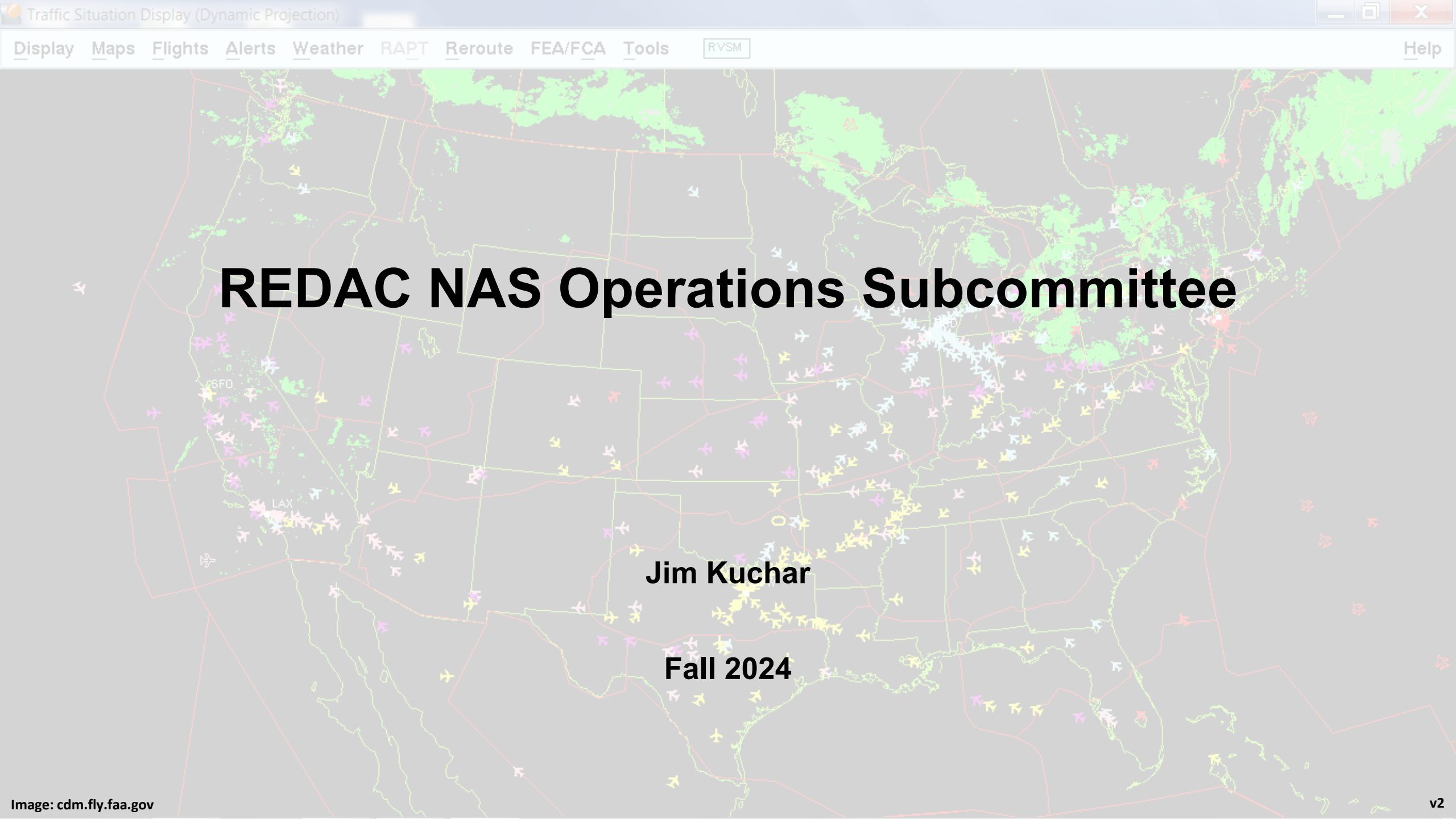

REDAC NAS Operations Subcommittee

Jim Kuchar

Fall 2024

Image: cdm.fly.faa.gov

v2

NAS Operations Subcommittee – Fall 2024 Meeting

27-28 August 2024, Washington, DC, hybrid format

Agenda

- Director Remarks
- Budget overview
- Enterprise Concept Development;
  New Air Traffic Management Requirements
- Runway Incursion Reduction Program
- Weather Program
- NextGen Wake Turbulence
- Operations Concept Validation &
  Infrastructure Evolution
- Enterprise Human Factors;
  ATC / Technical Operations Human Factors

