

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

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**Date:** *September 1-2, 2020*

**Location:** *Virtual Meeting*

**Purpose:** *Review of FY20-23 Proposed Portfolio; Provide Guidance and Recommendations; Informational Deep Dives*

**Facilitator:** *Phil Yeung, Designated Federal Officer (DFO)*

**Chairperson:** *Jim Kuchar*

**Note Takers:** *Emily Stelzer*

**Upcoming Meetings:** *March 16-17, 2021, Washington, DC*

**Day 1 – September 1, 2020, (Virtual Meeting)**

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Welcome / Review of Open Actions

**Presenters:** *Jim Kuchar/Philip Yeung*

**Summary:**

The agenda includes deep dives on specific topics in response to subcommittee request: NAS 2035 Vision, Weather Program, NAS 2045 Vision, Cyber R&D: International Aviation Trust Framework, Cyber R&D: Aircraft Security

The following updates were provided on outstanding actions from prior meetings:

- The subcommittee was sent Unmanned Aircraft System (UAS) Traffic Management (UTM) ConOps v2.0, Cybersecurity R&D Plan, and Commercial Space ConOps, closing those three action items
- Shelly Yak presented updates today on the Aviation R&D Landscapes, closing that action item
- AUS provided a presentation on FAA's Alliance for System Safety of UAS through Research Excellence (ASSURE) Center of Excellence (COE) and UAS research plan at the Spring 2020 meeting, closing that action item

There were two recommendations from the Spring 2020 meeting submitted at the Full REDAC meeting:

- Provide access to data being produced by the ASSURE COE to other researchers to amplify the benefits of that research to the broader community
- Engage industry in formulating the 2035 vision and concept

NAS Ops Subcommittee membership update:

- Leo Prusak, Dres Zellweger, and Mark Weber (after this meeting) will be stepping down from the NAS Ops subcommittee
- The subcommittee is seeking additional members moving forward

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**Presentation:** Director Remarks and Landscapes Updates

**Presenter:** *Shelley Yak/Steve Summer*

**Summary:**

The William J. Hughes Technical Center (WJHTC) has entered into Phase 1 COVID response three weeks ago:

- The Tech Center is required to maintain a minimum level of staff for the labs
- Gradually increases the number of staff in the building, averaging about 500 staff present on site
- Staff is developing new tools to do testing remotely for the acquisition efforts

Landscape and Research Drivers:

- The 33 drivers were organized into four key areas:
  - Advances in new vehicles and missions
  - Advances in technology and materials
  - Advances in data and processing power
  - System-wide advancements and improvements
- The landscapes and research drivers are used to inform FY22 budget prioritization
  - Each project is being aligned to the research drivers to identify possible gaps and opportunities for new research
  - Gaps were noted in space operations, autonomous ground equipment at airports, increased connectivity by cyber-physical systems, advances in electric/hybrid-electric propulsion
  - The landscapes are not yet being used to *push or drive* the prioritization
- The next steps for the effort include validating the driver-project mapping, improving the user input tool to maintain this information, and improving the socialization of the landscapes with the researchers

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**Presentation:** Budget Briefing

**Presenter:** *Elizabeth Delarosby*

**Summary:**

FY 2021 FAA total funding level is \$18,139M per House Bill

- An overall increase of \$618M above FY2021 request

FY21 House Language included the following highlights:

- A budget of \$5M for a program associated with aviation maintenance technical development and an additional \$5M for an aviation workforce development program
- Funding to examine alternative crew complements (e.g., technologies) for today's two-person flight decks
- \$14M to support Counter UAS technologies; continued funding of ASSURE COE
- \$21M for environment and energy, of which \$3M is additional funding for examining the impacts of noise at a national level
- \$35.1M to reduce aviation noise and exhaust emissions, \$3M of which is for the Continuous Lower Energy, Emissions and Noise (CLEEN) program to reduce noise at its source (i.e., the engine)

FY21 Senate budget and language have not been provided yet.

