Research, Engineering, and Development Advisory Committee (REDAC)

National Airspace System (NAS) Operations Subcommittee | MINUTES

Date: *March 24-25, 2020*
Location: *Virtual Meeting*
Purpose: *Review of FY20-21 Proposed Portfolio; Provide Guidance and Recommendations; Program Deep Dives*
Facilitator: *Philip Yeung, Designated Federal Officer (DFO)*
Chairperson: *Leo Prusak*
Note Takers: *Sadaf Alam*
Brian Powers
Upcoming Meetings: *September 1-2, 2020, Washington, D.C.*

Day 1 – March 24-25, 2020, (Virtual Meeting)

Review of REDAC Recommendations, Responses, and Open Actions

Presenters: *Leo Prusak/Philip Yeung*

Summary: As the Chairperson, Mr. Leo Prusak could not attend the Spring 2020 National Airspace System Operation Subcommittee (NASOPS) REDAC meeting, Mr. Jim Kuchar acted as the chairperson on his behalf. Mr. Kuchar opened the meeting with a review of the Prior Action Items, Current Action Items, and Finding and Recommendations that the subcommittee provided at the Fall 2019 REDAC meeting. The subcommittee inquired about the status of a Commercial Space Transportation briefing. They learned that it would be covered on Day 2 of the meeting, during the Integrating Commercial Space Operations into the NAS – Space Integrator, an informational deep-dive briefing.

Presentation: Budget Briefing
Presenter: *Elizabeth Delarosby*

Summary:

Ms. Elizabeth Delarosby began the briefing by providing some historical figures regarding the budgets from 2018 to 2020 and highlighted the increases in certain funding levels. Ms. Delarosby informed the subcommittee that the FAA's FY20 request was $120M for Research Engineering & Development (RE&D), and the House Committee on Appropriation funded RE&D at $191M. In comparison, the Senate Appropriation Committee funded RE&D at $194.2M. She then reviewed the FY20 conference language, specifically mentioning that the advanced materials/structural safety program is receiving $10M, the continued airworthiness program is receiving an additional
$10.2M, and Unmanned Aircraft System Research is receiving an additional $12M for various R&D initiatives specific to the program.

Ms. Delarosby also informed the subcommittee that the FY21 Budget was submitted to Congress the week of February 10, 2020. The FY22 target is $170M, and the FAA will deliver this to the Office of Safety and Training in June 2020, and the Office of

Management and Budget will receive the FAA budget submission in mid-September 2020. The FAA will submit the President's budget request to Congress in February 2021.

Questions:

Jim Kuchar asked what the "system planning and resource management" program was, and what does it cover. He also noticed a slight reduction in the weather programs and inquired about the increase in research. Ms. Delarosby responded that the money was deposited into grants to train pilots, directed by a congressional mandate, and the reauthorization of $10M was placed in the "system planning and resource management" program.

The subcommittee inquired how COVID-19 will impact Airport Trust Plan and if the FAA is planning to reduce ticket taxes. Ms. Delarosby explained that she is unaware of any discussion on this. Steve Bradford mentioned that the FAA has a significant surplus in the Airport Trust fund now and explained that RE&D comes out of the trust fund. A subcommittee member suggested that we can include further discussions at the Fall REDAC subcommittee meeting if there is a significant impact.

Presentation: NAS 2035 Vision
Presenter: *Steve Bradford*

Summary:

Mr. Bradford began the presentation by explaining how the FAA has been operationalizing NextGen and implementing initial Trajectory Based Operations (iTBO) in the Northeast Corridor (NEC) as an example. He further stated that the FAA has kicked off an effort with MITRE to build a vision for the year 2035 and then highlighted the need to define a NextGen organizational vision, future concepts, initiatives, system engineering, and a focus move forward beyond Trajectory-based Operations (TBO). The NAS 2035 Vision document is currently being drafted, while a series of briefings are conducted for staff members to understand their role. The plan is to brief the entire Office of NextGen (ANG) organization by early April 2020. He mentioned that the response has been outstanding and that the document will be provided to stakeholders once it is signed. After that, ANG will refine that plan adding more detail and coordination across the Agency, with the goal of signing the document by the FAA Administrator by the end of this year.

Mr. Bradford mentioned the need to focus on performance-based operations and areas such as reducing uncertainty for all types of operations, improving air traffic management, integrating small Unmanned Aircraft Systems (UAS), autonomous cargo, Urban Air Mobility (UAM), and Class E Upper Traffic Management (ETM) operations. He also stated that the FAA would pursue learning automation capabilities such as data analytics, machine learning, cloud, and digital twins. Mr. Bradford indicated he could provide a more in-depth dive briefing at the upcoming Fall REDAC meeting.

Questions:

Mark Weber question – How do the performance-based operations correspond to Acquisition Management System (AMS) lifecycles in 2035? Mr. Bradford replied that it depends on the topic area. One of the reasons FAA chose 2035 is that many of the Agency's automation systems are expected to come to end of life around 2028-29 (e.g., ERAM, STARS, etc.) learning could be in implementation. Also, FAA will be looking at a different kind of Data Comm then as well.

