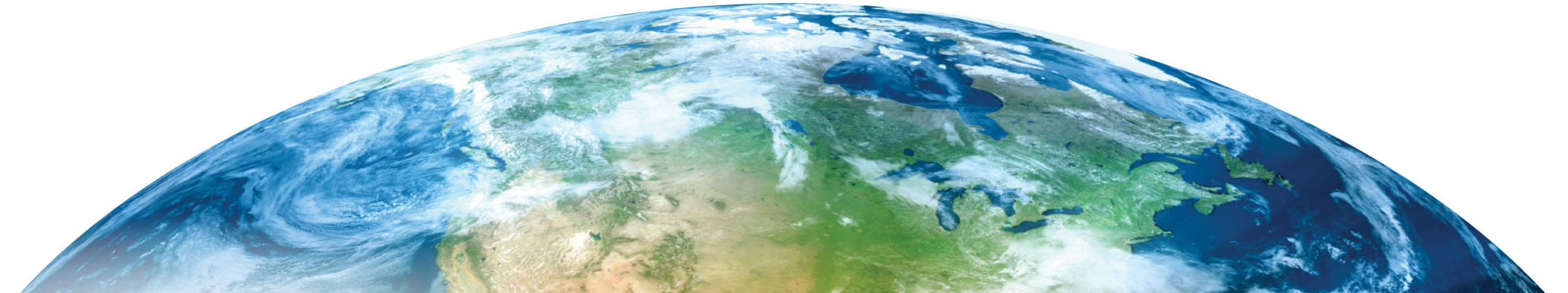
Enterprise Architecture (EA) Informational Briefing

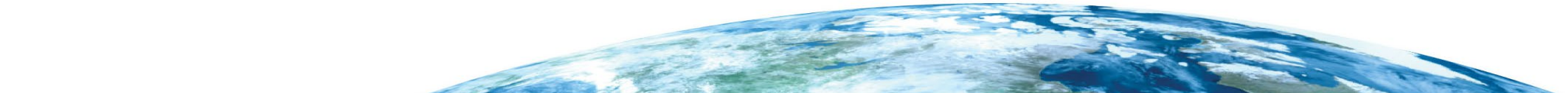
REDAC - NAS Operations Subcommittee Meeting

August 30, 2022



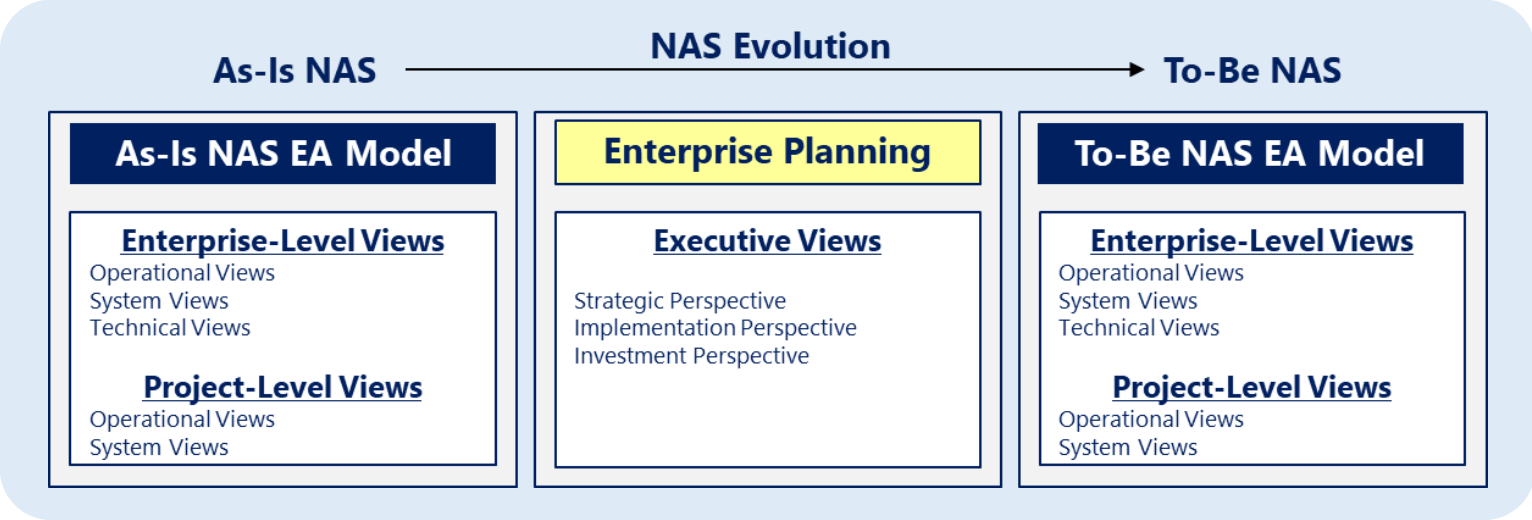
Agenda

- NAS EA Overview
  - NAS EA Defined
  - NAS EA Purpose
  - Enterprise-Level Planning
- Alignment and Traceability
- References
  - NAS Systems Engineering Portal
  - Points of Contact



