Fall 2019 REDAC
Subcommittee: NAS Operations
DFO Name: Philip Yeung

Note: The Office of Commercial Space Transportation (AST), Budget Line A.11N did not present in-person or provide a briefing deck.

FINDINGS AND RECOMMENDATIONS

Finding: Need for a Continuing Capability Utilization Evaluation Program

With the growing complexity and inter-relationships between automation systems (e.g., TBFM, TSAS, TFDM, STARS, ERAM) and new procedures and capabilities (e.g., Performance Based Navigation, Initial Trajectory Based Operations) it is becoming increasingly important to monitor the use of these systems to ensure their envisioned benefits are being realized. Gathering data on capability utilization is critical to validate assumptions made during system development, identify operational, safety, efficiency, and user training challenges, and inform future research priorities. This will become especially important as future capabilities increasingly rely on AI / machine learning-based systems that need to be periodically retrained due to changing operational conditions, data inputs, or other variables. The ATC / Technical Operations Human Factors portfolio (A11.h) includes this type of activity, but it is extremely limited in scope relative to the broad range of new capabilities being fielded.

Recommendation:

The FAA should establish a cross-cutting airspace services capability utilization monitoring program that collects data on existing and newly deployed automation systems and procedures. This program would include collecting data on overall system performance and benefits (e.g., are assumptions on delay reduction being realized; are optimal procedures being used during convective weather impacts; etc.) as well as more detailed human-use considerations (e.g., are training enhancements needed; are workload limits managed within appropriate boundaries). Data could be provided to ASIAS and other repositories for broader analysis and identification of airspace services safety risk trends. To ensure long-term continuity, a reliable funding stream and staffing levels need to be identified to maintain the effectiveness of this program.

Wake Turbulence

General Observation

During the Fall 2019 NAS Operations REDAC meeting, the subcommittee was briefed by the NextGen Wake Turbulence Program office on the FY2022 proposed portfolio for Budget Line A12.a. The Wake Turbulence programs objective is to safely increase capacity during peak demand periods.

Finding: The role of wake hazard advisory technology in flight deck operations has not yet been considered in this BLI activity (which has been focused on controller tools). Additional paths of inquiry make sense to include in this domain of investigation. For example, by what means can the flight deck be informed about wake hazards, enroute as well as terminal? What are the appropriate pilot actions in the context of what Air Traffic Controllers see and know? How do atmospherics affect optimal flight deck wake avoidance guidance data/graphics, in particular, for business and general aviation operators. How can we use real-time data from the aircraft to provide physics-based modeling of actual on-condition aircraft wake generation, decay, drift, and descent behaviors?

Recommendation:

We encourage the evaluation of the potential benefits of the wake hazard research program being applied to general aviation that could be extended to the flight decks for business as well as commercial aviation through the study of flight deck graphical wake avoidance advisories on mobile devices. In addition, the program office should develop a plan and strategy on how the enroute wake encounter data being gathered through ASRS and ASIAS are being leveraged and applied to inform the needed research as well as mitigation technologies and procedures.

Runway Incursion Reduction Program (RIRP)

General Observation

During the Fall 2019 NAS Operations REDAC meeting, the subcommittee was briefed by the Runway Incursion Reduction Program on the FY2022 proposed portfolio for Budget Line S09.02-00. The RIRP program's objective is to reduce the risk to people and property caused by collisions in the runway environment.

Finding: Projected RIRP research in FY20/21 emphasizes the development of technology transfer documentation, contract solicitation and award for capability developed under this program, for example the Small Airport Surveillance System (SASS) and Runway Incursion Prevention through Situational Awareness (RIPSA). The subcommittee commends the program office for taking steps to address runway incursion risks. However, when questioned on the associated acquisition concept, the RIRP program representative asserted that airport operating authorities would choose to procure the system in partnership with industry. It is not clear, however, how a critical mass of airport operators would come together to accomplish this, how they would effectively contract with industry to complete first article development, testing and acceptance, and what the ongoing role of the RIRP program would be. It is difficult for the subcommittee to assess the value of the recommended outyear RIRP program, given the vagueness of the acquisition concept.