Presentation: 1A07C New Air Traffic Management Requirements
Presenter: *Steve Bradford*

Summary:

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

Mr. Bradford provided an overview of the FY20 accomplishments, highlighting that the program completed the trajectory synchronization simulation plan, completed an analysis of the current NAS Enterprise Messaging Service (NEMS) architecture that resulted in recommendations for upgrading NEMS enabling System Wide Information Management to support NAS efficiency critical service data distribution threads, and assessed Airman's Meteorological Information discontinuation.

Mr. Bradford then briefly introduced current research activities for the program, such as; Weather Transition, Advanced Air/Ground Communications, Command and Control in the Cloud, Next-Generation Automation Input Devices, IP Based Command, and Control Data Links, and Artificial Intelligence for Air Traffic Management. He mentioned that the Next Generation Automation Input Devices research specifically has to do with the trackball upgrade for Air Traffic Control facilities, stating that the FAA has been using trackballs for a long time. The Agency is assessing whether the trackball is the input device of the future.

Questions:

Monica Alcabin asked if there were any other Artificial Intelligence (AI) and machine learning in the RE&D portfolio or in the FAA. Steve responded there is research in the Weather Program and in the Concepts Program, also in Aircraft Certification, but that does not fall under NAS Ops, and informed the subcommittee that he is unable to speak to that. Mr. Bradford mentioned that the FAA is evaluating decision support tools and that machine learning can help incorporate new procedures.

Presentation: 1A11A Enterprise Concept Development
Presenter: *Steve Bradford*

Summary:

Mr. Bradford also briefed on the Enterprise Concept Development presentation. He began the briefing by focusing on the benefits, research goals, past accomplishments, and plans for the program. He then provided an overview of the FY20 program accomplishments such as: the final Notice to Airmen Stakeholder Analysis Concept of Operations (ConOps), ETM Tabletop Exercise Report (2), ETM Scenarios and use case package, UAM Initial Stakeholder Needs and Intended use and UAM Integrated UAM Research Planning. Mr. Bradford specifically mentioned that UAM programs would be migrating to an F&E budget line in the future. He stated that the objective of the UAM

project is to develop a concept for immediate and flexible air transportation within a metropolitan area consisting of passenger-carrying operations.

Mr. Bradford provided a high-level overview of the anticipated research areas for FY21 and FY22. He specifically mentioned the program would review the potential of using AI and evaluate how various AI methods can be leveraged to improve the NAS's management. Mr. Bradford also said the program, a work under Enterprise Concepts, which explores concepts for the dynamic TBO timeframe, defines concepts of user and/or operations for these elements of dynamic TBO and the development of operational scenarios associated with dynamic TBO. Emerging topics in FY22 will focus on Dynamic TBO, potential use cases for AI and may be expanded to include items that may come out of the vision 2035 document mentioned earlier.

Deep Dive Request:
Jim Kuchar – ETM, UTM, and ATM Cross dependencies are some of the subcommittee's topics like a deeper dive on at the Fall NAS Ops REDAC meeting.

Steve Bradford affirmed and the publicly available documents on both FAA and NASA's website can be provided as well, specifically mentioning the UTM Concept 2.0 document available on NASA's website.

Presentation: Deep Dive - ASSURE COE Research on UAS Safety Assessment and Integration into the NAS
Presenter: *Sabrina Saunders-Hodge*

Discussion:

Per the subcommittee's request for a deep dive on the ASSURE Center of Excellence (COE), Ms. Sabrina Saunders-Hodge presented on behalf of the UAS Integration Office Research Division (AUS-300). Ms. Saunders-Hodge began the briefing by providing an update on UAS integrated research, explaining that this is an annual five-year rolling planning effort, informing the subcommittee that the program has incorporated as many comments as possible into the second addition, while others will be included in the third edition. The third edition has been completely approved, and Ms. Saunders- Hodge will work with Shelly Yak to provide a final plan.

She explained that the program works collaboratively with the U.S. Government and NASA partners, stating that the FAA looks to NASA to be out in front, forward-looking experts, and scientific research. In the applied research arena, the FAA focuses on Agency needs to address specific objectives and apply research in those areas. Ms. Saunders-Hodge further explained that applied research is a research method directed towards a specific practical aim or purpose. Ms. Saunders-Hodge highlighted some UAS collaboration and partnerships, such as pilot programs with industry, UAS COE ASSURE, standards group, government agencies, international partners, the William J. Hughes Technical Center, and others. The focus of this collaboration is a cross-pollination of research and eliminating duplication of research activities.

Ms. Saunders-Hodge then provided an overview of the UAS Safety Case framework and a data schema that ASSURE has been supporting the FAA with. She noted this activity was an essential research requirement and mentioned that Virginia Tech has also been involved, and the program is looking for the best expertise to define what a viable safety case is, develop risk mitigations, identify core optimum safety data sets, and develop a robust safety case framework. The end goal is to present findings, and

eventually get FAA approval. Ms. Saunders-Hodge mentioned that the FAA hopes to demo this product at the June 2020 UAS Symposium and looks to identify lead participants and the exact research they need. She informed the subcommittee that the safety analysis toolkit and Operational Risk Assessment prototype are being developed as part of the Cross-Agency Collaboration Working Group. The result will be how FAA will utilize ASSURE research outcomes and analysis needs.