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**Presentation:** Informational Deep Dive – NAS 2035 Vision**Presenter:** *Steve Bradford***Discussion:**

## Overview

- Vision uses innovative technologies and policies to build on the successes of NextGen
- Engaging with SMEs across LOBs and SOs, ANG developed an informed vision along three pillars: infrastructure, operations, safety
- A holistic and interconnected framework to support the Administrator's efforts to chart the FAA's future

The 2035 Vision presents innovation along three pillars:

- Operations
  - Diverse collaborating services
  - Fully integrated information regime
  - Agile systems and services with a stable safety-critical core
- Infrastructure
  - Ubiquitous, with coverage everywhere
  - Resilient
  - Evolving in response to future needs
- Safety
  - Tailored flexible flight rules will be in place based on the vehicle's capabilities
  - Standards for interoperability will be needed
  - Real-time information will be needed for safety analytics across all operations

Current activities include developing landscapes for operations, technologies, information, safety, and performance-based standards

Key elements of the 2035 vision are in the FY22 budget request

The vision has been shared with the following:

- FAA Administrator, with alignment into the new FAA Strategic Plan
- NextGen Management Board
- Deputies Weekly Meeting
- ATO Officers Group
- NASA

The NAS 2035 Vision Document will be available for publication by Q1/Q2 of FY21. Vision will also be shared at the Air Traffic Control Association (ATCA) conference in September, and FAA will engage with the industry as requested.

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**Presentation:** Informational Deep Dive – 1A10A0 Enterprise Concept Development**Presenter:** *Steve Bradford***Discussion:**

#### Upper-Class E Traffic Management (ETM) Concept Development:

- Phase 1 activities concluded in FY20 and held ETM demonstration
- Coordinating with industry and AIA's workgroup
- Provided v1.0 ETM ConOps to subcommittee

#### Urban Air Mobility (UAM) Concept Development:

- Development use cases, scenarios, and ConOps
- Provided v1.0 UAM ConOps to subcommittee; transitioning to UAS portfolio

#### Trajectory Based Operations (TBO) Concept:

- ConOps for ATM Services for 2035 underway

A cross-dependency analysis across UTM/ETM/UAM (i.e., the Extensible Traffic Management [xTM] umbrella) to identify commonalities is still underway. It will examine the commonalities across these different envisioned operations and the standards that apply to them. FAA will provide an update to the subcommittee on the timeline for the completion of that analysis.

#### Future research:

- Anticipated research in FY22 will include xTM applications and the potential use of AI in the NAS
- Expected \$1.5M F&E budget sustained through FY24
- This research is near-term focused currently, though this specific funding line in FY23 will align with the 2035 objectives

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### **Presentation:** 1A07C0 New Air Traffic Management Requirements

**Presenter:** *Steve Bradford*

#### **Summary:**

##### Machine Learning (ML)/Artificial Intelligence (AI) to Support Controller Functions

- Work being conducted to examine the potential use of ML/AI to support AI/ML, specifically for TFM
- Working with NASA to examine certification challenges of the use of learning systems

##### Air/Ground Trajectory Synchronization

- Proving that aircraft data can improve trajectory modeling and associated decision support capabilities (e.g., TBFM, TFMS)

##### Command and Control in the Cloud

- Examining the use of a cloud architecture to support command and control functions, informing the strategy for automation evolution

##### Connected Aircraft (Air/Ground SWIM)

- Establishing data distribution platform that allows for organization/distribution of connected aircraft software applications; developing a framework to advance the concepts that leverage the connected aircraft
- Ensuring global harmonization through ICAO

Future research:

- Expected \$7.5M F&E budget sustained through FY23

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**Presentation:** 1A01A Runway Incursion Reduction Program (RIRP)

**Presenter:** *Ben Marple/Giovanni Dipierro*

**Summary:**

The objective is to introduce and examine technologies that can be used to reduce runway incursions, including test and evaluation activities to prepare for the acquisition

Since the last REDAC meeting, the ANG and AJI research group has been teaming with AJM surveillance group to align efforts and ensure a consistent strategic direction

Small Airport Surface Surveillance (SASS):

- This research is in its final stages of development; currently testing mode S performance to target formal tech transfer in the November 2020 timeframe (includes a minor delay due to COVID)
- Working with DOT secretary to hold industry day and tech transfer
- Committee asked whether SASS and research considers the space-based ADS-B capabilities and analysis ongoing by industry (Harris and Aireon)

Runway Incursion Prevention through Situation Awareness (RIPSA):

- Developing Screening Information Request (SIR), which will be distributed in 2021; represents slip due to COVID and limited resources internal to the FAA's business processes
- SIR includes direct to pilot warning system; award contract in 2021
- 3 airports: San Antonio, Tucson, Daytona
- 3-5 year program

