**REDAC Recommendations Database Status History Report**

**ID #:** Fall\_2012\_06

**Subcommittee:** NAS Operations

**DFO Name:** Maureen Molz

**Recommendation Assignee Name:** John Marksteiner

**Finding:**

The FAA presented a plan to complete a Trajectory-Based Operation (TBO) concept of operations by November 2012. While there are several activities in place to develop standards and implement TBO capabilities, the direct benefits for operators equipping with a TBO capability have not been quantified, nor have the mechanisms for delivery of benefit been validated. Current work has not allayed operator concerns that equipped aircraft will not achieve differential benefits.

**Recommendation:**

The FAA research supporting the validation of a TBO concept of operations should include the following activities:

* Differentiation of mid-term (2018) and post-mid-term (2025+) operations and benefits
* Integrate operations associated traffic flow management and collaborative decision-making with those involving digital communications to the aircraft regarding reroutes (both pre-flight and during flight).
* Address mixed capability operations (see previous recommendation)
* Quantify the marginal benefits of differing performance requirements and capabilities from both a system perspective and the perspective of investing operators

**FAA Response:**

As presented to the Subcommittee, the FAA is developing a Service Level TBO ConOps. This document will be the FAA’s description of trajectory operations in the midterm (through 2020). The document will cite the known benefits related to trajectory operations. Once completed, it will be reviewed by external stakeholders. Post mid-term trajectory operations and benefits will be addressed after the midterm document is complete.

The mid-term TBO ConOps mentioned above will address the issue of how the FAA manages mixed equipage from the perspective of large jet aircraft, regional jets, and general aviation aircraft (high and low end) capabilities. Once this document is finalized, it will be used to guide future work addressing mixed capability operations.

The mid-term TBO ConOps will also use currently available information to quantify the marginal benefits of differing performance requirements and capabilities from both a system perspective and the perspective of the operators who invest in equipment. The mid-term TBO ConOps is a Service Level Concept that does not go into great depth concerning benefits. Once this document is finalized it will be used to guide future work on refining benefits.

**Current Status Date**:  July 17, 2014

**Current Status:** The final changes to the Trajectory-Based Operations ConOps are currently being adjudicated. Anticipate that these will be complete by August. The will be available for release once they are complete.

**ID #:** Spring\_2013\_22

**Subcommittee:** NAS Operations

**DFO Name:** Maureen Molz

**Recommendation Assignee Name:** Paul Fontaine

**Finding:**

The NASOPs Subcommittee has previously recommended that the FAA undertake a broader management framework for its research and development. This would enable FAA to manage its research portfolio across funding lines to focus on achieving specific operational benefits to the National Airspace System (NAS). At its summer 2012 meeting, Paul Fontaine agreed to develop a portfolio view of FAA activities related to NAS surface operations. The Subcommittee found this portfolio view to be excellent. The graphical depiction of related efforts highlighted the interplay between requirements sources, funding sources and projects within the portfolio and could easily be expanded to include more detail on FAA R&D and related research projects from other government agencies (e.g., DoD and NASA).

A true portfolio view and management of research priorities across the portfolio will require the right level of aggregation and oversight by an executive-level governance body such as the Research and Development Executive Board (REB), the NextGen Management Board (NMB), or the Strategic and Budget Planning (SBC). The Subcommittee realizes that asking for this information places workload on already highly loaded managers; however, we believe that there is high value to the FAA being able to see the integrated view to identify research gaps and synergies. The NextGen portfolios are a good start to taking a portfolio perspective; expanding these portfolios beyond projects with NextGen funding is a critical next step.

**Recommendation:**

The FAA should build upon the work that Paul Fontaine presented to the Subcommittee and present a similar portfolio view of FAA research for one or more additional NAS domains during the next subcommittee meeting. This portfolio view should include a first order, quantified description of the benefits pool(s) that drive the decision for the projects (e.g., safety case, security case, efficiency case, reliability case, etc.). In addition, the portfolio views should include more detail of FAA R&D activities and the research activities of inter agency and non-governmental organizations. The subcommittee will work with the FAA to define which domain(s) will be presented and how to maintain them as the research activities evolve.

**FAA Response:**

We agree that a portfolio view can provide value to the agency, but as noted, it is not a trivial effort to develop. As you suggested in your recommendation, we would like to discuss this with the Subcommittee in more detail at the August 2013 meeting to determine which domains are best suited for this and where R&D plays a role.