NAS EA Defined

- The NAS EA is a set of models and views that **documents the NAS in the current state**, the **desired future state**, and the **transition strategy** between the two



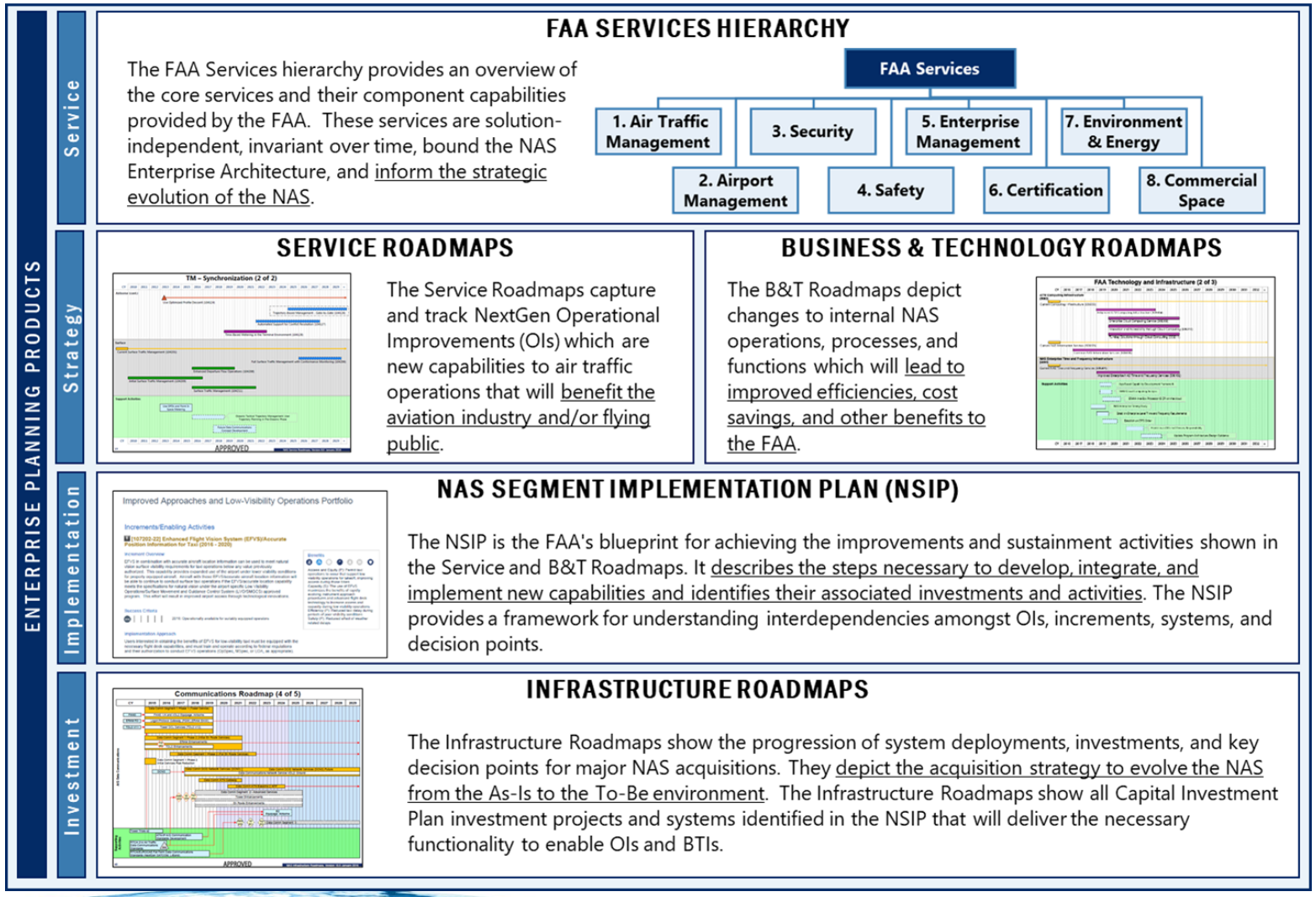
- The EA includes a series of roadmaps and implementation plans that communicate strategic improvements to the NAS over time, and the supporting research, operational concept development, and capital investment activities that enable them
- The NAS EA is updated annually, with the next Update Cycle scheduled to kickoff September 12, 2022

