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REDAC NAS Operations Subcommittee

Help

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Spring 2022

Image: cdm.fly.faa.gov

- 15-16 March 2022, virtual meeting
- Agenda
 - **o** Director Remarks
 - **o Budget overview**
 - Enterprise Concept Development; New Air Traffic Management Requirements
 - Enterprise Human Factors; ATC / Technical Operations Human Factors
 - Weather Program; Weather Technology in the Cockpit
 - ⊖ Flight Deck Data Exchange Requirements
 - $\circ~$ Wake Turbulence
 - Runway Incursion Reduction
 - **o** Operations Concept Validation & Infrastructure Evolution
 - $\circ~$ Invited deep dives
 - xTM Framework and Operational View
 - UAS Integration Research
 - BVLOS ARC Rulemaking Overview
 - UTM Implementation Plan Overview

NAS Ops Subcommittee – Spring 2022 General Observation #1

Overall Research Architecture and Swim Lanes

The Subcommittee received comprehensive briefings for the major portions of the FAA research portfolio including components funded through F&E and RE&D lines. The Subcommittee acknowledges the FAA's great work in response to the evolving community needs, and FAA's forward-leaning posture to address emerging Air Traffic Services challenges.

The Subcommittee would like to receive a briefing on the Enterprise Architecture and the alignment of research activities to operational improvements, particularly those associated with the Info-Centric NAS vision. We are looking to obtain greater strategic insight on the alignment of the individual components and how they all fit within the overall strategic vision and research roadmap for the FAA.

NAS Ops Subcommittee – Spring 2022 General Observation #2

UAS Integration Research Coordination

The subcommittee received a comprehensive overview of the UAS NAS Integration research plan, including the impressive portfolio of activities in the ASSURE Center of Excellence. The outcomes from this work appear to be highly relevant for strategies beyond small UAS aircraft operations, to include safe integration of large UAS and AAM aircraft into the NAS. The findings and outcomes of UAS research also have the potential to inform aspects of the FAA's future vision for an Info-Centric NAS, as this vision includes technology opportunities that are central to future UAS operations.

It was not clear to the subcommittee how these UAS NAS Integration activities are connected with, coordinated, or informing other related RE&D efforts (e.g., UTM Implementation, wake research, and topics such as AAM weather needs).

The Subcommittee requests informational briefing(s) that would provide higher-level visibility of the overarching RE&D roadmap that would illuminate the potential for value to be translated from UAS NAS Integration to other such projects. We also request a briefing describing the FAA view on the cross-coupling of the UAS NAS Integration outcomes into the vision for xTM and Info-Centric NAS capabilities.

NAS Operations Subcommittee Finding 1

Interactions Between Conventional and Emerging Air Traffic Management Services

The Subcommittee received briefings on UTM, Upper-E Traffic Management, and Advanced Air Mobility. The Subcommittee believes the currently planned research and development activities and concepts are on track to address the near-term requirements of the user community. For example, the initial concept of operations for AAM vehicles using flight corridors may be sufficient for very early introduction of the AAM vehicles into the airspace. The UTM, ETM, and AAM airspace management systems are currently envisioned as standalone systems without a great amount of integration or interaction with the conventional NAS Air Traffic Services.

Increasing diversity, density, complexity, and volume of highly-heterogeneous vehicles and missions will eventually force more integration and interaction of the emergent vehicles and traditional aviation both in controlled and uncontrolled airspace. Therefore, as more of these emergent vehicles enter operation, the UTM, ETM, and AAM systems will see the need to interact, exchange information, and even integrate with unconventional Air Traffic Services.

NAS Operations Subcommittee Recommendation 1

Interactions Between Conventional and Emerging Air Traffic Management Services

1. The NAS Operations subcommittee recommends that the FAA clearly identify requirements for integration and coordination between emergent and conventional Air Traffic Services, and develop and communicate near- and long-term RE&D plans to address these requirements.