Questions:

Monica Alcabin asked if the ASSURE COE slide about advancing operational capabilities and operations over people was in reference to the Notice of Proposed Rulemaking (NPRM) that came out last fall, to which Ms. Saunders-Hodge stated yes, that is correct. The research is doing what it is supposed to do, and when we meet a milestone, how we can use that moving forward. She indicated that the FAA had developed a ConOps, which is considered step 1. The FAA has been working with industry partners to figure out how to be more efficient and provide better data and figure out how to make the system better for all users, which is a significant focus of the program. Ms. Alcabin praised the presentation for including the NPRM, thanked the organization for the excellent work regarding the ASSURE Research, and said that she was delighted to see the UAS Integrated Pilot Program (IPP) participants and the toolkits they used.

Jim Kuchar asked if the FAA was developing a taxonomy and schema for collecting data and whether they will be available to the aviation community. Ms. Saunders-Hodge responded that the FAA currently is and is leveraging ASSURE because they are rich with information. However, the FAA's goal is to release all NAS users' data elements and made them available for public consumption.

Joe Bertapelle asked if this dataset can be used with the Aviation Safety Information Analysis and Sharing System (ASIAS) data set. Ms. Saunders-Hodge responded that the program is looking into cross-pollinating this information, and ASIAS is on the list of programs to achieve this goal.

Jim Kuchar asked if there was a central clearinghouse for this data, to which Ms. Saunders-Hodge replied that there has been no discussion on this until now but that it may be an option. It would require further internal discussions.

Presentation: FAA R&D Update
Presenter: *Shelly Yak*

Summary:

Ms. Yak began the briefing by informing the subcommittee that this was the third REDAC subcommittee conducted virtually and mentioned that this format might be considered for future meetings. Ms. Yak then
explained that the FAA is establishing a new Budget Line Item (BLI) named "Emerging Needs" due to budget constraints as the FAA plans two years out. This research would then be transitioned over to another program in year two.

Ms. Yak then spoke about the R&D landscapes and research drivers, mentioning that they are asking each BLI to identify their projects and align those projects to the NAS Aviation Research Plan goals and the research drivers. She stated that in FY22, they hope to conduct a gap analysis to assess if funding is being applied in the correct areas. Ms. Yak mentioned that there would be an assessment during

the summer, and findings will potentially be briefed during the September REDAC meetings. The second topic Ms. Yak spoke about was an activity regarding the advisory Committee. She stated the REDAC meetings are a legislative requirement, and the FAA is asking each of the REDAC subcommittees to think about in their opinion what works, what does not, new ideas, improvements, etc.

Presentation: 1A01A Runway Incursion Reduction Program (RIRP)
Presenter: *Ben Marple/Giovanni Dipierro*

Summary:

Mr. Marple briefed the subcommittee on the RIRP. He began the meeting by reviewing F&R recommendation three, stating that during the last REDAC, there were some questions about the involvement of airport operators and industry. Mr. Marple informed the subcommittee that the FAA is not able to address this at this time, mentioning that the FAA will go through the operational test and evaluation process. Still, concerns with the operator, the FAA is looking for new technology to design with industry and leveraging Airport Improvement Program (AIP) funds to see if these systems can be researched to qualify for AIP funding in the future.

Mr. Marple transitioned to the regular briefing by providing an overview of the RIRP program and explaining that the objective of the RIRP is to reduce the risk to people and property caused by collisions in the runway environment, emphasizing that the programs' primary concern is providing safety benefits for the FAA. The program will research technologies, develop and evaluate prototype systems that can be used to detect hazards in the Runway Safety Area.

Mr. Marple then introduced the three main work areas under the RIRP program: Small Airport Surface Surveillance (SASS), Runway Incursion Prevention through Situational Awareness, and Surface Taxi Conformance Monitoring (STCM). He elaborated on STCM, mentioning that the program developed a report on requirements and is looking at digitizing taxi instructions. He noted that SASS is getting ready to technology transfer software and hardware products in FY21.

Questions:

Joe Bertapelle inquired if the program focused on small or large airports or everything. Mr. Marple replied that the focus is on small airports; however, developing these capabilities for large airports will also be assessed. The program is looking at causal factors and how that data may apply to large airports.

Subcommittee member Mark Weber asked if the FAA has any potential technology transfer partners in discussion. Todd Lewis responded that the FAA does not and that the current plan is to have an industry day in July; Fed Biz Ops will announce to the industry. He added that the tech transfer's reality is that there is no idea yet as to the degree of interest in it.

Presentation: 1A11B0 Enterprise Human Factors (HF)
Presenter: Tara Holmes

Summary:

Ms. Tara Holmes began the presentation by providing an overview of the program, stating that the Enterprise Human Factor Development program will provide integrated guidance on human performance considerations to concept development, validation, and implementation teams. The programs research efforts look to identify and mitigate systemic HF considerations that may yield the following benefits: increase the utilization rate of concepts and systems among controllers; ensure controller acceptance of ideas and systems; increase safety through the mitigation of known HF risks, and decrease controller workload through improved tools and techniques.