NAS EA Purpose

Sets target state of the NAS and tracks progress against that future vision	Evolves with Agency strategies in response to changing priorities, emerging technologies, and future concepts
Provides Systems Engineering guidance to FAA investments traversing the AMS	Provides guidance, input, and oversight of project-level architectures to ensure alignment with Agency strategies
Informs and supports the FAA investment decisions boards (JRC, CIT)	Provides data and analysis to support investment board decisions
Complies with Federal Enterprise Architecture (FEA) mandates	FEA is mandated by a series of Federal laws

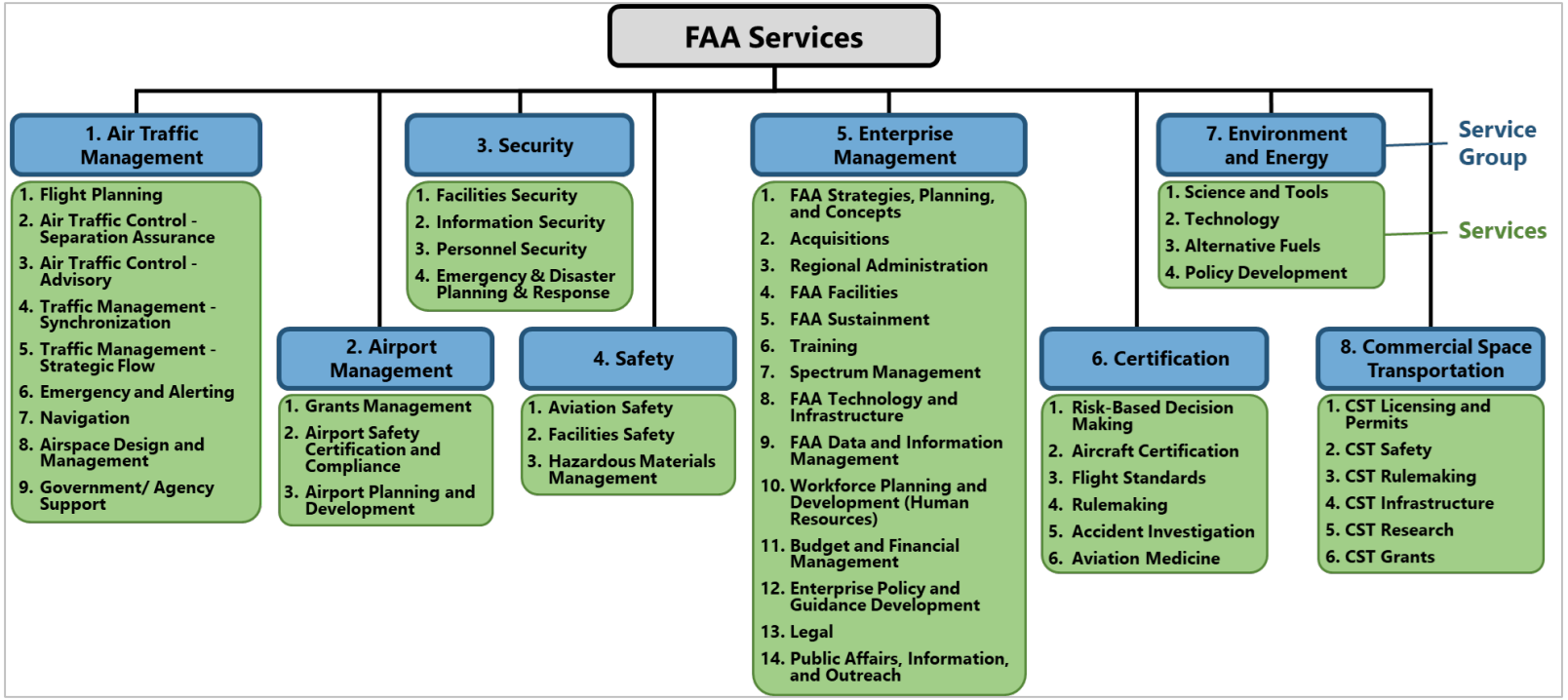
Enterprise-Level Planning

- The NAS EA provides enterprise-level planning products to show the transition strategy for the future state of the NAS
- These are structured in a hierarchy consisting of four layers
  - **Service**
  - **Strategy**
  - **Implementation**
  - **Investment**



