

Research, Engineering, and Development Advisory Committee (REDAC)

National Airspace System (NAS) Operations Subcommittee| MINUTES

Date: *March 26-27, 2019*

Location: *Washington, D.C. (Conference Room, varies by date)*

Purpose: *Review of FY20-21 Proposed Portfolio; Provide Guidance and Recommendations; Program Deep Dives*

Chairperson: *Leo Prusak*

Designated Federal Officer (DFO): *Francisco Bermudez*

Note Takers: *Sadaf Alam
Brian Powers*

Upcoming Meetings:

- *Full REDAC April 11, 2019, Washington, D.C*
- *Fall REDAC NAS Ops August 13th – 14th, 2019*

Day 1 – March 26th, 2019 (Veracity)

Review of REDAC Recommendations, Responses, and Open Actions

Presenters *Leo Prusak/Francisco Bermudez*

Summary:

Mr. Leo Prusak, the NAS Ops Subcommittee Chair opened the meeting with a review of Prior Closed Action Items, Current Action Items, and Findings and Recommendations (F&Rs) that the Subcommittee provided at the last Fall 2018 REDAC meeting. Reviewing the recommendations provided on the topics of Human Factors (HF) and Commercial Space Transportation (CST), the members expressed concern regarding the Commercial Space Program. They questioned that considering the Commercial Space launch and reentry operations were rapidly increasing, if the program would be sustainable. Following that discussion, the Subcommittee indicated a desire for additional information to be presented at the Fall 2019 REDAC NAS Ops meeting. Mr. Prusak informed the Subcommittee that the Air Traffic Management-eXploration (ATM-X) presentation would be rescheduled for the next REDAC NAS Ops Subcommittee meeting scheduled for August 2019.

Presentation Budget Briefing

Presenter *Mike Gallivan, ABP-330, FAA*

Summary:

Mr. Gallivan began the budget briefing by providing an overview of the FY19 Research, Engineering and Development (R, E&D) budget. He highlighted that the House Appropriations Committee funded the FAA at \$180M and the Senate Appropriations

Committee funded the FAA at \$191M. Mr. Gallivan pointed out that it was rare for the funding numbers to come in higher than projected and credited the FAA researchers with doing a good job providing budget justification. He pointed out that the Unmanned Aircraft Systems (UAS), and Advanced Material/Structural Safety received significant plus ups. Mr. Gallivan noted that the Senate conferees provided \$24M for UAS research, including \$12M for the UAS Center of Excellence (COE) in UAS research, while Advanced Material/Structural Safety received \$14M. Mr. Gallivan informed the Subcommittee that the FAA will deliver a budget to Office of Secretary of Transportation (OST) in June 2019, and Office of Management and Budget (OMB) would receive their budget submission in September 2019. The expectation was that the budget targets would change starting in FY22, since they were, at the time, baselined at \$120M. Fortunately, the funding level was higher than the \$74M requested in FY19, however, it was also noted that the funding level in the out-years were not at the \$180M-\$190M range that was received for FY19.

In response to the Subcommittee's request for the enacted budget numbers for FY17-FY18, Mr. Gallivan provided a copy of the previous year's budget information to the NAS Ops Subcommittee prior to the upcoming full REDAC meeting.

During the briefing, Subcommittee member, Mr. Zellweger, Consultant, requested that the FAA share the UAS Traffic Management (UTM) Report with the Subcommittee members when available. Mr. Gallivan indicated that report would be available to the Subcommittee when it is submitted to Congress.

Presentation Strategic Research & Development (R&D) Landscape
Presenter Maureen Molz, R&D Management Division Manager, FAA

Summary:

Ms. Maureen Molz began the presentation by reminding the Subcommittee of the introduction of the R&D Strategic Landscapes during the Fall 2018 REDAC session. She further reiterated the change to the Annual Modal Research Plan (AMRP), led to the decision to reorganize research activities into domain area groupings as directed by the Department of Transportation (DOT).

An emphasis was placed on better identifying potential research areas as well as the gaps where research is not being performed. R&D landscapes are defined as a "list of drivers for research" that provide information about the potential impacts to the aviation industry.