Surface Taxi Conformance Monitoring (STCM):

- Examining applications for GA pilots
- The app includes positional info and guidance on moving map; depicts hold short lines and warnings of runway entrance
- Human-In-The-Loop (HITL) testing completed, and analysis is underway

Funding profile:

- \$3M in FY21, growing annually to \$5M by FY26

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**Presentation:** 1A10B0 Enterprise Human Factors

**Presenter:** *Tara Holmes*

**Summary:**

Provides integrated enterprise HF guidance to increase the use of concepts and system, ensure controller acceptance of concepts and systems, decrease workload and improve safety.

Anticipated Research in FY21:

- TBO impact on Traffic Management Unit (TMU)
- Research plan to examine the human factors implications of highly automated vehicles on ATC
- Regional TMU coordination practices
- TBO training model
- Human factors impact of large ATC displays
  - Created in response to observed challenges associated with motion sickness of large display installations in facilities

Future research:

- Expected \$1.5M F&E budget sustained through FY25

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

**Presenter:** *Tara Holmes*

**Summary:**

Informs stakeholders (R&D sponsors and ATO stakeholders) to make important workforce policy, acquisition, and operational management decisions based on the results of a thorough, timeline and focused R&D efforts

Accomplishments in FY20:

- Three-year trend study of Ground-Based Interval Management for Spacing (GIM-S) capability use through data analysis of information collected from ERAM
  - Demonstrated the ability to use big data from NAS systems to ferret out human factors issues that are present in the field and then to confirm those issues and diagnose them with controllers
  - Can also be used to track improvements over time
  - The final report will be completed in September and will be available on the WJHTC website
- Completed HITL of ATC information display optimization
- Published report on the effectiveness of stress management training for new hire controllers

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**Presentation:** Informational Deep Dive – A11.j Weather Program

**Presenter:** *Randy Bass/Pat Murphy*

**Discussion:**

The budget line focuses on transitioning research activities into ATM decision support processes (via NWS or into FAA systems)

Accomplishments:

- Convective weather: updated algorithms to leverage machine learning
- Turbulence: Graphical Turbulence Guidance-Global (GTGG) software delivered to NOAA
- Ceiling and Visibility: conducted Safety Risk Management Panel (approved) to determine risks associated with the Helicopter Emergency Medical Services (HEMS) tool

- Modeling Development and Enhancement (MDE): Transferred code to NWS for operational implementation
- Advanced Weather Radar Techniques (AWRT): Creating automated polygons to capture dynamic convective weather
- Quality Assessment: Completed assessment of the High-Resolution Rapid Refresh (HRRR), which showed improved forecasts relevant to convective forecasts skill
- Aviation Weather Demonstration and Evaluation (AWDE) Services: Working with stakeholders for tabletop of weather on the glass
- Terminal Area Icing Wx Information for NextGen (TAIWIN): Completed workshop and preparation for a demonstration
- High Ice Weather Content (HIWC): Developing airborne weather radar algorithm

#### Upcoming Research Highlights:

- Convective Weather: Predictions for oceanic
- In-Flight Icing: Continue development of enhanced Current Icing Project (CIP)
- Turbulence: Working on the development of a turbulence avoidance model
- Examining commercial weather services can provide a faster mechanism for meeting weather needs

Budget reductions projected; research topics may need to be prioritized. FY20 funding will be rolled over in part to help smooth the budget reduction

- Will work to finish up key projects that have been ongoing and ensure delivery of those projects

#### Weather Requirements Service (WRS) Process:

- ANG-C6 develops weather-related constraint information for ready integration into decisions by pilots, controllers, dispatchers, and airport operations
- Requirements process
  - Needs analysis
  - Operational concept and use description
  - Requirements development and validation
  - Formal requirements allocation and transmittal
  - Transmittal
- Developed weather needs portal to accept requests from stakeholders
- Leverages ATO Concepts, Validation & Requirements (CVR) process where applicable, or the ANG-C6 process as needed for the transition to NWS

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**Presentation:** A11.q Weather Technology in the Cockpit (WTIC)

**Presenter:** Gary Pokodner

#### **Summary:**

#### Remote Oceanic Meteorological Information Operational (ROMIO)

- Simulated benefits for safety and efficiency-based demo

#### Augmented Reality and Pilot Report (PIREP) Enhancements

- Evaluating learning benefits of using Augmented Reality (AR Virtual Reality (VR.))
- Developing PIREP tool prototype to mitigate submission errors/barriers