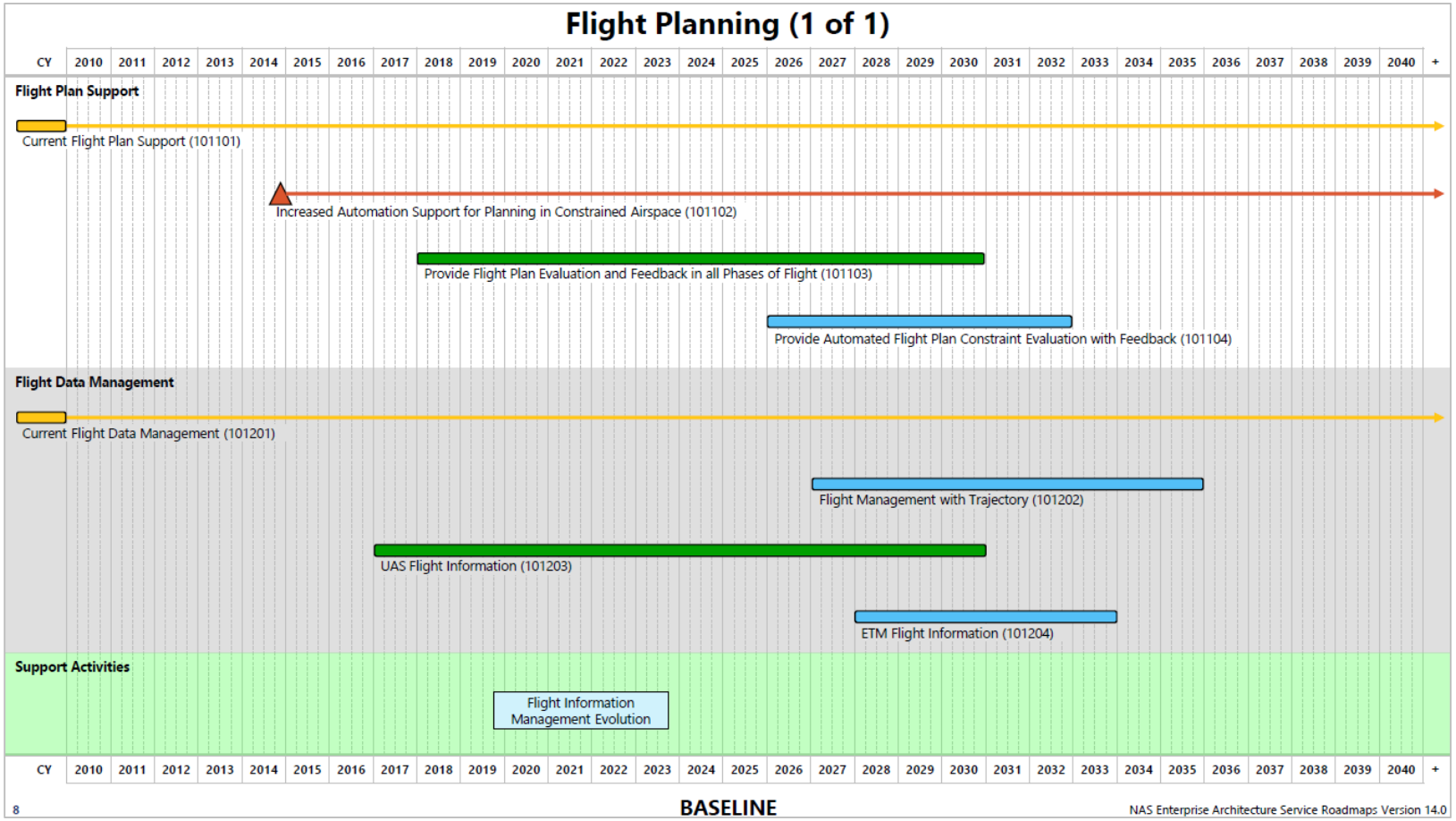
FAA Services Hierarchy

- FAA Services are the **processes and capabilities the agency provides** – both internally and externally – **to satisfy mission needs**
- FAA Services (in green) are organized by FAA Service Groups (in blue). Each FAA Service is broken down into Service Capabilities (not shown), which are the foundations for:
  - Operational Improvements
  - Business & Technology Improvements



