

REDAC NAS Operations Subcommittee

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Spring 2023

NAS Operations Subcommittee – Spring 2023 Meeting

14-15 March 2023, hybrid meeting

Agenda

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| <ul style="list-style-type: none">• Director Remarks• Budget overview• Runway Incursion Reduction Program• Enterprise Concept Development; New Air Traffic Management Requirements• Enterprise Human Factors; ATC / Technical Operations Human Factors• Wake Turbulence / Wake Recategorization• Weather Program; Weather Technology in the Cockpit• Operations Concept Validation & Infrastructure Evolution | <ul style="list-style-type: none">• Invited informational briefings<ul style="list-style-type: none">– Connected FMS Concept (Collins Aerospace)– UAM Airspace Demonstration Project– FAA AST R&D portfolio update– Industry Case for AAM Acceleration via Refined Focus on CNSi Technologies and Standards (GAMA EPIC Data communications subcommittee)– Remote Tower development status |
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GAMA = General Aviation Manufacturers Association
EPIC = Electric Propulsion and Innovation Committee

NAS Operations Subcommittee Observation 1

Strategic Outlook for Research (SOR) Framework

- **When planning and executing a research program, strategy development, strategic thinking, and strategic communications are vital for organizational success; further, the more diverse and interdependent the organization is, the more vital these skills and tools are.**
- **The FAA's proposed Strategic Outlook for Research (SOR) framework underscores the need for strategic clarity in the FAA's RE&D portfolio to avoid misperceptions and ensure accurate understanding across stakeholders.**
- **Articulating the RE&D portfolio across three strategic domains (Near Term/Current; Mid Term/Emerging; and Long Term/Projected), along with implications for FAA actions in each, is effective.**
- **The NAS Operations Subcommittee commends this messaging initiative and encourages the FAA to exploit the SOR framework to enhance its ability to communicate existing and planned RE&D efforts.**

NAS Operations Subcommittee Observation 2

Remote Tower Testbed at W. J. Hughes Technical Center

- **The NAS Operations subcommittee endorses the FAA decision to transition the Remote Tower pilot program toward centralized testing and evaluation of vendor-applicants for System Design Approval (SDA) using a new testbed being deployed at the National Research and Technology Park at the FAA Technical Center.**
- **The FAA's transition from distinct single-system sites to a common testbed for remote tower system evaluations will provide additional flexibility, the ability to directly compare and contrast system solutions, and support related standards development and validation.**

NAS Operations Subcommittee Finding 1

Acceleration of AAM CNS Technology Development

- **The Subcommittee received a briefing on “The Industry Case for AAM Acceleration via Refined Focus on CNS Technologies and Standards” from GAMA, representing the consensus of numerous OEM and system vendors in the AAM industry.**
- **The premise of the GAMA assessment is that due to a current focus on longer-term investments for UML-4 (involving a high volume of autonomous operations), there is a gap in government RE&D investment toward the needs of industry at the nearer-term UML-2 and -3 levels, where industry will first deploy commercial operations and create revenue. This gap creates a financial, regulatory, and schedule risk for AAM system innovation as a whole.**
- **The GAMA assessment produced an understanding that there is a need to expand integrated technology investment and involvement of the FAA and NASA with industry that supports integrated CNS capabilities to enable nearer-term AAM operations.**

NAS Operations Subcommittee Recommendation 1

Acceleration of AAM CNS Technology Development

- **The NAS Operations Subcommittee recommends that the FAA develop a clear RE&D strategy to partner with industry specifically to accelerate UML-2 and -3 CNS-related efforts.**
- **This effort should be conducted in partnership with NASA, industry, and other stakeholders, especially with respect to CNS technologies.**
 - **Example technical areas include command and control for beyond visual line of sight operations, airspace conflict management, detect and avoid technology, alternative positioning, navigation, and timing capabilities, and cloud architectures with corresponding cybersecurity considerations.**
- **FAA investments could include enhanced support to standards development organizations, support for collaborative ground and airborne testing, simulation support, etc.**
- **The strategy should be provided as a briefing by the FAA to REDAC and should include an assessment of the current RE&D CNS investments and shortfalls in the context of the needed technologies cited in the GAMA briefing.**

NAS Operations Subcommittee Finding 2

Commercial Space Research Alliance

- **The FAA's Office of Commercial Space Transportation (AST) research portfolio is in the process of transitioning from its prior Center of Excellence to a new planned public-private Research Alliance.**
- **Successful public-private partnerships have been built on frameworks and processes that are well-known in the aerospace sector.**
- **Now is the moment to take the time to study and implement best practices from successful public-private research and innovation alliances so that this new framework is most effective.**

NAS Operations Subcommittee Recommendation 2

Commercial Space Research Alliance

- **The NAS Operations Subcommittee recommends that the FAA carefully design the new AST public-private Research Alliance partnership by identifying and then applying best practices from other government-industry-academia technology alliances, to maximize the probability of success.**
- **This step could be implemented through any of several unbiased entities in the FAA network, including FFRDCs or the National Institute of Aerospace.**

