REDAC Environment & Energy Subcommittee

R&D Budget Status

Mike Gallivan September 11, 2018



Federal Aviation Administration

FAA FY 2018 Budget

• Full Appropriation signed March 23, 2018

Appropriation	FY 18		House		Senate		Omnibus	
	Request		Mark		Mark			
Operations	\$	9,890,886,000	\$	10,185,482,000	\$ 10,410,758,000	\$	10,246,754,000	
Facilities & Equipment	\$	2,735,000,000	\$	2,855,000,000	\$ 3,000,000,000	\$	3,329,589,000	
Research Engineering &								
Development	\$	150,000,000	\$	170,000,000	\$ 191,000,000	\$	188,926,000	
Grants-in-aid for Airports	\$	3,350,000,000	\$	3,350,000,000	\$ 3,350,000,000	\$	3,350,000,000	
Grants-in-aid for General					\$ 750,000,000	\$	1,000,000,000	
Total	\$	16,125,886,000	\$	16,560,482,000	\$ 17,701,758,000	\$	18,115,269,000	



R,E&D FY 2019 Budget

For FY 2019 total funding level \$1.244 trillion

- Defense funded at \$647 billion
- Non-defense funded at \$597 billion



R,E&D FY 2019 Budget

FY 19 R, E&D Request \$74M

- House Appropriation Committee (full committee)
 R,E&D funded at \$180M
- Senate Appropriation Committee (full committee)
 R,E&D funded at \$191M



FAA FY 19 Budget

Appropriation	FY 19 Request	FY 19 House Mark	Difference	FY 19 Senate Mark	Difference
Operations	\$ 9,931,312,000	\$ 10,410,758,000	\$ 479,446,000	\$ 10,410,758,000	\$ 479,446,000
Facilities & Equipment	\$ 2,766,572,000	\$ 3,250,000,000	\$ 483,428,000	\$ 3,000,000,000	\$ 233,428,000
Research Engineering &					
Development	\$ 74,406,000	\$ 180,000,000	\$ 105,594,000	\$ 191,000,000	\$ 116,594,000
Grants-in-aid for Airports	\$ 3,350,000,000	\$ 3,850,000,000	\$ 500,000,000	\$ 4,100,000,000	\$ 750,000,000
Total	\$ 16,122,290,000	\$ 17,690,758,000	\$ 1,568,468,000	\$ 17,701,758,000	\$ 1,579,468,000
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FY 19 R, E&D Request

	FY 2018	FY 2019	FY 19	FY 19	FY 2019	FY 19	2019
	Enacted	Request	House Mark	Request/FY19	Senate	Request/FV19	Conference
Program	(\$000)	(\$000)	(\$000)	House +/-	Mark (\$000)	Senate +/-	Mark (\$000)
Fire Research and Safety	7.200	4.867	7.200	2.333	7.200	2.333	-
Propulsion and Fuel Systems	2,100	555	3,295	2,740	2,100	1,545	-
Advanced Materials/Structural Safety	10,500	1.092	4.824	3.732	10.500	9.408	-
Aircraft Icing /Digital System Safety	9,253	7,684	9,673	1,989	9,253	1,569	_
Continued Airworthiness	11,269	6,177	11,269	5,092	11,269	5,092	-
Aircraft Catastrophic Failure Prevention Research	1,570	_	-	-	1,570	1,570	-
Flightdeck/Maintenance/System Integration Human							
Factors	7.205	5.052	7.546	2.494	7.305	2.253	-
System Safety Management	5,600	799	6,381	5,582	5,500	4,701	-
Air Traffic Control/Technical Operations Human			,				
Factors	5,800	1,436	6,091	4,655	5,800	4,364	-
Aeromedical Research	9,080	3,875	11,003	7,128	9,080	5,205	-
Weather Program	15,476	6,580	15,216	8,636	15,476	8,896	-
Unmanned Aircraft Systems Research	24,035	3,318	8,318	5,000	24,035	20,717	-
NextGen - Alternative Fuels for General Aviation	7,000		1,900	1,900	7,000	7,000	_
NextGen - Wake Turbulence	6,831	3,519	8,019	4,500	6,831	3,312	-
NextGen - Air Ground Integration Human Factors	6,757	1,336	7,949	6,613	6,757	5,421	-
NextGen - Weather Technology in the Cockpit	3,644	1,525	5,860	4,335	3,644	2,119	-
NextGen - Information Security	1,000	1,232	3,000	1,768	1,232	-	-
NextGen - Flight Deck Data Exchange	-	1,035	2,628	1,593	1,035	-	
Commercial Space	1,872	2,500	5,262	2,762	2,500	-	-
Environment and Energy	18,013	11,588	18,013	6,425	18,013	6,425	-
NextGen - Environmental Research - Aircraft							
Technologies, Fuels, and Metrics	29,174	7,578	29,174	21,596	29,174	21,596	-
System Planning and Resource Management	2,135	1,480	2,808	1,328	2,135	655	-
William J. Hughes Technical Center Laboratory							
Facility	3,412	1,178	4,571	3,393	3,591	2,413	-
TOTAL	188,926	74,406	180,000	105,594	191,000	116,594	-