- Evaluating voice recognition protocol

WTIC budget has been significantly reduced for FY22 and beyond; should work be funded fully, the focus would be on the following:

- Complete ADS-B turbulence algorithms
- Address gap resolution for helicopter operations
- Develop transfer package for crowdsourcing ceiling information using webcams
- Addressing industry gaps
- Service analysis on anticipated weather data

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**Presentation:** Informational Deep Dive – NAS 2045 Vision

**Presenter:** *Akbar Sultan, NASA*

**Discussion:**

- The visions being worked by the FAA/MITRE, and NASA are harmonious, building from NextGen towards 2035 and, ultimately, 2045
- Work-related to the Airspace Technology Demonstrations (ATD) and UTM efforts has helped to begin to shape the future vision
- The future airspace will have dramatically varied users, including markets represented by small/medium UAS, urban air mobility, thin/short-haul, large UAS/High Altitude Long Endurance (HALE)
- New vehicles and missions will stress the ATM system in ways that it was not designed to encompass
- The new paradigm would need to support a few million UAS operations at low altitudes
- The objective is a community-supported vision of the future NAS to guide R&D investment decisions, which will build on prior vision defining efforts with an emphasis on engaging the principal stakeholders of the future NAS
- Vision 2045 proposal was approved at March 2<sup>nd</sup> Research Transition Teams (RTT) convening authority meeting with additional direction provided at June 11<sup>th</sup> meeting
- Vision 2045 will represent a new epoch, building on past evolutionary epochs in the NAS (procedural, radar, trajectory, collaborative (2035) and highly automated (2045))
- Next steps:
  - Developing Joint Management Plan (JMP) with NASA and FAA
  - Developing an interagency communications plan, which will be harmonized by rapidly evolving NAS 2035 comm plan
  - Developing a stakeholder engagement plan, including direct engagements, workshops, TIMs, A4A, RTCA, FSF, ATCA, etc. to reach stakeholders
  - Develop a document that describes the characteristics of the 2045 NAS vision, including a concept with use cases, top-level requirements, and research barriers



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**Presentation:** Subcommittee Discussion Recap

**Presenter:** *Jim Kuchar*

**Discussion:**

The discussion was deferred to the morning session on Day 2.

### **Day 2 – September 2, 2020 (Virtual Meeting)**

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**Presentation:** Review Findings and Recommendations/ New Actions

**Presenter:** *Jim Kuchar*

**Discussion:**

In the 2035 NAS Vision discussion, the subcommittee noted that the FAA briefly shared Key Activities that are being conducted in support of the 2035 timeframe. Phil Yeung shared that this table is still undergoing internal FAA review. The subcommittee requests a copy of those activities when available.

The subcommittee notes that the 2035 and 2045 visions include elements of machine learning and artificial intelligence. The committee noted the nearer term opportunities for the use of Machine Learning and Artificial Intelligence for Traffic Flow Management activities.

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**Presentation:** A11.r Flight Deck Data Exchange Requirements

**Presenter:** *Biruk Abraham / Nouri Ghazavi*

**Summary:**

Funding objectives: Enable flight data exchange capabilities by identifying security management strategies required to mitigate threats and vulnerabilities around Electronic Flight Bags (EFB), Aircraft Interface Device (AID), and Internet Protocol (IP)

Accomplishments:

- Air/ground data interface alternatives
- Conducted cyber risk assessment on EFB and AID and flight deck IP data link

The subcommittee asked for information about the methods used for the assessment and the alignment of that method with ASIS.

Planned activities:

- Flight deck scope will be growing to include flight management system (FMS) as part of the architecture

The funding profile decreases from \$1M to \$0.9M in FY22.

The subcommittee asked about the alignment of this cyber activity with other cyber activities being funded within the AFS organization. Mr. Ghazavi noted that the AFS activities are specific analyses for a given asset or avionics component. The ANG activity is examining future applications for these kinds of technologies, not specific to a given asset.

The subcommittee asked about the customer for these analyses. The FAA shared that the findings would help to inform concept feasibility and future planning.

