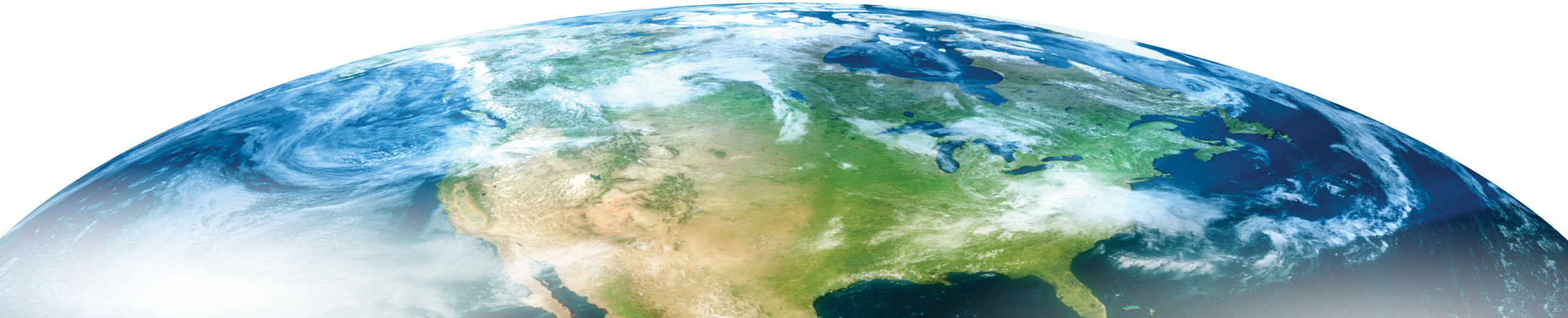
NextGen Portfolio Overview



What is a NextGen Portfolio?

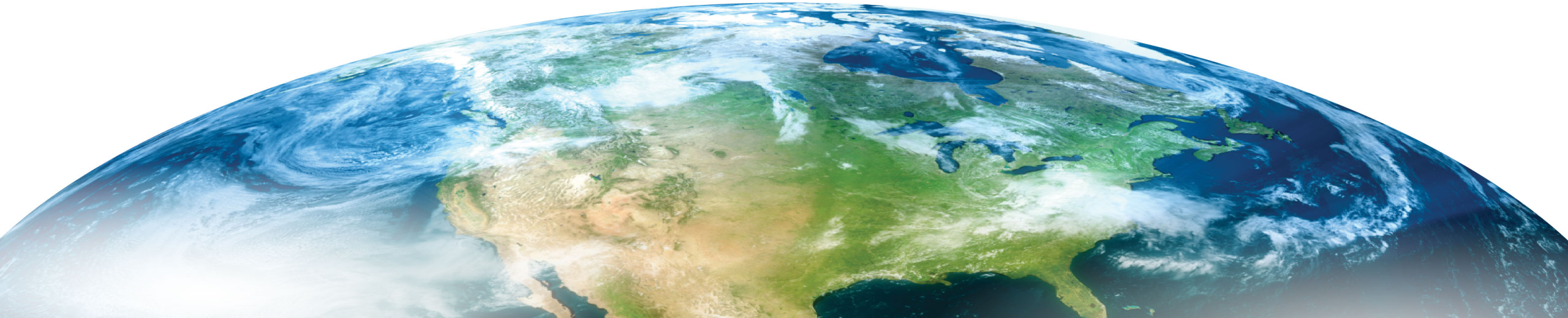
- The FAA NextGen Office uses a portfolio approach to assess, develop, and implement new capabilities and to understand the linkage to overarching supporting activities, including safety and infrastructure.

- A NextGen Portfolio could be considered a “Pre-Implementation” program where requirements are identified and capabilities are developed prior to reaching the Program Office for implementation.

Portfolio	Overview
Traffic Flow Management	The TFM portfolio was created in order to most effectively manage the evolution of Traffic Flow Management under one portfolio. Under the TFM portfolio, the 3T's are consolidated and provide an effective means of tracking progress in a unified manner.
Separation Management	Separation Management Portfolio focuses on the enhancement of aircraft separation assurance. The Separation Management portfolio conducts pre-implementation activities to reduce risk, and implementation activities supporting the safe and efficient separation of aircraft and other vehicles in the National Airspace System (NAS).
Performance Based Navigation	Improvements in aircraft navigation performance provide an opportunity to increase procedure efficiency and flexibility. The Performance Based Navigation (PBN) portfolio addresses ways to leverage emerging technologies and procedures to improve access and flexibility for point-to-point operations.
Improved Multiple Runway Operations	Improved Multiple Runway Operations (IMRO) activities support improved access to multiple runways to enable more arrival and departure operations. Closely Spaced Parallel Runway Operations (CSPO) will develop and refine procedures that enable operations for closely spaced parallel runways spaced less than 4300 feet laterally. Improving runway access will increase efficiency and capacity while reducing delays.
Commercial Space	NextGen Commercial Space activities include programs focused on the integration of space launch data into the NAS. With the advent of Commercial Spacecraft, the number of spacecraft launched is anticipated to increase. The current method of handling spacecraft launches is inadequate to handle this increase, thus new methods must be explored to integrate space operations into the NAS. These efforts will explore and develop concepts for this integration.
Unmanned Aircraft Systems	UAS operations have increased dramatically in both the public and civil sectors. Air Traffic products, policies, and procedures must be reviewed and refined, or developed through supporting concept maturation, to permit UAS operations in the NAS.
NAS Infrastructure	The NAS Infrastructure (NI) Portfolio contains key transformational and infrastructure sustainment capabilities that are critical to the success of NextGen. The NI portfolio contains capabilities that fall into the following infrastructure categories: Communications, Information Management, and Weather. This portfolio also includes technical refresh of infrastructure that is not directly rooted in Operational Improvements (OIs).
On Demand NAS Information	The On Demand NAS Information (ODNI) portfolio conducts pre-implementation work to reduce risk in supporting the secure exchange of information both within the FAA and with other National Air Space (NAS) users.
Environment & Energy	The E&E Portfolio provides capabilities to characterize and assess environmental risk, develops solutions to mitigate environmental constraints, and manages NextGen environmental performance.
System Safety Management	The SSM Portfolio aims to develop and implement the analytical tools, processes and policies that the FAA and industry will use to ensure safety. SSM will define the evolving role of analysis for improving safety in the current and future NAS.