NAS Operations Subcommittee Finding 2 UAS Weather Research Coordination

It is anticipated that UAS vehicles may be more susceptible to weather hazards than typical manned aircraft, and UAS service providers and operators may be less-well trained in aviation meteorology than the typical general aviation pilot. Defining standards for providing effective weather information to UAS service providers and operators, and methods for those users to understand the implications of that weather information, will be important to maintain safe and efficient UAS operations. This in turn will require some research devoted to UAS weather sensing, translating weather data into operational impact, and weather information distribution.

NAS Operations Subcommittee Finding 2 (continued) UAS Weather Research Coordination

- The A11.k Weather Program includes initiatives specifically addressing UAS weather requirements, such as the use of airport and off-airport observations to provide local weather information, urban micro-scale weather considerations, and the need to identify appropriate thresholds for alerting UAS operators of weather hazards.
- The A12.c WTIC program includes research focused on general aviation operations. Activities include evaluating methods for informing pilots about weather hazards, effectiveness of pre-flight weather briefings, and assimilation of non-collocated and varying-modality weather observations to generate weather products in regions not normally covered by airport weather sensing systems. The WTIC program scope has been limited to piloted general aviation applications and is only just starting to consider UAS weather information as a future area its portfolio.
- The UAS research plan described in the A11.L briefing covered a wide range of topics, but did not include weather information among the various research efforts being pursued or planned.

NAS Operations Subcommittee Recommendation 2 UAS Weather Research Coordination

2. The NAS Operations subcommittee recommends that the FAA explicitly identify and integrate UAS weather considerations into its UAS research plan. Relevant efforts underway or planned in the Weather Program and WTIC need to be included within the UAS research roadmap and coordinated with other UAS research efforts. For example, ongoing UAS flight test campaigns offer valuable opportunities to collect or evaluate UAS weather information – this opportunity would be lost if there is no coordination between these research tracks.

NAS Operations Subcommittee Finding 3 WTIC Program Scope Relative to UAS Weather Considerations

In the past, the WTIC program scope has been limited to piloted general aviation applications and is only just starting to consider UAS weather information as a potential future area its portfolio. Inasmuch as UAS operations may still involve a pilot or service provider interacting with weather information to manage the safe and efficient flight of an aircraft, similar weather research considerations may apply to both general aviation and UAS applications.

NAS Operations Subcommittee Recommendation 3 WTIC Program Scope Relative to UAS Weather Considerations

3. The NAS Operations subcommittee recommends that the FAA expand the scope of WTIC research to include considerations of UAS service provider (USS) as well as Providers of Services for UAM (PSU), and operator weather information needs. Synergies between general aviation, helicopter operations, and UAS operations (e.g., operations in weather at low level far from airport weather sensors) need to be exploited so that WTIC research has application and value to all three communities. Just as WTIC is defining requirements for a minimum weather service for general aviation operations, similar requirements are needed for UAS (and more broadly, UAM) operations.

NAS Operations Subcommittee Finding 4 WTIC Program Experimental Design

The WTIC program has initiated and conducted several experiments to explore potential improvements for weather information collection, processing, and dissemination to general aviation pilots. Examples include evaluating the use of video imagery of wind socks to estimate surface winds, or evaluating the use of augmented reality in pilot weather training exercises. Although these research activities are interesting and have potential benefits for general aviation, they do not appear to have been defined using a formal experimental framework including the identification of specific hypotheses and performance requirements with which to judge experimental outcomes. The use of a more formal experimental design framework would strengthen the impact of the experimental results and in turn lead to more effective transition into future operational products or systems.

NAS Operations Subcommittee Finding 4 WTIC Program Experimental Design

4. The NAS Operations subcommittee recommends that the FAA WTIC program enhance its rigor in defining and/or communicating specific research hypotheses when developing experimental projects. These hypotheses need to explicitly state performance metrics and acceptance thresholds by which the outcome of the experiments can be judged.

- Requested documents prior to next meeting
 - UTM Implementation Plan
- Requested Deep Dive topics for Fall 2022 meeting:
 - Info-Centric NAS data exchange ecosystem
 - UAM Concept of Operations
 - AST R&D Roadmap
 - General Aviation and AAM future CNS perspectives
 - Weather R&D for UAS / UTM / AAM
 - Remote Tower activities
 - ASSURE COE Program overview