Ms. Holmes then highlighted some of the program's accomplishments in FY20, highlighting the development of a TBO Training Analysis report to identify guidance to the curriculum design guide, developed the TBO Impact on Traffic Manager Unit (TMU) Current State of Knowledge on TBO and TMU Operations Report, and TBO Impact on En Route TMU is being studied using the Cognitive Model Method. She then provided an overview of the FY21 anticipated research areas such as, HF Integration for full TBO, HF integration of Traffic Flow Management concept development, HF integration of new PBN procedures, and HF integration and assessment of the traffic manager's cognitive load as FAA evolves into full TBO.

Questions:

Subcommittee member Dres Zellweger asked what traffic manager guidance should resemble. Ms. Holmes responded that this is still under development and mentioned this could be in the form of recommendations given to a program or standards.

Presentation: A11.h Air Traffic Control/Technical Operations Human Factors
Presenter: *Tara Holmes*

Summary:

Ms. Holmes began the briefing by providing an overview of the Air Traffic Control/Technical Operations HF program's purpose, stating the objective is to provide technical sponsors with timely and appropriate R&D products and consultation services, as identified by the Air Traffic Organization HF R&D Roundtable and ANG-C management. The program offers many benefits for the FAA, such as improving the safety and efficiency of complex Air Traffic Control (ATC) systems by application of R&D to address factors affecting human performance in air traffic control operations and ATC system maintenance. The program also recommends and tests improvements to design, procedures, air traffic controller training, selection and placement, and developing mitigations to address human performance shortfalls.

Ms. Holmes then outlined some of the program's FY20 accomplishments, highlighting work such as Color Standard Implementation Demonstrations, Completed Optimization of Information Display for the Controller (Phase 2) Human in the Loop, Alarms and Alerts Handbook Kickoff and Lab Orientation, and Completed coordination of ATC Tech Ops HF FY20 Requirements. She mentioned that the Color Standard Implementation Demonstrations were a joint effort with Civil Aerospace Medical Institute and seeks to provide users opportunities to view and interact with the proposed color palette to gain

controller acceptance.

Questions:
Subcommittee member Dres Zellweger asked if the program has investigated the color standard implementation cost and if it changes displays. Ms. Holmes responded that they are not looking to change the display. This research informs on the pros and cons of the current color palette, makes a comparison, and looks for any improvement. Mr. Bradford added that controllers can customize the current color palette in STARS right now. Still, this research could guide an individual to the correct color palette based on their individual deficiency.

The subcommittee stated that there used to be an HF roundtable and asked if requirements came from the roundtable. Tara Holmes informed the subcommittee that is exactly where we get our requirements for this budget line.

Presentation: 1A01C Operations Concept Development and Infrastructure (ATDP)
Presenter: *Guillermo Sotelo*

Summary:

Mr. Sotelo began with a brief overview of the ATDP for the Operation Concept Validation and Infrastructure program and the reason for the program's necessity. The ATDP program identifies operational gaps and potential technologies that could address these gaps. It conducts studies and analyses in operational focus areas to include Integration of Space Operations into the NAS, Evolution of TBOs, and Time-Based Metering Operations with Advanced Rerouting. This program ensures that potential enhancements are operationally sound and captured in the Architecture plans for the NAS.

Mr. Sotelo then highlighted some of the program's focus areas in FY20, including Future Flow Management (FFM), which provides operational analysis support for the FFM strategy, and preconditioning flows for arrival metering. He explained that the program would be assessing the application of the current set of TFM tools to manage the flow into an arrival metering operation and mentioned that phase one had been completed providing benefits of applying strategic preconditioning concept for arrivals. The program is also performing research in the following areas, iTBO Gate-to- Gate Strategy, Strategy and Action plan for the Integration of Space Operations into the NAS, Strategy to achieve Flight Deck Based Time-Based Management (TBM), and a NAS Operations Dashboard. Mr. Sotelo introduced new research planned for FY21 for the ATDP program, such as conducting an operational analysis of emerging concepts like Space Operations and UAS, Advanced Rerouting and TBM Operations, and maturing TBO concepts through operation scenario development and simulation. In FY22, the program will continue to enhance the synchronization of strategic and tactical capabilities to optimize TBM.

Questions:
Subcommittee member Joe Bertapelle inquired if upper airspace and commercial space stuff and concepts such as preconditioning flow will be applicable for oceanic and domestic flights? Mr. Sotelo responded, yes, they will. Steve Bradford added that much of the upper airspace research activities fall under the Advanced Surveillance Enhanced Procedural Separation (ASEPS) program.

Presentation: A11.j Weather Program
Presenter: *Randy Bass*

Summary:

Mr. Bass began the briefing by providing an overview of the benefits provided to the FAA by the Weather Program, specifically the enhanced safety of the National Airspace System via the reduction of accidents associated with hazardous weather and the improved capacity and efficiency of the NAS via reduced delays and cancellations and the increased capacity in high traffic areas. Mr. Bass highlighted the program's accomplishments in FY20 with activities such as Convective Weather, Turbulence, Ceiling & 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 Aviation Icing Weather Information for NextGen (TAWIN), and High Ice Water Content (HIWC).

