Research, Engineering and Development Advisory Committee (REDAC) NAS Operations Subcommittee

Federal Aviation Administration

Operational Concept Development & Infrastructure
BLI Number: 1A01C

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1A01C Operations Concept Validation

Briefing Objectives

- Review of Program Accomplishments
- Overview of Future Work Activities

Operations Concept
Development & Infrastructure - ATDP

Program Description

- Develop, mature, and validate near/mid-term emerging operational concepts to improve the capacity and efficiency of the NAS.
- Identify and mitigate operational integration concept challenges, focusing on optimizing the integration amongst emerging concepts, and amongst emerging concepts and existing NAS capabilities.
- Advance an enterprise-based perspective to the evolution of NAS capabilities, enabling a more integrated, synchronized, and sustainable NAS.

Partnerships

ANG-C

PMO

Volpe

NASA

Mitre

Funding Overview:

FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20
$4M	$3.5M	$3.953M	$4M	$4M	$4M	$4M	$4M	$6M	$6M

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Operations Concept
Development & Infrastructure - ATDP

Why is this program necessary?

The FAA is proceeding with NAS modernization based on the NextGen Operational Concept for 2025. Concept development and validation is necessary to investigate specific concept elements, and to drive out operational and technical requirements and implications for human factors, training and procedures. This program assesses the interaction of changing roles and responsibilities of NAS service providers and pilots, airspace changes, procedural changes and new mechanized systems for distributing weather, traffic and other flight related information. It tests the assumptions behind common situational awareness and distributed information processing.

The program uses analyses and associated white papers to validate whether future system requirements meet NextGen goals, including the flight data processing evolution in En Route Automation Modernization (ERAM), data communications, the future voice switch, changes in surveillance requirements and associated procedures, establishment of new roles and responsibilities to support increased productivity, etc. It will develop methods, metrics, and models to demonstrate that the modernized system can handle anticipated growth in traffic demand according to the Terminal Area Forecasts (TAF) for incremental years. This supports the goal of continued US leadership internationally and helps ensure the global harmonization through continued support for the ICAO Global ATM operational concept, the development of global requirements, and the definition of an air transportation performance framework.

Operations Concept
Development & Infrastructure - ATDP

What are the benefits to the FAA

The activity supports the FAA's Strategic Initiatives by delivering benefits through technology and infrastructure; Concept validation supports development, analysis, and simulation of new concepts to assess requirements and to evaluate the impact of the concept on system capacity, efficiency, safety and human performance. Evaluation criteria include the following:

- Impact/Improvement to Air Traffic Service Providers, airspace users, and automation that could increase capacity,
- Impact/Improvement on airspace structure which may increase productivity and hence capacity,
- Impact/Improvement on communication, navigation, and surveillance (CNS) requirements to support the FAA's efforts to reducing cost, increasing capacity and efficiency and;
- Impact/Improvement on automation, display, and facility configuration elements to increase productivity and hence capacity.

What determines program success

Success is measured by the completion of the goals identified in multi-year plans developed for each activity. Initiatives that successfully complete all the project goals identified are then presented as candidates for acquisition.

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Unmanned Aircraft Systems (UAS) Concept Maturation

Developed UAS Stakeholder Concept Validation External Stakeholder Engagement Plan

UAS Concept Maturation & Validation accomplishments:

- Performed initial assessment of gaps and concept elements in need of maturation associated with the UAS ConOps Version 2.0 document
- Modified existing scenarios and created new scenarios deemed necessary through tabletop discussions with working group ATC and UAS SMEs
- Updated initial concept level operational requirements based on scenario development/modifications and tabletop discussions with working group SMEs
- Vetted scenarios with ATC SMEs
- Updated concept level operational requirements based on scenario vetting sessions with ATC SMEs and other key stakeholders
- Completed internal FAA vetting of scenario allocation tables (via USG)
- Developed draft AJV-7 UAS Concept Maturation Plan and ATO UAS Operations Evolution Strategy (OES)
- **UAS Mid-term Timeframe 2018-2020:**
    + Conducted analysis to establish framework and assumptions for mid-term environment
    + Projected NAS capabilities and traffic projections
    + Identified mature state concept elements that may be applicable in the mid-term
    + Developed operational scenarios that investigated specific mid-term impacts on ATC/ATM operations
    + Derived initial set of operational requirements from scenario development and tabletop discussions with ATC and UAS SMEs
    + Vetted scenarios with ATC SMEs (other than working group SMEs) & other key stakeholders
    + Updated operational requirements based on scenario vetting sessions with ATC SMEs & other key stakeholders

