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

Office of the Administrator

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

February 15, 2022

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

Dear Chair Cantwell:

As directed by the Federal Aviation Administration (FAA) Modernization and Reform Act of 2012 (P.L. 112-95), I am pleased to provide you with a report on the FAA Centers of Excellence (COE) program for Fiscal Year (FY) 2020.

In accordance with Section 44513(h), FAA is required 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 contains COE program descriptions, narratives for each of the six active COEs, and attachments that list the required details of the FY 2020 awards and COE funding summaries.

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,

Steve Dickson
Administrator

Enclosure

U.S. Department
of Transportation

**Federal Aviation
Administration**

Office of the Administrator

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

February 15, 2022

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

Dear Ranking Member Wicker:

As directed by the Federal Aviation Administration (FAA) Modernization and Reform Act of 2012 (P.L. 112-95), I am pleased to provide you with a report on the FAA Centers of Excellence (COE) program for Fiscal Year (FY) 2020.

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Sincerely,

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Office of the Administrator

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

February 15, 2022

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

Dear Chair Johnson:

As directed by the Federal Aviation Administration (FAA) Modernization and Reform Act of 2012 (P.L. 112-95), I am pleased to provide you with a report on the FAA Centers of Excellence (COE) program for Fiscal Year (FY) 2020.

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Sincerely,

Steve Dickson
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**Federal Aviation
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Office of the Administrator

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

February 15, 2022

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

Dear Ranking Member Lucas:

As directed by the Federal Aviation Administration (FAA) Modernization and Reform Act of 2012 (P.L. 112-95), I am pleased to provide you with a report on the FAA Centers of Excellence (COE) program for Fiscal Year (FY) 2020.

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

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Steve Dickson
Administrator

Enclosure

Federal Aviation Administration

Air Transportation Centers of Excellence

Congressional Report

Fiscal Year 2020

Contents

Congressional Report - Fiscal Year 2020

Federal Aviation Administration
Air Transportation Centers of Excellence Program
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Background

Congress mandated the establishment of the Federal Aviation Administration (FAA) Air Transportation Centers of Excellence (COE) in the Omnibus Budget Reconciliation Act of 1990 Public Law (P.L.) 101-508, Title IX – Transportation, Section 9209 – Aviation Research and Centers of Excellence. Subsequently, the FAA Modernization and Reform Act of 2012 (P.L. 112-95), Section 907 (b), amended Section §44513 of Title 49, *United States Code*, by adding that the FAA Administrator shall transmit annually, to specified Congressional committees, a report that lists:

- Research projects that have been initiated by each center in the preceding year
- Amount of funding for each research project and the funding source
- Institutions participating in each research project and their shares of the overall funding for each project
- 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 among government, academia, and industry to advance aviation technologies and expand the FAA's 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 a COE team. The FAA Administrator and the Secretary of Transportation have used these criteria to select COE teams throughout the United States over the past two decades. After an open and rigorous competitive process a COE team is selected. COE members then generate one-to-one matching contributions from non-federal sources to augment the FAA's research capabilities.

COE Results

The first COE grants were awarded in 1993. Since this time, the FAA has established 13 COE teams — including 92 core universities. With their non-federal affiliates, COE partners were required to provide more than $412 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. Students have gained valuable hands-on experience applicable to aviation and aerospace careers while producing more than 3,000 doctoral dissertations and theses.

Determining Funding Levels

The 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 recompeted. 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 Recompeted COE

The COE team for Airworthiness Assurance and the COE team for Computational Modeling of Aircraft Structures have closed. The COE team for Aircraft Noise and Emissions Mitigation was recompeted and replaced by the COE team for Alternative Jet Fuels and Environment. The COE team for General Aviation Research was recompeted and replaced by the COE team for General Aviation Safety, Accessibility and Sustainability.

Fiscal Year 2020 COE Activities

In Fiscal Year (FY) 2020 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 192 grant awards for approximately $67 million during FY 2020. The grants were awarded to 56 core universities in support of 142 projects.

Matching contributions from industry and other non-federal sources would generally provide a minimum of $67 million to offset the cost of conducting mission-critical research with COE partners. The aviation and academic communities' contributions may be reduced to the allowable extent as discussed in the next section.

Grant Federal Cost Share

The FAA Administrator received legislative authority in 2012 to provide for 75 percent federal share of grant awards as circumstances may require. Due to the challenges of unforeseen circumstances caused by the economic downturn in Fiscal Year 2020 throughout the aviation and academic communities, the FAA has prepared to exercise the Administrator's authority by developing a new process to provide matching relief as required.

COE Narratives

The following sections contain descriptions for each of the active COE teams. Attachments to this document list grant and contract awards executed during FY 2020 with current university members of each COE team. Required matching contributions are included in the attachments in accordance with P.L.101-508.

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 2020 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 2020 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 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 under four years of operation, the center has already 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 2020, the FAA awarded grants to three core members totaling approximately $0.3 million (see Attachment II, Appendix A). Members matched grant awards dollar-for-dollar from non-federal sources in keeping with statutory requirements. Based on the competitive process used to select the COE team, 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 and Innovation.

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 quickly, safely, and efficiently integrate unmanned aircraft systems into the National Airspace System (NAS) with minimal changes to current operations. 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 2020 the FAA awarded grants to 13 of the core members totaling approximately $13.4 million (see Attachment II, Appendix B). Members matched grant awards dollar-for-dollar from non-federal sources in keeping with statutory requirements. Based on the competitive process used to select the COE UAS team, the FAA also executed IDIQ contracts to procure deliverables for the government's sole benefit. In FY 2020, the FAA did not award Contract Task Orders to COE UAS members through the IDIQ contract vehicle (see Attachment III, Appendix A).

The COE UAS team's research projects align with the DOT strategic goals of Safety, Innovation, and Accountability.

For additional information, 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 Infrastructure, Innovation, and Accountability. 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 2020, the FAA awarded grants to 16 core members totaling approximately $34.2 million (see Attachment II, Appendix C). Members matched grant awards dollar-for-dollar from non-federal sources in keeping with statutory requirements. 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 team's 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 2020, the FAA awarded grants to all six of its core members totaling approximately $0.8 million (see Attachment II, Appendix D). Members matched grant awards dollar-for-dollar from non-federal sources in keeping with statutory requirements. Based on the competitive process used to select the COE GA team, the FAA also executed IDIQ contracts to procure deliverables for the government's sole benefit. In FY 2020, 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, Infrastructure, Innovation, and Accountability.