Mr. Bass then outlined some of the expected and planned research activities for FY21 and FY22, such as Convective Weather which plans to improve Offshore Precipitation Capability (OPC), Turbulence will complete Graphical Turbulence Guide (GTG) high resolution, and Ceiling and Visibility will conduct an operational demonstration and quality assessment of the Visibility Estimation through Image Analytics (VEIA) algorithm, develop a VEIA confidence value, determine when human input provides value to VEIA, and write an Operational Concept Description for VEIA. Mr. Bass stated that UAS weather is a newly emerging research area for the program. They will collaborate with the FAA UAS community to ensure weather research supports UAS integration into the NAS and aligns with the FAA's vision of weather being a Key Focus Area. Mr. Bass also mentioned that TAIWIN expects to complete the In-Cloud and Icing Large drop Experiment (ICICLE) data processing. Emerging FY22 Research Focal Areas identified were the incorporation of near-term Traffic Flow Management (TFM) weather requirements, an Analysis of emerging automated weather detection and reporting technologies harmonized to establish and validate NAS weather observation needs. He also mentioned that the weather program would emphasize integrating weather data and information into Decision Support Systems and Services.

Questions:
Joe Bertapelle asked whether turbulence data from ADS-B was in the portfolio, to which Mr. Bass responded that work is mostly done by the WITC program.

Subcommittee member Dres Zellweger asked where the weather program is getting UAS weather requirements from, to which Mr. Bass stated mostly in conjunction with the UAS Integration Office (AUS), as WTIC is dependent on others for these requirements.

Jim Kuchar asked if the weather requirements process has been implemented. Mr. Bass responded that it had, and that the FAA had been working on requirement letters to send out, and have sent out requests for improvements (HEMS Tool) response was positive mostly, four immediately implemented, six will be implemented in the future—further stating that the FAA is now going to the National Weather Service (NWS) and asking if a capability exists, collaborating and not duplicating efforts.

Jim Kuchar questioned if there would be impacts from the RE&D budget reduction, to which Mr. Bass responded that the program held back some FY19 funding in expectation of an FY20 reduction in funding. If the program continues to see a decreased budget, then yes, we will be impacted in the future, FY22. The impact would cut down programs and projects.

Presentation: A11.o NextGen – Weather Technology in the Cockpit (WTIC)
Presenter: *Gary Pokodner*

Summary:

Mr. Pokodner began the briefing by identifying the WTIC program's purpose, which is to identify causal factors in weather-related general aviation safety risks and hazards by conducting research projects that develop, verify, and validate requirements for incorporation into Minimum Weather Service (MINWxSvc) standards. Mr. Pokodner then explained the WITIC program benefits to the FAA: enhanced safety by reducing adverse-weather safety risks, and the enhanced efficiency and increased capacity within the NAS resulting from consistent and predictable pilot adverse weather decision making due to established cockpit minimum weather services. These services include reduced emissions due to enhanced efficiency, reduced flight delays, and enhanced flight routing in and around adverse weather conditions. He explained that program success is measured by the number of standards released incorporating WTIC MinWxSvc recommendations and the number of transitions of WTIC MinWxSvc recommendations into commercial products or operations.

Mr. Pokodner asked the subcommittee for clarification of the F&R recommendation regarding weather transition and probable constraints. The subcommittee did not provide guidance, and Mr. Pokodner informed them that WTIC does not participate in those activities. He then briefly reviewed various WTIC program management artifacts, Microsoft Project program schedules showing estimated schedules, phases, cost, and final goals, and Gap database tracking items in response to the subcommittee's F&R for the program.

Mr. Pokodner outlined WTIC's accomplishments in FY20, specifically mentioning Remote Oceanic Meteorological Information Operation (ROMIO) had received volume two of the benefits analysis, which detailed that ROMIO provided ten minutes of additional time to plan weather deviation when compared to using weather radar. He stated that the ADS-B Turbulence Phase 1 final report and final briefing were completed and found extremely positive results in obtaining turbulence observations more accurate than Pilot Reports (PIREPs).

Questions:

A subcommittee member asked about the accuracy of the turbulence report, to which Mr. Pokodner responded that he could demonstrate this, but the information is all on graphs. He stated that it is far more accurate than the regular PIREPS. Randy Bass explained that although it is only phase 1, the initial results are very encouraging. However, there is work to be done to remove false readings. It was emphasized that big data would be the means of interpreting all of the turbulence data collected. Subcommittee member Joe Bertapelle. agreed on the benefits of the turbulence reports (1200 per day) and the potential benefit for all aircraft users in the NAS. He praised the team's efforts to deduce Turbulence, and Ms. Alcabin commended the examples presented in the Gap Analysis.

Presentation: Subcommittee Discussion Recap
Presenter: *Jim Kuchar*

Discussion: The acting Chairperson, Jim Kuchar, began the discussion by soliciting input from the subcommittee members and potential actions. Mr. Kuchar stated that he would solicit input from the subcommittee members to fulfill Shelly Yak's request and then provide feedback to the DFO, Phil Yeung.