- Invited informational briefings
  - ANG AI Certification Framework
  - AVS AI Roadmap Update
  - SOAR Framework
  - UAS & AAM Integration Research Update
  - ASSURE COE Program Update
  - Office of Commercial Space Transportation
    R&D Plan Update

NAS Operations Subcommittee Findings and Recommendations

1. Strategic Outlook for Aviation Research (SOAR)

2. Guidance for Third Party Service Provider NAS Integration

3. Human factors considerations for NAS integration with Third Party Service Providers

4. Research supporting Generative AI (GAI) for aviation applications

NAS Operations Subcommittee Finding 1

Strategic Outlook for Aviation Research (SOAR)

- **The NAS Operations subcommittee appreciates the view into the FAA's Strategic Outlook for Aviation Research (SOAR) framework that was presented by Mr. Eric Neiderman**

- **The subcommittee believes that the SOAR charts provide a valuable high-level means for communicating accomplishments, current research, near- and far-term expected research activities, and the expected outcomes of those activities in a single consolidated view**

NAS Operations Subcommittee Recommendation 1

Strategic Outlook for Aviation Research (SOAR)

- **The NAS Operations subcommittee recommends that the FAA continue to refine and update the SOAR charts to reflect the current state and goals of FAA RE&D activities**

- **The activities represented in the SOAR charts should be closely coordinated with other research frameworks including the National Aviation Research Plan (NARP) and the AVS Safety Research Strategy**

- **We request that the FAA provide an annual update to the REDAC to highlight changes to the SOAR charts and progress against research outcomes over time.**

NAS Operations Subcommittee Finding 2

Guidance for Third Party Service Provider NAS Integration

- **Third Party Service Provider (TPSP) concepts and their domains include**
  - **Uncrewed Aircraft System (UAS) Service Suppliers (USS) for UAS Traffic Management (UTM)**
  - **Upper Class E Service Suppliers (ESS)**
  - **Provider of Services for Urban Air Mobility (PSU) for Advanced Air Mobility (AAM) and Regional Air Mobility**
  - **Command and Control Communication Service Providers (C2CSP)**

- **Example anticipated TPSP services include**
  - **Weather information provision**
  - **Flight planning and management including strategic and tactical separation**
  - **Command and Control, Navigation, Surveillance, and multi-path communications**

- **TPSPs will also ingest data from FAA systems including requests for National Airspace System (NAS) data regarding airspace availability or similar information**

NAS Operations Subcommittee Finding 2 (continued)

Guidance for Third Party Service Provider NAS Integration

- **Though provided by non-Federal entities, TPSP capabilities must ensure the safety with which new entrants will interact with traditional users of the NAS. TPSP operators will be authorized by the FAA for assurance of safety, equitable access, and quality**

- **We expect that FAA responsibilities for TPSP qualification will include some combination of rule-making, standards development (e.g., involving RTCA, SAE, IEEE, or ASTM), and defining related means of compliance for licensing and operational approvals**

- **The lack of a unified, consolidated description of how the FAA will set standards and authorize TPSPs delays the ability of industry to establish business plans; financing; systems, technical, and operational requirements; Safety Management System (SMS) assessment; and related client service level agreements and contracts**

NAS Operations Subcommittee Recommendation 2

Guidance for Third Party Service Provider NAS Integration

- **The Subcommittee recommends that the FAA accelerate the development of draft guidance for Third Party Service Providers (i.e., USS, ESS, PSU, and C2SCP entities), to include initial considerations for proposed regulatory requirements, anticipated systems standards, and related licensing processes for qualification and authorization of these new entities**

- **This action should necessarily engage industry to assure alignment and relevance between government and industry actors**

NAS Operations Subcommittee Finding 3

Human factors considerations for NAS integration with Third Party Service Providers

- **TPSPs will likely include provision for exchange of selected data into and out of certain FAA systems. FAA air traffic personnel may interact with TPSP-supplied data when operations require integration between airspace users**

- **It has yet to be determined specifically what human interactions with TPSP data will be required, however several examples are given in the Urban Air Mobility Concept of Operations v2.0: Example ATC responsibilities in the CONOPs are to "issue traffic advisories regarding known UAM operations (e.g., active UAM corridors) to aircraft receiving ATC services", "set UAM corridor availability", and "respond to UAM off-nominal operations"**