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 primary mission of the FAA's Office of Commercial Space Transportation (AST) is to regulate commercial space launch and reentry operations, to the extent necessary, to ensure compliance with international obligations of the U.S., and to protect the public health and safety, safety of property, and national security and foreign policy interests of the United States. AST's secondary mission is to encourage, facilitate, and promote 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 is focused on 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, 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 in the accomplishment of the dual regulatory and promotional missions of the FAA AST
  - 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 2020, the FAA awarded grants to all ten of its core members totaling approximately $3.4 million (see Attachment II, Appendix D). Members match grant awards dollar-for-dollar from non-federal sources in keeping with statutory requirements.

Research projects conducted by the COE CST team align with DOT strategic goals of Safety, Infrastructure, Innovation, and Accountability. 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 FAA Administrator and Secretary of Transportation selected the Joint COE team for Advanced Materials (JAMS) in 2004. In compliance with the FAA Reauthorization Act of 2018 (Sec. 762), the FAA continues operation of the Joint COE for Advanced Materials. The COE team conducts research and development on the following topics to ensure the safe use of advanced materials in aircraft products:

- Damage tolerance
- Maintenance practices
- Crashworthiness
- Environmental effects
- Structural integrity of adhesively bonded structures
- Continued operational safety and certification efficiency for emerging technologies
- Additive manufacturing.

Recent increases in the use of advanced materials in commercial and civil aircraft require a proactive approach to maintain safe operations in the NAS. While traditional metals used in aircraft have nearly a century of usage and associated lessons learned regarding material behavior, the same cannot be said about advanced materials like composites and additive manufacturing. This COE team is conducting research to addresses this gap and add to the knowledge base in this important area. The FAA uses this research to develop regulations, policy, and guidance material for FAA employees and the aircraft industry.

The COE team also supports publication of the Composite Materials Handbook-17 (CMH-17), the authoritative worldwide focal point for technical information on composites and additively manufactured structures. As an industry-wide global standard, the document provides information and guidance necessary to design and fabricate end items from composite materials. The handbook helps standardize testing and engineering data development methodologies for current and emerging composite materials.

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 2020, the FAA awarded grants to six core members totaling approximately $14.9 million (see Attachment II, Appendix F). Members match grant awards dollar-for-dollar from non-federal sources in keeping with statutory requirements.

The JAMS COE team’s research projects align with DOT strategic goals of Safety, Innovation, and Accountability.

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

Attachment I - Summary Table
Centers of Excellence Grant and Contracts Awards
FY 2019 – FY 2020

CENTER OF EXCELLENCE	Grants		Contracts	
	FY 2019	FY 2020	FY 2019	FY 2020
Technical Training and Human Performance (TTHP)	$1,976,527	$298,709	$0	$0
Unmanned Aircraft Systems (UAS)	$3,532,507	$13,363,638	$2,029,200	$0
Alternative Jet Fuels and Environment (AJFE)	$7,685,041	$34,159,355	$0	$0
General Aviation (GA)	$2,008,423	$779,207	$49,038	$0
Commercial Space Transportation (CST)	$0	$3,429,113	$ 0	$0
Joint Center of Excellence for Advanced Materials (JAMS)	$5,203,186	$14,923,227	$0	$0
TOTAL	**$20,405,684**	**$66,953,249**	**$2,078,238**	**$0**

Attachment II - Fiscal Year 2020 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

FAA Centers of Excellence (COE)
Technical Training and Human Performance Grant Awards
Fiscal Year 2020
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 2020)	Total Matching Amount
16-C-TTHP-OK-038	**Improvements of Flight Inspection Antenna Modeling and Simulation**	**The University of Oklahoma**	**$100,000**	**$0**	**The University of Oklahoma**	**$100,000**	**$100,000**
16-C-TTHP-OKSU-006	**UAS Combat Flight Inspection Project Plan**	**Oklahoma State University**	**$29,872**	**$0**	**Oklahoma State University**	**$29,872**	**$29,872**
16-C-TTHP-WISU-020	**UAS Combat Flight Inspection Project Plan**	**Wichita State University**	**$3,000**	**$0**	**Wichita State University**	**$3,000**	**$3,000**
16-C-TTHP-WISU-021	**Wichita State University (WISU) Administrative Program Management**	**Wichita State University**	**$155,837**	**$0**	**Wichita State University**	**$155,837**	**$155,837**
16-C-TTHP-WISU-022	**Improvements of Flight Inspection Antenna Modeling and Simulation**	**Wichita State University**	**$10,000**	**$0**	**Wichita State University**	**$10,000**	**$10,000**
		Total	**$298,709**	**$0**	**Total**	**$298,709**	**$298,709**

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

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
FY 2019	$2.0
FY 2020	$0.30
Total	**$8.80**

Attachment II Appendix A

FAA Centers of Excellence
Unmanned Aircraft Systems (UAS) ASSURE Grant Awards
Fiscal Year 2020
Core Members: 15 Industry Members: Approximately 40
Cooperative Agreement Period of Performance: 2015–2021

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 2020)	Total Matching Amount
15-C-UAS-ERAU-017	**Urban Air Mobility (UAM): Safety Standards, Aircraft Certification and Impact on Market Feasibility and Growth Potentials**	**Embry-Riddle Aeronautical University**	**$249,923**	**$0**	**Embry-Riddle Aeronautical University**	**$249,923**	**$249,923**
15-C-UAS-MSU-049	**UAM: Safety Standards, Aircraft Certification and Impact on Market Feasibility and Growth Potentials**	**Mississippi State University**	**$315,000**	**$0**	**Mississippi State University**	**$315,000**	**$315,000**
15-C-UAS-NCSU-06	**UAM: Safety Standards, Aircraft Certification and Impact on Market Feasibility and Growth Potentials**	**North Carolina State University**	**$184,999**	**$0**	**North Carolina State University**	**$184,999**	**$184,999**
15-C-UAS-WISU-014	**UAM: Safety Standards, Aircraft Certification and Impact on Market Feasibility and Growth Potentials**	**Wichita State University**	**$450,000**	**$0**	**Wichita State University**	**$450,000**	**$450,000**
15-C-UAS-MSU-047	**ASSURE Phase I Year 6 Program Management**	**Mississippi State University**	**$1,290,410**	**$0**	**Mississippi State University**	**$1,290,410**	**$1,290,410**
15-C-UAS-KSU-010	**Develop Risk-Based Training and Standards for Operational Approval and Issuance**	**Kansas State University**	**$198,161**	**$0**	**Kansas State University**	**$198,161**	**$208,069**
15-C-UAS-UAF-010	**Develop Risk-Based Training and Standards for Operational Approval and Issuance**	**University of Alaska Fairbanks**	**$150,000**	**$0**	**University of Alaska Fairbanks**	**$150,000**	**$150,000**
15-C-UAS-UND-019	**Develop Risk-Based Training and Standards for Operational Approval and Issuance**	**University of North Dakota**	**$150,000**	**$0**	**University of North Dakota**	**$150,000**	**$157,500**
15-C-UAS-DU-07	**Establish UAS Pilot Proficiency Requirements**	**Drexel University**	**$192,000**	**$0**	**Drexel University**	**$192,000**	**$201,600**
15-C-UAS-KSU-011	**Establish UAS Pilot Proficiency Requirements**	**Kansas State University**	**$60,000**	**$0**	**Kansas State University**	**$60,000**	**$63,000**
15-C-UAS-ORSU-03	**Establish UAS Pilot Proficiency Requirements**	**Oregon State University**	**$248,000**	**$0**	**Oregon State University**	**$248,000**	**$260,400**

