

**Research, Engineering, and Development Advisory Committee (REDAC)
National Airspace System (NAS) Operations Subcommittee | MINUTES**

Date: *March 15 – 16, 2022*
Location: *Virtual Meeting*
Purpose: *Review of FY22-24 Proposed Portfolio; Provide Guidance and Recommendations; Informational Briefings or Updates*
Facilitator: *Phil Yeung, Designated Federal Officer (DFO)*
Chairperson: *Jim Kuchar*
Note Takers: *Monica Alcabin*
Upcoming Meetings: *August 30 – 31, 2022*

Day 1 – March 15, 2022 (Virtual Meeting)

Welcome / Review of Actions

Presenters: *Jim Kuchar / Phil Yeung*

Summary:

Phil Yeung, the NAS Ops Subcommittee DFO, and Jim Kuchar, Subcommittee chair, welcomed the Subcommittee members and the presenters to the meeting, thanking them for their time and participation in the REDAC meeting.

Jim reminded the Subcommittee that its charge is to develop recommendations to guide FAA R&D programs, and the Subcommittee members should continue to think critically about information they are presented to determine what guidance they can provide to the FAA.

Phil Yeung reviewed the agenda for the two-day meeting.

Presentation: 1. Director Remarks

Presenter: *Shelley Yak*

Summary:

Eric Neiderman presented in place of Shelley Yak. Eric thanked everyone for their participation, and summarized the FAA's status now that it's been 2 years into the COVID pandemic. The FAA Technical Center has been open for business with approximately 7-10% of employees on site. Mr. Neiderman also summarized some of the priorities in the latest Infrastructure Bill, which includes \$5B for airport terminals, \$15B for airport infrastructure, and \$5B for ATC facilities. Mr. Neiderman noted the FAA has begun a strong focus on environmental and sustainability to be carbon neutral by 2050.

Presentation: 2. Budget Briefing**Presenter:** *Beth Delarosby***Summary:**

Ms. Delarosby presented information on the RE&D budget and Congressional conference language. Several changes were noted, including that some funding for Environment and Energy was moved into other BLIs such as NextGen environmental research and alternate fuels. Funding for Human Factors in the Flight Deck went up.

Ms. Delarosby mentioned that the current reauthorization expires at the end of 2023.

The Subcommittee thanked Ms. Delarosby for the briefing.

Presentation: 3. Enterprise Concept Development**Presenter:** *Steve Bradford***Summary:**

Mr. Bradford provided an overview of the Enterprise Concept Development effort. This effort focuses on new ideas requiring development of Concept of Operations (ConOps) documents and validation of Concepts, to assess their feasibility and budget requirements if they are selected to move forward into an acquisition program.

Mr. Bradford noted that this effort is a partnership with NASA for Machine Learning (ML)/Artificial Intelligence (AI) in the NAS, and that the FAA will qualify ML/AI for other functions before doing so for safety-critical separation functions.

Mr. Bradford reviewed elements within this portfolio including Extensible Traffic Management (xTM) Framework Analysis and Trajectory Based Operations (TBO) Concept.

The Subcommittee thanked Mr. Bradford for the briefing.

Presentation: 4. New Air Traffic Management Requirements**Presenter:** *Steve Bradford***Summary:**

Steve Bradford summarized the work in this area as less focused on research and more so on development and technical requirements, with testing primarily at the Embry Riddle Florida Test Bed (FTB) and NextGen Integration and Evaluation Capability (NIEC) facilities. He mentioned that an AI certification framework is being developed for a collaborative environment including future flight planning / flight management and dynamic TBO.

Work under this portfolio in surveillance infrastructure modernization is coordinated with AJM-4 who serves as the executing office. Work on weather R&D focuses on needs coordination and transition of FAA-specific weather R&D, informs the National Weather

Service (NWS) of FAA requirements, and transitions products from R&D to FAA Facilities and Equipment (F&E) or NWS.

Mr. Bradford mentioned that the FAA is partnering with NASA (AOSP / NARI) for certification of future AI systems, with a focus on autonomous aircraft, how to certify or qualify systems for ATM, and developing a framework for how to proceed.