NAS Operations Subcommittee Finding 3

Wake Program Sensor Refresh

- **The wake program's existing lidar equipment, used to empirically measure aircraft wakes near airports, is aging out of maintenance windows and requires replacement.**
- **The FAA has initiated a sensor study to identify and procure the next generation of wake sensors. The need for a refresh of wake turbulence sensor technology is vital for maintaining operational safety in the NAS as affected by wake turbulence.**
- **The increase of new entrant AAM aircraft in the NAS, and their potentially unconventional mission profiles, poses new requirements for the characterization of wake turbulence effects.**
- **The transition to new wake measurement systems represents an opportunity to consider a broader focus of wake data collection to include new airport locations and new AAM entrants.**

NAS Operations Subcommittee Recommendation 3

Wake Program Sensor Refresh

- **The selection of sensors should be derived from an overarching wake research plan and its corresponding requirements for data collection.**
- **The NAS Operations Subcommittee recommends that the FAA complete its wake sensor study while including consideration for deployment to new locations and configurations to collect data related to AAM vehicles and operations.**
- **This may result in different factors being considered in the selection of sensors than has been the case for conventional aircraft operations.**

NAS Operations Subcommittee Finding 4

Wake Program Business Case Development

- **The Wake Recategorization program has been developing and assessing dynamic wake solutions that could enhance NAS efficiency, but this program is coming to an end with no further funding or transition planned.**
- **It is not clear that a comprehensive business case study has been completed by which future research investments into dynamic wake solutions would be guided.**
- **Work under this program also does not appear to be coordinated with AJV-S to ensure that potential enhancements are operationally sound and captured in the architecture plans for the NAS.**

NAS Operations Subcommittee Recommendation 4

Wake Program Business Case Development

- **The NAS Operations Subcommittee recommends that the FAA conduct and complete a comprehensive cost/benefit business case for the employment of a range of dynamic wake procedures that could be employed at different airports and operating environments, including potential future AAM operations.**
- **This work should be coordinated with AJV-S to ensure that potential enhancements are operationally sound and captured in the architecture plans for the NAS.**

NAS Operations Subcommittee Finding 5

Remote Tower Technology for AAM

- **The Subcommittee notes that the remote tower strategy has not accounted for the prospective value of remote tower concepts to AAM operations, especially for higher density operations that involve mixed traditional and new entrant operations in shared airspace.**
- **This aspect becomes more challenging when including the planned deployment of third party commercially operated Providers of Services to UAM (PSUs) and Command and Control Communication Service Providers (C2CSPs) responsible for managing the AAM airspaces of interest.**

NAS Operations Subcommittee Recommendation 5

Remote Tower Technology for AAM

- **The NAS Operations Subcommittee recommends that the FAA incorporate AAM considerations into planning for the remote tower testbed being deployed at the FAA Technical Center.**
- **As an interim step, the Subcommittee requests a briefing on the FAA's strategy considering the value of the remote tower technologies in AAM operations, especially regarding higher density and mixed fleet airspace operations.**
- **The Subcommittee anticipates that this strategy would be based in part on lessons learned from the current remote tower project, and that NASA's role in prospective related research would be considered.**

NAS Operations Subcommittee Finding 6

RE&D Focused on the Use of Uncertainty Information

- **The increasing availability of data enabled through expanding connectivity creates opportunities for applying artificial intelligence and machine learning techniques to exploit the wealth of data to improve safety and efficiency. Data mining techniques enable characterization of uncertainty and likelihood of certain outcomes, which can be beneficial for risk assessment and decision making.**
- **Effectively communicating and exploiting uncertainty information is relevant for both human and automation system performance.**
- **These general findings reach across multiple areas of digital systems and technologies, environment and weather impact mitigation, aerospace performance and planning, and human and aeromedical factors.**
 - **As one example, probabilistic airspace constraint and traffic flow modeling are becoming more common, including the ability to exercise what-if scenarios and training of decision makers.**
- **Conducting RE&D in this domain is important for the FAA to exploit the rapid evolution in capabilities across the aviation and information industries.**

NAS Operations Subcommittee Recommendation 6

RE&D Focused on the Use of Uncertainty Information

- **The NAS Operations Subcommittee recommends that the FAA begin RE&D efforts specifically related to uncertainty characterization, quantification, communication, and exploitation, with an initial use case on demand/capacity balancing for air traffic management.**
- **This includes development of relevant standards, human factors studies, and processes for certification, approval, and use of systems that convey uncertainty or confidence information.**

Next NAS Ops Meeting: March 22-23 August 2023

- **Requested documents prior to next meeting**
 - **xTM Conops 1.0**
 - **NAS Integration of Transiting and Higher Airspace Operations (NITRO) Strategy and Roadmap document**
- **Requested informational briefing topics for Fall 2023 meeting:**
 - **Briefing(s) on NASA status and updates on their xTM and AAM projects**
 - **“Innovate 28” program**
 - **UAM Demonstration status update**