REDAC / NAS Ops

Review of FY 2022 Proposed Portfolio

New ATM Requirements

BLI Number: 1A07C

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New ATM Requirements
1A07C

What are the benefits to the FAA

- The New Air Traffic Management (ATM) Requirements program is needed to identify new opportunities to improve the efficiency and effectiveness of air traffic management operations
- Activities include the research and development of procedures, tools, and systems in support of operational improvements
- These developments support the NextGen goal of expanding capacity and improving the strategic management of operations in the NAS

What determines program success

- The service analysis and operational demonstration activities within this program support the development of operational improvements that will increase the number of arrivals and departures at major airports
- The results of these early development efforts will transition into future standards, tools, guidance, and applications necessary for safe and effective airspace operations

New ATM Requirements / 1A07C Overview Capabilities

People:

- Portfolio Manager: David G. Howard, ANG – C73
- Project Managers
- Subject Matter Experts (air traffic control specialists, meteorologists, information management and communications specialists)

Laboratories:

- Boeing Avionics Lab
- Honeywell IPS Labs
- Rockwell Collins Labs
- NASA Glenn Labs (communications standards development and validation work)
- NextGen Integration and Evaluation Capability (NIEC)
- Embry Riddle Florida Test Bed (FTB)

New ATM Requirements

FY20 Accomplishments

- Completed trajectory synchronization simulation plan and continued prototype development.
- Completed analysis of current NEMS architecture resulting in recommendations for upgrading NEMS enabling SWIM to support NAS efficiency critical service data distribution threads
- Assessed the technical feasibility of a data distribution platform surrounding the Connected Aircraft concept
- Assessed the impact of discontinuing the text AIRMET and only disseminating the Graphical AIRMET currently produced in BUFR digital format

Weather Transition

This activity ensures that aviation weather research concepts are matured and technically developed under FAA guidelines to a level of readiness for operational use in the NAS. This includes Concept Maturity and Technology Development based work in support of the Research for Service Analysis and Service Analysis AMS lifecycle phases. The matured capabilities developed will support future weather information enabled decision support for the NAS.

Planned Research Activities

- FY20 Conduct studies to determine current weather information that requires modernization and transition as well as identifying emerging weather requirements associated with several future FAA programs
- FY21 - Create, test and evaluate ceiling and visibility information support prototypes and conduct operational demonstrations to display pre-service functionality.
- FY22 - Conduct studies surrounding the operational usage of convective weather information support capabilities, determine the performance level of current weather products and develop report.

Expected Research Products

- Matured capabilities to support future weather information-enabled decision support for the NAS.

Advanced Air/Ground Communications

In collaboration with international partners, this activity will support the development of advanced communication technologies such as the Aeronautical Telecommunications Network (ATN) Internet Protocol Suite (IPS) standards for operational usage. This activity will result in the development and validation of Standards for Future Communications Infrastructure technologies. These advanced communications technologies will help to alleviate spectrum congestion issues and enable the achievement of more stringent NextGen performance requirements needed for future applications.

Planned Research Activities

- FY21 - Complete report documenting requirements for a Software Defined Radio to support multi-modal operation
- FY22 - Complete a report on the findings of investigating further usage of Software Defined Radios to support Multi-modal operations in the NAS environment.

Expected Research Products

- Development and validation of Standards for Future Communications Infrastructure technologies.

Command and Control in the Cloud

This program evaluates the current information sharing infrastructure by focusing on the application of cloud infrastructures to provide for future NextGen needs. NextGen has started investigation of cloud solutions for its National Airspace System (NAS) operational systems. As a result, the Enterprise Services Infrastructure Framework (ESIF) was developed to support the allocation of NAS functional capabilities to infrastructure with a specific focus on cloud infrastructure. With ESIF providing this cloud- analysis framework, NextGen has started an analysis of ERAM in the Cloud, as a next step towards bringing these NAS operational systems into a cloud environment.

Planned Research Activities

- FY21 - Develop prototype command and control instance in the cloud for a selected demonstrator system.
- FY22 - Prepare and deliver a technology transfer package for Command and Control in the Cloud technologies.

Expected Research Products

- Evaluation of and recommendations for cloud architecture to provide command and control services in the future.

Next Generation Automation Input Devices

This activity will support the definition of requirements and concept development for an enterprise solution to next generation input devices for automation systems in the NAS.

Planned Research Activities

- FY21 - Identify gaps in current input device capabilities for automation systems in the NAS and complete report.
- FY22 - Identify and evaluate candidate technologies suitable for an enterprise solution for automation systems in the NAS and develop transition strategy..

Expected Research Products

- Recommendations for next generation input devices for automation systems in the NAS.

IP Based Command and Control Data Links

This activity will conduct engineering and analysis to support the potential use of internet-based data exchange for command and control applications.

Planned Research Activities

- FY21 - Complete initial analysis of performance, security requirements, and risk management analysis to support the potential use of internet-based data exchange for command and control applications
- FY22 – Complete final analysis of performance, security requirements, and risk management analysis to support the potential use of internet-based data exchange for command and control applications

Expected Research Products

- Establish framework to potentially enable internet-based exchange of command and control information

Artificial Intelligence for Air Traffic Management

Conducts engineering and analysis to support the potential use of Artificial Intelligence (AI) to support controllers in functions including aircraft separation.

Planned Research Activities

- FY22 – Identify areas for potential use of AI in support of controller functions and ATC (Air Traffic Control) automation
- FY23 – Conduct safety risk management and analyze requirements for the potential use of AI in support of controller functions

Expected Research Products

- Determine assess capabilities and controller functions that may be enhanced by the use of artificial intelligence

Emerging FY22 Focal Areas

- **Artificial Intelligence for Air Traffic Management**
  - Conducts engineering and analysis to support the potential use of Artificial Intelligence (AI) to support controllers in functions including aircraft separation.

New ATM Requirements

Research Requirement

The New ATM Requirements program is needed to identify new opportunities to improve the efficiency and effectiveness of air traffic management operations. Activities include the research and development of procedures, tools, and systems in support of operational improvements.

Outputs/Outcomes

- Advanced communications technologies for data exchange between air and ground systems.
- Transition strategy and technology transfer package for Command and Control in the Cloud technologies.
- Enterprise solution to next generation input devices for automation systems in the NAS.
- Establish framework to enable internet-based exchange of command and control information
- Analysis in the potential use of AI to support controller functions

FY 2022 Planned Research

- Conduct studies surrounding the operational usage of convective weather information support capabilities and determine the performance level of current weather products
- Investigate further usage of Software Defined Radios to support multi-modal operations in the NAS environment.
- Conduct high level assessment for candidate technologies suitable for an enterprise solution for NAS automation systems' next generation of input devices
- Complete analysis of performance and security requirements and conduct risk management analysis to support the potential use of internet-based data exchange for command and control applications

Out Year Funding Requirements

FY20	FY21	FY22	FY23
$6.0	$7.5	$7.0	$7.0