Ms. Shelley Yak (Director, William J. Hughes Technical Center) explained that in January 2018 during the partial government shutdown, all of the FAA's Facilities & Equipment (F&E) employees were furloughed, which impacted the FAA's ability to compile a list of research drivers and challenges, and develop draft landscapes prior to the early REDAC Subcommittee meetings. Ms. Yak stated that a decision was made to re-direct the focus of the spring REDAC Subcommittee meetings to talk about the landscapes and requested that the REDAC NAS Ops Subcommittee members provide feedback on the research driver list contained in the workbook that was provided to the

Subcommittee members. She stressed that the landscapes were a key source of input for the FAA and help to define where the focus should be on the research. The key was to determine in which areas of the research should the FAA be participating in, and where should the FAA be leading the research effort. Ms. Molz further elaborated that the research landscapes would be a live document that is updated on an annual basis. The FAA expected to produce the *Research Landscape for the National Airspace System* document by June 30th, 2019. Ms. Molz and Ms. Yak reaffirmed that the Subcommittee members examine the list of research drivers and identify potential gaps or missing research activities that the FAA should be focusing on in terms of the aviation industry direction. The Subcommittee members agreed to provide feedback to the FAA by April 11, 2019, before the full REDAC meeting.

Presentation 1A09D NextGen – New Air Traffic Management Requirements
Presenter Steve Bradford, Chief Scientist & Technical Advisor, FAA

Summary:

Mr. Bradford briefed the Subcommittee on the New Air Traffic Management (ATM) Requirements program. His presentation explained that this program was needed to identify new opportunities to improve the efficiency and effectiveness of air traffic operations. Mr. Bradford explained that the programs' activities include the research and development of procedures, tools, and systems in support of operational improvements. These developments support NextGen's goal of expanding capacity and improving the strategic management of operations in the NAS.

Mr. Bradford then outlined the FY19 New ATM Requirements Program's accomplishments, specifically with activities such as evaluating safety performance requirements for Airborne Collision Avoidance System (ACAS Xu), a spectrum reallocation study, continued work on the synchronization of Air/Ground procedures and evolving a development plan for the northeast corridor for the initial Trajectory Based Operations (iTBO) implementation strategy to name a few.

Mr. Bradford provided a high-level overview of the projects within the New ATM program such as Future Collision Avoidance Systems (Future CAS), Weather Transition, Synchronization of Air/Ground procedures, Advanced Air/Ground Communication, Command and Control in the Cloud, Next Generation Automation Input Devices, and Internet Protocol (IP) Based Command and Control Data Links.

Mr. Zellweger inquired about how the FAA decided what projects to focus on. Mr. Bradford responded that the FAA collaborates with the industry and MITRE to decide on focus areas. He also expressed hope that Subcommittee member's input on the FAA R&D Landscape workbook will provide additional guidance on future research areas.

Presentation 1A11A Enterprise Concept Development

Presenter *Steve Bradford, Chief Scientist & Technical Advisor, FAA*

Summary:

Mr. Bradford briefed on the Enterprise Concept Development presentation. He focused on the benefits, research goals, past accomplishments, and future plans for this topic. He briefly introduced some of the Enterprise research concepts such as Vertical Conformance Verifications (VCV), Urban Air Mobility (UAM), Notice to Airmen (NOTAM) Modernization, Space Vehicle Operations, and Class E Upper Airspace Management Concept Development (ETM). Mr. Bradford gave an overview of the Enterprise Concept Development activities and how they would benefit the FAA. Validated operational concepts and feedback from stakeholders have led to the advancements in research and pre-implementation work to determine the feasibility of advanced concepts and maximized benefits and flexibility for NAS users. Additionally, he explained how work in this program satisfies research requirements to validate new concepts and generate information supporting the validity of identified capability shortfalls, future service needs, and capability requirements that will foster increased system capacity, efficiency, and throughput.

When discussing the topic of UAM, a Subcommittee member inquired on the status of the UAS Research Plan. The DFO reminded the members that the UAS Research Plan was provided to the Subcommittee per their request at the last REDAC meeting in Fall 2018. Per the Subcommittee chairperson, Mr. Leo Prusak, indicated that the members would like to revisit the UAS Research Plan, but also confirmed that the UAS open action item from the last REDAC NAS Ops Meeting is complete.