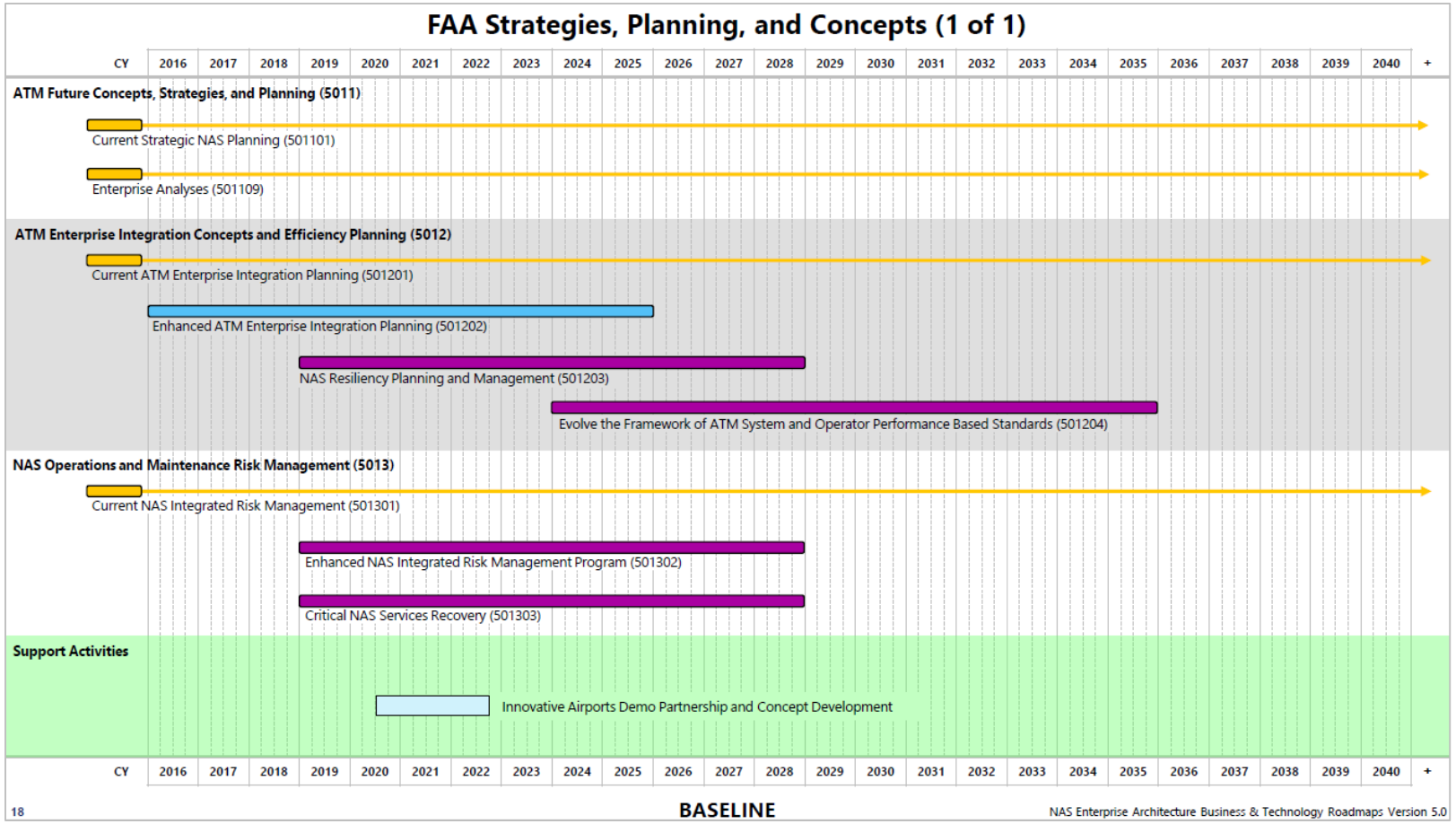
Service Roadmaps

- The Service Roadmaps depict the availability timeframes of **operational capabilities** that benefit the aviation community
- They also include relevant Support Activities which are generally **research and operational concept development** activities that support the identification and evolution of new capabilities