Recommendation: The program office should develop a more detailed acquisition concept including a list of candidate airports, quantitative assessment of the safety or operational impact that deployment of the targeted technologies would achieve at these airports, and a notional process by which the program office would support these airports in the system development and acquisition process. This acquisition concept should be presented to the subcommittee at the spring 2020 meeting. Furthermore, the program office should develop a strategic plan on how the

individual research elements within the program are integrated and address the runway incursion risk. In addition, the program office should develop a concept of operations on the integrated set of technologies and operations, as well as the actions all users of the NAS are to take on the information being displayed and/or provided to them. The program office should develop a set of metrics to measure the effectiveness of the technologies and proposed new operations as well as the application of the technologies and operations to specific events that lead to runway incursions.

Weather Technology in the Cockpit Program (WTIC)

General Observation

During the Fall 2019 NAS Operations REDAC meeting, the subcommittee was briefed by the NextGen Weather Technology in the Cockpit office on the FY2021 & 22 proposed portfolio for Budget Line A12.c. The WTIC program research enhances safety, efficiency and capacity impacts related to weather.

Finding: The introductory portions of the WTIC briefing to the subcommittee provided a solid list of stakeholders (Government, industry, academia, standards setting organizations) and metrics for program success. However, the process through which these foundational elements determine the particular projects that are being pursued currently, and planned for the outyears, is not clear. The particular research efforts briefed to the subcommittee seem disjoint and it is not clear how they contribute to the strategic goals of the program.

Recommendation: The WTIC program should develop an end-to-end strategic plan and brief this to the subcommittee at the spring 2020 meeting. This should augment the existing material on stakeholders and metrics with a clearer statement of desired program outcomes, a process for optimizing the research projects selected for funding to achieve these outcomes, and a stronger explanation of why the projects briefed to the subcommittee are important to this strategy. Furthermore, the program should document the specific weather translation activities and probabilistic analysis to be able to clearly convey and set expectations for the users on the weather products for them to make informed decisions.

ACTION ITEMS

The NAS Operations Subcommittee appreciates the updates provided by the FAA briefing teams in the following topic, and requests this item be included in upcoming Subcommittee meetings:

1. **Aviation R&D Landscapes:** The subcommittee requests an example or trial use of the Landscapes framework. An example we have in mind is to apply the landscapes framework list of categories of “Drivers” as a checklist for an existing RE&D BLI program. The purpose is to evaluate the utility of using the framework as context for program managers to use in evaluation of broader creative thinking about the technologies affecting their programs.

DEEP DIVE BRIEFING REQUESTS

General Observation

During the Fall 2019 NAS Operations REDAC meeting the subcommittee requested a deep dive briefing on Commercial Space transportation. The subcommittee requests Commercial Space Transportation, BLI A11. regarding the methods in development for launch vehicle-to-aircraft trajectory separation management, its expected improvement in NAS operations, and deployment strategy. Commercial Space Transportation did not brief the NAS Ops-Subcommittee briefing nor was any supporting briefing, documentation or response forwarded the sub-committee.

Once again, the NAS Ops-Sub Committee is requesting:

1. The Commercial Space Transportation, BLI A11.N provide a deep dive briefing regarding the methods in development for launch vehicle-to-aircraft trajectory separation management, its expected improvement in NAS operations, and deployment strategy.
    a. Update on Commercial space CONOPS.
    b. How is the CST activity forecast informed?
2. The subcommittee requests the ASSURE COE provide a deep dive briefing regarding their research on UAS safety assessment and integration into the NAS. Given the high demand by the UAS user community on the FAA, it is critical to understand the level of integration and cross dependency between the UAS research, IPP, UPP, and ASSURE COE and how they collective address the UAS research needs.

Dates for the next two meeting:

March 24 & 25 - Spring 2020

Sept 1 & 2 - Fall 2020