**Current Status Date:** July 29, 2014

**Current Status:** As the scope and nature of this issue has matured since the recommendation was initially issued, recommend re-routing this recommendation to ANG-E for current status and consideration. With that in mind, ANG-D is happy to provide portfolio briefings upon request.**ID #:** Spring\_2014\_03

**Subcommittee:** NAS Operations

**DFO Name:** Maureen Molz

**Recommendation Assignee Name:** Paul Fontaine, Arthur Sullivan

**Finding (3):**

The Subcommittee is encouraged with the FAA’s response, indicating the intent to establish a research plan that addresses these needs. The FAA’s plans for operations concept validation (F&E 1A08H) as presented, however, did not list any activities related to mitigation of mixed equipage challenges to achieving NextGen benefits.

**Recommendation:**

FAA should ensure that mixed equipage challenges and trade space analyses are explicitly addressed in research plans associated with NextGen concepts. Because this work may be funded outside of the RE&D funding category, the FAA should identify, within the research plan, other work that may be addressing mixed equipage performance and business case questions for specific concepts, such as trajectory-based operations, and other NextGen concepts that require aircraft equipage to achieve operational benefits.

**FAA Response:**

The Life Cycle Integration Office (ANG-D3) prepared a draft paper, dated May 25, 2011, addressing “NextGen equipage strategy” and various mixed performance environments. The paper describes a systematic pathway for identifying and validating NextGen services and benefits to be accrued based on a set of user-defined operations. It lays out the foundation for the next level of detail supporting the development of NextGen Implementation Plan to evolve enabling technologies. The strategy will help facilitate improved performance for all stakeholders (i.e., mainline, regional business, general aviation, military) for the mid-term. Part of the strategy is to address the challenges and dynamics of aircraft mixed equipage, airspace design and procedures, airport configuration and operations, variations in business case analysis practices, and other critical success factors. The paper also proposes a simplistic means of providing air traffic controllers with additional aircraft capability information and scenarios to support traffic flow and operational management of aircraft.

**Current Status Date:**   July 29, 2014

**Current Status:** Our concept validation work includes both safety analyses and benefit analyses which are addressed as part of the feasibility assessment. This holds for both concepts that are procedural and those that include new avionics such as ADS-B In’s Flight Interval Management or the introduction of datacomm on the flight deck. These are always more completely addressed if the capability is found to be feasible and moves on toward implementation. Strategies to incentivize adoption or that show the benefits to encourage adoption are considered as part of the investment strategy.

We note that issues of mixed equipage, aircraft capability, performance, training, and the accompanying safety implications are not new for the FAA and are not exclusive to NextGen. Aircraft today already have tremendous variability in their performance. The addition of equipage that provide advanced NextGen capabilities contribute to this variability but only to a degree. For example the difference in performance of piston versus gas turbine aircraft is very large and is currently managed very successfully in the national airspace system.

Where possible, we provide automation support to the controllers as they apply the expanding set of procedures and rules that maintain safety but do not limit the efficiency for each flight. This strategy of support automation evolution together with procedural and technological advances has been the basis for the successful increases in National Airspace System capacity, efficiency, and safety over the past several decades. We anticipate that this process will be just as successful in helping us adapt to the challenges presented by mixed equipage/capability fleets going forward. For example, we are currently engaged in engineering to expand the capability of the Automated Terminal Proximity Alert (ATPA) to include updated wake restrictions to improve efficiency. Additionally, we are including runway sequencing and spacing into the Time Based Flow Management automation to support PBN usage in higher volumes of traffic. Again the tools will support the controller in safely providing more efficient operations.

As we noted above, the crux of the issue is actually related to implementation and usage: to what degree can the FAA accommodate each aircraft fully utilizing its equipage and capabilities without compromising safety? In order not to compromise safety, there will be mitigations for mixed capabilities/equipage that will not allow for fully efficient use of the equipage in some cases. These compromises to ensure safety already exist today. Further, since many of our uses actually evolve after implementation of the first research article e.g RNP, it is not possible to predetermine during research all the efforts needed for a moving “full” implementation target.

**ID #:** Spring\_2014\_05

**Subcommittee:** NAS Operations

**DFO Name:** Maureen Molz

**Recommendation Assignee Name:** John Marksteiner, Rob Hunt

**Finding (5)**:

NextGen Implications for Commercial Space Transportation. Little focused investment exists in either the FAA or NASA in this arena. The FAA’s presentation to the Subcommittee on its New Air Traffic Management Requirements and Operational Concept Validation included a Space Vehicle Operations Concept Development task deliverable in October 2014. While the Commercial Space Transportation Advisory Committee (COMSTAC) is currently advising the Administrator on matters related to commercial space flight, the REDAC NAS Operations Subcommittee has no insight as to whether NextGen topics such as TBO, DataComm, SWIM, and others are being addressed by the COMSTAC.