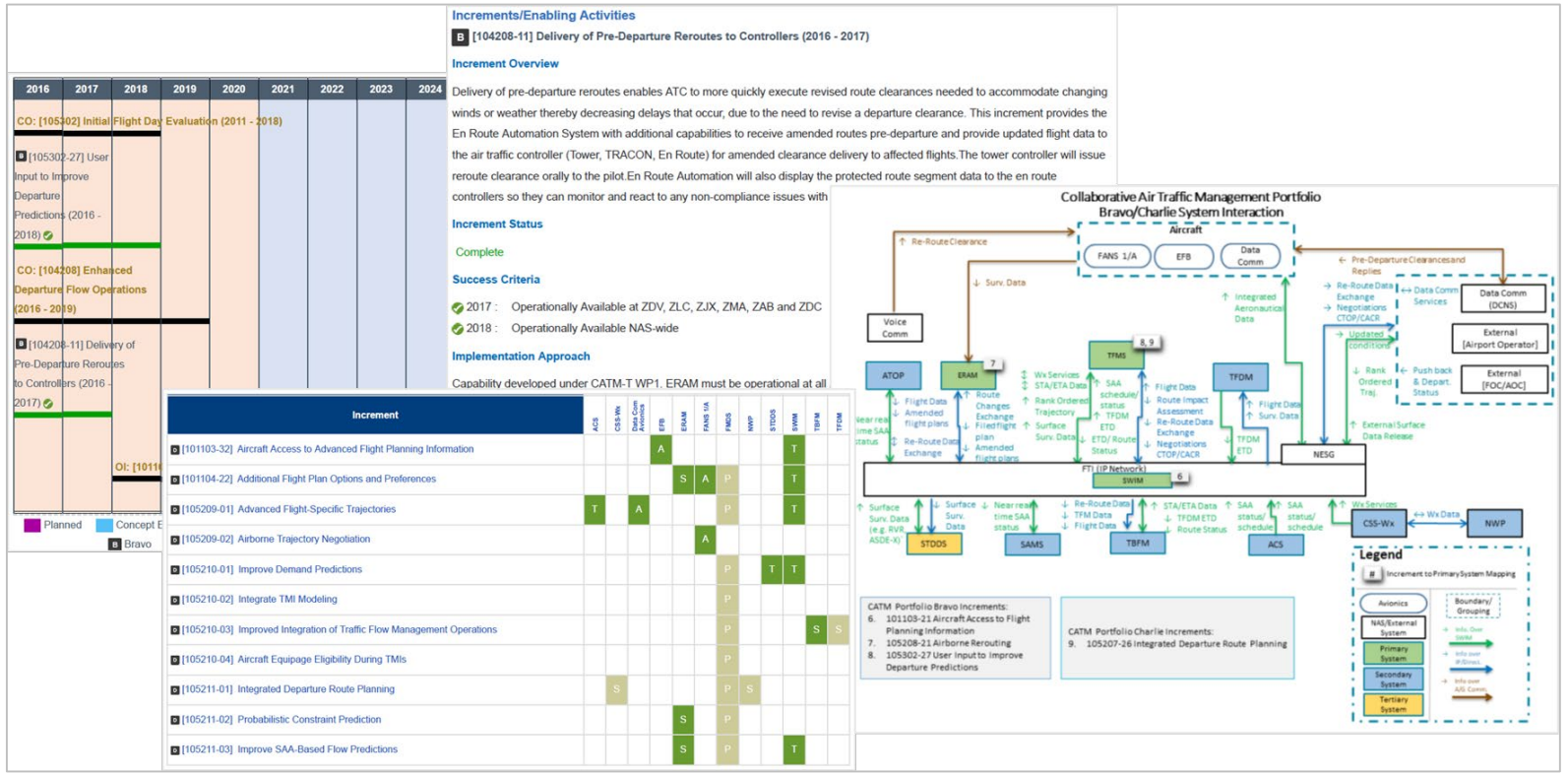
Business & Technology (B&T) Roadmaps

- The B&T Roadmaps depict the availability timeframes of **changes to business processes and functions** that benefit the FAA
- They also include relevant Support Activities which are generally **research and technical development** activities that support the identification and evolution of new capabilities

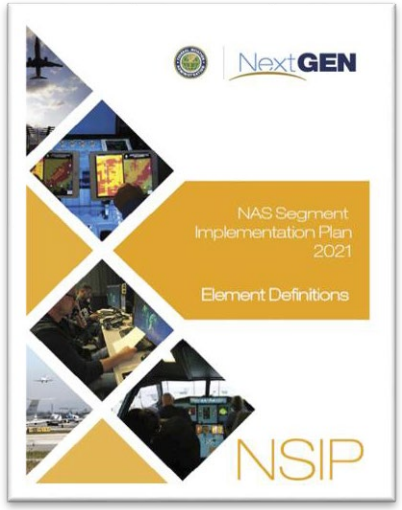


NAS Segment Implementation Plan (NSIP)

- The NSIP is the FAA's blueprint for achieving goals of NextGen and the Info-Centric NAS
- Provides the bridge between strategy and investment
- Decomposes the operational improvements tracked on the Service Roadmaps and **identifies implementation strategies and required systems**

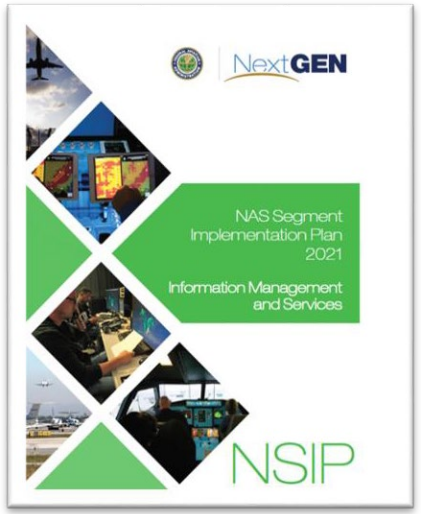


NSIP Appendices



Element Definitions

The NSIP Element Definitions document provides definitions for the various components of the NSIP; Portfolios, OI and Increment elements (e.g., Benefits, Status, Success Criteria, Segment, etc.)



Information Management and Services

The NSIP Information Management and Services document is an annex to the overarching NSIP. It focuses on the NextGen information management and services associated with current and future NextGen capabilities. This document also describes the improved information management standards and interoperability across various applications.