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Unmanned Aircraft Systems (UAS) ASSURE Grant Awards
Fiscal Year 2020
Core Members: 15 Industry Members: Approximately 40
Cooperative Agreement Period of Performance: 2015–2021

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 2020)	Total Matching Amount
15-C-UAS-KU-05	**Identify Wake Turbulence and Flutter Testing Requirements for UAS**	**University of Kansas**	**$800,000**	**$0**	**University of Kansas**	**$800,000**	**$800,000**
15-C-UAS-OSU-023	**Identify Wake Turbulence and Flutter Testing Requirements for UAS**	**The Ohio State University**	**$698,921**	**$0**	**The Ohio State University**	**$698,921**	**$733,868**
15-C-UAS-KSU-015	**Safety Risks and Mitigations for UAS Operations On and Around Airports**	**Kansas State University**	**$220,000**	**$0**	**Kansas State University**	**$220,000**	**$220,000**
15-C-UAS-NMSU-031	**Safety Risks and Mitigations for UAS Operations On and Around Airports**	**New Mexico State University**	**$320,000**	**$0**	**New Mexico State University**	**$320,000**	**$320,000**
15-C-UAS-UAF-017	**Safety Risks and Mitigations for UAS Operations On and Around Airports**	**University of Alaska Fairbanks**	**$401,999**	**$0**	**University of Alaska Fairbanks**	**$401,999**	**$401,999**
15-C-UAS-UAH-018	**Safety Risks and Mitigations for UAS Operations On and Around Airports**	**University of Alabama Huntsville**	**$219,815**	**$0**	**University of Alabama Huntsville**	**$219,815**	**$219,815**
15-C-UAS-UND-026	**Safety Risks and Mitigations for UAS Operations On and Around Airports**	**University of North Dakota**	**$320,000**	**$0**	**University of North Dakota**	**$320,000**	**$320,000**
15-C- UAS-UAH-017	**Science and Research Panel (SARP) Support**	**University of Alabama Huntsville**	**$70,383**	**$0**	**University of Alabama Huntsville**	**$70,383**	**$70,539**
15-C-UAS-ERAU-016	**UAS Standards Tracking, Mapping, and Analysis**	**Embry-Riddle Aeronautical University**	**$264,900**	**$0**	**Embry-Riddle Aeronautical University**	**$264,900**	**$264,900**
15-C-UAS-UND-024	**UAS Standards Tracking, Mapping, and Analysis**	**University of North Dakota**	**$235,000**	**$29,188**	**University of North Dakota**	**$235,000**	**$235,000**
15-C-UAS-MSU-048	**Transportation Disaster Preparedness and Response - Phase 1**	**Mississippi State University**	**$130,000**	**$0**	**Mississippi State University**	**$130,000**	**$130,000**
15-C-UAS-NCSU-05	**Transportation Disaster Preparedness and Response - Phase 1**	**North Carolina State University**	**$124,979**	**$0**	**North Carolina State University**	**$124,979**	**$125,000**

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15-C-UAS-NMSU-029	**Transportation Disaster Preparedness and Response - Phase 1**	**New Mexico State University**	**$233,999**	**$0**	**New Mexico State University**	**$234,000**	**$234,000**
15-C-UAS-ORSU-05	**Transportation Disaster Preparedness and Response - Phase 1**	**Oregon State University**	**$165,000**	**$0**	**Oregon State University**	**$165,000**	**$173,250**
15-C-UAS-UAF-016	**Transportation Disaster Preparedness and Response - Phase 1**	**University of Alaska-Fairbanks**	**$245,000**	**$0**	**University of Alaska-Fairbanks**	**$245,000**	**$245,000**
15-C-UAS-UAH-016	**Transportation Disaster Preparedness and Response - Phase 1**	**University of Alabama-Huntsville**	**$1,101,000**	**$289,000**	**University of Alabama-Huntsville**	**$1,101,000**	**$1,101,714**
15-C-UAS-NMSU-030	**Cybersecurity and Safety Literature Review**	**New Mexico State University**	**$150,000**	**$0**	**New Mexico State University**	**$150,000**	**$150,000**
15-C-UAS-ORSU-06	**Cybersecurity and Safety Literature Review**	**Oregon State University**	**$200,000**	**$0**	**Oregon State University**	**$200,000**	**$200,000**
15-C-UAS-UND-025	**Cybersecurity and Safety Literature Review**	**University of North Dakota**	**$144,238**	**$0**	**University of North Dakota**	**$144,238**	**$144,238**
15-C-UAS-UAF-011	**UAS Flight Data Collection and Analysis Phase II**	**University of Alaska Fairbanks**	**$25,000**	**$0**	**University of Alaska Fairbanks**	**$25,000**	**$25,000**
15-C-UAS-UND-020	**UAS Flight Data Collection and Analysis Phase II**	**University of North Dakota**	**$74,953**	**$0**	**University of North Dakota**	**$74,953**	**$74,953**
15-C-UAS-KSU-012	**UAS Safety Case Development, Process Improvement, and Data Collection**	**Kansas State University**	**$200,000**	**$0**	**Kansas State University**	**$200,000**	**$210,000**
15-C-UAS-MSU-043	**UAS Safety Case Development, Process Improvement, and Data Collection**	**Mississippi State University**	**$150,000**	**$0**	**Mississippi State University**	**$150,000**	**$150,000**
15-C-UAS-NMSU-025	**UAS Safety Case Development, Process Improvement, and Data Collection**	**New Mexico State University**	**$149,999**	**$0**	**New Mexico State University**	**$149,999**	**$149,999**

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Core Members: 15 Industry Members: Approximately 40
Cooperative Agreement Period of Performance: 2015–2021

