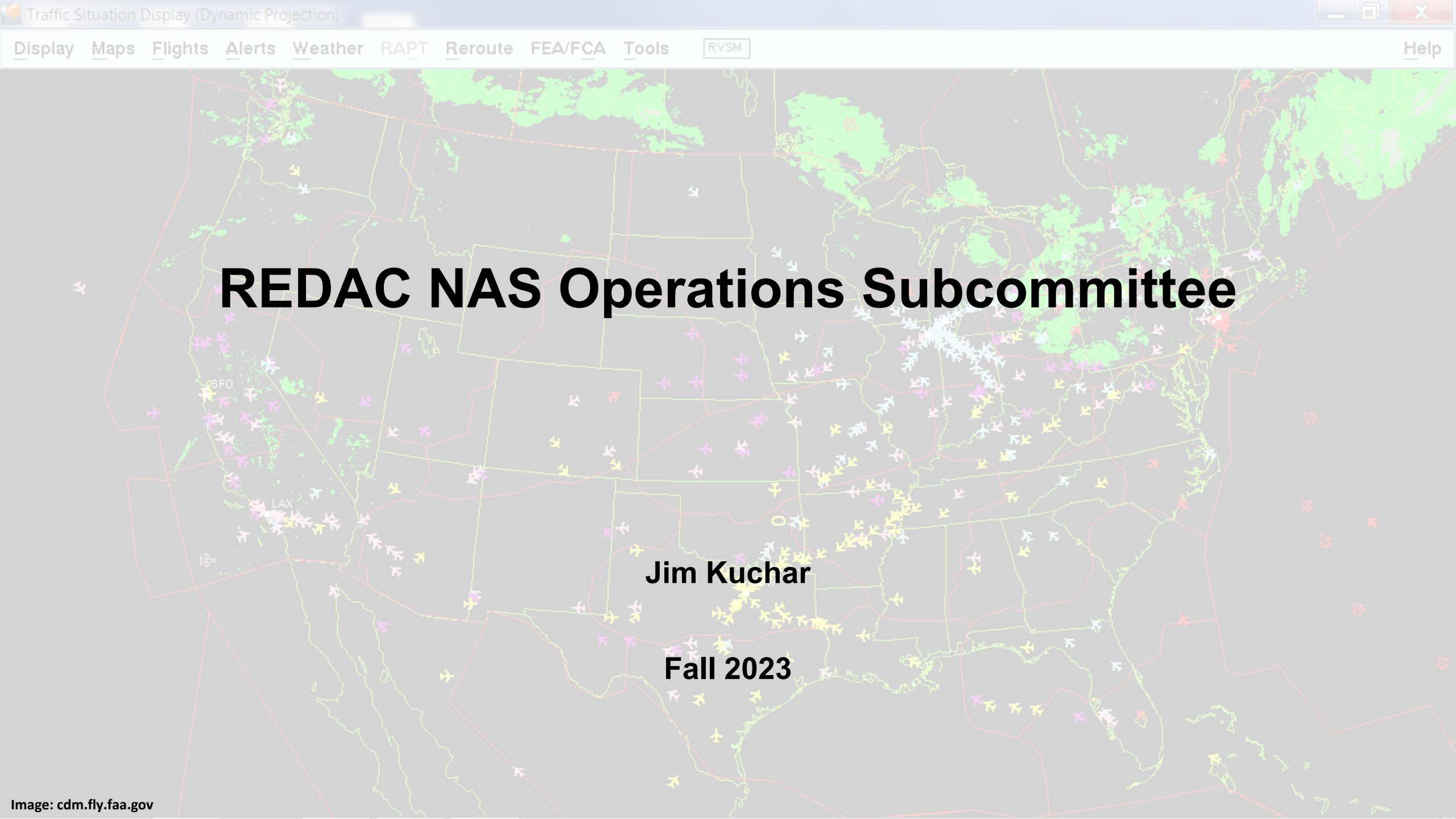

REDAC NAS Operations Subcommittee

Jim Kuchar

Fall 2023

Image: cdm.fly.faa.gov

NAS Operations Subcommittee – Fall 2023 Meeting

22-23 August 2023, hybrid meeting

Agenda

- Director Remarks
- Budget overview
- Enterprise Concept Development; New Air Traffic Management Requirements
- Enterprise Human Factors; ATC / Technical Operations Human Factors
- Runway Incursion Reduction Program
- Wake Turbulence / Wake Recategorization
- Flight Deck Data Exchange Requirements
- Weather Program; Weather Technology in the Cockpit
- Operations Concept Validation & Infrastructure Evolution