TBO Implementation Plan

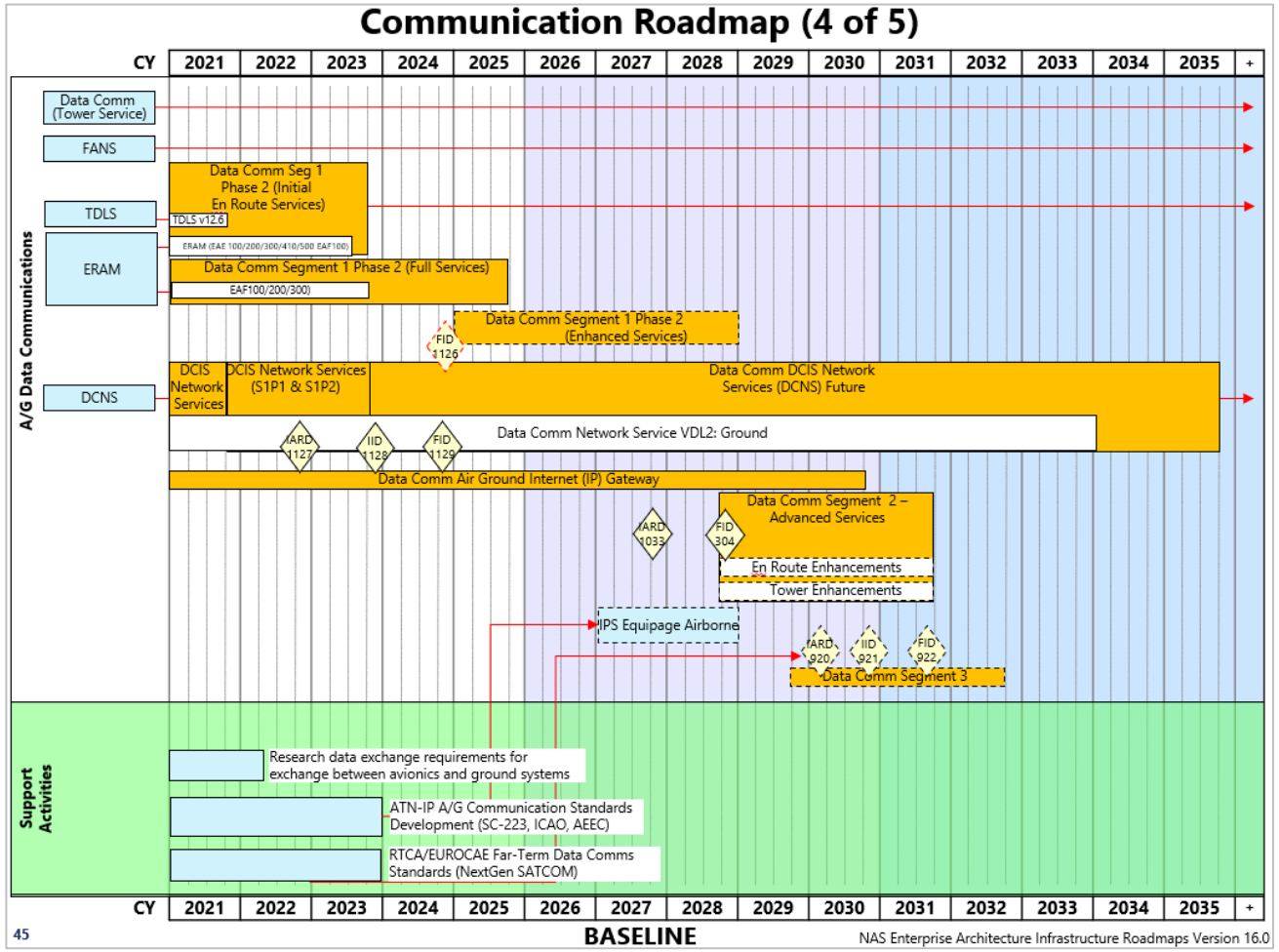
As the FAA moves forward in delivering TBO, it is important to establish a common understanding of the building blocks that must be assembled to achieve the operational change envisioned.
While the NSIP and its OIs and increments do this at detailed level, the Path to TBO has been developed to convey a higher-level view of the themes in which operational changes and the associated dependent technical capabilities are being developed and deployed.

Evolution towards an Info-Centric NAS (I-CN)

A high-level description of the future evolution of the NAS to complement the Charting Aviation's Future: Operations In An Info-Centric NAS vision document. This Appendix describes the ongoing, planned, and future improvement needs to reach the envisioned state.

