REDAC / NAS Ops

Enterprise Concept Development

BLI Number: 1A11A

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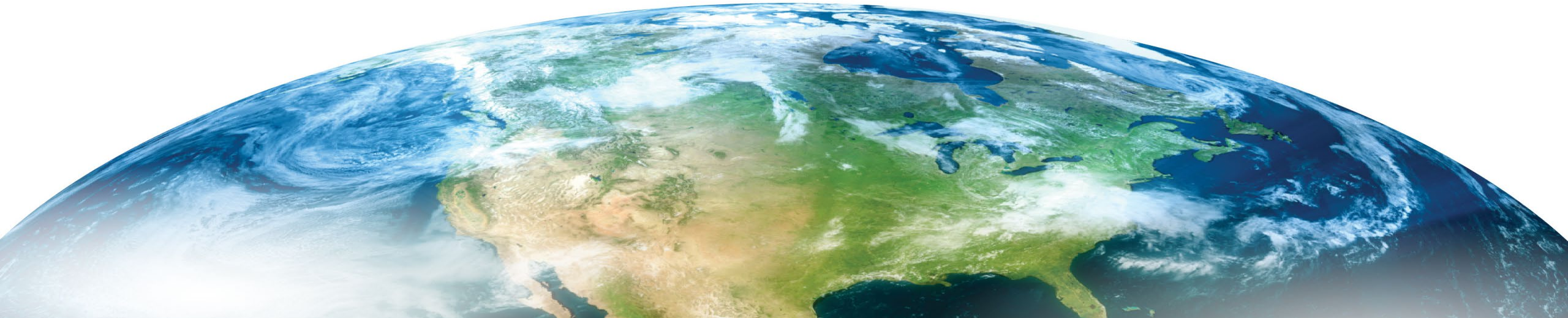
Review of FY 2020 - 2023 Proposed Portfolio



Enterprise Concept Development Overview

What are the benefits to the FAA

- The Enterprise Concept Development program is used to identify and assess early NextGen concepts and conduct validation activities (i.e., modeling and real-time simulations) that will transform the National Airspace System (NAS) into the Next Generation of the NAS. Areas of interest include, but are not limited to, trajectory-based coordination, the use of artificial intelligence in the NAS and the potential of unmanned aircraft systems for urban transportation. When appropriate, concept activities will be considered from a global perspective including ICAO requirements for global aircraft tracking and network communication.
- Validated operational concepts and feedback from stakeholders have led to advancements in research and pre-implementation work to determine the feasibility of advanced concepts and maximize benefits and flexibility for NAS users.
- This program executes research, engineering analysis, demonstrations and evaluations in support of service analysis and strategic planning.

What determines program success

- This program is necessary to assess the feasibility of proposed NextGen capabilities during the early phases of the Acquisition Management Systems lifecycle. The program develops and conducts studies that prove out NAS concepts to ensure feasibility and viability within the NAS.

Enterprise Concept – FY20 Accomplishments

Under Enterprise Concept Portfolio construct the following are some of the major accomplishments in FY20:

- Final NOTAM Stakeholder Analysis Concept of Operations (ConOps)
- NOTAM Software Package Scenarios
- ETM Tabletop Exercises Report
- ETM Scenarios & Use Cases Package
- ETM Final Concept of Operations (ConOps)
- UAM Initial Stakeholder Needs and Intended Use
- UAM Integrated Research Planning
- UAM Initial Concept of Operations

NextGen Notice to Airmen (NOTAM) Modernization

The objective of NOTAM Modernization is to provide flight critical information on a timely basis that is more current than other regularly scheduled publications can provide. NOTAM information may inform NAS users about a wide range of changing operational environmental factors including time critical delays, corrections or changes to previously published data concerning navigational aids, Airport Traffic Control Towers (ATCT) hours of service changes, surface or airspace changes in hours of operations, Remote Communications Outlet (RCO) status, weather reporting station availability, public airport openings and closings, Aircraft Rescue and Firefighting (ARFF) capability and restrictions, changes in runway characteristics or conditions, NAS lighting systems changes. The currency, availability, accessibility of NOTAMs is necessary for both the efficiency and safety of flight operations across the NAS.