Day 2 – March 24, 2020 (Virtual Meeting)

Presentation: Review Findings and Recommendations/ New Actions
Presenter: *Jim Kuchar*

Discussion: The acting Chairperson, Jim Kuchar, opened the second day of the NAS Ops REDAC Subcommittee by welcoming all Subcommittee members and announced two discussion items.

1. The first was to develop a response to Shelly on changes to the REDAC process. The subcommittee mentioned that historically the REDAC was a handy tool and believed it could be leveraged better to collaborate with the FAA. In the early 1990s, the REDAC was a very powerful subcommittee that included industry members. The FAA gave the Committee more weight, and FAA used the REDAC to answer complicated answers, e.g., off-the-shelf systems use in the FAA. The subcommittee members agreed that REDAC is not currently being used to the full potential. Jim Kuchar will collect ideas on Shelly's request from the subcommittee members and then provide the response to Phil, who will then have a meeting with Shelly Yak.

2. New F&R/ Action for the Fall 2020 REDAC:

2035 Vision – The subcommittee wants to be more involved in these types of future planning activities and suggested an industry-wide meeting at the beginning stages. The approach would be very beneficial

NASA 2045 Plan – Subcommittee would like NASA to give a briefing on this topic at the Fall 2020 NAS Ops REDAC meeting.

Presentation: Deep Dive – Commercial Space Transportation (CST) – Launch Vehicle to Aircraft Trajectory Separation Management Development and Deployment Strategy
Presenter: *Ty Madden*

Discussion:

Per the NASOPS Subcommittee request for a deep dive, Mr. Ty Madden presented on behalf of the CST program. He began the briefing by giving the subcommittee a pulse of the industry and providing an overview of space exploration, new launch vehicles, technology, and communication. Mr. Madden explained to the subcommittee that in the last year, launch cases have increased from ten in 2019 to fifty projected in 2020 and noted this is a large uptick in one year. He mentioned that there has also been an increase in spaceports popping up around the country. Mr. Madden explained that this

has led to lost capacity in the NAS due to Atlantic flight routes being closed for over an hour before the Aircraft Hazard area is activated for launch/reentry operations. The current state is a "permission-based operations" approach towards getting an all-clear for space launch operations. In the future, operations would shift towards a "full NAS integration" approach with, essentially, an entire shift away from permission-based operations.

Mr. Madden then discussed the different phases of Space Data Integrator (SDI), stating that SDI Phase 1 is a foundational piece that allows to receive data from Launch and Reentry Operators and provide it to Traffic Flow Management System. SDI Phase 2 will provide faster Aircraft Hazard Area generation; current technology takes about 8-12 minutes to generate, while phase 2 will generate the hazard area in seconds. Space Integration Capabilities takes "space data" to ATC automation systems. These are the 3 current investments of the FAA for commercial space. Overall, the SDI will allow the FAA to begin integration and keep pace with the increasing frequency and complexity of commercial launch and reentry operations. Mr. Madden emphasized that CST is a top priority for the FAA

Questions:

Dres Zellweger asked if there was a concept of operations on how ATC will use this data and how the airlines work with them. Mr. Madden responded that the FAA has worked on a commercial space integration ConOps that is very close to being ready for internal review. It will then be distributed externally and will lay out the high-level capability vision and strategic direction. Concerning SIC, access to vehicle information, the controller needs to see hazard area integration, polygon on ATC Glass, and decision support capability – hazard mitigation capability. Currently, it is unclear how the airline would leverage this data and how that piece would fit into the plan. The program will take action to investigate this.

Jim Kuchar asked if Mr. Madden sees the launch and reentry operator providing the hazard areas or the FAA? Mr. Madden responded that there are currently two schools of thought. The FAA is presently focused on SDI Phase 2. Phase 2 is now looking at a prototype to create real-time hazard volume, calculating a real-time hazard volume to end up on Air Traffic Automation, FAA should own and operate. Creating that volume could be done by a service provider, FAA provides validation accreditation, we would be a consumer. NextGen has done some work on this as well.

Joe Bertapelle asked if the program has the necessary funding to accelerate this work.

Mr. Madden responded that funding is not the issue where we are going to encounter challenges; it is the deployment of something like this; it will take time and a safety-critical focus. We have multiple funding profiles; funding is not the challenge as it accelerates NAS capabilities, develops correct safety measures, and the research time needed.

Presentation: A12.a Wake Turbulence and 1A05C Wake Turbulence Re-Categorization
Presenter: *Jillian Cheng*

Summary:

The RE&D Wake Turbulence and Wake Turbulence Re-cat programs were briefed by the program manager, Ms. Jillian Cheng. Ms. Cheng started the briefing by providing an overview of the two Wake programs, stating that research in this area satisfies the NextGen objective to increase capacity during peak demand periods safely. Ms. Cheng explained that the difference between the two programs was that the Wake Turbulence budget line is more research-focused, while the Wake Re-Cat budget line is focused on the implementation and application portion. She stated that the two programs provide benefit to the NAS users and airports by determining safe throughput capacity maintaining wake risk mitigation separations for use in today's ATC operations, and developing concepts for safe, dynamic throughput capacity increasing wake risk mitigating separations to enable an increased number of flights at the nation's airports and in its air corridors. The Wake Re-cat program translates concepts coming to the wake turbulence research into solutions and developing efficient dynamic wake turbulence risk mitigation procedures and separation for air traffic controllers in managing daily ATC operations.

