REDAC
Human Factors Subcommittee

R&D Budget Status

Mike Gallivan

September 16, 2014

R,E&D FY 14 Budget

- **R,E&D FY 14 Budget Request - $166.0M**
- **FY 14 Appropriation $158.792**
  - Signed Jan. 17, 2014
  - Safety - $87.244
  - Improve Efficiency - $24.329
  - Reduce Environmental Impacts - $41.579
  - Mission Support - $5.640

FY 15 R,E&D Request

Program	FY 2015 Request ($000)	FY 15 House Mark ($000)	FY 15 Request/FY 15 House +/-	FY 2015 Senate Mark ($000)	FY 15 Request/FY15 Senate +/-	2015 Conference Mark ($000)	FY 15 Request/FY15 Draft Conference +/-
Fire Research and Safety	6,929	6,929	-	6,000	(929)		(6,929)
Propulsion and Fuel Systems	2,413	2,413	-	2,000	(413)		(2,413)
Advanced Materials/Structural Safety	2,909	2,909	-	2,909	-		(2,909)
Aircraft Icing /Digital System Safety	5,889	5,889	-	5,500	(389)		(5,889)
Continued Airworthiness	9,619	9,619	-	9,619	-		(9,619)
Aircraft Catastrophic Failure Prevention Research	1,567	1,567	-	1,500	(67)		(1,567)
Flightdeck/Maintenance/System Integration Human Factors	9,897	6,000	(3,897)	8,500	(1,397)		(9,897)
System Safety Management	7,970	7,970	-	7,970	-		(7,970)
Air Traffic Control/Technical Operations Human Factors	5,898	5,898	-	5,400	(498)		(5,898)
Aeromedical Research	8,919	8,919	-	8,300	(619)		(8,919)
Weather Program	17,800	15,897	(1,903)	15,847	(1,953)		(17,800)
Unmanned Aircraft Systems Research	8,974	10,974	2,000	12,974	4,000		(8,974)
NextGen - Alternative Fuels for General Aviation	5,700	6,000	300	6,000	300		(5,700)
NextGen - Advanced Systems and Software Valida	-		-		-		-
Joint Planning and Development Office	-		-		-		-
NextGen - Wake Turbulence	8,541	8,541	-	8,541	-		(8,541)
NextGen - Air Ground Integration Human Factors	9,697	9,697	-	9,697	-		(9,697)
NextGen - Self Separation Human Factors			-		-		-
NextGen - Weather Technology in the Cockpit	4,048	4,048	-	4,048	-		(4,048)
Environment and Energy	14,921	14,921	-	14,921	-		(14,921)
NextGen - Environmental Research - Aircraft Technologies, Fuels, and Metrics	19,514	23,014	3,500	21,514	2,000		(19,514)
System Planning and Resource Management	2,135	2,135	-	2,100	(35)		(2,135)
William J. Hughes Technical Center Laboratory Facility	3,410	3,410	-	3,410	-		(3,410)
TOTAL	156,750	156,750	-	156,750	-	-	(156,750)

FY 2015 House Language

- ***Unmanned aerial systems (UAS) research.*—The FAA has established six UAS test sites, which are expected to provide valuable information for developing the regulatory framework for UAS integration. However, the FAA will need to develop a comprehensive plan to identify research priorities, including how data from test site operations will be gathered, analyzed, and used. The Committee recognizes these challenges and provides $10,974,000 for UAS research, which is $2,000,000 above the budget request. These additional funds are provided to help meet the FAA's UAS research goals of system safety and data gathering, aircraft certification, command and control link challenges, control station layout and certification, sense and avoid, and environmental impacts.**

- ***Unmanned aerial systems data sharing.*—Issues with defining the safety data the FAA needs from the Department of Defense (DoD) remain a barrier in its efforts to develop safety standards. The Committee directs the FAA to develop a plan to resolve these data-sharing issues with the DoD and to identify what data is needed, why it is needed, and how it will be used.**