Mr. Bradford stated that Command and Control in the Cloud activities included analyzing the En Route Automation Modernization (ERAM) system to see what parts are cloud-ready. The FAA is currently building a copy of ERAM-in-the-cloud in a laboratory R&D environment that can replicate all controls and systems to include assessment of flexibility, security, and resiliency. This work is being coordinated with NASA, but mostly performed by the FAA/FTB/WJHTC.

Finally, Mr. Bradford noted that work on Connected Aircraft / Synchronization of Air-Ground SWIM is looking at alternatives to traditional Data Comm.

The Subcommittee thanked Mr. Bradford for the briefing.

Presentation: 5. Informational Briefing: xTM Framework and Operational View

Presenter: *Sherri Magyarits*

Summary:

Ms. Magyarits provided a presentation on the FAA's xTM Framework and Operational View.

Mr. Holmes asked whether this work included hypersonics, to which Ms. Magyarits replied that yes, it does, and the FAA is working with NASA (NARI) and industry.

The Subcommittee thanked Ms. Magyarits for the briefing.

Presentation: 6. Enterprise Human Factors

Presenter: *Tara Gibson*

Summary:

Ms. Gibson briefed Enterprise Human Factors. This BLI research focuses on successful integration of systems developed and deploy to enable NextGen concepts.

Accomplishments include a Traffic Management Unit (TMU) decision making project final report, and the group has begun a human readiness levels project kickoff. Overall the activity is taking on a more traffic management related theme, shaping acquisition processes, and working closely with system engineering groups.

Anticipated FY23 research includes TBO human factors effects on the TRACON and TMU, regional TMU decision-making and coordination, and TBO training model.

Jim Kuchar asked whether any airline operations center (AOC) representatives have been included in the collaborative decision making research? Karl Kaufmann replied that not yet, but they will be integrating AOCs as new actors in the next phase.

Jim Kuchar noted that it is good to see the focus has expanded from traditional tactical ATC HF to TFM HF.

The Subcommittee thanked Ms. Gibson for the briefing.

Presentation: 7. Air Traffic Control/Technical Operations Human Factors

Presenter: *Tara Gibson*

Summary:

Ms. Gibson's second presentation was on Air Traffic Control/Technical Operations HF. This BLI research focuses on near term needs (3-5years) and is all RE&D funded.

Joe Bertapelle asked whether we can point back to somewhere in the past where we changed controller candidates based on results of these studies? Ms. Gibson noted that there are several studies that have been done in the past, and Dan stated that they have identified factors that have contributed to candidates' success.

The Subcommittee thanked Ms. Gibson for the briefing.

Presentation: 8. Informational Update: UAS Integration Research

Presenter: *Kerin Olson / AUS*

Summary:

Ms. Olson provided a requested deep-dive briefing on recent Unmanned Aircraft System (UAS) Integration Research. Emphasis has been on research for Beyond Visual Line-of-Sight (BVLOS) and Advanced Air Mobility (AAM).

Bruce Holmes noted that there is some interesting work being done at the Tech Center on the command and control link. Customers for that capability might be willing to work with the Alliance for System Safety of UAS through Research Excellence (ASSURE) to help guide those activities. Many of the research efforts are highlighted, and there are other research efforts where we are partnering with the Tech Center.

Joe Bertapelle noted that the presentation provided an impressive comprehensive review of the research arena, and asked whether there has been participation from 3rd party vendors. Ms. Olson replied that yes, there are always opportunities for further partnering. Within AUS-300, there is a branch that looks at those partnerships.

Bruce Holmes asked where is ASSURE in the lifecycle of the Center of Excellence (COE)? We want to avoid the disruption of a recompute for the COE. Would be good to know that the current ASSURE activity has some stability over the next 5 years. This was a proposed topic for more information at the next Subcommittee meeting.

Jim Kuchar asked whether they have mapped out the investment in research it is going to take to accomplish the stated goals -- Is there enough budget to do it all? Ms. Olson replied that all of the research identified today has a place, but there are some needs/gaps identified. The work here was \$24M over several years.

The Subcommittee thanked Ms. Olson for the briefing.

Presentation: 9. Weather Program

Presenter: *Randy Bass*

Summary:

Mr. Bass provided an overview of the Aviation Weather Research Program including its current portfolio, recent accomplishments, and future research plans.