Ms. Cheng then provided an overview on planned research activities for the two programs in FY21/22, highlighting that RE&D Wake will develop FAA wake separation recommendations for new aircraft entering service in the 2021-2022 timeframe. The recommendations are to be incorporated into ATC Orders and associated automation to ensure safe and capacity-efficient NAS operations for these aircraft. The Wake Re- Cat program plans to conduct a William J. Hughes Technical Center (WJHTC) controller simulation of the wake separations being used at a candidate airport. Additionally, they will initiate prototype development of advanced algorithms that use weather/wind observed (including aircraft-based observations) and NWS forecast model data to support ATC's use of dynamic wake separations in the terminal area and in the En Route airspace.

Questions:

Joe Bertapelle inquired if any of this work ties to NextGen Advisory Committee (NAC), Northeast Corridor (NEC), MARS efforts? Ms. Cheng responded that the programs are not currently working on these solutions, have not been participating in those, and are more tied to multiple runway operations.

A subcommittee member asked if the FAA had a timeframe for assessing UAS operations to develop wake risk mitigation solutions. Ms. Cheng responded that the program feels that this research activity is a few years down the road, with ERAM Enhancement 3 mentioning there are no wake mitigation rules currently for En Route operations.

Presentation: A11.q Flight Deck Data Exchange Requirements
Presenter: *Biruk Abraham / Nouri Ghazavi*

Summary of Briefing:

Mr. Nouri Ghazavi began the briefing by explaining this was a new project and provided an overview of the FAA's benefits by the Flight Deck Data Exchange Requirements Program (FD DER). The program is specifically seeking to enable enhanced flight deck data exchange capabilities by identifying security management strategies required to mitigate potential threats and vulnerabilities around Electronic Flight Bag (EFB), Aircraft Interface Display (AID), and Internet Protocol (IP) Data Link, with additional avionics to be included in future phases. Mr. Ghazavi then explained that the program's success would be determined by ensuring data exchange confidentiality, integrity, and availability to support future connected aircraft concepts. The initial phase focusing on three primary components – EFB, AID, and IP Data Link, and provides security management recommendations for the future connected aircraft concept.

Mr. Ghazavi outlined FD DER's accomplishments in FY20 specifically mentioning that they established a contract with industry partners to begin work under SE2025 and conducted a kickoff meeting to determine high-level technical approaches for conducting cybersecurity assessments. Mr. Ghazavi then provided an overview of the FD DER program's planned research activities in FY21/22, mentioning that in FY21, they expect to complete cybersecurity risks assessment associated with EFB, AID, and IP Data Link and identify mitigation strategies to address those risks. The program will also develop a plan for the FD DER initial architecture and evaluation activities to support cybersecurity risks management of flight deck information exchange. In FY22, the program is looking to expand the research scope to include additional avionics and integrated flight deck components required to enable securely connected aircraft. This may include, but is not limited to, systems in the aircraft control domain such as Flight Management System.

Questions:

Dres Zellweger asked if it would be better for the FAA to develop security requirements and have people adjust to them instead of providing assessment reports. Mr. Ghazavi stated that it would make sense, but the FAA cannot dictate industry requirements, and not everyone in the industry uses the same components in the same manner.

Jim Kuchar asked if there is another RE&D budget red line targeted at digital system safety, how this program is different. Nouri mentioned that he is not familiar with that project and offered to investigate it and follow up with the subcommittee.

Emily Stelzer asked if the work has touchpoints with the Trust Framework work with International Civil Aviation Organization (ICAO). Mr. Ghazavi stated confirmed that we do not drive requirements for ICAO, but members are heavily involved. The program has incorporated input from them into our research and potentially provides information back from our findings.

Presentation: Subcommittee Discussion Recap & Closing
Presenter: *Jim Kuchar*

Discussion:

Mr. Kuchar concluded the meeting by summarizing the Subcommittee members' actions, pointing out the briefing topic findings and recommendations discussed earlier. Mr. Kuchar informed the members that he would be reaching out to the NAS Ops DFO with action items and recommendations prior to the full REDAC meeting, scheduled for July 9, 2020.