- Invited informational briefings
  - Innovate 28 Overview (FAA)
  - AAM Vision (Joby Aviation)
  - AAM R&D Needs (GAMA)
  - NASA ATM-X Update (NASA)

GAMA = General Aviation Manufacturers Association

NAS Operations Subcommittee Observation 1

Strategic Outlook for Aviation Research (SOAR) Framework

- **The NAS Operations subcommittee continues to be interested in seeing the FAA's planned Strategic Outlook for Aviation Research (SOAR) as it matures and becomes available for review. A strategic overview of major research areas and their phases over time will help the subcommittee and others understand how FAA RE&D is prioritized and planned to address critical needs.**

- **The subcommittee is also interested in seeing a more strategic view of each of the Budget Line Items (BLIs) that traditionally provide presentations at our biannual meetings. One example could be a summary chart showing each of a BLI's research tasks on a common timeline showing key milestones, interdependencies, connections to other activities, and outcomes the research is intended to inform. We will work with our Designated Federal Officer to explore new approaches toward organizing those presentations so that they can be most effective.**

NAS Operations Subcommittee Observation 2

Innovate 28 Roadmap

- **The NAS Operations subcommittee received a briefing on the FAA Innovate 28 (I28) roadmap. The subcommittee was pleased to see an integrated approach and commends the FAA for articulating a clear approach and roadmap, as the well as the requirements for the integration of first-generation AAM vehicles into the NAS under existing rules, regulations, and procedures. The subcommittee believes the roadmap will help provide AAM manufactures and operators with guidelines by which to develop their technologies.**

NAS Operations Subcommittee Finding 1

Airport Surface Safety Human Factors

- The subcommittee received an update on Human Factors ATC Tech Ops (BLI A11.i) which noted that a new activity will begin in FY24 to support an FAA response to NTSB Report AIR-18-01. This NTSB report was generated following the July 2017 taxiway overflight of an Air Canada A320 at San Francisco International Airport.
- Since 2017, there have been a number of other noteworthy runway incursions and related near-miss events at a range of large and medium airports -- most recently including incidents at John F. Kennedy International Airport in January 2023, Austin in February 2023, and Boston and San Diego in August 2023.
- The subcommittee noted that these incidents are indicators of safety risks that need to be explored in order to determine what mitigations might be most effective in preventing a potential future major accident at an airport.

NAS Operations Subcommittee Recommendation 1

Airport Surface Safety Human Factors

- **The NAS Operations subcommittee recommends that the FAA accelerates research into human-factors-related causes and potential mitigations for runway incursions, wrong surface approach alignments, and related incidents during takeoff and landing operations. The planned effort in response to NTSB Report AIR-18-01 should be expanded to encompass all forms of runway incursion and surface safety events. This would include studies that re-evaluate operational procedures (e.g., Line Up and Wait while concurrently clearing aircraft to land on the same runway), pilot and controller training, workload, duty schedules, and potential technologies to improve situational awareness and alerting to runway incursions, wrong surface approach alignments, or other loss-of-separation events.**

NAS Operations Subcommittee Finding 2

Airport Surface Safety Research Roadmap

- **The subcommittee received an update on the Runway Incursion Reduction Program (RIRP). The subcommittee noted that recent work in RIRP has been focused on lower-cost surveillance and safety solutions for small and medium airports but there did not appear to be an overarching RE&D strategy at this time. The program's near-term focus is on an operational demonstration of surface surveillance and direct-to-pilot warning lights to be conducted at San Antonio airport.**
- **Although there are certainly safety benefits to be gained at smaller airports, recent runway incursion events at major airports (see Finding #1 above) demonstrate that even though significant hazard mitigations have been deployed at large airports, safety risks remain that still warrant continued research and development.**

NAS Operations Subcommittee Recommendation 2

Airport Surface Safety Research Roadmap

- **The NAS Operations subcommittee recommends that the FAA RIRP develop an updated research roadmap that lays out the landscape of runway incursion and surface safety risks, identifies gaps and research needs, and provides a prioritized and time-sequenced research plan to mitigate runway incursion and other surface safety risks. This plan should not be restricted to low-cost systems for smaller airports and should include considerations for major airports including those where several recent runway incursion events have occurred.**