NextGEN

Traffic Flow Management



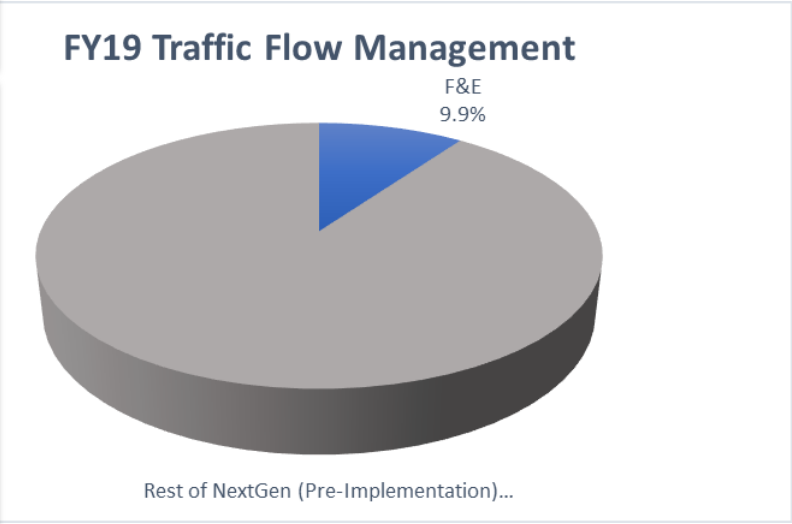
TFM Portfolio Executive Summary

Portfolio Summary

The TFM portfolio was created in order to most effectively manage the evolution of Traffic Flow Management under one portfolio. Under the TFM portfolio, the 3T's are consolidated and provide an effective means of tracking progress in a unified manner.

Major Efforts

- ❖ Managing the implementation and pre-implementation efforts for TFMS including the influence of the TFMS Action Plan on future enhancements.
- ❖ System development efforts for the first roll out of TSAS.
- ❖ Maturation of capabilities for TBFM Enhancement 2. (e.g. Path Stretch, TSAS and IDAC Expansion, TBFM Planning Tool)
- ❖ Collaborating with NASA to ensure successful transition of their research to NAS Operational use (ATD-1, -2, -3, ATM-X).



Milestones

- ❑ TBFM E2 IARD – Q2 2019
- ❑ TSAS Key Site IOC – Q4 2020
- ❑ TFDM Key Site IOC – Q1 2020

Challenges/Shortfalls

- ❖ TFMS Sustainment need and Enhancement 5 delay
- ❖ TSAS site expansion
- ❖ TFDM/ATD-2 Schedule integration

The evolution of TFM capabilities is a key part to achieving the vision for Full TBO.

CURRENT TFM EFFORTS

Pre-Implementation

$14,000,000

Programs

- Advanced Methods
  - Early research: speech recognition, AI applications
- SFMA
  - Future TFMS enhancement concept development
  - TFMS Cloud Analysis
- SFMEE
  - CRD and IA work for future TFMS enhancements
- TBFM Enhancement 2
  - Path Stretch, TBFM planning tool, TSAS and IDAC site expansion
- Surface Tactical Flow (STF)
  - Supporting ATD-2 research transition
  - Mobile applications research

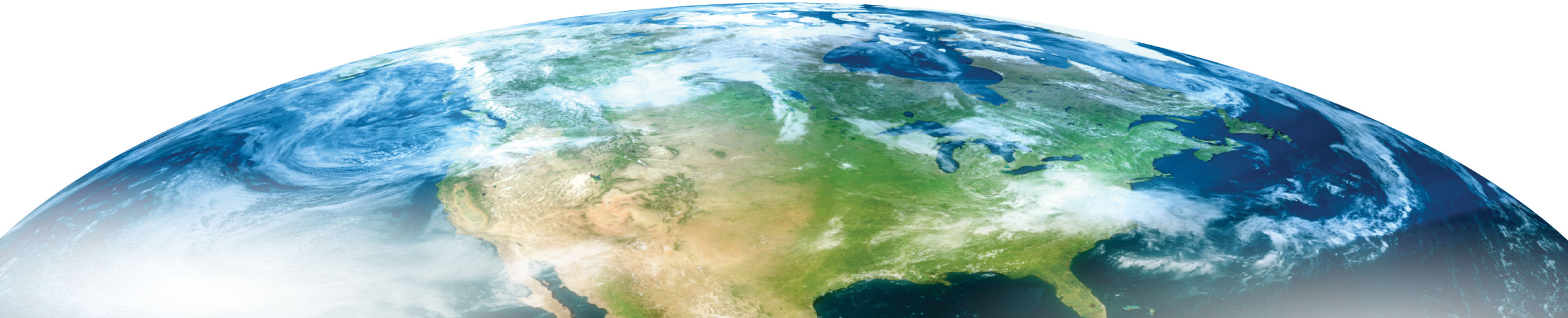
Implementation

$164,500,000

Programs

- TFMS Enhancement 4
  - Integrated Departure Route Planner, Improved Demand Predictions, Transition to CSS-Wx Weather Data
- TBFM Enhancement 1
  - Terminal Sequencing and Spacing initial rollout, Integrated Departure Arrival Capability site expansion
- TBFM Sustainment 1
  - Hardware and software refresh to support future enhancements
- TFDM
  - Development and full waterfall of new surface system

Separation Management



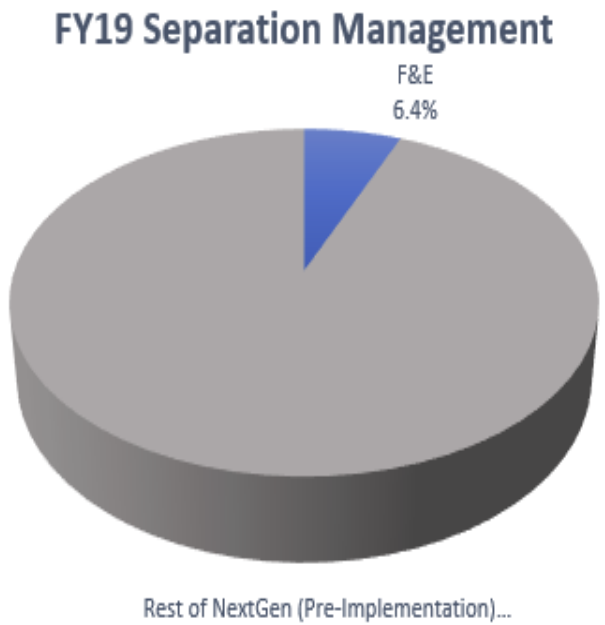
SepMan Portfolio Executive Summary

Portfolio Summary

NextGen Separation Management Portfolio focuses on the enhancement of aircraft separation assurance. The Separation Management portfolio conducts pre-implementation activities to reduce risk, and implementation activities supporting the safe and efficient separation of aircraft and other vehicles in the National Airspace System (NAS).