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 2020)	Total Matching Amount
15-C-UAS-OSU-018	**UAS Safety Case Development, Process Improvement, and Data Collection**	**The Ohio State University**	**$174,958**	**$0**	**The Ohio State University**	**$174,958**	**$183,706**
15-C-UAS-UAF-012	**UAS Safety Case Development, Process Improvement, and Data Collection**	**University of Alaska Fairbanks**	**$260,000**	**$0**	**University of Alaska Fairbanks**	**$260,000**	**$260,000**
15-C-UAS-UND-021	**UAS Safety Case Development, Process Improvement, and Data Collection**	**University of North Dakota**	**$545,000**	**$245,000**	**University of North Dakota**	**$545,000**	**$572,250**
15-C-UAS-MSU-050	**Validation of ASTM Remote ID Standards - Safety Research Center**	**Mississippi State University**	**$750,000**	**$0**	**Mississippi State University**	**$750,000**	**$750,000**
15-C-UAS-MSU-051	**Validation of Low-Altitude Detect and Avoid Standards - Safety Research Center**	**Mississippi State University**	**$1,500,000**	**$0**	**Mississippi State University**	**$1,500,000**	**$1,500,000**
		Total	**$13,363,637**	**$563,188**	**Total**	**$13,363,638**	**$13,496,132**

Note: Due to the impact of COVID-19 on the ability to generate matching contributions previously committed, the Administrator will be exercising authority to grant relief to the one-to-one matching requirements and to provide 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	6.0
FY 2019	3.5
FY 2020	13.4
Total	**34.9**

FAA Centers of Excellence
Alternative Jet Fuels and Environment Grant Awards
Fiscal Year 2020
Core Members: 16 Industry Members: Approximately 60
Cooperative Agreement Period of Performance: 2013–2020

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 Funds)	Amount/Value of Contribution (FY 2020)	Total Matching Amount
13-C-AJFE-WaSU-022	**Administer Program Office for Center of Excellence for Alternative Jet Fuels and Environment**	**Washington State University**	**$399,713**	**$0**	**Washington State University**	**$399,713**	**$399,713**
13-C-AJFE-GIT-074	**Aviation Environmental Design Tool (AEDT) Evaluation and Development Support**	**Georgia Institute of Technology**	**$700,000**	**$0**	**Georgia Institute of Technology**	**$700,000**	**$700,000**
13-C-AJFE-GIT-054	**AEDT Evaluation and Development Support**	**Georgia Institute of Technology**	**$700,000**	**$0**	**Georgia Institute of Technology**	**$700,000**	**$700,000**
13-C-AJFE-MIT-073	**Aircraft Noise Abatement Procedure Modeling and Validation**	**Massachusetts Institute of Technology**	**$370,000**	**$0**	**Massachusetts Institute of Technology**	**$370,000**	**$370,000**
13-C-AJFE-MIT-075	**Aircraft noise exposure and market outcomes in the US**	**Massachusetts Institute of Technology**	**$380,000**	**$0**	**Massachusetts Institute of Technology**	**$380,000**	**$380,000**
13-C-AJFE-PU-35	**Aircraft Technology Modeling and Assessment**	**Purdue University**	**$222,116**	**$0**	**Purdue University**	**$222,116**	**$222,116**
13-C-AJFE-GIT-056	**Aircraft Technology Modeling and Assessment**	**Georgia Institute of Technology**	**$1,200,000**	**$0**	**Georgia Institute of Technology**	**$1,200,000**	**$1,200,000**
13-C-AJFE-GIT-076	**Aircraft Technology Modeling and Assessment - Evaluation of Supersonic Aircraft to Support ICAO CAEP**	**Georgia Institute of Technology**	**$1,100,000**	**$0**	**Georgia Institute of Technology**	**$1,100,000**	**$1,100,000**
13-C-AJFE-PU-040	**Aircraft Technology Modeling and Assessment - Evaluation of Supersonic Aircraft to Support ICAO CAEP**	**Purdue University**	**$225,000**	**$0**	**Purdue University**	**$225,000**	**$225,000**
13-C-AJFE-GIT-62	**Alternative Design Configurations to Meet Future Demand**	**Georgia Institute of Technology**	**$250,000**	**$0**	**Georgia Institute of Technology**	**$250,000**	**$250,000**
13-C-AJFE-UI-028	**Alternative Fuels Test Database Library**	**University of Illinois**	**$130,000**	**$0**	**University of Illinois**	**$130,000**	**$130,000**

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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 2020)	Total Matching Amount
13-C-AJFE-UI-033	**Alternative Fuels Test Database Library (Year 7)**	**University of Illinois**	**$200,000**	**$0**	**University of Illinois**	**$200,000**	**$200,000**
13-C-AJFE-MIT-067	**Alternative Jet Fuel Supply Chain Analysis**	**Massachusetts Institute of Technology**	**$500,000**	**$0**	**Massachusetts Institute of Technology**	**$500,000**	**$500,000**
13-C-AJFE-WaSU-026	**Alternative Jet Fuel Supply Chain Analysis**	**Washington State University**	**$566,454**	**$0**	**Washington State University**	**$566,454**	**$566,454**
13-C-AJFE-UH-013	**Alternative Jet Fuel Supply Chain Analysis – Tropical Region Analysis**	**University of Hawaii**	**$200,000**	**$0**	**University of Hawaii**	**$200,000**	**$200,000**
13-C-AJFE-UD-032	**Alternative Jet Fuel Test and Evaluation to support the ASTM International Approval Process**	**University of Dayton**	**$1,049,700**	**$0**	**University of Dayton**	**$1,049,700**	**$1,049,700**
13-C-AJFE-MIT-058	**Alternative Jet Fuels Supply Chain Analysis**	**Massachusetts Institute of Technology**	**$400,000**	**$0**	**Massachusetts Institute of Technology**	**$400,000**	**$400,000**
13-C-AJFE-UTENN-013	**Techno-Market Analysis of US Biorefinery Supply Chains from Feedstock to Alternative Jet Fuels**	**University of Tennessee**	**$250,000**	**$0**	**University of Tennessee**	**$250,000**	**$250,000**
13-C-AJFE-PU-36	**Techno-Economic and Lifecycle Analysis of Alternative Aviation Biofuels Supply Chains**	**Purdue University**	**$523,000**	**$0**	**Purdue University**	**$523,000**	**$523,000**
13-C-AJFE-WaSU-023	**Alternative Jet Fuels Supply Chain Analysis**	**Washington State University**	**$525,001**	**$0**	**Washington State University**	**$525,001**	**$525,001**
13-C-AJFE-UD-025	**Alternative Jet Fuels Test and Evaluation**	**University of Dayton**	**$1,926,434**	**$0**	**University of Dayton**	**$1,926,434**	**$1,926,434**
13-C-AJFE-MIT-069	**Analysis to Support the Development of an Engine nvPM Emissions Standard**	**Massachusetts Institute of Technology**	**$200,000**	**$0**	**Massachusetts Institute of Technology**	**$200,000**	**$200,000**
13-C-AJFE-MIT-060	**Analytical Approach for Quantifying Noise from Advanced Operational Procedures**	**Massachusetts Institute of Technology**	**$250,000**	**$0**	**Massachusetts Institute of Technology**	**$250,000**	**$250,000**

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Cooperative Agreement Period of Performance: 2013–2020