Operations Concept
Development & Infrastructure - Accomplishments

Operational Integration Analysis

- Developed operational representation of operational changes to reduce potential risk when implementing mid-term enhancements / capabilities / initiatives
- Performed and documented operational integration analysis/vetting using scenarios for several phases of flight and the NSIP Alpha and Bravo segments. Was conducted with SMEs for En Route, TRACON, Oceanic and En Route Cruise Flight Operations. Analysis
- Illustrated mid-term capability interactions
- Identified key integration and interoperability risk areas (holes, gaps, opportunities)
- Developed potential mitigations for the identified potential risk
- Utilized this program methodology to establish a baseline for assessing future changes

National Special Activity Airspace Project (NSAAP)

- Developed NSAAP Strategic Plan and Multi-Year Project Plan once leadership of NSAAP was transitioned to AJV-7
- Conducted analysis of project artifacts at time of leadership change
- Initiated shortfall analyses and ConUse development, and maturation activities
- Identified requirements gaps between NSAAP and other ongoing activities
- Developed "As is" case and identified the shortfalls for ERAM-SAA Integration for ERAM Sector Enhancement
- Developed SAA-ATM Integration Shortfalls
- Provided SAMS-ERAM integration options/recommendations for ERAM Sector Enhancement
- Continued shortfall analysis and operational scenario development activities for other operational domains
- Identified new requirements for SAMS
- Briefed the National Customer Forum and RTCA Tactical Ops Committee on current and planned activities
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Enterprise Information Display and Delivery

- Identified AT information integration shortfalls and recommended mitigations
- Conducted Stakeholder meetings to review overall investment and future activities
- Developed budget and schedule estimates to prepare for a CRD RD for the emerging investment (Enterprise Information Display System)
- Finalized program Shortfalls Assessment Documentation
- Achieved CRD RD in 2014
- Drafted Updated ConOps and Final Shortfall Analysis Report
- Preparing numerous other artifacts to support this investment

Terminal Sequencing and Spacing

- Conducted the Terminal Sequencing & Spacing (TSS) Operational Integration Assessment (OIA) at the WJHTC, in partnership with NASA. This event, which involves en route and terminal NATCA controllers and Traffic Management Coordinators (TMC) using TSS and en route metering (along with Ground-Internal Management-Spacing), was designed to assess the interoperability of these capabilities in a high-fidelity environment. Informal feedback from the OIA has been very positive. Formal results are expected to be documented and made available this summer.

RTCA

- This program contributes to the FAA's support for the RTCA, a non-profit association that develops standards based on manufacturers, government, and aviation operator inputs. RTCA also recommends operational improvements to increase the efficiency of air transportation.
- Continued support and analysis of International standard and public/private collaboration

Operations Concept
Development & Infrastructure – FY16/17 Plans

Operational Integration Analysis

Objective: Continued examination of possible operational integration issues as emerging concepts evolve and new concepts are planned for the mid-term

Potential Activities: Scenario development/update/execution, mitigation recommendations (e.g. further research, requirements)

PBN Optimization

Objective: Expand the efficient use of PBN procedures in the NAS

Potential Activities: Concept engineering activities designed to mature a lateral path stretch capability that will enable PBN during metering operations; and identify enhancements to TSS to further enable PBN operations

Interval Management

Objective: Mature advanced interval management applications

Potential Activities: Concept validation through scenario development/execution, HITLs exercises, Part Tasks

Trajectory-Based Operations

Objective: Mature Trajectory-Based Operations (TBO) concept

Potential Activities: Leveraging previous trajectory-related pieces (PBN, IM, DataComm, system trajectory improvements, RTCA work), mature and evaluate the TBO ConOps

RTCA Support

Continued support of international standards and public/private collaboration

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Questions?

BACK UP

Operations Concept
Development & Infrastructure – FY15/16 Focus

Unmanned Aircraft Systems (UAS) Concept Maturation

Objective: Enable the future increased use of UASs in the NAS

Activities: Scenario development/execution, functional analysis, requirements development

Operational Integration Analysis

Objective: Identify possible operational integration issues amongst emerging concepts, and amongst emerging concepts and existing operational capabilities

Activities: Scenario development/execution, mitigation recommendations (e.g. further research, requirements)

Enterprise-Based Information Delivery and Dissemination

Objective: Create an enterprise-based perspective and delivery/dissemination platform for AT support information (existing information and new information planned to be available in the mid-term)

Activities: Shortfall analyses, conceptual solutions, requirements development

National Special Activity Airspace (SAA) Concept Maturation

Objective: Improve the scheduling and real-time use of SAA in the NAS

Activities: Concept validation, CONOPs revision, requirements development, requirements allocation

Interval Management Concept Exploration

Objective: Evaluate Interval management applications

Activities: Concept development, high-level CONOPs

RTCA Support

Continued support of international standards and public/private collaboration

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