-WISU-170	**Development of Higher-Level Building Block Testing Standards**	**Wichita State University**	**900,000**	**0**	**Wichita State University**	**900,000**	**900,000**
12-C-AM-WISU-171	**Advanced Fiber Reinforced Polymer Composite Materials Guidance for Aircraft Design, Certification and Process Control**	**Wichita State University**	**550,000**	**0**	**Wichita State University**	**550,000**	**550,000**
12-C-AM-WISU-172	**Ceramic Matrix Composite (CMC) Materials Guidelines for Aircraft Design and Certification**	**Wichita State University**	**750,000**	**0**	**Wichita State University**	**750,000**	**750,000**
12-C-AM-WISU-173	**Development of Guidance for Technical Standard Order (TSO) for Composite Materials**	**Wichita State University**	**500,000**	**0**	**Wichita State University**	**500,000**	**500,000**
12-C-AM-WISU-174	**Additive Manufacturing Guidance for Aircraft Design and Certification**	**Wichita State University**	**3,000,000**	**0**	**Wichita State University**	**3,000,000**	**3,000,000**
12-C-AM-WISU-175	**Effects of cleaning & disinfectants chemicals/processes in the mechanical & flammability characteristics of aircraft interior**	**Wichita State University**	**302,740**	**0**	**Wichita State University**	**302,740**	**302,740**
		Total	**21,198,809**	**0**		**21,198,809**	**21,198,809**

Please note: Due to the impact of COVID-19 on the ability to generate matching contributions previously committed, the Administrator exercised his authority to grant relief to the one-to- one matching requirements and to provide up to 75 percent federal share as requested by COE grant recipients on a case-by-case basis.

Joint COE for Advanced Materials
Total Funding Awarded by Fiscal Year
(In millions of dollars)

Fiscal Year	Funding Level
FY 2004	2.4
FY 2005	2.7
FY 2006	2.8
FY 2007	1.4
FY 2008	3.7
FY 2009	2.0
FY 2010	2.5
FY 2011	2.3
FY 2012	2.2
FY 2013	1.8
FY 2014	2.4
FY 2015	2.4
FY 2016	5.6
FY 2017	4.9
FY 2018	1.5
FY 2019	5.2
FY 2020	14.9
FY 2021	21.2
Total	**81.9**

Attachment III - Fiscal Year 2021 Contract Awards

Appendix A - COE for Unmanned Aircraft Systems
Appendix B - COE for General Aviation Safety, Accessibility, and Sustainability

FAA Centers of Excellence
Unmanned Aircraft Systems - ASSURE Contract Awards
Fiscal Year 2021
(In dollars)

Contract Number	Title of Research	COE Award Recipients	FAA Award Amount	Sub-Award Recipients	Total Sub-Award Amounts	Source of Matching Contribution	Amount/Value of Contribution (FY 2021)
		University of Alabama-Huntsville	**324,477**		**0**	**0**	**0**
		Total	**324,477**		**0**	**0**	**0**

Note: Contracts are awarded by (Acquisitions and Contracting Division). The requirements of the Indefinite Delivery Indefinite Quantity contracts determined the award amounts and matching contributions.

Unmanned Aircraft Systems - ASSURE
Total Contract Funding Awarded by Fiscal Year
(In millions of Dollars)

Fiscal Year	Funding Level
FY 2018	0.1
FY 2019	2.0
FY 2020	0.0
FY 2021	0.3
Total	**2.4**

FAA Centers of Excellence (COE)
General Aviation (GA) Contract Awards
Fiscal Year 2021

Contract Number	Title of Research	COE Award Recipients	FAA Award Amount	Sub-Award Recipients	Total Sub-Award Amounts	Source of Matching Contribution	Amount/Value of Contribution (FY 2021)
	None awarded in FY21		**0**		**0**	**0**	**0**
		Total	**0**		**0**	**0**	**0**

Note: Contracts are awarded by (Acquisitions and Contracting Division). The requirements of the Indefinite Delivery Indefinite Quantity contracts determined the award amounts.

General Aviation
Total Contract Funding Awarded by Fiscal Year
(In millions of Dollars)

Fiscal Year	Funding Level
FY 2012	0.0
FY 2013	0.1
FY 2014	1.6
FY 2015	1.8
FY 2016	0.0
FY 2017	0.0
FY 2018	0.06
FY 2019	0.05
FY 2020	0.0
FY 2021	0.0
Total	**3.61**