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 Funds)	Amount/Value of Contribution (FY 2020)	Total Matching Amount
13-C-AJFE-MIT-070	**Analytical Approach for Quantifying Noise from Advanced Operational Procedures**	**Massachusetts Institute of Technology**	**$250,000**	**$0**	**Massachusetts Institute of Technology**	**$250,000**	**$250,000**
13-C-AJFE-GIT-065	**Analytical Methods for Expanding the AEDT Aircraft Fleet Database**	**Georgia Institute of Technology**	**$150,000**	**$0**	**Georgia Institute of Technology**	**$150,000**	**$150,000**
13-C-AJFE-MIT-074	**Clean Sheet Supersonic Aircraft Engine Design and Performance**	**Massachusetts Institute of Technology**	**$400,000**	**$0**	**Massachusetts Institute of Technology**	**$400,000**	**$400,000**
13-C-AJFE-MIT-059	**Clean Sheet Supersonic Engine Design and Performance**	**Massachusetts Institute of Technology**	**$400,000**	**$0**	**Massachusetts Institute of Technology**	**$400,000**	**$400,000**
13-C-AJFE-GIT-073	**CLEEN II System Level Assessment - Benefits Assessments Continuation with Additional Technologies**	**Georgia Institute of Technology**	**$250,000**	**$0**	**Georgia Institute of Technology**	**$250,000**	**$250,000**
13-C-AJFE-GIT-055	**CLEEN II System Level Assessment**	**Georgia Institute of Technology**	**$240,000**	**$0**	**Georgia Institute of Technology**	**$240,000**	**$240,000**
13-C-AJFE-WaSU-025	**COE Program Office**	**Washington State University**	**$419,206**	**$0**	**Washington State University**	**$419,206**	**$419,206**
13-C-AJFE-MIT-061	**Combustion Concepts for Next-Generation Aircraft Engines**	**Massachusetts Institute of Technology**	**$300,000**	**$0**	**Massachusetts Institute of Technology**	**$300,000**	**$300,000**
13-C-AJFE-MIT-071	**Combustion Concepts for Next-Generation Aircraft Engines to Reduce Fuel Burn and Emissions**	**Massachusetts Institute of Technology**	**$300,000**	**$0**	**Massachusetts Institute of Technology**	**$300,000**	**$300,000**
13-C-AJFE-PSU-057	**Combustor Wall Cooling Concepts for Dirt Mitigation**	**Pennsylvania State University**	**$150,000**	**$0**	**Pennsylvania State University**	**$150,000**	**$150,000**
13-C-AJFE-BU-020	**Community Measurement of Aviation Emission Contribution of Ambient Air Quality**	**Boston University**	**$1,299,991**	**$0**	**Boston University**	**$1,299,991**	**$1,299,991**

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13-C-AJFE-MIT-072	**Comparative Assessment of Electrification Strategies for Aviation**	**Massachusetts Institute of Technology**	**$300,000**	**$0**	**Massachusetts Institute of Technology**	**$300,000**	**$300,000**
13-C-AJFE-MIT-062	**Comparative Assessment of Electrification Strategies for Aviation**	**Massachusetts Institute of Technology**	**$300,000**	**$0**	**Massachusetts Institute of Technology**	**$300,000**	**$300,000**
13-C-AJFE-UNC-012	**Development of Aviation Air Quality Tools for Airport-Specific Impact Assessment: Air Quality Modeling**	**University of North Carolina**	**$350,064**	**$0**	**University of North Carolina**	**$350,064**	**$350,064**
13-C-AJFE-UNC-014	**Development of Improved Aviation Emissions Dispersion Capabilities for AEDT**	**University of North Carolina**	**$569,000**	**$0**	**University of North Carolina**	**$569,000**	**$569,000**
13-C-AJFE-UI-029	**Evaluation of FAA Climate Tools**	**University of Illinois**	**$200,000**	**$0**	**University of Illinois**	**$200,000**	**$200,000**
13-C-AJFE-UD-027	**Evaluation of High Thermal Stability Fuels**	**University of Dayton**	**$184,997**	**$0**	**University of Dayton**	**$184,997**	**$184,997**
13-C-AJFE-UD-030	**Evaluation of High Thermal Stability Fuels**	**University of Dayton**	**$100,000**	**$0**	**University of Dayton**	**$100,000**	**$100,000**
13-C-AJFE-UD-029	**Fuel Composition Impact on Combustor Durability**	**University of Dayton**	**$299,148**	**$0**	**University of Dayton**	**$299,148**	**$299,148**
13-C-AJFE-UD-031	**Fuel Testing Approaches for Rapid Jet Fuel Prescreening**	**University of Dayton**	**$250,000**	**$0**	**University of Dayton**	**$250,000**	**$250,000**
13-C-AJFE-UD-026	**Fuel Testing Approaches for Rapid Jet Fuel Prescreening**	**University of Dayton**	**$159,998**	**$0**	**University of Dayton**	**$159,998**	**$159,998**
13-C-AJFE-UI-30	**Fuel Testing Approaches for Rapid Jet Fuel Prescreening**	**University of Illinois**	**$150,000**	**$0**	**University of Illinois**	**$150,000**	**$150,000**

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13-C-AJFE-GIT-059	**Geospatially Driven Noise Estimation Module**	**Georgia Institute of Technology**	**$250,000**	**$0**	**Georgia Institute of Technology**	**$250,000**	**$250,000**
13-C-AJFE-PU-038	**Impact of Fuel Heating on Combustion and Emissions**	**Purdue University**	**$250,000**	**$0**	**Purdue University**	**$250,000**	**$250,000**
13-C-AJFE-BU-022	**Improved Engine Fan Broadband Noise Prediction Capabilities**	**Boston University**	**$300,000**	**$0**	**Boston University**	**$300,000**	**$300,000**
13-C-AJFE-GIT-078	**Improved Open Rotor Noise Prediction Capabilities**	**Georgia Institute of Technology**	**$300,000**	**$0**	**Georgia Institute of Technology**	**$300,000**	**$300,000**
13-C-AJFE-MIT-064	**Improving Policy Analysis Tools to Evaluate Higher-Altitude Aircraft Operations**	**Massachusetts Institute of Technology**	**$500,000**	**$0**	**Massachusetts Institute of Technology**	**$500,000**	**$500,000**
13-C-AJFE-UI-031	**Modeling supersonic Jet Noise Reduction with Global Resolvent Modes**	**University of Illinois**	**$199,956**	**$0**	**University of Illinois**	**$199,956**	**$199,956**
13-C-AJFE-SU-024	**Physics-Based Analyses and Modeling for Supersonic Propulsion Exhaust Noise**	**Stanford University**	**$200,000**	**$0**	**Stanford University**	**$200,000**	**$200,000**
13-C-AJFE-PSU-058	**Jet Noise Modeling to Support Low Noise Supersonic Aircraft Technology Development**	**Pennsylvania State University**	**$100,000**	**$0**	**Pennsylvania State University**	**$100,000**	**$100,000**
13-C-AJFE-GIT-063	**Supersonic Jet Noise Reduction**	**Georgia Institute of Technology**	**$100,000**	**$0**	**Georgia Institute of Technology**	**$100,000**	**$100,000**
13-C-AJFE-GIT-079	**Low Emissions Pre-Mixed Combustion Technology for Supersonic Civil Transport**	**Georgia Institute of Technology**	**$1,000,000**	**$0**	**Georgia Institute of Technology**	**$1,000,000**	**$1,000,000**
13-C-AJFE-PSU-067	**Measurements to Support Noise Certification for UAS/UAM Vehicles and Identify Noise Reduction Opportunities**	**Pennsylvania State University**	**$500,000**	**$0**	**Pennsylvania State University**	**$500,000**	**$500,000**