Presentation 1A01A Runway Incursion Reduction Program (RIRP)

Presenter *Amrit Choudhri, Program Manager, FAA*

Summary:

Mr. Choudhri briefed the Subcommittee on the Runway Incursion Reduction program (RIRP). He began the presentation by explaining the objective of RIRP was to reduce the risk to people and property caused by collisions in the runway environment, emphasizing that the programs' primary concern was providing safety benefits for the FAA, and not performance. He also mentioned that Technology Transfer is another focus area for RIRP. Mr. Choudhri provided a synopsis of the Small Airport Surface Surveillance (SASS), explaining that this was a low-cost option for secondary surveillance at small airports. The program is currently working on a proof of concept, which is expected in FY20, followed by refactoring the software in preparation for technical transfer to industry.

Mr. Choudhri introduced the Surface Taxi Conformance Monitoring (STCM) technology and that its' primary focus was to research capabilities needed to digitize taxi route instructions, and research airport surface database requirements for taxi conformance

monitoring. He mentioned that MITRE is currently working on creating a set of standards for how to develop a runway map, with turn by turn directions. Mr. Steve Bradford added that there was a lot of human factors involvement in support of this initiative. The Subcommittee questioned on when the standards will be developed for STCM and if there would be an internal study, to which Mr. Choudhri responded that he would discuss it with his peers and get back to the Subcommittee with a response.

Presentation 1A01C Operations Concept Validation & Infrastructure (ATDP)
Presenter *Guillermo Sotelo, Physical Scientist, FAA*

Summary:

Mr. Sotelo began the briefing with an overview of Advanced Technology Development and Prototyping (ATDP) for the Operations Concept Validation and Infrastructure program. The ATDP program investigates specific concept elements and drives operational and technical requirements and implications for human factors, training, and procedures.

Mr. Sotelo introduced the Time-Based Flow Management (TBFM) – Traffic Flow Management System (TFMS) operational integration and stated that in FY19 the FAA completed assessment of on-going NASA research for the use of the current TFMS toolset to precondition demand into TBFM. TBFM -TFMS operational integration identifies capabilities and/or data exchange between the two systems to optimize integrated strategic tactical flow management initiatives. Mr. Prusak questioned if the TBFM-TFMS integration had been delayed due to the other Northeast Corridor (NEC) initiatives, to which Mr. Sotelo responded that there was a delay due to the partial government shutdown and the re-baselining of other programs, since there were only a limited number of Subject Matter Experts (SME's) that were allocated to the FAA. Mr. Sotelo, then emphasized on the upcoming research activities in FY20 such as operational integration analysis, advanced rerouting, time-based management operations, and trajectory-based operations. Some expected research products include identification of operational opportunities and challenges as emerging concepts evolve, simulation activities, maturation of Concept Operations, risk mitigation recommendation, and technology transfer packages. He further listed the emerging FY21 focal areas, which include the enhanced synchronization of strategic and tactical capabilities to optimize Time-Based Management.

Presentation Deep Dive – Aviation Weather Research Program
Requirements Definition Process

Presenter *Bill Bauman, Supervisory Meteorologist, FAA*

Summary: Per the NASOPS Subcommittee request from Fall 2018, Mr. Bauman, in lieu of Mr. Randy Bass, presented the Aviation Weather Division's new requirements development and validation process. The Policy and Requirements Branch in Aviation Weather Division serves as the clearinghouse for all FAA weather requirements. This branch acquires aviation weather needs and requests from the field (FAA, airlines, organizations, etc.) and validate those requests as formal requirements. The Requirements Branch then collaborates with the National Weather Service (NWS) to

determine if capabilities already exist to meet the request (government or industry capabilities may be appropriate depending on the request or need), and if not, a gap analysis is conducted to see if research is needed. If research is required, the information is sent to the Weather Program and will be prioritized, developed and conducted. If/when the research is complete and the solution meets the need, the Policy and Requirements Branch will work with the transition phase with appropriate entities (FAA PMO, NWS, etc.). Aviation Weather Division Requirements Service is a repeatable process by which weather requirements are developed, validated, allocated and transmitted to FAA or NWS.