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**Presentation:** Informational Deep Dive – FAA Cyber R&D, International Aviation Trust Framework – Governance

**Presenter:** *Rob Segers*

**Discussion:**

Aviation organizations have noted that the rising cost of aviation-specific networks and the use of protected spectrum has reduced the network's ability to grow. The future visions prescribe the use of commercial networks, but this will require protection for end-to-end information integrity.

The FAA is working with ICAO to align plans with the International Aviation Trust Framework.

The International Aviation Trust Framework (IATF):

- Ensures that participant identities are trustable,
- Information flow is attributable to the identity source which has digitally signed the information
- IATF enabling networks called Global Resilient Aviation Information Network (GRAIN) is trustable (i.e., has common network policies that are audited, trusted network addressing, trusted domain naming services, trusted network operations through security monitoring)

The framework is achieved through governance to address technical, legal, auditing, and operational considerations.

Mr. Segers reviewed the IATF proposed organization, which is an international organization to achieve the vision. A subcommittee member asked about how the Interoperability Solutions Lab will be established with respect to existing lab facilities. Mr. Segers indicated that it would be outsourced to a vendor.

Membership will include airlines, ANSPs, aviation manufacturers, communication service providers, identity service providers, domain representatives, regional representatives, registration service providers, etc. Members would be classified as platinum, gold, silver, and general, which defines one's membership's rights and responsibilities, which defines one's membership's rights and responsibilities, which defines one's membership's rights and responsibilities.

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**Presentation:** A11.o Wake Turbulence and 1A04B0 Wake Turbulence Re-Categorization

**Presenter:** *Jillian Cheng*

**Summary:**

Wake Turbulence RE&D Funds

- Funding focused on wake risk mitigations (including new concepts)

- Accomplishments:
  - Developed new separation recommendations for ATC operations with ICAO
  - Assessed UAS operations for wake
  - Progressed development of Absolute Wake Encounter Metrics
  - Developed concepts for using High-Resolution Rapid Refresh (HRRR) model, real-time aircraft observed weather to enhance DSTs
  - Collecting wake track data for SFO and JFK
  - Scan flight operational quality assurance (FOQA) data to collect data on wake encounters (from takeoff to touchdown), eliminating contextual confounding factors (e.g., turbulence)
- Planned Activities
  - Planned activities will include moving forward with each of the FY20 activities
- The subcommittee asked whether wake for UAS due to buildings or factors may be considered; the FAA noted that the focus is primarily caused by other vehicles or aircraft. The FAA noted that there are other organizations covering wake due to buildings or obstacles. The subcommittee will consider this as a topic for a future meeting.
- Funding extends through FY23 and then is not funded in FY24/25

#### Wake RECAT

- Develops an enhanced means of safely separating aircraft from the wakes of other aircraft
- Accomplishments:
  - Developing Total Wind (TW) Dynamic Pairwise Wake Separation – Mitigation (DSW-M) solution for adding flight capacity for IFR flight capacity-constrained airports
  - ADS-B Wx data elements accepted for inclusion in the V3 update of ADS-B MOPS
- Planned Activities
  - Demonstration of TW solution through the development of a prototype algorithm
  - Enterprise Architecture system-level engineering to route ADS-B Wx data to future dynamic wake DSTs
  - Funding has been reduced in the last three years from \$7.6M FY17 to 3.9M in FY20, and it will be reduced to \$2.8M in the coming years.

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

**Presenter:** *Guillermo Sotelo*

#### **Summary:**

#### Accomplishments:

- Completed analysis for preconditioning of flows for arrival metering at PHL
- Completed technical description of iTBO gate-to-gate operations; used to identify operational gaps
  - The subcommittee requested this document from the FAA prior to the next REDAC meeting

- Defined operational goals, objectives, and outcomes to drive near term evolution of TFM towards TBO

#### Planned Activities:

- Technical and operational analysis of the evolution of TFM
- Technical and operational analysis for the evolution of Oceanic Services
  - The subcommittee has requested the future of the Ocean 2035 vision document from the FAA, which was finalized for internal FAA delivery in August 2020
- New entrants operational integration analysis: ETM, UTM, and UAM

Funding profile expected to increase from \$5M to \$6 beginning in FY23 and extending to FY25.

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**Presentation:** Informational Deep Dive – FAA Cyber R&D, Aircraft Security

**Presenter:** *Isidore Venetos*

#### **Discussion:**

The work's objective is to assess the cyber risks associated with the aircraft and the mitigations that can be introduced.