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 2020)	Total Matching Amount
13-C-AJFE-UD-024	**National Jet Fuels Combustion Program**	**University of Dayton**	**$582,983**	**$0**	**University of Dayton**	**$582,983**	**$582,983**
13-C-AJFE-GIT-066	**Noise Certification Streamlining**	**Georgia Institute of Technology**	**$250,000**	**$0**	**Georgia Institute of Technology**	**$250,000**	**$250,000**
13-C-AJFE-GIT-077	**Noise Generation and Propagation from Advanced Combustors**	**Georgia Institute of Technology**	**$1,500,000**	**$0**	**Georgia Institute of Technology**	**$1,500,000**	**$1,500,000**
13-C-AJFE-GIT-058	**Noise Generation and Propagation from Advanced Combustors**	**Georgia Institute of Technology**	**$1,499,984**	**$0**	**Georgia Institute of Technology**	**$1,499,984**	**$1,499,984**
13-C-AJFE-PSU-059	**Noise Model Validation for AEDT**	**Pennsylvania State University**	**$115,000**	**$0**	**Pennsylvania State University**	**$115,000**	**$115,000**
13-C-AJFE-GIT-061	**Noise Model Validation for AEDT**	**Georgia Institute of Technology**	**$235,000**	**$0**	**Georgia Institute of Technology**	**$235,000**	**$235,000**
13-C-AJFE-GIT-053	**Noise Power Distance Re-Evaluation**	**Georgia Institute of Technology**	**$200,000**	**$0**	**Georgia Institute of Technology**	**$200,000**	**$200,000**
13-C-AJFE-GIT-075	**Noise Power Distance Re-Evaluation (NPD+C) to Include Airframe Noise in AEDT**	**Georgia Institute of Technology**	**$200,000**	**$0**	**Georgia Institute of Technology**	**$200,000**	**$200,000**
13-C-AJFE-GIT-057	**Over-Wing Engine Placement Evaluation**	**Georgia Institute of Technology**	**$590,000**	**$0**	**Georgia Institute of Technology**	**$590,000**	**$590,000**
13-C-AJFE-GIT-064	**Parametric Noise Modeling For Boundary Layer Ingesting Propulsors**	**Georgia Institute of Technology**	**$300,000**	**$0**	**Georgia Institute of Technology**	**$300,000**	**$300,000**
13-C-AJFE-GIT-067	**Predictive Simulation of nvPM Emissions in Aircraft Combustors**	**Georgia Institute of Technology**	**$500,000**	**$0**	**Georgia Institute of Technology**	**$500,000**	**$500,000**
13-C-AJFE-GIT-080	**Reduction of nvPM emissions from Aero-Engine Fuel Injectors**	**Georgia Institute of Technology**	**$500,000**	**$0**	**Georgia Institute of Technology**	**$500,000**	**$500,000**

FAA Centers of Excellence
Alternative Jet Fuels and Environment Grant Awards
Fiscal Year 2020
Core Members: 16 Industry Members: Approximately 60
Cooperative Agreement Period of Performance: 2013–2020

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 Funds)	Amount/Value of Contribution (FY 2020)	Total Matching Amount
13-C-AJFE-PSU-053	**Rotorcraft Noise Abatement Procedures Development**	**Pennsylvania State University**	**$150,000**	**$0**	**Pennsylvania State University**	**$150,000**	**$150,000**
13-C-AJFE-PSU-063	**Rotorcraft Noise Abatement Procedures Development**	**Pennsylvania State University**	**$150,000**	**$0**	**Pennsylvania State University**	**$150,000**	**$150,000**
13-C-AJFE-SU-027	**Shock Tube and Flow Reactor Studies of the Kinetics of Jet Fuels (Rapid IR Fuel Screening)**	**Stanford University**	**$300,000**	**$0**	**Stanford University**	**$300,000**	**$300,000**
13-C-AJFE-PSU-055	**Support for Supersonic Aircraft En-Route Noise Efforts in ICAO CAEP**	**Pennsylvania State University**	**$200,000**	**$0**	**Pennsylvania State University**	**$200,000**	**$200,000**
13-C-AJFE-PSU-064	**Support of Supersonic Aircraft En-Route Noise Efforts in ICAO CAEP**	**Pennsylvania State University**	**$220,000**	**$0**	**Pennsylvania State University**	**$220,000**	**$220,000**
13-C-AJFE-MIT-063	**Surface Analysis to Support AEDT APM Development**	**Massachusetts Institute of Technology**	**$200,000**	**$0**	**Massachusetts Institute of Technology**	**$200,000**	**$200,000**
13-C-AJFE-MIT-068	**Surface Analysis to Support AEDT APM Development**	**Massachusetts Institute of Technology**	**$200,000**	**$0**	**Massachusetts Institute of Technology**	**$200,000**	**$200,000**
13-C-AJFE-UTENN-011	**Techno-Market Analysis of US Biorefinery Supply Chains from Feedstock to Alternative Jet Fuels**	**University of Tennessee**	**$250,000**	**$0**	**University of Tennessee**	**$250,000**	**$250,000**
13-C-AJFE-MST-014	**Transitioning a Research nvPM Mass Calibration Procedure to Operations**	**Missouri University of Science and Technology**	**$846,707**	**$0**	**Missouri University of Science and Technology**	**$846,707**	**$846,707**
13-C-AJFE-PSU-065	**Turbine Cooling Through Additive Manufacturing**	**Pennsylvania State University**	**$400,000**	**$0**	**Pennsylvania State University**	**$400,000**	**$400,000**
13-C-AJFE-PSU-054	**Turbine Cooling Through Additive Manufacturing**	**Pennsylvania State University**	**$400,000**	**$0**	**Pennsylvania State University**	**$400,000**	**$400,000**
13-C-AJFE-PSU-066	**Urban Air Mobility Noise Reduction Modeling**	**Pennsylvania State University**	**$280,000**	**$0**	**Pennsylvania State University**	**$280,000**	**$280,000**