Major Efforts

- ❖ Developing the Flight-deck based Interval Management (FIM) Minimum Operational Performance Standards (MOPS) version 2
- ❖ SASE project is conducting pre-implementation work towards ERAM Enhancement 3 IARD
- ❖ ATOP WP1 has a scheduled FID in April 2019
- ❖ Wake Research conducts new aircraft wake separation recommendations and collects data and analyzes wake behavior
- ❖ Continued research into dynamic wake separations



Milestones

- ✓ ATOP FID – 4/2019
- ❑ ASEPS Yearly Strategy Meeting – 4/2019
- ❑ ADS-B Advanced IM – Tentative JRC strategy 5/2019

Challenges/Shortfalls

- ❖ ATO/ANG Wake ReCat alignment
- ❖ Prioritization of ERAM capabilities

SepMan matures automation enhancements to maximize ATC's ability to maintain efficient operations in a TBO NAS

CURRENT SEPMAN EFFORTS

RE&D Programs

$6,800,000

Programs

- RE&D Wake Turbulence
  - Mid and Far term Wake Concepts

Pre-Implementation Programs

$9,000,000

Programs

- ADS-B In Applications: Flight Interval Management (FIM/A-IM) Planning
  - MOPS v2
- Separation Automation System Engineering (SASE)
  - ERAM Enhancements 3 Pre-Implementation
  - SASE Global Information Services (GIS)

Implementation Programs

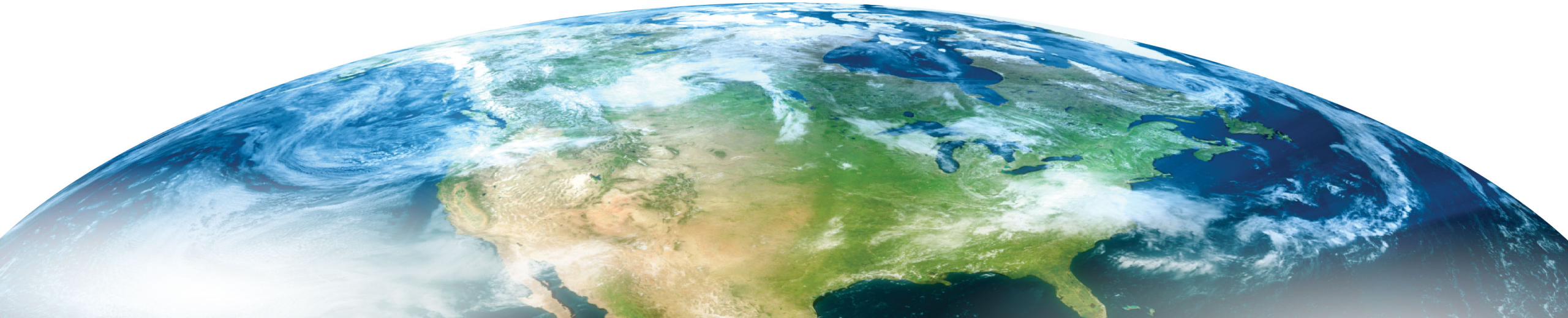
$123,900,000

Programs

- ERAM Enhancement 2
  - Trajectory Modeling and Conflict Probe Enhancements
- ERAM Sustainment 2 – Tech Refresh
- ERAM Sustainment 3 - Tech Refresh
- Advanced Surveillance Enhanced Procedural Separation (ASEPS)
  - Space Based ADS-B

NextGEN

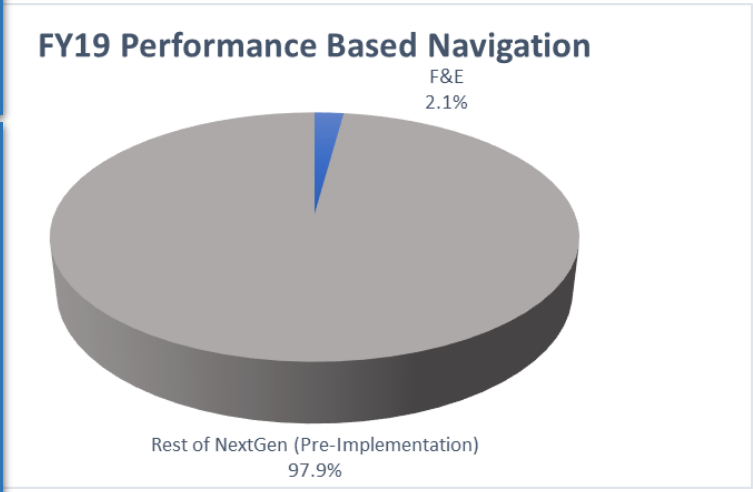
Performance Based Navigation



PBN Portfolio Executive Summary

Portfolio Summary

Improvements in aircraft navigation performance provide an opportunity to increase procedure efficiency and flexibility. The Performance Based Navigation (PBN) portfolio addresses ways to leverage emerging technologies and procedures to improve access and flexibility for point-to-point operations.



Major Efforts

- NextGen DME infrastructure deployment to enable navigation resiliency
- Changes made to Controller Handbook FAA JO 7110.65 for simultaneous operations
  - 5-9-7 Independent Duals and Triples
  - 5-9-10 Independent Widely-Spaced Duals
- Multiple Airport Route Separation (MARS) – Part of NAC Northeast Corridor (NEC) Project
- Metroplex will help address the major operational issues facing today's busy metropolitan areas

Milestones

- 2020: Denver & Las Vegas Metroplex Implementation
- 2021: South/Central Florida Metroplex Implementation
- 2021: Complete En Route DME coverage

Challenges/Shortfalls

- Prioritization of concepts for the INDP project
- Completion of all Metroplex sites and Phases

PBN provides precise and repeatable procedures that allow for improved air traffic management strategic planning initiatives in a TBO NAS.

CURRENT PBN EFFORTS

Pre-Implementation:

Concept Development for Integrated NAS Design and Procedure Planning (INDP)

$3,000,000

- **PBN Initiatives: Established on RNP, Advanced RNP, Multiple Airport Route Separation (MARS)**

Implementation:

Metroplex

$15,000,000

- **Airspace redesign**

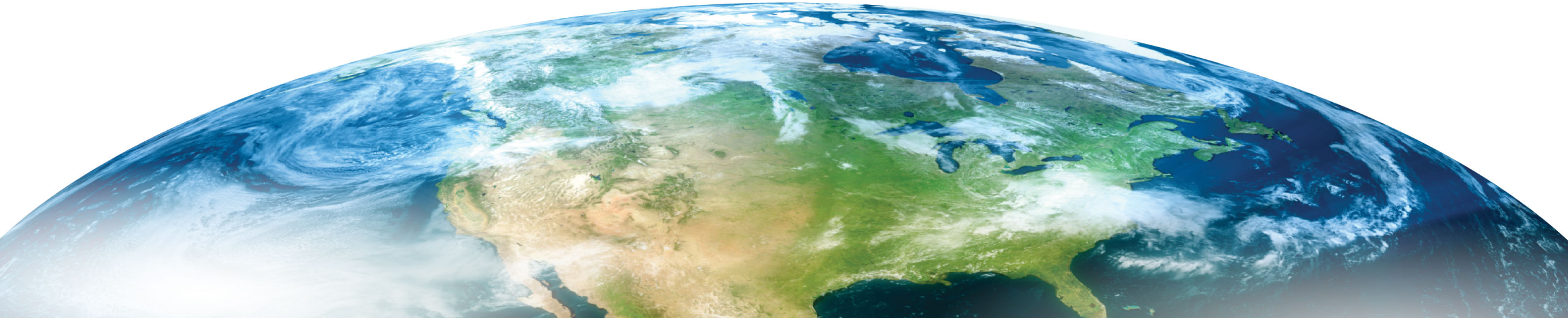
Implementation:

NextGen DME

$5,000,000

- **PBN resiliency infrastructure**

Improved Multiple Runway Operations



SepMan Portfolio Executive Summary

IMRO Activities

Portfolio Summary

Improved Multiple Runway Operations (IMRO) activities support improved access to multiple runways to enable more arrival and departure operations. Closely Spaced Parallel Runway Operations (CSPO) will develop and refine procedures that enable operations for closely spaced parallel runways spaced less than 4300 feet laterally. Improving runway access will increase efficiency and capacity while reducing delays.

Major Efforts

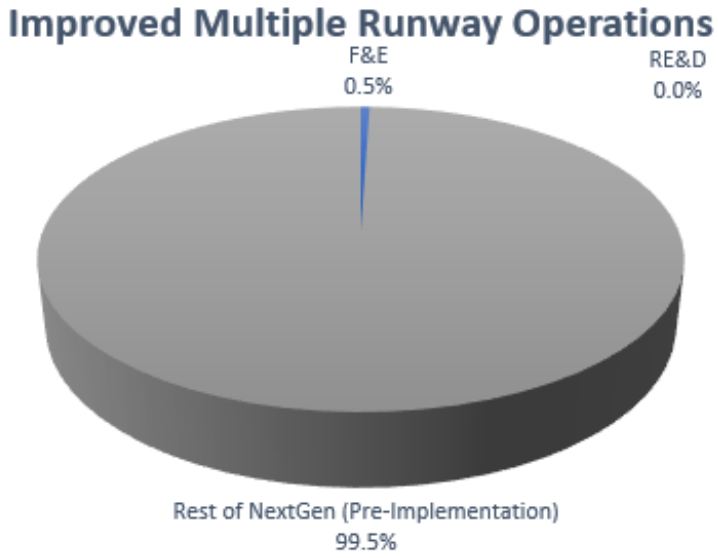
- ❖ Safety Study of Dependent Staggered and Independent Reduced Divergence Departures
- ❖ Safety Analysis and Benefits Assessment for Reduction of MRS on Final Approach
- ❖ CSPO activities will result in Amendments to the FAAO JO 7110.65

Milestones

- ✓ Implement independent runway standards at SDF, PHX, CVG, MEM. 2017
- ✓ Implement triple independent parallel operations at ATL and IAD - 2017
- ❑ Publication of Document Change Proposal (DCP) of new standards for CSPO Departures - 2021

Challenges/Shortfalls

- ❖ N/A



CURRENT IMRO EFFORTS

Pre-Implementation

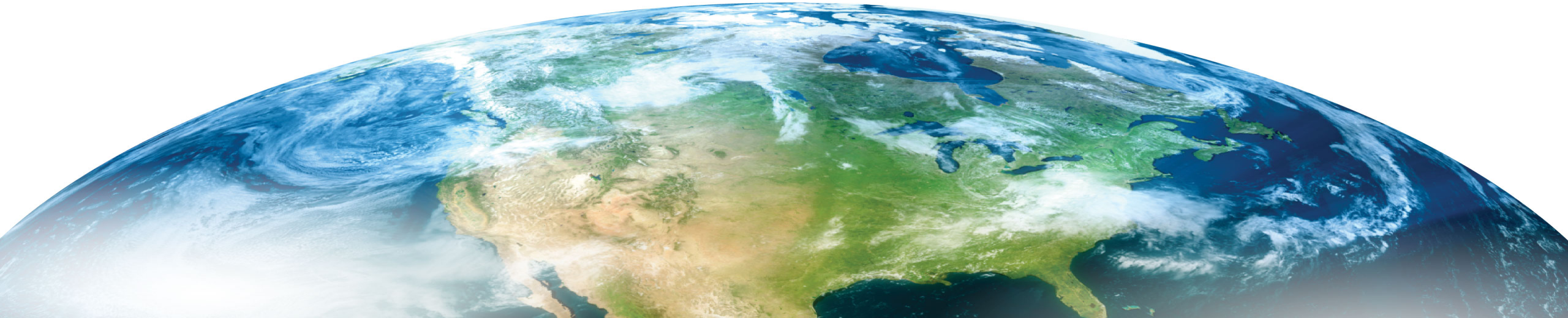
$1,000,000

Programs

- Closely Spaced Parallel Runway Operations
  - Development of new procedures to increase peak throughput performance at airports with parallel runways spaced less than 4300 feet laterally and integrated arrivals/departures
  - Amend FAAO JO 7110.65

NextGEN

Commercial Space



Separation Management Portfolio Executive Summary

Commercial Space Activities

Portfolio Summary

NextGen Commercial Space activities include programs focused on the integration of space launch data into the NAS. With the advent of Commercial Spacecraft, the number of spacecraft launched is anticipated to increase. The current method of handling spacecraft launches is inadequate to handle this increase, thus new methods must be explored to integrate space operations into the NAS. These efforts will explore and develop concepts for this integration.

Major Efforts

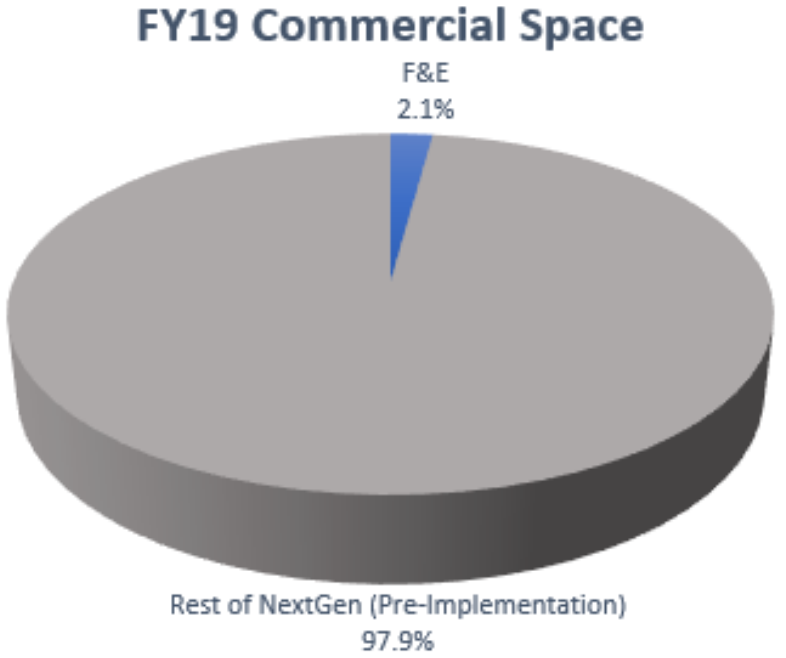
- ANG-C5 collaborating with SpaceX on a joint, planned failure demo to inform future SIC solutions
- AJV-7 is developing IARD artifacts for Space Integration Capabilities (SIC)
- Space Data Integrator (SDI) working to identify a Minimum Viable Product (MVP) to address short-term space integration shortfalls at the Command Center