Presentation A11.k Weather Program

Presenter *Bill Bauman, Supervisory Meteorologist, FAA*

Summary:

Mr. Bill Bauman began his presentation defining the benefits of the Weather Program for the FAA, and the factors determining its success. He then outlined the Weather Program's accomplishments in FY19 specifically with activities such as Convective Weather, Turbulence, Ceiling and Visibility (C&V), In-Flight Icing, Advanced Weather Radar Techniques (AWRT), Modeling Development and Enhancement (MDE), Quality Assessment (QA), Aviation Weather Demonstration and Evaluation (AWDE) Services, Terminal Area Icing Weather Information for NextGen (TAIWIN), High Ice Water Content (HIWC), and Weather Requirements for Wake Mitigation. Mr. Bauman highlighted the expected and planned research activities anticipated in FY19 and FY20, such as the completed In-Cloud and ICing Large drop Experiment (ICICLE) field program to collect aircraft measurements of in-flight icing environments to use for development and validation of high-resolution diagnostic and forecast capabilities, including drop size. Mr. Bauman informed the Subcommittee of the FY19 accomplishments for Convective Weather stating that the government and industry feedback on Offshore Precipitation Capability collected is to be used in future upgrades. He also mentioned that there was a completed assessment of Convective Weather Avoidance Model (CWAM) algorithms compared to NextGen Weather Processor (NWP). Mr. Bauman also mentioned that currently there is a tech push for upgrading CWAM for a redesigning of the model to incorporate machine learning techniques and optimize use for strategic time frames (2-8-hour forecasts).

Presentation A12.c NextGen – Weather Technology in the Cockpit (WTIC)

Presenter *Gary Pokodner, General Engineer, FAA*

Summary:

Mr. Pokodner began the briefing by identifying the purpose of the WTIC program, which is to identify casual factors in weather-related General Aviation safety risks and hazards. Mr. Pokodner explained how the WTIC program benefited the FAA, stating that enhanced NAS efficiency and increased capacity resulting from consistent and predictable pilot adverse weather decision-making due to the established cockpit minimum weather

services. These services include reduced emissions due to enhanced efficiency, reduction in flight delays, and enhanced flight routing in and around adverse weather conditions. He then outlined the program's accomplishments in FY19, specifically with activities such as Remote Oceanic Meteorological Information Operational (ROMIO), Nulling NEXRAD Latency, Pilot Reports (PIREP) Modernization, Augmented Reality, ADS-B Turbulence Study, and completed a wind study assessment of wind lexicon. Mr. Pokodner further explained the purpose of the wind study was to address the issue of identical terms used for different wind data, and the inclusion of slang terms. Moving forward there will be an effort to eliminate same terms from wind lexicon. The Subcommittee expressed interest in whether the WTIC research was addressing Simplified Vehicle Operations, and if something was being done to assess the minimum weather service criteria. The subcommittee agreed to address this question as a Finding and Recommendation and will wait on the FAA's official response.

Presentation A11.n Commercial Space Transportation (CST)

Presenter *Ken Davidian, Aerospace Engineer, FAA*

Summary:

Mr. Davidian began the briefing by providing an overview of the Office of Commercial Space Transportation (AST) portfolio structure and mission. AST's mission is to ensure the protection of the public, property, national security, and foreign policy interests of the United States during commercial launch and reentry, and to encourage, facilitate, and promote United States commercial space transportation. He further summarized that in 2018, AST's Research and Development (R&D) priorities were realigned to provide low cost access to cutting-edge capabilities in commercial space, and to better meet the National Space Council (NSpC), DOT, FAA's strategic objectives. The new approach is designed to address REDAC findings and recommendations.

The Office of Research delivers cutting-edge studies and center of excellence expertise in support of the AST and FAA mission. The four major Focus Areas of AST are Systemic Safety, Regulatory Streamlining, Deployment of Innovation, and Spaceport Infrastructure Research. Mr. Davidian highlighted the importance of the AST research initiatives and its contribution to the nation. Some of the benefits derived from this program are advances in safety and efficiency of the NAS, maintaining AST's expertise, and understanding of a complex commercial space sector with its role in advancing the US economy and global competitiveness.