Mr. Bass noted that Weather Observations is a new topic for this program. Most of the Weather Observations work is in the F&E side, and the group started this program to do some applied research.

The Subcommittee thanked Mr. Bass for the briefing.

Presentation: 10. NextGen – Weather Technology in the Cockpit (WTIC)

Presenter: *Gary Pokodner*

Summary:

Mr. Pokodner presented an update on research activities within the WTIC program. He noted that WTIC is starting to look farther out toward future concepts within the Information-Centric NAS. They have added metrics for avoidable delays and reduction in accidents/incidents and are including a broad range of stakeholders in WTIC portfolio.

The Subcommittee thanked Mr. Pokodner for the briefing.

Presentation: Findings and Recommendations Discussion

Presenter: *Jim Kuchar / Subcommittee*

Summary:

The Subcommittee reviewed its document requests and opportunity to expand Subcommittee membership.

Day 2 – March 16, 2022 (Virtual Meeting)

Presentation: Review Findings and Recommendations

Presenter: *Jim Kuchar / Subcommittee*

Summary:

The Subcommittee reviewed their notes from the prior day and began preparing Findings and Recommendations. Dates were set for the spring 2023 meeting on 14-15 March 2023.

Presentation: 11. Informational Briefing: BVLOS ARC Rulemaking Overview

Presenter: *Peter Sachs*

Summary:

Mr. Sachs provided a requested deep-dive briefing on recent UAS Beyond Visual Line-of-Sight (BVLOS) Operations Aviation Rulemaking Committee (ARC). The presentation reviewed the ARC report recommendations for performance-based requirements affecting 14CFR. Operations in scope include precision agriculture, aerial surveillance, and package delivery. The results are still being deliberated.

The Subcommittee thanked Mr. Sachs for the briefing.

Presentation: 12. Informational Briefing: UTM Implementation Plan Overview

Presenter: *Peter Sachs*

Summary:

Mr. Sachs provided a requested deep-dive briefing on the UAS Traffic Management (UTM) Implementation Plan.

The UTM implementation plan collected internal comments but efforts were paused in September because they were given the recommendation that they should wait for ARC recommendations before finalizing the report. Key questions have included: What can industry deploy today? What are the safety services that are needed? What services are needed to seek a waiver for 91.113? What does the V2V link look like? Do you need aviation protected spectrum?

Bruce Holmes noted that the General Aviation Manufacturers Association (GAMA) published a report on Vehicle to Vehicle (V2V) in December and asked whether the considerations that GAMA put forth was included in the FAA's analysis. Mr. Sachs replied that there are internal discussions going on, with a tentative goal to present the UTM implementation plan at the Advanced Aviation Advisory Committee (AAAC) meeting in June.

The Subcommittee thanked Mr. Sachs for the briefing.

Presentation: 13. NextGen – Flight Deck Data Exchange Requirements

Presenter: *Nouri Ghazavi*

Summary:

This presentation was canceled due to presenter illness.

Presentation: 14. Wake Turbulence Re-Categorization

Presenter: *Jillian Cheng*

Summary:

Ms. Cheng provided a presentation summarizing the Wake Turbulence BLI, which assesses aircraft wake encounter risks at all flight levels, including en route as well as terminal operations.

The Subcommittee thanked Ms. Cheng for the briefing.

Presentation: 15. Wake Turbulence Re-Categorization

Presenter: *Jillian Cheng*

Summary:

Ms. Cheng followed up with a presentation on the Wake Turbulence Re-Categorization program, where the focus is on increasing runway capacities during Instrument Flight Rules (IFR) operations.

Current research is in dynamic pair wise separation with simulation at the Tech Center. The solution is similar to what Heathrow is doing with their separations, but whereas Heathrow is only looking at headwind, the FAA is looking at total wind because US operations are different from how Heathrow operates.

The Subcommittee thanked Ms. Cheng for the briefing.