Milestones

- ✓ Briefed the Executive Pathfinder Group (EPG) on the scope of Space Integration Capabilities (SIC) – March 2019
- ✓ SDI JRC Strategy – April 2019
- ❑ SpaceX Demo – Tentatively June 2019
- ❑ SIC IARD – Q4 2019

Challenges/Shortfalls

- Synchronizing space integration throughout the different automation platforms
- Requires the collaboration of many internal stakeholders
- Coordination with SDI development and prototype efforts
- Planning for implementation funding for SIC



CURRENT Commercial Space EFFORTS

Pre-Implementation

$3,000,000

Programs

- Space Integration Capabilities (SIC)
  - Integrating airspace constraints derived from commercial space operations with ATC automation
  - Display space launch constraints on ATC automation

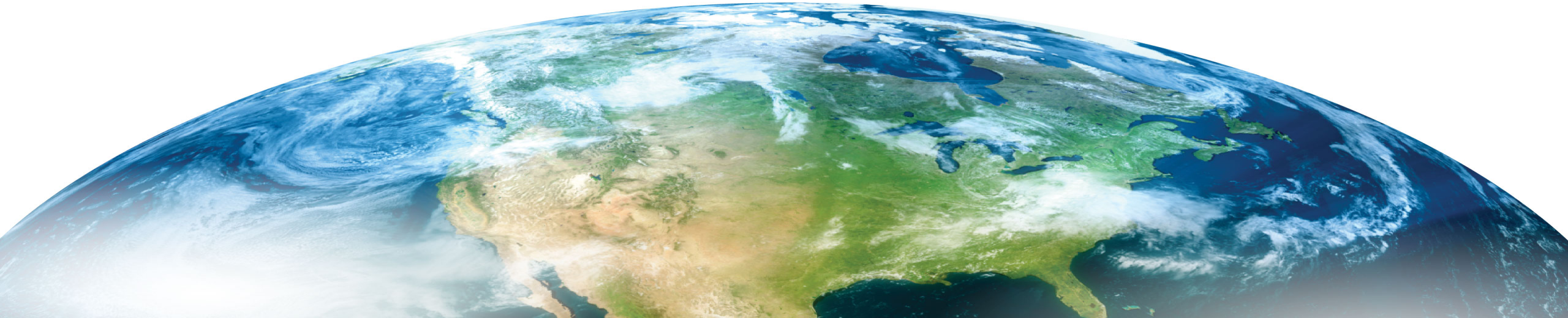
Implementation

$9,000,000

Programs

- Space Data Integrator (SDI) Prototype Sustainment - (M-CIP)
  - Demonstrates the display of real-time vehicle information and telemetry data for the Joint Space Operations Group (JSpOG) at the Command Center
- Space Data Integrator (SDI) - (M-CIP)
  - Acquisition replacement and enhancement to SDI Prototype
  - Automation of data exchange between systems that currently require manual data entry at the JSpOG

Unmanned Aircraft Systems (UAS)



New Entrants-UAS Portfolio Executive Summary

Portfolio Summary

UAS operations have increased dramatically in both the public and civil sectors. Air Traffic products, policies, and procedures must be reviewed and refined, or developed through supporting concept maturation, to permit UAS operations in the NAS.

Major Efforts

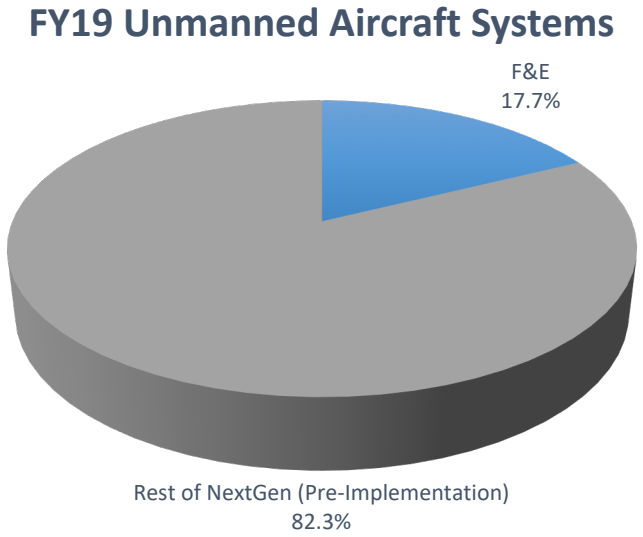
- ❖ Expand LAANC to enable Part 107 authorizations at 100% of FAA Facilities and Surface Area E airports that have UAS facility maps, October, 2018.
- ❖ UAS Traffic Management
- ❖ Section 349
- ❖ Remote ID (RID)

Milestones

- ✓ Remote ID RFI use cases completed and submitted to Chief Scientist
- ✓ Concept & Use Case Package #3 for UTM RTT in final updates
- ❑ UAS Enhancements 1 Package CRDRD planned for FY20

Challenges/Shortfalls

- ❖ Governance process for UAS needs to be managed amongst Intra-agency stakeholders
- ❖ Difficult to plan for and adapt to new requirements with F&E



CURRENT UAS EFFORTS

Pre-Implementation
$25,000,000

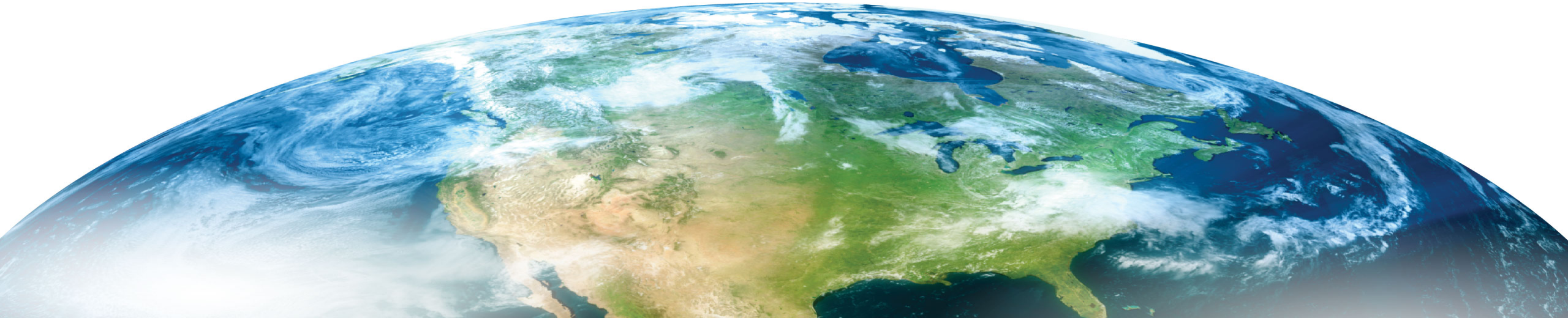
- **UAS FIMS-**This program develops Policy & Rulemaking, UTM data exchange requirements, and information architecture.
- **UAS Concept Validation & Requirements Development-** This program examines, and develops concepts and requirements to integrate UAS into the NAS.