FY 2015 House Language

- ***NextGen—Alternative fuels for general aviation.*—The Committee provides $6,000,000 for alternative fuels research for general aviation, which is $300,000 above the budget request. During the complex transition of the general aviation piston fleet to an unleaded fuel, an increase in funding above last year is merited to move from research to a phase focused on coordinating and facilitating the fleet-wide evaluation, certification and deployment of an unleaded fuel and to help overcome any market issues that prevent it from moving forward. The Committee recognizes this is a multi-year effort and looks forward to updates on the continued progress on this initiative as it effectively balances environmental improvement with aviation safety, technical challenges, and economic impact.**

- ***NextGen environmental research—aircraft technologies, fuels and metrics.*—The Committee provides $23,014,000 for the FAA's NextGen environmental research aircraft technologies, fuels and metrics program, which is $3,500,000 above the budget request. Over the last few years, the Committee has provided additional resources for the FAA's environmental research program in an effort to expedite the development of viable alternative fuels that can be used in aircraft. Recognizing that fuel costs continue to consume the largest portion of airline operating budgets and in an effort to reduce the aviation sector's emissions footprint, the Committee provides additional resources to continue the research, development and testing of alternative fuels. Now that the United States Air Force Research Laboratory is no longer able to support alternative fuels testing, it is expected that the FAA will use some of these resources to produce fit for purpose chemical-analytical, fuel-property and material compatibility testing for many of the new chemical processes that produce alternative jet fuel. In addition, the Committee provides resources to continue the FAA's Continuous, Lower Energy Emission, and Noise Program.**

FY 2015 Senate Language

- ***Unmanned Aerial Systems Research—Center of Excellence*.—The Committee recommendation includes $12,974,000 for unmanned aircraft systems research, an increase of $4,000,000 above the budget request and $4,330,000 above the fiscal year 2014 enacted level. The administration's request includes $1,000,000 for a new center of excellence on unmanned aircraft systems [UAS], but given its importance, the Committee directs the FAA to dedicate the full funding increase to the center, which would receive a total of $5,000,000 under the Committee recommendation.**

  The Committee is pleased with the Department's progress in establishing a UAS center of excellence to address a host of research challenges associated with integration of UAS into the national airspace. The formation of a UAS center of excellence is essential to meet the requirements enacted as part of the FAA Modernization and Reform Act of 2012. The Committee directs that when the FAA selects candidates for the center, the agency shall consider a geographically and climatically diverse team of academic institutions with proven track records in unmanned aircraft systems engineering and certification, airspace integration, aviation modeling and simulation, UAS policy, UAS training and pilot certification, and collaboration with partners in the UAS industry. As cyber security is of paramount importance to safe UAS operations, the FAA should pay particular attention to teams with National Security Administration and Department of Homeland Security cyber education, research and operations certifications. Candidates should be well integrated with the FAA UAS test sites, with emphasis on teams that have the capacity to research beyond line of sight small UAS operations. Candidates should have close relations with disaster response agencies, the Department of Homeland Security and the Department of Agriculture in order to facilitate research into key UAS mission areas, such as environmental monitoring, weather and hydrologic prediction, precision agriculture, law enforcement, disaster response and oil transportation systems monitoring.

FY 2015 Senate Language

- ***Unmanned Aerial Systems Research—Strategic Plan for Research.***— **In order to support the integration of UAS into the national airspace, the FAA Modernization and Reform Act of 2012 required the FAA to work with other Federal agencies and representatives from the aviation industry on a comprehensive plan that would include a timeline for the necessary research and regulations. The law also required the FAA to write its own roadmap for integrating UAS into the national airspace, to update this roadmap each year, and to designate six test sites that will collect data and conduct research.**

  Although the FAA has completed each of these requirements, the Committee remains concerned that the FAA has not yet shown details on how its research will directly lead to better UAS integration. The first edition of FAA's roadmap, entitled the ''Integration of Civil Unmanned Aircraft Systems [UAS] in the National Airspace System [NAS] Roadmap,'' contains no discussion on what specific questions need to be answered before integrating UAS into the national airspace, what research projects would answer those questions, or which data are necessary to support that research. Importantly, the roadmap does not provide a strategy on how the test sites will participate in these efforts.

