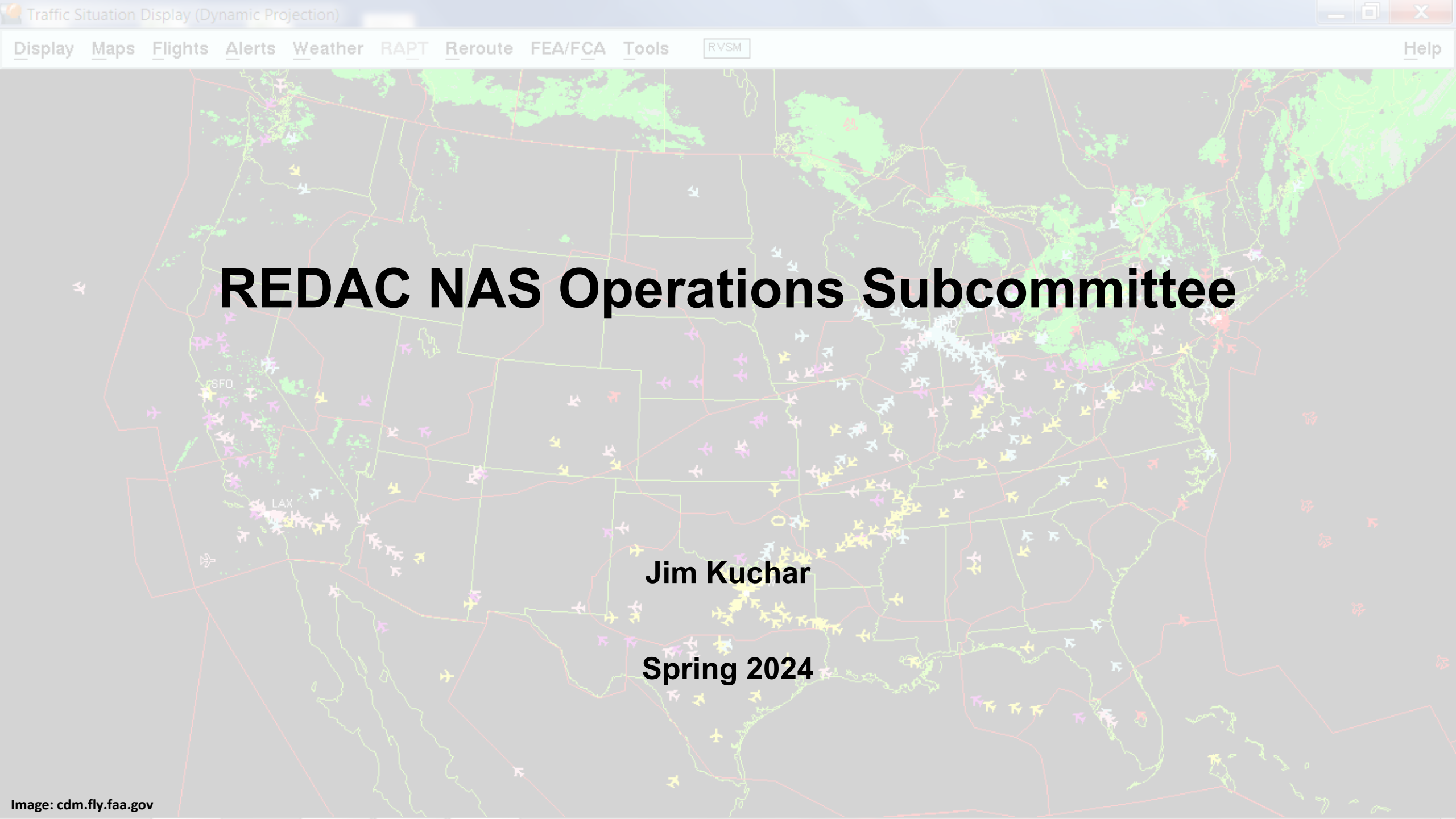

REDAC NAS Operations Subcommittee

Jim Kuchar

Spring 2024

Image: cdm.fly.faa.gov

NAS Operations Subcommittee – Spring 2024 Meeting

19-20 March 2024, hybrid meeting

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
  - AI Certification Framework (FAA)
  - Innovate 28 Update (FAA)
  - Status of ADS-B Vertical Rate Turbulence Project (NCAR)
  - AVS Research Strategy (FAA)
  - AAM Vision (Wisk)

NAS Operations Subcommittee Observation 1

Strategic Outlook for Aviation Research (SOAR) Framework

- **The NAS Operations subcommittee continues to be interested in the FAA's Strategic Outlook for Aviation Research (SOAR) framework 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.**

- **We would like to request a presentation reviewing the current status of the SOAR framework, including examples of its application to several research areas, at our Fall 2024 meeting.**

NAS Operations Subcommittee Observation 2

AI / ML Development and Coordination

- **The subcommittee observed that the pace of AI / ML development within the government, industry, and academia is continuing to accelerate, emphasizing the need for the FAA to ensure it is informed on the current state-of-the-art so that it can effectively develop processes with which those technologies can be certified or qualified for use in the National Airspace System. Some degree of AI / ML certification/qualification process development is already being coordinated across the FAA, including outreach to industry and academia. The subcommittee would like to underscore the importance of that coordination and information sharing and the subcommittee plans to continue to track its progress in future meetings.**