FY 19 House and Senate mark are draft – final bills not voted on in the House or Senate



FY 2019 House Language

- Unmanned Aircraft Systems Research.—The Committee recommendation includes \$8,318,000 for Unmanned Aircraft Systems Research, an increase of \$5,000,000 above the budget request to support research and development activities to accelerate the safe integration of UAS into the national airspace.
- Accelerating UAS Traffic Management.—The Committee believes that an unmanned aircraft ٠ system (UAS) traffic management (UTM) network is critical to safe integration in the National Airspace System (NAS) and innovative uses of beyond visual line of sight drone operations, such as package delivery, infrastructure inspections, and precision agriculture. Unlike crash avoidance and flight planning, UTM will allow for the active management of UAS at the volume of operations expected. The Committee is concerned that FAA is not acting with sufficient urgency to meet its statutory obligations under Section 2208 of the FAA Extension, Safety, and Security Act of 2016 (Public Law 114–190) to develop a UTM research plan and establish a pilot program. The nationwide Low Altitude Authorization and Notification Capability (LAANC) program and a UTM pilot program are both essential building blocks to enable states and regions to establish UTM networks. Therefore, NASA and the FAA shall submit the research plan required under Section 2208 by September 30, 2018 and demonstrate pilot program use cases by December 31, 2018. Upon completion of the demonstration project, pilot program research and development shall be transferred to the FAA Air Traffic Organization so that all UTM development efforts are consolidated and industry UAS Service Suppliers can build and deploy a UTM network.



FY 2019 House Language (cont.)

- Counter unmanned aircraft systems.—The Committee recommends that FAA promote research and demonstration activities for counter unmanned aircraft systems (CUAS) to protect airports and the national airspace (NAS) as the FAA accelerates its efforts to safely integrate UASs into the national airspace. The Committee believes that the successful integration of these capabilities to identify, monitor and track the UAS and UAS handset operator; differentiate between authorized and unauthorized UASs; capable of identifying the specific signature of the UAS and UAS handset; operate in a completely passive mode and not interfere with existing aviation, civilian or commercial communications systems; and non- kinetic will help protect U.S. airports and the NAS from errant or nefarious drone operators. CUAS capabilities will allow the FAA to protect airport operations, navigation, air traffic services and provide for the safe and efficient operation of the national airspace system.
 - UAS test sites.—The Committee recognizes the critical and unique role the FAA UAS Test Sites serve in perpetuating technology innovations through safety and operational needs to safety integrate in the national airspace. As such, the test sites must be on the forefront of the technology and the adoption thereof. Therefore, the Committee recommends the FAA grant specific beyond visual line of sight (BVLOS) authority.



FY 2019 House language (cont.)

- *UAS firefighting interference.*—The Committee directs FAA to utilize its test sites, research efforts, and pilot programs to develop systems to detect and mitigate unauthorized UAS that interfere with firefighting efforts in our nation. The system should detect, identify and track both the air vehicle and ground controller; must be controlled by an entity that is independent from and would not be dependent on compliance by the UAS manufacturer or the UAS user/operator; would have the capability to adapt to fluid borders; differentiate between legitimate firefighting UAS and unauthorized UAS; and not interfere with essential first responder communications systems. The Committee directs FAA to report on these efforts no later than 120 days after enactment of this Act.
- Alternative fuels for general aviation.—The Committee provides \$1,900,000 for alternative fuels for general aviation. This program received \$7,000,000 in fiscal year 2018 and is proposed for elimination in the budget request. Funds are provided to complete the testing and certification activities under the current test program and support the current personnel required for operations and equipment needs of the lab.



FY 2019 House Language (cont.)

NextGen, Environmental Research-Aircraft Technologies, Fuels, and Metrics.—The recommendation includes \$29,174,000 for NextGen, Environmental Research-Aircraft Technologies, Fuels, and Metrics, the same as the enacted level and an increase of \$20,156,000 above the budget request. This program supports efforts to reduce the impacts associated with aviation noise and exhaust emissions and increasing energy efficiency and availability. This program utilizes the Center of Excellence (COE) to discover, analyze, and develop science-based solutions to the energy and environmental challenges facing the aviation industry. Funding for this activity will advance the goal of developing and operating an aviation system that improves aviation's energy and environmental position, does not constrain growth, and improves sustainability.



FY 2019 Senate Language

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- Advanced Materials/Structural Safety.—The Committee recommendation includes a total of \$10,500,000 for advanced materials/structural safety. With the emergence of additive manufacturing processes, the Committee recognizes that advances in the fabrication of complex structures has the potential to transform aircraft and spacecraft. The Committee understands the primary challenge in additive manufacturing for aerospace applications is the certification of airworthiness of complex processes used within the additive manufactured components. The Committee, therefore, directs \$6,000,000 of this funding to advance the use of these new additive materials (both metallic and non-metallic based additive processes) into the commercial aviation industry, as well as additional funds to advance the use of fiber reinforced composite materials into the commercial aviation industry through the FAA Joint Advanced Materials and Structures Center of Excellence.
- Additive Manufactured Continued Airworthiness.—The Committee recommendation includes \$11,269,000 for continued air worthiness. The Committee is encouraged by the potential impact that stitched resin composites can have on the aviation industry, and the Committee recommendation includes \$2,000,000 for FAA to work with public/private partners to evaluate the material for airworthiness certification.