FAA developed a cyber risk-based decision-making approach (RBDM), which industry is now using (Cyber Safety Commercial Aviation Team)

#### Methodology ensures

- Consistent outputs
- Repeatable and validated
- Removes assessment bias
- Aligns SMS, SRM, and RBDM principles

Partnered with MIT LL, Johns Hopkins APL, and Astronautics to examine existing best practices to define a repeatable methodology

End-to-End System analysis to be completed in November 2020, including ACARS, field-loadable software, Electronic Interface Device, and flight management systems

The subcommittee asked Mr. Venetos about the relationship with this activity and the Flight Deck Data Exchange analysis that was briefed yesterday. Mr. Venetos shared that the Flight Deck Data Exchange analysis was briefed on this methodology.

The CAT team is structured around representatives from US private sector, international private sector, the international government, and US government (including AVS, ATO, ANG, ARP, AXE, AIS within the FAA)

The subcommittee clarified the funding source, and Mr. Venetos noted that this work is funded through RE&D (A11D), with some additional activities (e.g., use case analysis) being funded through ATO and Ops funding.

#### Future research

- Extend CS CAT to use Cybersecurity Data Science (CSDS) principles to offer a path forward to use data-rich environments besieged by unknown-unknowns
- CSDS uses AI/ML in a data-rich aviation ecosystem, consistent with NAS 2035 vision

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**Presentation:** Recap & Closing

**Presenter:** *Jim Kuchar / Phil Yeung*

**Discussion:**

Additional information requested:

- More extended briefing of the 2035 Vision, referenced by Steve Bradford and Diana Liang
- Summary of Key Activities toward the 2035 vision, including the three pillars of innovation (i.e., operations, safety, and infrastructure)
- Technical description of iTBO gate-to-gate operations described under BLI A01C; used to identify operational gaps
- Future of the Ocean 2035 Vision, described under BLI A01C

In-depth dive topics requested for the next meeting:

- Update from NASA, including topics related to 2045 and V&V of autonomy software
- Status of TBO program and Future Flow Management
- Update on Machine Learning/.I.AI from MITRE
- Commercial space and related issues impacting the NAS

Discussion:

- The FAA shared an update regarding the research landscapes and priorities.
  - The subcommittee appreciated the comprehensiveness of the drivers and landscapes
  - The subcommittee noted that the alignment should be explicit, with research objectives being driven by the information contained within the landscapes
- Budget observations
  - There are significant reductions, specifically related to weather research
- Connectivity between Weather in the Cockpit and UAS/UAM Weather R&D
  - The connectivity between these research areas was not explicit
- Future Vision
  - The subcommittee discussed the extent to which the 2035 and 2045 visions consider “off-nominal” conditions or situations; The vision includes constructs for recovery in autonomous operations, infrastructure resiliency, but the subcommittee noted that detecting unobserved situations (or precursors to those) through machine learning or smart systems is particularly challenging.
  - The subcommittee intends to submit a finding and recommendation related to the research and development associated with AI and ML shift and off-nominal event management

- A subcommittee member raised a topic on work related to research EVTOL systems and simplified pilot operations being conducted at CAMI. Subcommittee to seek additional information and its relationship to Advanced Air Mobility (AAM).

## REDAC / NAS Operations Subcommittee Meeting Agenda

**Date:** September 1-2, 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 Spring Meeting. The FAA briefs the proposed R&D FY+3yrs

### Tuesday, September 1<sup>st</sup>

0900-0915	Welcome / Review of Open Actions	Jim Kuchar / Phil Yeung
0915-0945	Director Remarks and Landscape Updates	Shelley Yak / Steve Summer
0945-1000	Budget Briefing	Elizabeth Delarosby
1000-1030	Informational Deep Dive – NAS 2035 Vision	Steve Bradford
1030-1045	Break	
1045-1115	1A10A0 Enterprise Concept Development	Steve Bradford
1115-1145	1A07C0 NextGen – New Air Traffic Management Requirements	Steve Bradford
1145-1215	1A01A Runway Incursion Reduction (RIRP)	Ben Marple / Giovanni Dipierro
1215-1300	Lunch	
1300-1330	1A10B0 Enterprise Human Factors	Tara Holmes
1330-1400	A11.i Air Traffic Control/Technical Operations Human Factors	Tara Holmes
1400-1500	Informational Deep Dive – A11.j Weather Program	Randy Bass / Pat Murphy
1500-1515	Break	
1515-1545	A11.q NextGen – Weather Technology in the Cockpit (WTIC)	Gary Pokodner
1545-1645	Informational Deep Dive – NAS 2045 Vision	Akbar Sultan/NASA
1645-1700	F&R Discussion	Subcommittee