REDAC / NAS Operations Subcommittee Meeting Agenda

Date: March 24 – 25th, 2020
Location: REMOTE ONLY | SEE DIAL-IN & VIDEO CONFERENCING DETAILS ON LAST PAGE
Purpose: Review the R&D portfolio developed based on the subcommittee's strategic guidance from the Fall Meeting. The FAA briefs the proposed R&D FY+2yrs

Tuesday, March 24th

0830-0900	Welcome/ Review of Open Actions	Leo Prusak / Phil Yeung
0900-0930	Budget Briefing	Elizabeth Delarosby
0930-0945	NAS 2035 Vision	Steve Bradford
0945-1015	1A09D NextGen – New Air Traffic Management Requirements	Steve Bradford
1015-1030	Break	
1030-1100	1A11A Enterprise Concept Development	Steve Bradford
1100-1200	Informational Deep Dive – ASSURE COE Research on UAS Safety Assessment and Integration into the NAS briefing	Sabrina Saunders-Hodge
1200-1215	FAA R&D Update	Shelley Yak
1215-1300	Lunch	
1300-1330	1A01A Runway Incursion Reduction (RIRP)	Ben Marple / Giovanni Dipierro
1330-1400	1A11B0 Enterprise Human Factors	Tara Holmes
1400-1430	A11.h Air Traffic Control/Technical Operations Human Factors	Tara Holmes
1430-1500	1A01C Operations Concept Validation & Infrastructure (ATDP)	Guillermo Sotelo
1500-1515	Break	
1515-1545	A11.j Weather Program	Randy Bass
1545-1615	A11.o NextGen – Weather Technology in the Cockpit (WTIC)	Gary Pokodner
1615-1645	F&R Discussion	Subcommittee

Wednesday, March 25th

0830-0900	Review Findings and Recommendations	Subcommittee
0900-1000	Informational Deep Dive - CST - Launch Vehicle to Aircraft Trajectory Separation Management Development and Deployment Strategy	Ty Madden
1000-1030	A11.m Wake Turbulence	Jillian Cheng
1030-1045	Break	
1045-1115	1A05C Wake Turbulence Re-Categorization	Jillian Cheng
1115-1145	A11.q Flight Deck Data Exchange Requirements	Biruk Abraham / Nouri Ghazavi
1145-1215	Recap and Closing	Leo Prusak

Legend Key:

	Informational Deep Dives

REDAC NASOPS CONFERENCE INFORMATION

REDAC NASOPS Meeting Day 1

Join by phone
+1-408-418-9388 United States Toll
Access code: 793 486 042

Join by computer, tablet or smart phone

Meeting Link: **https://a3technologyinc-gqs.my.webex.com/a3technologyinc-gqs.my/j.php?MTID=m488106711172f2be751f039b02c6a795**

Meeting Number: 793 486 042

REDAC NASOPS Meeting Day 2

Join by phone
+1-408-418-9388 United States Toll
Access code: 792 035 186

Join by computer, tablet or smart phone

Meeting Link: **https://a3technologyinc-gqs.my.webex.com/a3technologyinc-gqs.my/j.php?MTID=mf82fc0832117e0a2b594393626600322**

Meeting Number: 792 035 186

Subcommittee on NAS Operations
Winter-Spring 2020 - March 24 - 25, 2020
Attendees Lists

DAY 1

Number	Name	Affiliation
1	Alam, Sadaf	A3 TECH., Inc.
2	Albin, Monica	BOEING
3	Bass, Randy	FAA
4	Bertapelle, Joseph	JETBLUE
5	Bradford, Steve	FAA
6	Buntin, Charles	FAA
7	Carr, Kristina	FAA
8	Chambers, Nattiel	DIGI.
9	Delarosby, Beth	FAA
10	Dipierro, Giovanni	FAA
11	Holmes, Bruce	HOLMES CONS.
12	Holmes, Tara	FAA
13	Kuchar, Jim	
14	Lewis, Ronald	FAA
15	Marple, Ben	FAA
16	Mario (?)	
17	Moore, Monique	FAA
18	Nguyen, Peter	FAA
19	Pokodner, Gary	A3 Tech., Inc.
20	Powers, Brian	FAA
21	Roundtree-Coleman, CA	FAA
22	Saunders-Hodge, Sabrina	FAA
23	Sotelo, Guillermo	NASA
24	Steltzer, Emily	MITRE
25	Sultan, Akbar	FAA
26	Summer, Steve	FAA
27	Vaughan (?)	
28	Weber, Mark	NOAA
29	Wondowlowski, Frank	FAA
30	Yak, Shelley	FAA
31	Yeung, Phil	FAA
32	Zellweger, Dres	Aviation Consultant
33	Zerfas, David	A3 Tech., Inc.

DAY 2

Number	Name	Affiliation
1	Alam, Sadaf	A3 Tech., Inc.
2	Alcabin, Monica	BOEING
3	Bertapelle, Joseph	JETBLUE
4	Cheng, Jillian	FAA
5	Ghazavi, Nouri	FAA
6	Holmes, Bruce	HOLMES CONS.
7	Johnson, Edward	FAA
8	Kuchar, Jim	MITLL
9	Lawler, Chris	FAA
10	Madden, Ty	FAA
11	Moore, Monique	FAA
12	Powers, Brian	A3 Tech., Inc.
13	Roundtree-Coleman, CA	FAA
14	Sharma, Puni	FAA
15	Steltzer, Emily	MITRE
16	Sotelo, Guillermo	FAA
17	Sultan, Akbar	NASA
18	Weber, Mark	NOAA
19	Wondowlowski, Frank	FAA
20	Yeung, Phil	FAA
21	Zellweger, Dres	Aviation Consultant
22	Zerfas, David	A3 Tech., Inc.