Planned Research Activities

- Activities concluding in Q1FY21

Expected Research Products

- Software Package Technical Analysis
- Initial NOTAM Engineering Analysis

Class E Upper Airspace Management (ETM) Concept Development

The objective of the ETM project is to conduct research, analyze and develop concepts for future operations above FL600. While current Class E (upper airspace) regulations are predicated on traditional airspace usage, increasing commercial interests and the advent of new technologies present new challenges for the diversified operations within this airspace. ETM is an airspace management concept that describes a vision for future Class E (upper airspace) operations, encompassing a wide range of operational mission characteristics in this airspace; including geostationary, extreme velocity and long duration operations.

Planned Research Activities

- Phase 1 Activities have concluded in FY20 (see accomplishments)
- ETM Demonstration

Expected Research Products

- Concept & Use-Cases
- HALE cooperative separation
- Flexible Floor Environment

Requested Products

- ETM Concept of Operations: https://nari.arc.nasa.gov/sites/default/files/attachments/ETM_ConOps_V1.0.pdf

Urban Air Mobility (UAM) Concept Development

The objective of the UAM project is to develop a concept for immediate and flexible air transportation within a metropolitan area consisting of passenger-carrying operations. UAM enables unmanned vehicles with passengers to travel within an urban and metropolis environment at lower altitudes. UAM vehicles are assumed to require various degrees of autonomous operations to reach their full potential as the concepts are implemented and the market develops. The outcomes of this project will support the initial engineering and system prototype development effort for UAM, leading to future demonstrations to support concept maturity.

Planned Research Activities

- Activities for UAM Concept Development are concluding in Q2 FY21
- UAM Demonstration

Expected Research Products

- UAM Use Cases and Scenarios
- Final Concept of Operations

Requested Research Products

- UAM Concept of Operations: https://nari.arc.nasa.gov/sites/default/files/attachments/UAM_ConOps_v1.0.pdf

Trajectory Based Operations (TBO) Concept

The objective of the TBO work under Enterprise Concepts is to explore concepts for the Dynamic TBO timeframe, define concepts of user and/or operations for these elements of Dynamic TBO, and to develop operational scenarios associated with Dynamic TBO. The program plans to develop operational scenarios and vignettes that help put the 2035 Vision for Air Traffic Management Services in an operational context and use these to develop a Level I concept of operations that corresponds to the 2035 Vision.

Planned Research Activities

- Concept of Operations for ATM Services in 2035
- Complete development of initial requirements document for trajectory collaboration and NAS application

Expected Research Products

- Initial Concept of Operations for the TBO NAS in 2035
- Use-Cases and Scenarios

Anticipated Research in FY21

Artificial Intelligence (AI) for the NAS

The objective of the AI for the NAS project is to evaluate how various artificial intelligence methods can be leveraged to improve the management of the NAS. Potential applications in the aviation industry include leveraging artificial intelligence to support Air Traffic Control (ATC), General Aviation (GA) (i.e. flight following), and NOTAMs.

Planned Research Activities

- Planned start in FY21

Expected Research Products

- Draft scenarios and use cases for AI for the NAS

Anticipated Research in FY22

Planned Research Activities

- Preliminary AI for the NAS Scenarios, Use Cases, and Concept of Operations
- Planned Research activities will be in support of Extensible Traffic Management (xTM) Engineering efforts

Emerging FY23 Focal Areas

- Plans to evaluate future concept activities to support integration of emerging technologies into the NAS

Backup Slides

1A11A – G05A.02-10 - Enterprise Concept Development – F&E

Research Requirement

This program will validate new concepts and generate information supporting the validity of identified capability shortfalls, future service needs, and capability requirements that will foster increased system capacity, efficiency, and throughput. Validated operational concepts will identify technical and operational requirements (including airspace, procedures, and automation requirements needed to realize the capacity gains.

Outputs/Outcomes

UAM Concept of Operations
Evaluation of AI applications to support ATM and NAS operations
TBO Concept of Operations for capabilities associated with incorporation operator and pilot preferences
Development of operational scenarios for Dynamic TBO

FY 2023 Planned Research

- Continued Planned research activities for Artificial Intelligence for the NAS
- Continued Planned research activities for Urban Air Mobility (UAM) Concept Development
- Continued Planned Concept work for Dynamic TBO

Out Year Funding Requirements

FY20	FY21	FY22	FY23	FY24
$1.5M	$1.5M	$1.5M	$1.5M	$1.5M