Presentation: 16. Runway Incursion Reduction (RIRP)

Presenter: *Rob Higginbotham / Giovanni Dipierro*

Summary:

Mr. Higginbotham provided updates to the RIRP program. This BLI is focused on runway environment and researching technologies to detect hazards in the runway safety area and to provide alerts. Results will be transferred to the PMO for further development and acquisition. Most recently, technology for Small Airport Surveillance Sensor (SASS) was transitioned to AJV-S.

Jim Kuchar asked why wrong-surface landing prevention technologies are taking so long to implement (not planned until 2024), given that there was a serious incident at SFO in 2017? Mr. Higginbotham replied that he was not sure, it could be a funding issue; they are working on whether we can use Airport Surface Detection System —

Model X (ASDE-X) to get information in advance and issue a go-around in those types of situations.

The Subcommittee thanked Mr. Higginbotham for the briefing.

Presentation: 17. Operations Concept Validation & Infrastructure Evolution (ATDP)

Presenter: *Guillermo Sotelo*

Summary:

Mr. Sotelo provided an overview of work being performed to identify operational gaps, needs, mitigations, and ensure solutions are effective. Results from his program area are then sent to the PMO for potential acquisition.

Future Flow Management (FFM) work has involved initial validation with ATO stakeholders, developing operational outcomes and strategy, developing action plan, and key milestones for next 3-7 years.

The NAS Integration of Transiting Operations (NITRO) program has similar plan and process, and is in the same phase.

For the Future of The Ocean 2035 (FOTO35) effort, a high level ConOps has been developed.

The Subcommittee thanked Mr. Sotelo for the briefing.

Presentation: Findings and Recommendations Discussion

Presenter: *Jim Kuchar / Subcommittee*

Summary:

The Subcommittee closed the meeting with a discussion of several observations and findings/recommendations to be developed for the Spring Full REDAC meeting. Assignments for writing up these points were given and the dates for the Spring 2023 meeting were set for March 14-15, 2023.

Jim Kuchar and Phil Yeung thanked the presenters and Subcommittee members for their time, and adjourned the meeting.

Presentation: Recap and Closing

Presenter: *Jim Kuchar / Phil Yeung*

Summary:

Requested documents prior to next meeting:

- UTM Implementation Plan

Requested informational topics requested for the next meeting:

- Deep dive on the Info-Centric NAS data exchange ecosystem, including FF-ICE, EPP, IP-based command and control, Connected Aircraft, Flight Information System (FIMS), and IPS-datacomm (Steve Bradford or designee).
- UAM Concept of Operations updated document (per Steve Bradford: Nouri Ghazavi)
- AST R&D Roadmap, including their newly-planned Industry-Led Commercial Space Research Alliance. Information should be limited to topics related to 1.1 NAS Integration including air traffic management integration of space operations, safety, security, resilience, spaceport-to-spaceport high-speed transport, hypersonics, and hazard area reduction and dynamic management (Ken Davidian)
- GA and AAM Future integrated, digital Communications / Navigation / Surveillance industry perspectives on R&D and demonstration needs (Bruce Holmes or designee)
- Deep dive on UAS / UTM / AAM weather R&D roadmap and accomplishments (Randy Bass / Kevin Johnston)
- Overview of Remote Tower activities including requirements, assessments of technologies / systems, and consideration of potential value of systems coming out of RIRP (e.g. SASS, RISPA, STCM). Update on status of operational and regulatory approvals for Remote Tower (RT), including national strategies since RT technologies may apply to AAM operations that fly in traditional airspace and VFR/IFR.
- The Subcommittee requests an overview of the FAA ASSURE COE Program. We reviewed information regarding the procurement life cycle for the current ASSURE team and want to understand, for example, when is the current contract up for renewal and how might that renewal cycle disrupt the effectiveness of the current team to meet critical timelines for outcomes of national value for UAS NAS integration? Are there similar risks for other COEs?
- NextGen Wake Turbulence program briefing: please provide additional detail on recent field wake measurement campaign and development of absolute wake encounter metrics
- ATDP briefing: please include brief summaries of the Action Plans for Future Flow Management and NITRO, specifically how they will prioritize and drive R&D efforts to support these concepts.

REDAC / NAS Operations Subcommittee Meeting Agenda

Date: March 15-16, 2022

Location: Remote only | See last page for phone and video conferencing details

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+2 years.