**Wednesday, September 2<sup>nd</sup>**

0900-0915	Review Findings and Recommendations	Subcommittee
0915-0945	A11.r Flight Data Exchange Requirements	Biruk Abraham / Nouri Ghazavi
0945-1045	Informational Deep Dive – FAA Cyber R&D, International Aviation Trust Framework – Governance	Rob Segers
1045-1100	Break	
1100-1130	A11.o Wake Turbulence	Jillian Cheng
1130-1200	1A04B0 Wake Turbulence Re-Categorization	Jillian Cheng
1200-1300	Lunch	
1300-1330	1A01C Operations Concept Validation & Infrastructure (ATDP)	Guillermo Sotelo
1330-1430	Informational Deep Dive – FAA Cyber R&D, Aircraft Security	Isidore Venetos
1430-1500	Recap and Closing	Jim Kuchar / Phil Yeung

Legend Key:

	Informational Deep Dives
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## REDAC NASOPS CONFERENCE INFORMATION

### **REDAC NASOPS Meeting Day 1**

#### **Join by phone**

+1-408-418-9388 United States Toll  
Access code: 132 406 5203

#### **Join by computer, tablet or smart phone**

Meeting Link: <https://a3technologyinc-gqs.my.webex.com/a3technologyinc-gqs.my/j.php?MTID=m6472133bc090284484e5f59afa0d88c9>

Meeting number: 132 406 5203

### **REDAC NASOPS Meeting Day 2**

#### **Join by phone**

+1-408-418-9388 United States Toll  
Access code: 132 373 0371

#### **Join by computer, tablet or smart phone**

Meeting Link: <https://a3technologyinc-gqs.my.webex.com/a3technologyinc-gqs.my/j.php?MTID=maa78ac21a76b875c2e1784f5d1ad077a>

Meeting number: 132 373 0371

**Subcommittee on NAS Operations**  
**Summer-Fall 2020 - September 01 - 02, 2020**  
**Attendees Lists**

**DAY 1**

<b>Number</b>	<b>Name</b>	<b>Affiliation</b>
1	CA Roundtree-Coleman	FAA
2	Jim Kuchar	MIT/LL
3	Philip Yeung	FAA
4	A3 Technology/Host/Rick	A3 Technology
5	Emily Stelzer	
6	Frank Wondolowski	
7	Joe Bertapelle	
8	Kristina Carr	
9	Monica Alcabin	
10	Philip Hays	
11	Sadaf Alam	
12	Shelley Yak	
13	Steve Summer	
14	Karl Kauffman	
15	Akbar Sultan	
16	Brice Holmes	
17	Diana Liang	
18	Nattiel Chambers	
19	Isidore Venetos	
20	Chuck	
21	Elizabeth Delarosby	
22	Mark Hale	
23	Micael Welch	
24	Tara Holmes	
25	Shelli Brunswick	
26	Biruk Abraham	
27	Sally Frodge	
28	Tiffany Mitchell	
29	Vidyut Patel	
30	Oliver Palumbo	
31	Dan Herschler	
32	Giovanni Dipirro	
33	Ben Marple	
34	Randy Bass	
35	Pat Murphy	

## DAY 2

1	CA Roundtree-Coleman
2	A3 Technology/Host
3	A3 Technology
4	Akbar Sultan
5	Biruk Abraham
6	Brian Bagstad
7	Bruce Holmes
8	Diana Liang
9	Emily K. Stelzer
10	Isidore Venetos
11	Jim Kuchar
12	Joe Bertabelle
13	Karl Kauffman
14	Mark Weber
15	Monica Alcabin
16	Nouri Ghazavi
17	Phil Yeung
18	Philip Hays
19	Rob Segers
20	Sadaf Alam
21	Vidyut Patel
22	Guillermo Sotelo
23	Edward Johnson
24	Cailin Matulenas
25	Chris Lawler
26	Gabriel Elkin