Presentation 1A07A0 Enterprise Human Factors

Presenter *Bill Kaliardos, Scientific and Technical Advisor, FAA*

Summary:

Mr. Bill Kaliardos started the presentation by providing an overview of the program, stating that The Enterprise Human Factor Development program provides integrated guidance on human performance considerations to concept development, validation, and implementation teams. He then mentioned the research activities that were focused on identifying and mitigating systemic human factors considerations that may yield several benefits such as increasing the utilization rate of concepts and systems among controllers, ensuring controller acceptance of concepts and systems, increasing safety through the mitigation of known human factors risks, and decreasing controller workload through improved tools and techniques. Subcommittee member, Jim Kuchar, inquired if the projects within Enterprise Human Factors were visible to other programs, if there was a repository for the data to which Mr. Kaliardos explained that the current work being performed was updated on the Enterprise Human Factors website, and if the focal goal of the HF program is to identify the need to involve others and bring more visibility to these projects.

Presentation ATM-X Program Overview

Presenter *NASA*

Summary:

Deferred until the next NAS OPS meeting in Fall 2019.

Presentation Findings and Recommendations (F&R) Discussion

Presenter *Subcommittee*

Discussion – The Subcommittee Chairperson, Mr. Prusak, decided that the NASOPS REDAC will postpone the Subcommittee discussion on F&Rs until Day 2 of the REDAC NASOPS meeting.

Day 2 – March 27th, 2019 (Veracity)

Presentation Review Findings and Recommendations/ New Actions

Presenter *Subcommittee*

Discussion – The Subcommittee decided that, based on their review of the potential topics for F&Rs, they would provide an official F&R response to the DFO and the FAA prior to the Full REDAC meeting on April 11th, 2019.

Presentation Strategic R&D Landscape

Presenter *Maureen Molz, R&D Management Division Manager, FAA*

Summary:

Leo Prusak recommended that this discussion would be delayed until members of the REDAC NAS Ops subcommittee have reviewed the landscape document. Mr. Prusak's instructions were for all Subcommittee members to review this document and list the biggest challenges for each research category. Leo Prusak also agreed to add the following as standard items to the form:

Time Frame till maturity, Entities, Procedures

Topics to be Combined:

1st Research Category – Emergent Operations

Combine 1,2,3,4,5,6,7,8 The first 8. Keep #4 and include subsets of the first 8.

2nd Research Category – Infrastructure

Combine 9, 12, 16, 20, 22, 24 (#20: Add "Spectrum" in the language)

3rd Research Category - Data

Combine 21, 19, 18, 17, 23 and IOT

Presentation A11.i Air Traffic Control/Technical Operations Human Factors

Presenter *Dan Herschler, Scientific and Technical Advisor for HF, FAA*

Summary:

Mr. Herschler started the briefing by providing an overview of the purpose of the Air Traffic Control/Technical Operations Human Factors program. He mentioned the purpose is to provide technical sponsors with timely and appropriate R&D products and consultation services, as identified by the ATO Human Factors R&D Roundtable and ANG-C management. Additionally, it's also to provide support to human factors efforts for FAA acquisition programs through In-Service Review Checklist Human Factors approval responsibility, and Acquisition Management System (AMS) Policy updates.

Mr. Herschler then outlined how research activities performed by the program benefits the FAA, such as improving the safety and efficiency of complex ATC systems by the application of R&D to address factors affecting human performance in air traffic control operations and ATC system, by recommending and testing improvements to design, procedures, training, selection, and placement as well as developing mitigations to address human performance shortfalls.

Subcommittee member, Mr. Joe Bertapelle, inquired if the ATC/Tech Ops Human Factors research addressed Notice to Airmen (NOTAMs) in any way. Mr. Herschler responded that at this time there was no human factor involvement with NOTAMs, as the need for research in that area has not yet been identified. The Subcommittee was informed that the program was open to suggestions and if there was a gap in the research or an opportunity for improvement, the ATC/Tech Ops Human Factors group would be receptive of an official F&R in this area. Subcommittee member, Mr. Akbar Sultan, stated that NASA built a tool for identifying the true state of fatigue (by means of cognitive tests), he inquired if the FAA was leveraging that tool for use by the ATC personnel.