NAS Operations Subcommittee Finding 1

AI / ML Certification Framework

- **The subcommittee received an overview of initial research developing a certification framework for AI technology under the New ATM Requirements portfolio within the office of NextGen (ANG). At this stage, the framework is intended to be applied to low-safety-risk traffic management applications. The subcommittee agrees that this work is important, especially given the accelerated pace of AI / ML development within and outside the FAA.**
- **The framework that was presented includes a range of factors to consider when determining the level of rigor required in performing AI / ML certification, but *operational impact* of the AI technology was not explicitly included among them. Certain traffic management tools could have significant operational impact risk, e.g. related to the magnitude and equitable distribution of delays across airspace users that result from the tool's use.**

NAS Operations Subcommittee Recommendation 1.1

AI / ML Certification Framework

- **The NAS Operations subcommittee recommends that the FAA more explicitly and formally include consideration of operational impact, including metrics such as aggregate delay or equitable distribution of delays across airspace users, when determining the degree of rigor to be applied in its AI / ML certification process for traffic management applications. Methods to estimate and quantify that operational risk will need to be developed and applied.**

- **The subcommittee would like to see an example applying the framework to a selected AI / ML use case at our Fall 2024 meeting.**

NAS Operations Subcommittee Finding 2

AI / ML Model Re-Training in the Certification Framework

- **As part of its assessment process, the FAA's proposed AI / ML certification framework includes consideration of how a given model has been trained. Less clear is the degree to which the processes for conducting model re-training are included in the framework. It is anticipated that even "frozen" ML systems will need to be periodically re-trained at some cadence as input data sources or operational behaviors change over time. An important consideration for certification will be the processes for determining when re-training will be necessary.**

NAS Operations Subcommittee Recommendation 2.1

AI / ML Model Re-Training in the Certification Framework

- **The NAS Operations subcommittee recommends that the FAA ensure that AI / ML model re-training processes be explicitly included as a consideration in its certification framework. This might involve a requirement to re-certify certain systems when they are re-trained, or alternately it may be determined that the system need only be certified once given that there is sufficient assurance in the re-training process to have confidence the system will remain operationally acceptable over time.**

NAS Operations Subcommittee Finding 3

Low Altitude Weather Information Remote From Observation Systems

- **New entrants, including small UAS and other Advanced Air Mobility concepts, have the potential to involve increasing numbers of aviation operations at relatively low altitudes in regions remote from weather observation systems. The ability to maintain an accurate understanding of current and forecast weather conditions in remote regions will be important to ensure the safe and efficient operation of these vehicles. One example application could involve the ability to generate information analogous to Meteorological Aerodrome Reports (METARs) and Terminal Aerodrome Forecasts (TAFs) at any arbitrary location, but with the caveat that those METARs are not explicitly measured at that location.**

NAS Operations Subcommittee Finding 3 (continued)

Low Altitude Weather Information Remote From Observation Systems

- **Weather conditions in remote regions can be estimated and forecasted by fusing and extrapolating observations, where available, with numerical weather prediction model data, but effective methods to determine the accuracy and spatio/temporal validity of those estimates need to be developed, especially when weather may change dynamically over short distances or times. It is also anticipated that there are significant human factors issues related to how pilots and operators may interpret and act on this type of estimated weather information. Some initial research on this topic has begun within the Weather Research portfolio.**

NAS Operations Subcommittee Recommendation 3.1

Low Altitude Weather Information Remote From Observation Systems

- **The NAS Operations subcommittee recommends that the FAA expands research on performance standards for weather information in regions remote from observation systems. This would include determining appropriate requirements for accuracy, update rate, and spatio/temporal validity of low-altitude weather information elements such as wind speed and direction, precipitation type and rate, temperature, and ceiling and visibility.**
- **This work should be coordinated between the Weather Research portfolio and the UAS/AAM integration research plan so that applications to both general aviation and UAS/AAM can be leveraged.**

NAS Operations Subcommittee Recommendation 3.2

Low Altitude Weather Information Remote From Observation Systems

- **The NAS Operations subcommittee recommends that the FAA begins researching the human factors implications of communicating confidence in weather analyses and forecasts for regions remote from observation systems. This could include exploring more explicit methods of communicating weather uncertainty and whether/how that information could be used in decision-making.**
- **This work should be coordinated between the Weather Research portfolio, the Human Factors portfolio, and the UAS/AAM integration research plan so that applications to both general aviation and UAS/AAM can be leveraged.**

Next NAS Ops Meeting: September 4-5 2024

- **Requested documents prior to next meeting**
  - **xTM Conops Document (S. Bradford)**
  - **AVS Safety Research Plan (B. DeCleene)**

- **Requested presentations to add to the meeting agenda**
  - **SOAR Framework including example application to one or more research areas**
  - **AI Certification Framework update including example application to one or more use cases**
  - **AVS AI Roadmap update**
  - **UAS / AAM Integration Research Plan update**
  - **FAA ASSURE COE program update, particularly research related to large UAS**
  - **Update on Office of Commercial Space Transportation R&D plan**