REDAC / NAS Ops

Enterprise Concept Development

BLI Number: 1A11A

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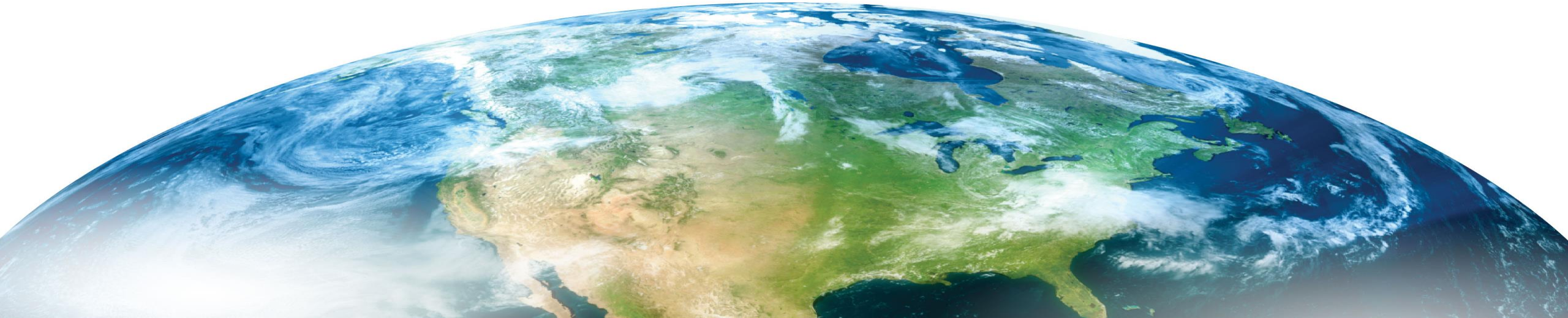
Date: August 31th, 2021

Review of FY 2021 - 2024 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 International Civil Aviation Organization (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 – FY21 Accomplishments

Under Enterprise Concept Portfolio construct the following are some of the major accomplishments in FY21:

- Urban Air Mobility (UAM) Initial Concept of Operations v1.0
- Established UAM Concept of Operations, UAM Use Cases and Scenarios Repository, and Reference Document
- Extensible Traffic Management (xTM) Framework Analysis Initial Principles and Assumptions Document

Trajectory Based Operations (TBO) Concept

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

- Planned activities will conclude in FY22 Q2
- 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 Dynamic TBO, Use-Cases, and Scenarios

Extensible Traffic Management (xTM) Framework Analysis

This project will investigate and analyze future Extensible Traffic Management (xTM) services that allow for new entrant operations and technologies to co-exist with conventional Air Traffic Services (ATS), by the sharing of fully integrated and interoperable digital information. It will address the operations of select new entrants within dynamically segregated airspace. The project's operational analysis and engineering activities will focus on the initial development of an xTM framework that will extend traffic management services to new entrants (1) beyond those currently provided by Air Traffic Control & Traffic Flow Management (2) that leverage Internet and wireless technologies to provide full connectivity; and (3) that are scalable and can be offered to new emerging markets.

Planned Research Activities

- xTM Analysis & Framework Development
- Perform validation exercises with xTM Subject Matter Experts

Expected Research Products

- Initial xTM Framework Analysis Document
- UTM/ETM/UAM/ATM Tabletop Exercise Report
- xTM Operational View Document
- xTM Framework Document

Anticipated Research in FY23

Planned Research Activities

- Develop detail operational scenarios for the seamless integration of xTM in the 2030-2035 timeframe
- Planned Research activities will be in support of Extensible Traffic Management (xTM) Engineering Efforts

Emerging FY24 Focal Areas

- Plans to evaluate future concept activities to support integration of emerging technologies into the NAS, 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.
- Concept activities will be considered from a global perspective including International Civil Aviation Organization requirements for global aircraft tracking and network communication.

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

- Finalized UAM Concept of Operations
- TBO Concept of Operations for capabilities associated with incorporation of operator and pilot preferences
- xTM Analysis & Framework Development

FY 2024 Planned Research

- Continued Planned research activities for Artificial Intelligence for the NAS
- Evaluation of AI applications to support ATM and NAS operations
- Continued Planned Concept work for Dynamic TBO
- Update the Vision 2035 2.0 CONOPs

Out Year Funding Requirements

FY21	FY22	FY23	FY24	FY25	FY26
$1.5M	$1.5M	$1.5M	$1.5M	$1.5M	$1.5M

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 and will be transitioning to the UAS portfolio
- Final UAM Concept of Operations v1.0 (see accomplishments)
- UAM Use Cases and Scenarios Repository and Reference Document (see accomplishments)

Expected Research Products

- UAM Demonstration

Requested Research Products

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

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
- ETM Demonstration

Expected Research Products

- 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

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