**Recommendation**:

The FAA should ensure that NextGen capabilities are specifically addressed in its development of the Space Vehicle Operations Concept Development. The FAA should ensure that both COMSTAC and REDAC are made aware of any NextGen implications for commercial space flight operations in the NAS.

**FAA Response**:

The emergence of commercial space as a component of the NAS infrastructure is not new. Since the development of NAS Architecture 3.0, consideration of commercial space operations has been part of the deliberations. In 2008, as part of the second year of NextGen implementation, debris modeling capability was added to the strategic flow tool suite in cooperation with commercial space office. We are addressing commercial space with relationship to Air Navigation Operations. Both the departure and arrival characteristics of the vehicles taking part in commercial space will drive the degree to which NextGen will need to adjust current planning and infrastructure.

Where we can, we are already considering what we may need to support future operations. As with UAVs, we assume that the operator will need to be included at their ground location in the party-line voice and that datacomm will need to allow logon from that same operator position. This is in addition to the analysis of requirements for the FAA Command Center’s direct communications with the individual space launch operations centers. Also, if the vehicle on its return will operate with flight characteristics similar to aircraft or even UAVs then at a minimum Class A airspace equipage requirements may hold and aircraft certifications may apply.

**Current Status Date:**     July 17, 2014

**Current Status:** The SVO ConOps being developedand scheduled for completion by September is being developed to ensure that NextGen capabilities will be able to effectively accommodate anticipated SVO’s in the mid and far term. The ConOps will be updated in FY 15 as well as additional work developing initial data elements for FIXM to ensure proper integration with NextGen systems is scheduled for FY 15 and 16. The Nextgen Office is coordinating these activities with the ATO as well as the Commercial Space Office.

**ID #:** Spring\_2014\_06

**Subcommittee:** NAS Operations

**DFO Name:** Maureen Molz

**Recommendation Assignee Name:** Cathy Bigelow

**Finding (6)**:

The Subcommittee is pleased that the FAA is committed to developing a more holistic view of its research program. It was clear from the briefing by Mr. Filler that he is committed to this goal, but the Subcommittee finds that the work is still in its conceptual stages.

The Subcommittee is pleased with the FAA’s commitment to strengthen the high level goals of the NARP to align more closely with the National Aeronautics Research Plan and NextGen. The Subcommittee finds the three R&D principles (Improve Aviation Safety, Improve Efficiency, and Reduce Environmental Impacts) to be reasonable. However, the Subcommittee noted that the resulting R&D goals covered a very broad area of research topics and that the FAA has simply mapped all the existing RE&D Budget Line Items (BLI) onto the new goals without any indication of prioritization or changes to the research portfolio. Furthermore, there was almost no quantitative aspect to the research goals – many of them contained phrases such as “improved understanding”, and “improved knowledge”, which provide no reasonable means to track progress toward the goals.

**Recommendations**:

1. The FAA should vigorously pursue its stated commitment: “to develop a more strategic, forward looking process, so that there will be an integrated agency-wide view of R&D”. The FAA should present its progress toward its stated goal at the next Subcommittee meeting in the spring of 2014.
2. As the FAA formulates its research goals, they should contain quantitative goals and metrics by which the progress of its R&D can be measured. If quantitative research goals have not been established, then the FAA should reorient its research program to establish these goals.

**FAA Response:**

The FAA will consider changes in the next update of the FAA National Aviation Research Plan (NARP) to provide a more forward-looking document that provides an integrated agency wide view of FAA research programs.

**Current Status Date:** July 17, 2014

**Current Status:**  The timeline for the FAA to implement the response to this recommendation has been revised. As the Subcommittee is aware, the FAA has tasked all the REDAC Subcommittees at the summer meetings to look much further ahead to 10**+** years and provide us advice that will enable the FAA to develop a R&D portfolio that is strategic and has an integrated agency-wide view. Therefore, we are planning to use the advice and recommendations from the summer meetings to look at options to develop a NARP that is more forward looking with an integrated agency-wide view. We will update the Subcommittee on our progress at the Spring 2015 meeting.