Implementation
$0

The following Implementation programs will not be receiving funding until FY2020.

- **Small UAS Implementation-** This program will implement UTM capabilities such as Low Altitude Authorization & Notification Capability (LAANC) and Remote ID
- **FAA Drone Zone –**This program will support future requirements, new regulations and continuous improvements for sUAS releases.

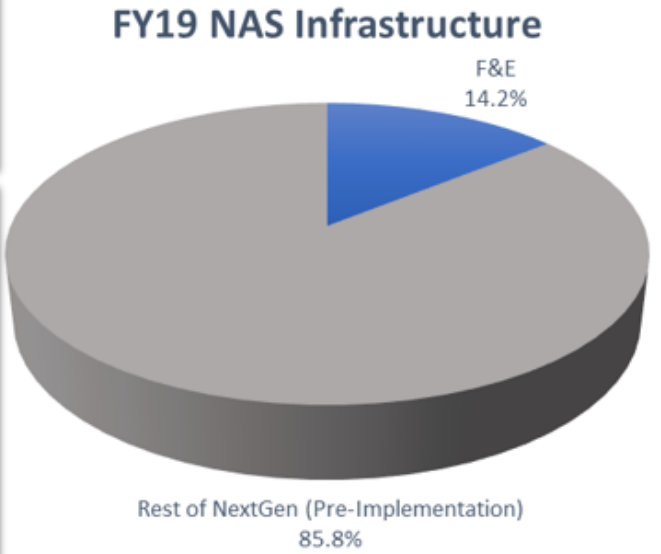
NAS Infrastructure (NI)



NAS Infrastructure Portfolio Executive Summary

Portfolio Summary

- The NAS Infrastructure (NI) Portfolio contains key transformational and infrastructure sustainment capabilities that are critical to the success of NextGen. The NI portfolio contains capabilities that fall into the following infrastructure categories: Communications, Information Management, and Weather. This portfolio also includes technical refresh of infrastructure that is not directly rooted in Operational Improvements (OIs).



Major Efforts

- The Data Comm Program provides data communications services between pilots and air traffic controllers enabling pilots and controllers to exchange text like messages to supplement existing voice communications.
- Common Support Services for Weather (CSS-Wx) will establish an aviation weather publishing capability for the NAS enabling universal access and the standardization of weather information for dissemination to users by System Wide Information Management (SWIM).
- The NextGen Weather Processor (NWP) program will establish a common weather processing platform that will functionally replace the legacy FAA weather processor systems and host new capabilities.

Milestones

- ✓ NextGen DME FID – 2017
- ❑ CSS-Wx/NWP E1 IARD – Q1 2020
- ❑ SWIM S3 CRDRD – Q3 2020

Challenges/Shortfalls

- NVS Demo and Qualification line zeroed out
- Furlough Delay and Contract Award for WOI – Potential risk for tech transfer to ASWON Sustainment 2
- APB Milestones for CSS-Wx/NWP at risk

CURRENT NAS INFRASTRUCTURE EFFORTS

RE&D Programs
$3,640,000

Programs

- RE&D Weather Technology in the Cockpit (WITC) – *Minimum weather service recommendations*

Pre-Implementation Programs
$20,000,000

Programs

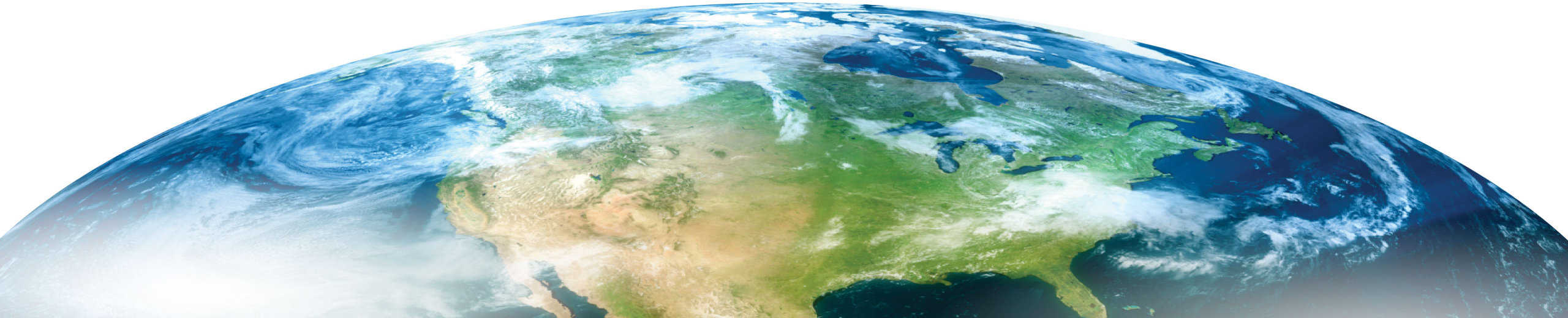
- Information Management (IM) - *(SWIM S3 requirements development)*
- Weather Forecast Improvements (WFI) - *(International, integration, enhancements to CSS-Wx/NWP)*
- Weather Observation Improvements (Wx Obs) - *(PWS implementation into ASWON)*
- NextGen Navigation Engineering (NNE) – *Required navigation capabilities analysis for Class E airspace and emerging tech*
- New ATM Requirements
  - Enterprise Services Infrastructure - Cloud (ESI Cloud) – *Cloud supported ERAM*
  - Air/Ground Trajectory Synchronization (A/G Sync) – *Conduct a simulation of the AGTS concept between two ground decision support systems*
  - Air/Ground SWIM (Connected Aircraft) – *Safety Critical data exchange over IP*
  - Commercial Off-the-Shelf Common Displays (COTS) – *Gather requirements for currently deployed TFMS displays*

Implementation Programs
$163,600,000

Programs

- Data Comm *(Initial Services, Full Services, ATN Gateway)*
- Common Support Services – Weather (CSS-Wx)
- NextGen Weather Processor (NWP)

On Demand NAS Information (ODNI)



ODNI Portfolio Executive Summary

Portfolio Summary

The On Demand NAS Information (ODNI) portfolio conducts pre-implementation work to reduce risk in supporting the secure exchange of information both within the FAA and with other National Air Space (NAS) users.