  The Committee understands that the new UAS center of excellence can perform a vital role in coordinating with each of the test sites and filling research gaps for the FAA. However, the Committee believes that the FAA must direct the strategy itself. The Committee therefore directs the FAA to include a strategic plan on research efforts as part of its next edition of the roadmap. The roadmap shall include a section that discusses the specific research needs to safely integrate UAS into the NAS, including an examination of the research goals that the FAA must reach in order to successfully and safety advance NAS integration; FAA's strategy to obtain the identified research through partnerships with other Federal agencies, the UAS center of excellence, participants in the UAS and aviation industry, and the UAS test sites; and an evaluation of the ability of the UAS test sites to coordinate with the FAA and its center of excellence, and participate in the FAA's strategy, and help achieve the research goals identified in the roadmap.

FY 2015 Senate Language

- ***Unmanned Aerial Systems Research—Coordination with Other Agencies.***—**Both the U.S. Customs and Border Protection [CBP] and the National Aeronautics and Space Administration [NASA] research and develop UAS technologies. The Committee therefore encourages the FAA to leverage these research and development efforts as it integrates UAS into the national airspace. The Committee expects the FAA to use the resources provided for UAS research under the Committee recommendation to collect and evaluate data and information from CBP and NASA UAS projects, and to collaborate with these partners on research efforts necessary to integrate UAS into the national airspace. The Committee also encourages the FAA to study how the Air Force conducts routine UAS operations, including the safe takeoff and landing of multiple platforms in a short period of time, as part of its airspace integration efforts.**

- ***Alternative Fuels for General Aviation.***—**The Committee recommendation includes $6,000,000 for research that supports alternative fuels for general aviation. This funding level is $300,000 above the budget request and equal to the fiscal year 2014 enacted level**

FY 2015 Senate Language

- ***NextGen—Environmental Research—Aircraft Technologies, Fuels, and Metrics.*—The Committee recommendation includes $21,514,000 for NextGen environmental research. This funding level is $2,000,000 above the budget request and $5,465,000 below the fiscal year 2014 enacted level. The Committee recommendation provides funding above the budget request to support the Continuous Low Energy, Emissions and Noise [CLEEN] program. Under the CLEEN program, the FAA partners with the aviation industry to develop and test aircraft technologies that reduce noise, emissions and fuel burn. The Committee recommendation also includes an additional $3,000,000 above the budget request for the CLEEN program in the appropriation for FAA's facilities and equipment. In total, the Committee recommendation provides $21,200,000 for the CLEEN program, an increase of $5,000,000 above the budget request.**

- ***National Center for Advanced Materials Performance.*—The FAA has effectively partnered with the National Center for Advanced Materials Performance [NCAMP] on mutually beneficial initiatives that reduce Federal spending and improve FAA standardization for aviation oversight. The Committee believes that NCAMP will similarly contribute to future initiatives within the National Network for Manufacturing Innovation [NNMI] enterprise, and as such, the Committee encourages the FAA to recommend adding NCAMP to the NNMI framework.**

FAA FY 2015 Budget Request

Account	FY 15 Request	FY 15 House Mark	Difference (+/-)	Fy 15 Senate Mark	Difference (+/-)
Operations	$ 9,750,000,000	$ 9,750,000,000	$ -	$ 9,750,000,000	$ -
Facilites & Equipment	$ 2,603,700,000	$ 2,600,000,000	$ (3,700,000)	$ 2,473,700,000	$ (130,000,000)
Research, Engineering & Development	$ 156,750,000	$ 156,750,000	$ -	$ 156,750,000	$ -
Airports	$ 2,770,000,000	$ 3,350,000,000	$ 580,000,000	$ 3,480,000,000	$ 710,000,000
Total	$ 15,280,450,000	$ 15,856,750,000	$ 576,300,000	$ 15,860,450,000	$ 580,000,000