FAA Centers of Excellence
Alternative Jet Fuels and Environment Grant Awards
Fiscal Year 2020
Core Members: 16 Industry Members: Approximately 60
Cooperative Agreement Period of Performance: 2013–2020

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 Funds)	Amount/Value of Contribution (FY 2020)	Total Matching Amount
13-C-AJFE-PSU-052	**Urban Air Mobility Noise Reduction Modeling**	**Pennsylvania State University**	**$280,000**	**$0**	**Pennsylvania State University**	**$280,000**	**$280,000**
13-C-AJFE-SU-022	**Validation of Low Exposure Noise Modeling by Open Source Data Management and Visualization Systems Integrated with AEDT**	**Stanford University**	**$169,903**	**$0**	**Stanford University**	**$169,903**	**$169,903**
13-C-AJFE-SU-026	**Validation of Low Exposure Noise Modeling by Open Source Data Management and Visualization Systems Integrated with AEDT**	**Stanford University**	**$400,000**	**$0**	**Stanford University**	**$400,000**	**$400,000**
13-C-AJFE-GIT-060/069	**Modeling and Measurements of Supersonic Civil Transport Jet Noise**	**Georgia Tech**	**$250,000**	**$0**	**Georgia Tech**	**$250,000**	**$250,000**
		Total	**$34,159,355**	**$0**	**Total**	**$34,159,355**	**$34,159,355**

Note: Due to the impact of COVID-19 on the ability to generate matching contributions previously committed, the Administrator will be exercising authority to grant relief to the one-to-one matching requirements and to provide 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	0.10
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
Total	**84.2**

FAA Centers of Excellence
General Aviation Safety, Accessibility, and Sustainability Grant Awards
Fiscal Year 2020
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 2020)	Total Matching Amount
12-C-GA-ISU-043	**Heated Airport Pavement**	**Iowa State University**	**$150,000**	**$0**	**Iowa State University**	**$150,000**	**$150,000**
12-C-GA-FIT-042	**Management and Administration of COE**	**Florida Institute of Technology**	**$5,000**	**$0**	**Florida Institute of Technology**	**$5,000**	**$5,000**
12-C-GA-GIT-048	**Management and Administration of COE**	**Georgia Tech University**	**$5,000**	**$0**	**Georgia Tech University**	**$5,000**	**$5,000**
12-C-GA-ISU-042	**Management and Administration of COE**	**Iowa State University**	**$5,000**	**$0**	**Iowa State University**	**$5,000**	**$5,000**
12-C-GA-PU-099	**Management and Administration of COE**	**Purdue University**	**$135,000**	**$0**	**Purdue University**	**$135,000**	**$135,000**
12-C-GA-TEES-037	**Management and Administration of COE**	**Texas A&M University**	**$5,000**	**$0**	**Texas A&M University**	**$5,000**	**$5,000**
12-C-GA-OSU-064	**Management and Administration of COE**	**The Ohio State University**	**$5,000**	**$0**	**The Ohio State University**	**$5,000**	**$5,000**
12-C-GA-GIT-050	**Rotocraft Aviation Safety Information Analysis & Sharing (ASIAS)**	**Georgia Tech University**	**$167,500**	**$0**	**Georgia Tech University**	**$167,500**	**$167,500**
12-C-GA-PU-100	**Safety Analysis for General Aviation**	**Purdue University**	**$185,000**	**$0**	**Purdue University**	**$185,000**	**$185,000**
12-C-GA-GIT-049	**Weather Technology in the Cockpit (WTIC) Helicopter Operations Weather Information (HOWI)**	**Georgia Tech University**	**$116,707**	**$0**	**Georgia Tech University**	**$116,707**	**$116,707**
		Total	**$779,207**	**$0**		**$779,207**	**$779,207**

Note: Due to the impact of COVID-19 on the ability to generate matching contributions previously committed, the Administrator will be exercising authority to grant relief to the one-to-one matching requirements and to provide 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	0.80
Total	**18.6**

FAA Centers of Excellence
Commercial Space Transportation (CST) Grant Awards
Fiscal Year 2020
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 (FY 2020)	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
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 (FY 2020)	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**

Note: Due to the impact of COVID-19 on the ability to generate matching contributions previously committed, the Administrator will be exercising authority to grant relief to the one-to-one matching requirements and to provide 75 percent 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
FY 2020	3.4
Total	**14.4**

FAA Centers of Excellence
Joint COE for Advanced Materials Grant Awards
Fiscal Year 2020
(JAMS) – Core Members: 6 Industry Members: Approximately 50
Cooperative Agreement Period of Performance: 2004–2020

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 2020)	Total Matching Amount
12-C-AM-WISU-143	**Adhesive Bond Qualification Guidance for Aircraft Design Certification**	**Wichita State University**	**$900,000**	**$0**	**Wichita State University**	**$900,000**	**$900,000**
12-C-AM-WISU-141	**Administration of the Center of Excellence for Composites and Advanced Materials (CECAM)**	**Wichita State University**	**$75,000**	**$0**	**Wichita State University**	**$75,000**	**$75,000**
12-C-AM-WISU-147	**Administration of the Center of Excellence for CECAM**	**Wichita State University**	**$75,000**	**$0**	**Wichita State University**	**$75,000**	**$75,000**
12-C-AM-UW-051	**Administration of the FAA Center on Advanced Materials in Transport Aircraft Structures (AMTAS)**	**University of Washington**	**$83,439**	**$0**	**University of Washington**	**$83,439**	**$83,439**
12-C-AM-UW-048	**Administration of the JAMS-AMTAS Center of Excellence**	**University of Washington**	**$84,622**	**$0**	**University of Washington**	**$84,622**	**$84,622**
12-C-AM-WISU-134	**Advanced Fiber Reinforced Polymer Composite Materials Guidance or Aircraft Design Certification Process and Process Control**	**Wichita State University**	**$475,000**	**$0**	**Wichita State University**	**$475,000**	**$475,000**
12-C-AM-WISU-148	**Ceramic Matrix Composite (CMC) Materials Guidelines for Aircraft Design and Certification**	**Wichita State University**	**$500,000**	**$0**	**Wichita State University**	**$500,000**	**$500,000**
12-C-AM-WISU-135	**CMC Materials Guidelines for Aircraft Design and Certification**	**Wichita State University**	**$350,000**	**$0**	**Wichita State University**	**$350,000**	**$350,000**
12-C-AM-WISU-132	**Composite Materials Handbook - 17 for Additive Manufacturing**	**Wichita State University**	**$200,000**	**$0**	**Wichita State University**	**$200,000**	**$200,000**
12-C-AM-WISU-144	**Composites Materials Handbook - 17**	**Wichita State University**	**$125,000**	**$0**	**Wichita State University**	**$125,000**	**$125,000**
12-C-AM-WISU-130	**Composites Materials Handbook - 17**	**Wichita State University**	**$125,000**	**$0**	**Wichita State University**	**$125,000**	**$125,000**
12-C-AM-WISU-136	**Core Materials Qualification Guidance for Aircraft Design and Certification**	**Wichita State University**	**$500,000**	**$0**	**Wichita State University**	**$500,000**	**$500,000**