Major Efforts

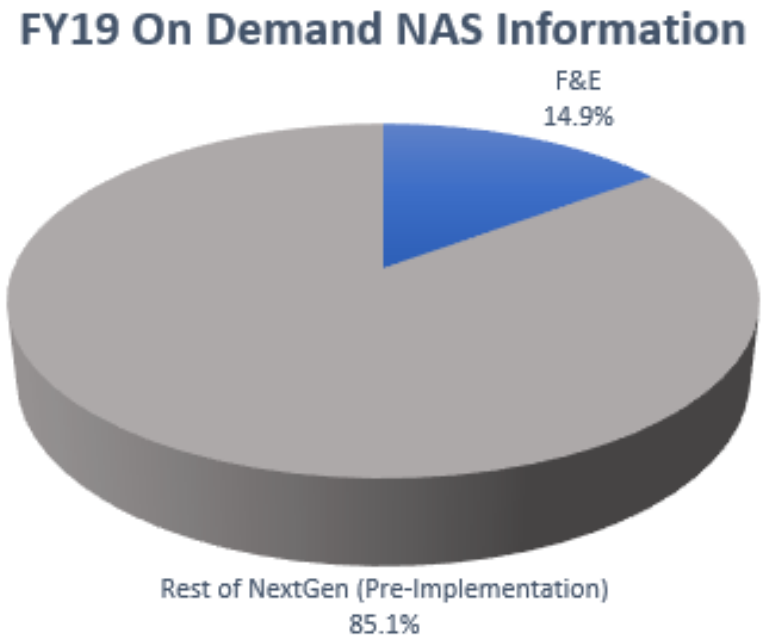
- ❖ Initial Investment Activities – CSS-FD, ACAT: 2NI
- ❖ Final Investment Activities – AIMM E1, ACAT: 4SE | SWIM S2C, ACAT: 4TR

Milestones

- ✓ Achieved IARD for AIMM E1 – January 2018
- ✓ Achieved IARD for CSS-FD – June 2018
- ❑ SWIM S2C FID Q3 2019
- ❑ AIMM E1 FID Q2 2020
- ❑ SWIM S3 CRDRD Q3 2020
- ❑ CSS-FD FID Q4 2021

Challenges/Shortfalls

- ❖ CSS-FD funding alignment
- ❖ Dynamic Airspace primary communication infrastructure (NVS alternative)



ODNI provides the information sharing backbone that supports Trajectory Based Operations (TBO)

ODNI Portfolio Focus Areas

RE&D
$2,200,000

Programs

- RE&D Information Security – *Self adaptive systems and networks to maintain cybersecurity in the Mission Support domain*
- RE&D Flight Deck Data Exchange Requirements – *Security and performance requirements development for all data exchange with the flight deck*

Pre-Implementation
$21,000,000

Programs

- Common Status & Structure Data (CSSD) – *Machine to machine data exchange*
  - AIXM – *Standardized format for exchange of aeronautical information*
  - Information Services – *Development of guidance to implement current and future aeronautical information services*
- Flight Object – *Defines the mechanisms for capturing and sharing the most up-to-date information on any flight in a FIXM format*
- Common Support Services-Flight Data (CSS-FD) – *Flight planning & filing, flight data sharing, centralization of flight information*
- Flight Deck Collaborative Decision Making (FD CDM) – *Flight deck application for information sharing on the surface*
- Dynamic Airspace – *Sector reallocation in support of contingency operations/outages*
- Enterprise Information Management (EIM) – *Localization of Mission Support information management in a cloud environment*

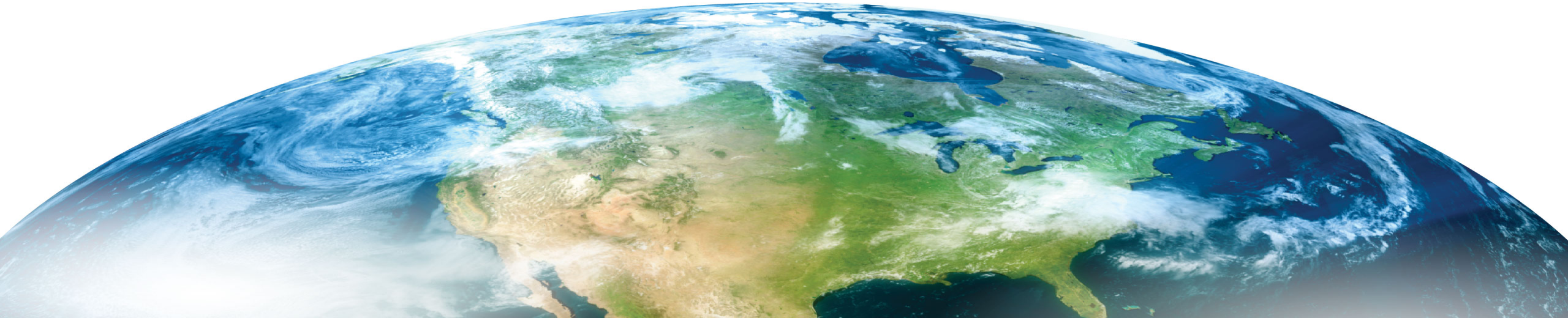
Implementation
$43,200,000

Programs

- System Wide Information Management (SWIM) Segment 2B – *Standard Terminal Data Distribution Service (STDDS) Phase 2, NAS Common Reference (NCR), etc.*
- SWIM Segment 2C – *NAS Enterprise Messaging Service (NEMS) tech refresh and infrastructure upgrades to support CSS-Wx/NWP*
- AIMM Enhancement 1 – *Digital airspace constraints from SOPs/LOAs, real-time SAA status, standardized access of aeronautical information for NAS automation systems*

NextGEN

Environment & Energy (E&E)



Environment & Energy Portfolio Executive Summary

Portfolio Summary

The E&E Portfolio provides capabilities to characterize and assess environmental risk, develops solutions to mitigate environmental constraints, and manages NextGen environmental performance.