NAS Operations Subcommittee Finding 3

Limits of Visual Flight Rule Operations Under Advanced Air Mobility Concepts

- **The subcommittee received an invited informational presentation from Joby Aviation on their plans and perspectives for Advanced Air Mobility (AAM). Joby Aviation's near-term operational concept lies at one end of the spectrum in which Electric Vertical Takeoff and Landing (eVTOL) aircraft will fly under Visual Flight Rules (VFR), similarly to conventional helicopter operations, requiring minimal or no changes to current operational procedures.**
- **A key concern that was raised as part of the presentation is that it is unclear to what degree VFR operations can scale up in dense airspace environments before additional procedures and technologies would be required to manage surveillance, communications, workload, safety, and efficiency. It will be important to understand limitations on the achievable scale of VFR operations so that future RE&D to address gaps can be planned and executed.**

NAS Operations Subcommittee Recommendation 3

Limits of Visual Flight Rule Operations Under Advanced Air Mobility Concepts

- **The NAS Operations subcommittee recommends that the FAA conduct research to determine limitations on achievable conventional VFR operations as the number and complexity of VFR AAM aircraft operations increase, especially in denser airspace environments such as in the vicinity of Class B and Class C airports. This research should also identify mitigations or enablers that could potentially extend the scope of VFR operations for AAM and/or develop clear criteria from which a transition to non-VFR control modes and procedures for AAM would occur and be supported.**

NAS Operations Subcommittee Finding 4

Wake Risks Under Advanced Air Mobility Concepts

- **During the Joby Aviation presentation mentioned in Finding #3, it was noted that there may be mixed AAM operations at airports in which eVTOL aircraft could be exposed to risks from persistent conventional aircraft wake turbulence. These wake risks at low altitude, coupled with novel aircraft performance characteristics and flight profiles, may require new approaches to defining wake separation criteria for AAM operations.**

NAS Operations Subcommittee Recommendation 4

Wake Risks Under Advanced Air Mobility Concepts

- **The NAS Operations subcommittee recommends that the wake programs (A11.p and 1A04A0) begin research to understand how wakes might affect eVTOL aircraft transiting across the runway, approach, and departure environments during intervals between conventional takeoff and landing operations.**
- **This activity would include research to (1) measure and model aircraft wake generation, transport, and decay on and across runways (both longitudinally and laterally) and (2) model how eVTOL aircraft respond to those wakes and other turbulent flow features from the perspective of AAM operations. Based on those wake models, interaction models, and safety analyses, the potential for new wake separation criteria for AAM operations should be explored.**

NAS Operations Subcommittee Finding 5

Human Factors for Highly Automated and Autonomous Advanced Air Mobility Concepts

- The subcommittee received updates on Enterprise Human Factors (BLIs 1A12B0/1A11B0) and Air Traffic Control / Technical Operations Human Factors (BLI A11.i), both of which appeared focused on utilization and integration of legacy and current technologies and vehicles. However, with the upcoming integration of Advanced Air Mobility concepts, it is envisioned that highly automated and increasingly autonomous vehicles will begin operations within the NAS. In addition, the ground-based controller assistance tools will also contain higher levels of automation. It is not clear how these vehicles will impact how a controller manages the airspace, and if the roles and procedures will or will not change. In addition, clear articulation of the roles and responsibilities, graceful degradation, and off-nominal procedures are needed. Furthermore, the subcommittee could not easily determine the overall integrated approach and roadmap encompassing Human Factors research.

NAS Operations Subcommittee Recommendation 5

Human Factors for Highly Automated and Autonomous Advanced Air Mobility Concepts

- **The NAS Operations subcommittee recommends that the FAA develop an integrated fully encompassing roadmap of all Human Factors research which identifies cross-leveraging, inter-dependencies, and targeted applications of the research outcomes. The subcommittee also recommends the FAA engage in targeted Human Factors research aimed at integration of highly automated and increasingly autonomous Advanced Air Mobility concepts into the NAS, as well as utilization of increasingly automated controller assistance technologies.**

Next NAS Ops Meeting: March 19-20, 2024

- **Requested documents prior to next meeting**

  - ☐ **UAS/AAM Integration Research Plan, if/when updated beyond March 2022 version**

  - ☑ **“Future Connectivity for Aviation”, EU/US Task Force Whitepaper, EASA, FAA, Airbus, Boeing, 11 September 2022**
    (This document has been received by the subcommittee)