FAA Centers of Excellence
Joint COE for Advanced Materials Grant Awards
Fiscal Year 2020
(JAMS) – Core Members: 6 Industry Members: Approximately 50
Cooperative Agreement Period of Performance: 2004–2020

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 2020)	Total Matching Amount
12-C-AM-WISU-149	**Correlation between Effects of Defects on Static and Dynamic Strength Behavior of Composite Materials**	**Wichita State University**	**$150,000**	**$0**	**Wichita State University**	**$150,000**	**$150,000**
12-C-AM-WISU-129	**Correlation Between Effects of Defects on Static and Dynamic Strength Behavior of Composite Materials**	**Wichita State University**	**$299,972**	**$0**	**Wichita State University**	**$299,972**	**$299,972**
12-C-AM-UU-027	**Development and Evaluation of Fracture Mechanics Test Methods for Sandwich Composites**	**University of Utah**	**$100,000**	**$0**	**University of Utah**	**$100,000**	**$100,000**
12-C-AM-WISU-131	**Development and Safety Management of Composite Certification Guidance**	**Wichita State University**	**$180,000**	**$0**	**Wichita State University**	**$180,000**	**$180,000**
12-C-AM-WISU-150	**Development and Safety Management of Composite Certification Guidance**	**Wichita State University**	**$180,000**	**$0**	**Wichita State University**	**$180,000**	**$180,000**
12-C-AM-WISU-139	**Development of a Higher Level Building Block Testing Standards**	**Wichita State University**	**$875,000**	**$0**	**Wichita State University**	**$875,000**	**$875,000**
12-C-AM-WISU-133	**Development of Guidance for Technical Standard Order for Composite Materials**	**Wichita State University**	**$150,000**	**$0**	**Wichita State University**	**$150,000**	**$150,000**
12-C-AM-WSU-012	**Durability of Bonded Aerospace Structure**	**Washington State University**	**$75,000**	**$0**	**Washington State University**	**$75,000**	**$75,000**
12-C-AM-WISU-140	**Evaluation of Aged Structural Bonds on Rotor Blades**	**Wichita State University**	**$350,000**	**$0**	**Wichita State University**	**$350,000**	**$350,000**
12-C-AM-WISU-127	**FAA Composite Structural Engineering Technology (CSET), Composite Maintenance Technology (CMT), Composite Manufacturing Technology (CMfgT) and Adhesive Online Courses - Mod and Implementation Phase II**	**Wichita State University**	**$100,000**	**$0**	**Wichita State University**	**$100,000**	**$100,000**
12-C-AM-WISU-128	**FAA Research Requirement on Lightning Strike of Composites Structure**	**Wichita State University**	**$125,000**	**$0**	**Wichita State University**	**$125,000**	**$125,000**
12-C-AM-AU-02	**Factors Affecting Qualification/Certification: Evaluating the Criticality of Inherent Anomalies/Defects on the Fatigue Behavior of AM Metallic Parts**	**Auburn University**	**$1,199,990**	**$0**	**Auburn University**	**$1,199,990**	**$1,199,990**

FAA Centers of Excellence
Joint COE for Advanced Materials Grant Awards
Fiscal Year 2020
(JAMS) – Core Members: 6 Industry Members: Approximately 50
Cooperative Agreement Period of Performance: 2004–2020

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 2020)	Total Matching Amount
12-C-AM-AU-03	**Factors Affecting Qualification/Certification: The Effect of Machine and Machine-to-Machine Variability on Mechanical Properties of Additive Manufactured Materials**	**Auburn University**	**$1,799,967**	**$0**	**Auburn University**	**$1,799,967**	**$1,799,967**
12-C-AM-UCSD-020	**Impact Damage Tolerance Guidelines for Stiffened Composite Panels**	**University of California San Diego**	**$396,698**	**$0**	**University of California San Diego**	**$396,698**	**$396,698**
12-C-AM-WISU-126	**Inspection and Teardown of Aged In-Service Bonded Repairs**	**Wichita State University**	**$250,000**	**$0**	**Wichita State University**	**$250,000**	**$250,000**
12-C-AM-WISU-146	**Inspection and Teardown of Aged In-Service Bonded Repairs**	**Wichita State University**	**$500,000**	**$0**	**Wichita State University**	**$500,000**	**$500,000**
12-C-AM-WISU-138	**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-UW-050	**Nanomechanical Characterization of Adhesive Bondlines**	**University of Washington**	**$150,000**	**$0**	**University of Washington**	**$150,000**	**$150,000**
12-C-AM-WISU-142	**Polymer-Based Additive Manufacturing Guidelines for Aircraft Design and Certification**	**Wichita State University**	**$2,800,000**	**$0**	**Wichita State University**	**$2,800,000**	**$2,800,000**
12-C-AM-WISU-145	**Resin Infused Fiber Reinforced Materials Guidelines for Aircraft Design and Certification**	**Wichita State University**	**$600,000**	**$0**	**Wichita State University**	**$600,000**	**$600,000**
12-C-AM-UW-047	**Safety of Certification of Discontinuous Fiber Composite Structures**	**University of Washington**	**$698,539**	**$0**	**University of Washington**	**$698,539**	**$698,539**
12-C-AM-WISU-137	**Thermoplastic Welding Process Qualification Protocols for Aircraft Design and Certification**	**Wichita State University**	**$350,000**	**$0**	**Wichita State University**	**$350,000**	**$350,000**
		Total	**$14,923,227**	**$0**		**$14,923,227**	**$14,923,227**

Note: Due to the impact of COVID-19 on the ability to generate matching contributions previously committed, the Administrator will be exercising authority to grant relief to the one-to-one matching requirements and to provide 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
Total	**60.7**

Attachment III -Fiscal Year 2020 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 2020

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 2020)
	None awarded in FY 2020						
		Total	**$ -**			**Total**	**$ -**

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	0.14
FY 2019	2.0
FY 2020	0
Total	**2.14**

FAA Centers of Excellence (COE)
General Aviation (GA) Contract Awards
Fiscal Year 2020

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 2020)
	None awarded in FY 2020						
		Total	**$ -**			**Total**	**$ -**

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

Fiscal Year	Funding Level
FY 2012	0
FY 2013	0.15
FY 2014	1.6
FY 2015	1.8
FY 2016	0
FY 2017	0
FY 2018	0.056
FY 2019	0.049
FY 2020	0
Total	**3.6**