Tuesday, March 15th

9:00am	Welcome / Review of Actions	Jim Kuchar / Phil Yeung
9:15am	1. Director Remarks	Shelley Yak
9:20am	2. Budget Briefing	Beth Delarosby
9:30am	3. Enterprise Concept Development	Steve Bradford
10:00am	4. New Air Traffic Management Requirements	Steve Bradford
10:30am	Break	
10:45am	5. Informational Briefing: xTM Framework and Operational View	Sherri Magyarits
11:45am	6. Enterprise Human Factors	Tara Gibson
12:15pm	7. Air Traffic Control/Technical Operations Human Factors	Tara Gibson
12:45pm	Lunch	
1:30pm	8. Informational Update: UAS Integration Research	Sabrina Saunders- Hodge / AUS
2:30pm	9. Weather Program	Randy Bass
3:00pm	Break	
3:15pm	10. NextGen – Weather Technology in the Cockpit (WTIC)	Gary Pokodner
3:45pm	Findings and Recommendations Discussion	Subcommittee

Wednesday, March 16th

9:00am	Review Findings and Recommendations	Subcommittee
9:15am	11. Informational Briefing: BVLOS ARC Rulemaking Overview	Peter Sachs / AUS
9:45am	12. Informational Briefing: UTM Implementation Plan Overview	Peter Sachs / AUS
10:45am	Break	
11:00am	13. NextGen – Flight Deck Data Exchange Requirements	Nouri Ghazavi
11:30am	14. NextGen – Wake Turbulence	Jillian Cheng
12:00pm	15. Wake Turbulence Re-Categorization	Jillian Cheng
12:30pm	Lunch	
1:15pm	16. Runway Incursion Reduction (RIRP)	Rob Higginbotham / Giovanni Dipierro
1:45pm	17. Operations Concept Validation & Infrastructure Evolution (ATDP)	Guillermo Sotelo
2:15pm	Findings and Recommendations Discussion	Subcommittee
3:00pm	Recap and Closing	Jim Kuchar / Phil Yeung

Legend Key:

	Informational Briefing or Update
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Day 1 Attendee List:

Phil Yeung	FAA
Jim Kuchar	MIT Lincoln Laboratory
Chinita Roundtree-Coleman	FAA
Beth Delarosby	FAA
Bruce Holmes	Holmes Consulting LLC
Akbar Sultan	NASA
Bill Kaliardos	FAA
Brian Powers	A3 Technology, Inc.
Dan Herschler	FAA
Emily Stelzer	MITRE
Joe Bertapelle	Joe Bertapelle LLC
Jon Schleifer	FAA
Kerin Olson	FAA
Marcus Boukedes	FAA
Mark Allen	FAA
Matthias Steiner	NCAR
Michael Reininger	FAA
Monica Alcabin	Boeing
Monique Moore	FAA
Nattiel Chambers	DIGITALiBiz
Steve Bradford	FAA
Kristina Carr	FAA
Sherri Magyarits	FAA
Gary Pokodner	FAA
Randy Bass	FAA
Tara Gibson	FAA
Eric Neiderman	FAA

Day 2 Attendee List:

Phil Yeung	FAA
Jim Kuchar	MIT Lincoln Laboratory
Chinita Roundtree-Coleman	FAA
Akbar Sultan	NASA
Bill Kaliardos	FAA
Brian Powers	A3 Technology, Inc.
Emily Stelzer	MITRE
Guillermo Sotelo	FAA
Jarrett Larrow	FAA
Joe Bertapelle	Joe Bertapelle LLC
Jon Schleifer	FAA
Marcus Boukedes	FAA
Matthias Steiner	NCAR
Michael Reininger	FAA
Monica Alcabin	Boeing
Monique Moore	FAA
Peter Sachs	FAA
Tara Gibson	FAA
Marlo Allen	Quasars, Inc.

Jillian Cheng	FAA
Ben Conway	FAA
Caitlin O'Kelly	FAA
Chris Lawler	Cavan Solutions
Chris Johnson	SAIC
Eddie Sierra	FAA
Rob Higginbotham	FAA
Randy Mauer	FAA
Dan Herschler	FAA
Bruce Holmes	Holmes Consulting LLC