Major Efforts

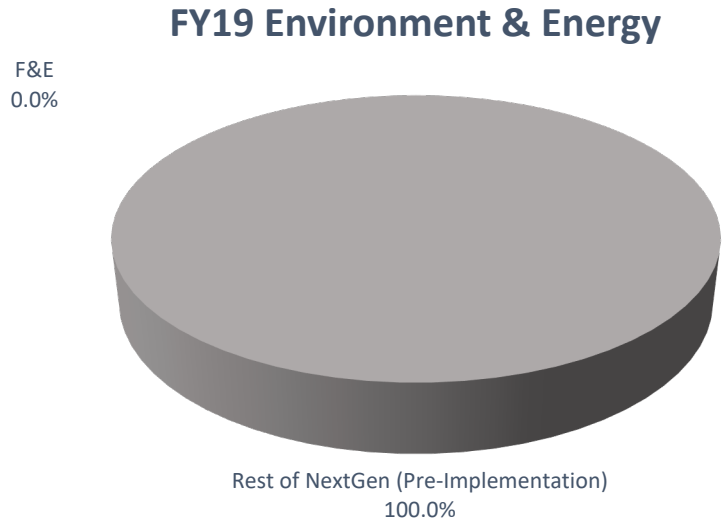
- Accelerate development and commercial deployment of environmentally promising aircraft technologies and sustainable alternative fuels (CLEEN)
  - Mature aircraft technologies that reduce fuel burn, emissions and noise
  - Evaluate environmental/economic sustainability and potential benefits of alternative jet fuels
- Working with GA and EPA to evaluate safety, environmental impact, and performance of alternatives to conventional GA fuel

Milestones

- ✓ CLEEN II TRL Milestone – Boeing Structurally Efficient Wing
- ❑ CLEEN II TRL Milestone – GE Flight Management System/Engine Integration
- ❑ Test material and safety clearance for the resumption of Jet Fuels flight testing

Challenges/Shortfalls

- Out year funding profile uncertainty for RE&D E&E



RE&D funding only

CURRENT E&E EFFORTS

RE&D PROGRAMS

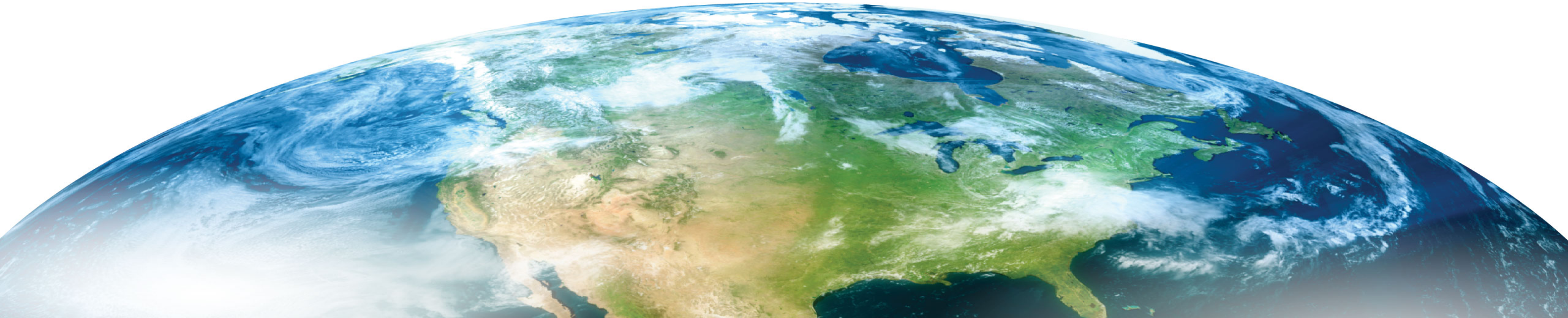
$29,174,000

Programs

- **RE&D – Environmental Research – Aircraft Technologies, Fuels, and Metrics**
  - Mature NextGen aircraft technologies via Year 5 of the Continuous Lower Energy, Emissions and Noise II (CLEEN II Technologies) Program
  - Mature sustainable alternative jet fuels (Phase II Year 5)
  - Demonstrate and assess benefits of NextGen aircraft technologies (Year 5)
- **Alternative Fuels for General Aviation***
  - Restart Testing after mitigating issues with materials incompatibility, maldistribution, engine operability

*Alternative Fuels for GA: This is work from FY17 and FY18

System Safety Management



System Safety Management Portfolio Executive Summary

Portfolio Summary

The SSM Portfolio aims to develop and implement the analytical tools, processes and policies that the FAA and industry will use to ensure safety. SSM will define the evolving role of analysis for improving safety in the current and future NAS.

Major Efforts

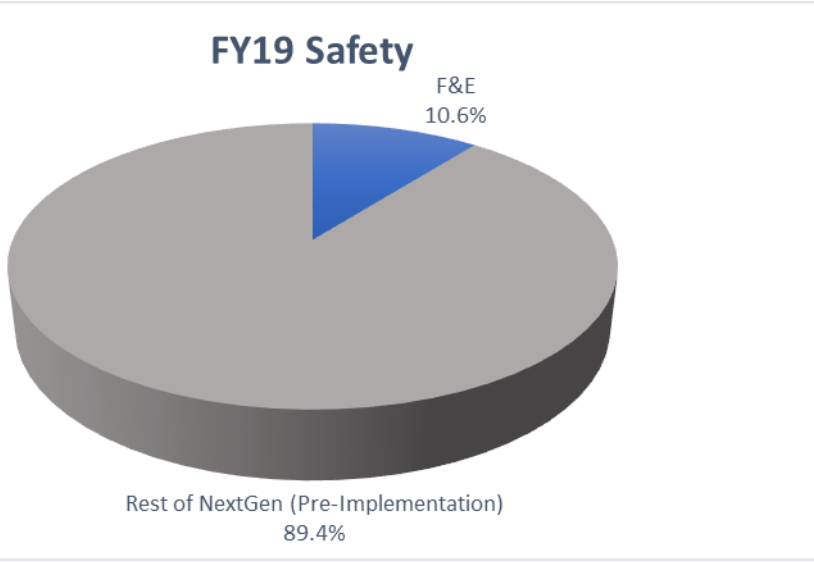
- ❖ Aviation Safety Information Analysis and Sharing (ASIAS) - Government/industry initiative to share and analyze data to proactively discover system safety concerns before accidents or incidents occur
- ❖ System Safety Management Transformation (SSMT) - Models and tools to collect data, identify risk, and support risk mitigation evaluation

Milestones

- ✓ SSMT deployment (ASAIC 2.0) FY18
- ❑ SSMT deployment (ISAM 6.0, ASIAC 3.0, SITAR 3.0, WVSS 2.0) FY21 (TOM application denied / being appealed)
- ❑ ASIAS 2.0/Data-fusion analytics – Planned deployment FY21
- ❑ ASIAS 3.0 – FID CY2020/Q1

Challenges/Shortfalls

- ❖ Consistent funding to support growing volumes of ASIAS data/participants/analyses
- ❖ Stable and sufficient funding for SSMT if budget is reduced



CURRENT SSM EFFORTS

Pre-Implementation Programs

$14,200,000

Programs

- **Safety, Security, Environment - Aviation Safety Information Analysis and Sharing (ASIAS)**
  - Continue to provide a national resource for discovering common and systemic safety problems that span multiple airlines, fleets, and regions of the global air transportation system
- **System Safety Management Transformation (SSMT)***
  - Continue to develop capabilities to baseline, monitor, and forecast risk assessments within the air transportation system

*SSMT: Did not receive funding in FY19, they continue to complete activities funded by the portfolio in FY18