- **These data exchange requirements need to be clarified as a function of the type of AAM operation and potential for integration with conventional ATC services**

NAS Operations Subcommittee Finding 3 (continued)

Human factors considerations for NAS integration with Third Party Service Providers

- **Numerous human factors research issues are anticipated to arise related to the data exchange interfaces that may be proposed and must be approved for use**

- **Example issues include whether and how to indicate that data displayed on an FAA system are supplied by a TPSP, or determining what types of interfaces and methods will be used by ATC personnel to communicate with TPSPs (such as whether by voice or digital communication). At the same time, human factors constraints from conventional NAS operations may levy requirements on TPSP data exchange, e.g. related to controller workload or information content and update rate, that may impact the design of UAS and AAM architectures**

- **The Enterprise Human Factors portfolio, presented to the subcommittee, anticipates work may be starting in FY26 related to diverse airspace operations and new entrants, but details for those efforts have yet to be defined.**

NAS Operations Subcommittee Recommendation 3

Human factors considerations for NAS integration with Third Party Service Providers

- The NAS Operations subcommittee recommends that the FAA begin clearly identifying those functions that would require human ATC interaction with TPSP information and how that usage would be integrated into (or modify) existing ATC procedures and processes

- This effort should then lead to the definition of a human factors research portfolio to address the use of TPSP information by FAA air traffic personnel to explore issues related to human interface design, training, and procedures

- These research thrusts should be an explicit component of the UAS/AAM Integration Research plan, with research requirements communicated to the appropriate human factors research groups at the FAA (e.g., Enterprise Human Factors). Close collaboration with industry should continue in order to ensure that TPSP concepts are appropriately understood and that FAA human factors research findings are communicated to the TPSP development community.

NAS Operations Subcommittee Finding 4

Research supporting Generative AI for aviation applications

- **The FAA Roadmap on AI Safety and the AI/ML Certification Framework have confined their initial work to the applications of AI/ML in which deterministic outcomes are ensured**
  - **Determinsitic AI ensures that the same inputs will lead to the same outputs, using tools such as In-Context Learning (ICL) or closed or learned language models**
  - **This initial approach to ensuring safety in AI/ML tool development and related certification processes by limiting the scope to deterministic AI is appropriate**

- **The FAA charter extends to NAS efficiency, security, environmental stewardship, innovation, and international leadership and collaboration – all of which may be enhanced through Generative AI (GAI) tools leveraging large language models based on open or learning information and data sources**
  - **GAI tools offer the promise of creative contributions to problem solving and concept development, while also producing non-deterministic outcomes. The rapid pace of GAI development suggests that opportunities will soon be appearing to leverage GAI to improve NAS operations**

NAS Operations Subcommittee Finding 4

Research supporting Generative AI for aviation applications

- **There are many domains for application of GAI tools that may be of significant value in NAS operations, including interpreting weather forecasts, informing aviation dispatch services, facilitating collaborative decision making for air traffic management, flight deck problem-solving and decision support, and airport operations.**

- **The distinction between closed AI models and open GAI models is of vital relevance to FAA strategies for applications development. Progress in AI research is rapid, and the FAA will soon risk being unprepared for new tools and concepts that may be appearing in the aviation industry**

- **The subcommittee suggests that while the FAA's initial focus on deterministic AI/ML tools for safety management is warranted, the current exclusion of GAI tool exploration is not in the best interests of the agency and to its broader responsibilities across NAS operations**

NAS Operations Subcommittee Recommendation 4

Research supporting Generative AI for aviation applications

- **The NAS Operations subcommittee recommends that the FAA accelerate and raise the level of strategic leadership and management related to GAI research to include matters related to the broader non-safety-critical domains of the FAA charter**

- **This may mean establishing a position in the agency's leadership to oversee the development, approval, and application of GAI across multiple domains of value to the agency**

Next NAS Ops Meeting: 11-12 March 2025

- **Requested documents prior to next meeting**
  - **Aviation-Specific Responsible AI Framework (S. Bradford)**
  - **Updated UAS/AAM Integration Research Plan (S. Saunders-Hodge)**

- **Requested presentations for the next meeting**
  - **GAMA: CNS roadmap for supervised flight operations of autonomous systems**
  - **Future spectrum issues and research**
  - **Atlantic City International Airport remote tower testbed status and plans**
  - **Air/Ground SWIM Connected Aircraft**
  - **AI certification framework update**
  - **NASA Airspace Operations and Safety Program (AOSP) update**