FY 15 R,E&D Request

		FY 2014 Enacted	FY 2015 Pres. Bud. Request
FEDERAL AVIATION ADMINISTRATION			
A. Research, Engineering and Development		**158,792**	**156,750**
A11	**Improve Aviation Safety**	**87,244**	**94,484**
a.	Fire Research and Safety	8,000	6,929
b.	Propulsion and Fuel Systems	1,800	2,413
c.	Advanced Materials/Structural Safety	2,600	2,909
d.	Aircraft Icing/Digital System Safety	7,500	5,889
e.	Continued Airworthiness	8,000	9,619
f.	Aircraft Catastrophic Failure Prevention Research	1,500	1,567
g.	Flightdeck/Maintenance/System Integration Human Fact	5,000	9,897
h.	System Safety Management	11,000	7,970
I.	Air Traffic Control/Technical Operations Human Factors	5,000	5,898
j.	Aeromedical Research	7,000	8,919
k.	Weather Program	14,200	17,800
l.	Unmanned Aircraft Systems Research	8,644	8,974
m.	NextGen - Alternative Fuels for General Aviation	6,000	5,700
n	NextGen - Advanced Systems and Software Validation	1,000	-
A12	**Improve Efficiency**	**24,329**	**22,286**
a.	Joint Planning and Development Office	-	-
b.	NextGen - Wake Turbulence	9,000	8,541
c.	NextGen - Air Ground Integration Human Factors	11,329	9,697
d.	NextGen - Self-Separation Human Factors		
e.	NextGen - Weather Technology in the Cockpit	4,000	4,048
A13	**Reduce Environmental Impact**	**41,579**	**34,435**
a.	Environment and Energy	14,600	14,921
b.	NextGen - Environmental Research - Aircraft Technologie	26,979	19,514
A14	**Mission Support**	**5,640**	**5,545**
a.	System Planning and Resource Management	2,200	2,135
b.	William J. Hughes Technical Center Laboratory Facility	3,440	3,410

F&E Portfolio FY 15

Program	Appropriation Account	2014 Enacted ($000)	2015 Request ($000)	FY 15 House Mark	FY 15 Senate Mark
NextGen - ATC/Tech Ops Human Factors - Controller Efficiency/Air Ground Integration	F&E	4,722	-		
NextGen - Environment & Energy - Environmental Management Systems and Advanced Noise and Emissions Reduction	F&E	9,443	2,500		
NextGen - New ATM Requirements	F&E	20,775	4,980		
NextGen - Operations Concept Development Validation Modeling	F&E	4,722	-		
NextGen - System Safety Management Transformation	F&E	7,555	5,700		
NextGen - Wake Turbulence Re-categorization	F&E	1,416	-		
NextGen - Operational Assessments	F&E	7,555	-		
NextGen Staffed NextGen Towers (SNT)	F&E	1,889	-		-
Total NextGen Transportation system - System Development		**58,077**	**13,180**	-	

FY 15 Congressional Issues

- **House and Senate working from the same base**
  - $1,013,628,000,000 Base
    - $492,000,000,000 Discretionary Funding
- **Debt Ceiling not an issue for FY 15 Budget Request**
- **Sequestration not an issue for FY 15 Budget Request**
- **Election for House and Senate seats**
- **Sequestration may/will be an issue in FY 16**

R,E&D FY 16 Budget Status

- **FY 16 R,E&D OST Submission June 4, 2014**
- **FY 16 R,E&D OMB Submission early Sept. 2014**
- **Scheduled date of FY 16 budget presented to Congress February 2, 2015**

Out Year Targets

- **Targets established February 2014**
  - FY 16 - $160M
  - FY 17 - $164M
  - FY 18 - $167M
  - FY 19 - $171M
  - FY 20 - $175M
- **Expect targets to change**

FAA Reauthorization

- **Current Authorization thru FY 2015**
- **FAA has started work on its proposed reauthorized bill**
  - Will have to go thru OST and OMB

Budget Future

•It is unclear regarding funding levels after FY 15