Mr. Herschler acknowledged that although it's a great idea, there has not been any research centered on the collection of that type of cognitive data. Our research is guided by ATO, and that any suggestions by the Subcommittee are welcome.

Presentation [A12.a Wake Turbulence and 1A05C Wake Turbulence Re-Categorization](#)

Presenter *Jillian Cheng, Program Manager, FAA*

Summary:

The Wake RE&D and Wake Turbulence programs were briefed by the Program Manager, Ms. Jillian Cheng, with the support of Technical Lead, Mr. Jeff Tittsworth. Ms. Cheng began the briefing with a broad overview of the two Wake programs, highlighting the research in this area satisfied the NextGen objective to safely increase capacity during peak demand periods. She mentioned that Wake RE&D had increased access to airport runways and airspace while maintaining or enhancing the safety of the NAS. Wake RE&D and Re-CAT research matures wake turbulence standards, procedures, and operational concepts to the point they can be directly implemented by the FAA. Ms. Cheng further elaborated that the requirements for new or existing systems of NAS Infrastructure enhancements was required to implement the standards, procedures, and operational concepts.

Mr. Zellweger inquired about the level of collaboration on wake research with Eurocontrol, to which Ms. Cheng stated that the program coordinates with Single European Sky ATM Research (SESAR) and Eurocontrol, and attends

semiannual meetings. All FAA's Wake Research activities is collaborative with Eurocontrol.

Presentation Commercial Space Launch Research on NAS Integration (CST)

Presenter *Francisco Bermudez, DFO*

Summary:

A summary for the Commercial Space Launch Research on NAS Integration (CST) briefing is currently not available.

Presentation Subcommittee Discussion Recap & Closing

Presenter *Leo Prusak*

Discussion – Mr. Prusak concluded the meeting by summarizing the actions for the Subcommittee members, pointing out the briefing topic findings and recommendations discussed earlier. Mr. Prusak informed the members that he will be reaching out to the NASOPS DFO at the FAA, with action items and recommendations prior to the full REDAC, which will be held on April 11, 2019.

NASOPS SUBCOMMITTEE WINTER/SPRING 2019

MARCH 26, 2019

MARCH 27, 2019

Name	Affiliation	Name	Affiliation
Steve Summer	FAA	Jim Kuchar	MIT Lincoln Lab
Mark Huberdeau	MITRE	Akbar Sultan	NASA
Lidiya Gavrilenko	FAA	Emily Stelzer	MITRE
Brian Powers	A3 Tech	Maureen Molz	FAA
Mark Weber	NOAA	Steve Summer	FAA
James Wetherby	FAA	Mark Huberdeau	MITRE
Guillermo S.	FAA	Lara Schmidt	FAA
Chinita Roundtree-Coleman	FAA	Dan Herschler	FAA
Sadaf Alam	A3 Technology	Natee Wongsangpaiboon	FAA
Gary Pokodner	FAA HQ	Jillian Cheng	FAA
Bill Bauman	FAA	Jeff Tittsworth	FAA
Dres Zelleweger	Consultant	Bruce J. Holmes	Smartsky Network
Joe Bertepelle	Jetblue	Joe Bertapelle	Jetblue
Bruce J. Holmes	Smartsky Networks	Dres Zelleger	Consultant
Steve Bradford	FAA	Mark Weber	NOAA
Leo Prusak	PASSUR	Brian Powers	A3 Technology
Maureen Molz	FAA	Sadaf Alam	A3 Technology
Emily Stelzer	MITRE	Francisco Bermudez	FAA
Jm Kuchar	MIT Lincoln Lab	Leo Prusak	PASSUR
Shelli Brunswick	Space Foundation	Chinita Roundtree-Coleman	FAA
Nina Mohleji	MITRE		
Ken Davidson	FAA		
Bill Kaliardos	FAA		