- Unmanned Aircraft Systems [UAS] Research—Center of Excellence.—The Committee recognizes the valuable role of the Center of Excellence in assisting the FAA in a host of research challenges associated with the integration of UAS into the NAS. The Committee recommendation includes \$24,035,000 for UAS research, equal to the fiscal year 2018 enacted level and \$20,717,000 above the budget request. Of the funds provided for UAS research, \$12,035,000 is directed to support the expanded role of the UAS Center of Excellence in areas of UAS research, including cybersecurity, agricultural applications, beyond visual line of sight technology, and studies of advanced composites and other nonmetallic engineering materials not common to manned aircraft but utilized in UAS. Furthermore, the Center of Excellence shall establish a UAS safety research facility at the Center to study appropriate safety standards for UAS and to develop and validate certification standards for such systems. Of the total funding, \$2,000,000 is for the Center's role in transportation disaster preparedness and response, partnering with institutions that have demonstrated experience in damage assessment, collaboration with State transportation agencies, and applied UAS field testing; and \$10,000,000 is to support UAS research activities at the FAA technical center and other FAA facilities.
- Alternative Fuels for General Aviation.—The Committee recommendation includes \$7,000,000 for research that supports alternative fuels for general aviation. Funds are provided to complete the testing and certification activities under the current test program and support the current personnel required for operations and equipment needs of the lab.



- Environmental Sustainability.—The Committee recommendation includes \$47,187,000 for research related to environmental sustainability, of which \$18,013,000 is for "Environment and Energy" and \$29,174,000 is for "Next Gen—Environmental Research Aircraft Technologies, Fuels and Metrics". The FAA is directed to use the increase in funding for the Center of Excellence, resulting in a total of \$15,000,000 for the Center.
 - The Committee supports NextGen's five pillar strategy in conducting research through the Center of Excellence, which includes: (1) improved scientific knowledge and integrated modeling; (2) new aircraft technologies; (3) sustainable alternative aviation fuels; (4) air traffic management modernization and operational improvements; and (5) policies, environmental standards, and market- based measures. The Committee is concerned with the removal of the sustainable alternative aviation fuels pillar in the budget request and directs the FAA to continue research on alternative fuels following performance, economic, and environmental principals. This sustained investment will lead to reducing emissions and expanding alternative domestic energy sources that diversify fuel supplies, contribute to price and supply stability, and support economic development in rural communities. Further, the Committee directs the FAA to utilize the comprehensive five pillar strategy as outlined in the fiscal year 2018 budget request.



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Accelerating UAS Traffic Management.—The Committee believes that creation of an UTM system is critical to the safe integration in the NAS and for innovative uses of beyond visual line of sight drone operations, such as package delivery, infrastructure inspection, and precision agriculture. The Committee is concerned that FAA is not acting with sufficient urgency to meet its statutory obligations under section 2208 of the FAA Extension, Safety and Security Act of 2016, which required the agency to develop a research plan for UTM development and deployment. In executing section 2208, the Committee encourages the FAA to coordinate the three programs that serve as building blocks for the commercial development of a UTM system: LAANC program, the UTM Pilot Program and the UAS integration pilot program. The FAA should also coordinate with state and local law enforcement agencies to test the prevention of unsafe operations that could impact critical infrastructure or personal safety. The Committee directs FAA to submit the research plan no later than December 31, 2018, including milestones for the deployment of a full-scale UTM network. This work is essential to overall UTM development efforts, which will allow industry and UAS service suppliers to build and deploy a UTM network that advances the safety of our national airspace.



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Noise Health Effects Research.—The Committee supports research at FAA's Center of Excellence for Alternative Jet Fuel and Environment, and the Aviation Sustainability Center [ASCENT] on the impact of aviation noise on both sleep and cardiovascular health. The Committee directs the FAA to continue to prioritize this research, as many communities across the country contend with an increased frequency of passing aircraft on a daily basis. In addition, the Committee directs the FAA to continue to evaluate alternative metrics to the current day night level [DNL] 65 standard and other methods to address community airplane noise concerns, including cumulative noise impacts from increased frequency of flights.



R,E&D FY 2020 Budget

- FY 2020 target \$74M
- Delivered to OST June 2018
- FY 2019 remaining schedule
 - Submit to OMB mid September
 - Submit Presidents request to Congress Feb 4, 2019



Out Year Targets

Targets established Jan. 2018

- FY 19 \$74M
- FY 20 \$74M
- FY 21 \$74M
- FY 22 \$74M
- FY 23 \$74M
- Expect targets to be updated



FAA Reauthorization

- Current Authorization approved by Congress which extends authorization thru the end of FY 2018 (September 30, 2018)
- Awaiting congressional action
 - Lacking any congressional action expect another extension



Budget Future - Foggy