Infrastructure Roadmaps

- The Infrastructure Roadmaps provide an overview of FAA **system deployment, sustainment, and investment schedule**
- Depicts the **F&E funding plan** for CIP projects and systems, and **AMS milestones** and solution-focused support activities



Support Activities

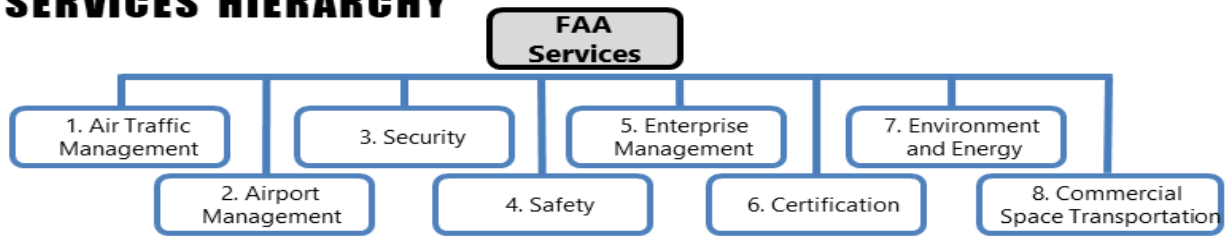
- A Support Activity is any **pre-implementation activity undertaken by the FAA or external partner to increase the likelihood of success of a primary activity on a roadmap**
  - Support Activities are undertaken to develop and validate operational concepts (Service and B&T Roadmaps) and technical solutions (Infrastructure and B&T Roadmaps)
- Support Activities are used to track research activities to show progress against future visions and strategies, such as I-CN

ENTERPRISE PLANNING PRODUCTS

SERVICE

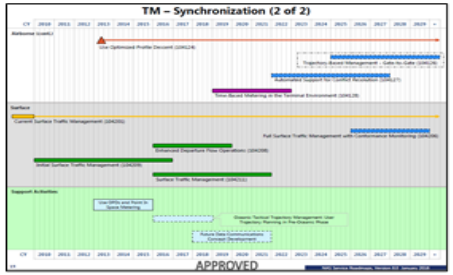
FAA SERVICES HIERARCHY

The FAA Services Hierarchy provides an overview of the core services and their component capabilities provided by the FAA. These services are solution-independent, invariant over time, bound the NAS Enterprise Architecture, and inform the strategic evolution of the NAS.



STRATEGY

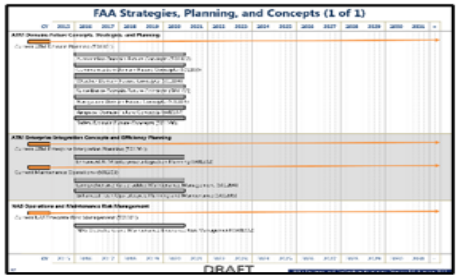
SERVICE ROADMAPS



The Service Roadmaps capture and track NextGen Operational Improvements (OIs) which are new capabilities to air traffic operations that will benefit the aviation industry and/or flying public.

BUSINESS & TECHNOLOGY ROADMAPS

The B&T Roadmaps depict changes to internal NAS operations, processes, and functions which will lead to improved efficiencies, cost savings, and other benefits to the FAA.

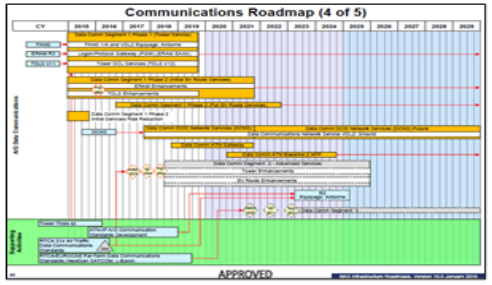


IMPLEMENTATION

NAS SEGMENT IMPLEMENTATION PLAN (NSIP)

The NSIP is the FAA's blueprint for achieving the improvements and sustainment activities shown in the Service and B&T Roadmaps. It describes the steps necessary to develop, integrate, and implement new capabilities and identifies their associated investments and activities. The NSIP provides a framework for understanding interdependencies amongst OIs, increments, systems, and decision points.

INVESTMENT



INFRASTRUCTURE ROADMAPS

The Infrastructure Roadmaps show the progression of system deployments, investments, and key decision points for major NAS acquisitions. They depict the acquisition strategy to evolve the NAS from the As-Is to the To-Be environment.

The Infrastructure Roadmaps show all Capital Investment Plan investment projects and systems identified in the NSIP that will deliver the necessary functionality to enable OIs and BTIs.

Integrating Info-Centric NAS Concepts into the NAS EA

- Improvements from the Info-Centric NAS vision document are integrated in the NAS EA in the form of Operational Improvements (OI's) and Business and Technology Improvements (BTI's). These serve as the strategic direction of NAS evolution.
- NextGen EA teams determine research activities required to achieve the OI or BTI and are captured in the form of Support Activities in the NAS EA.
- The Info-Centric NAS OI's, BTI's, and Support Activities are displayed in multiple NAS EA roadmaps.
- The alignment between the Support Activities and the OI's and BTI's are best displayed in tabular form and are captured in the NAS Segment Implementation Plan 2022 Evolution towards an Info-Centric NAS.

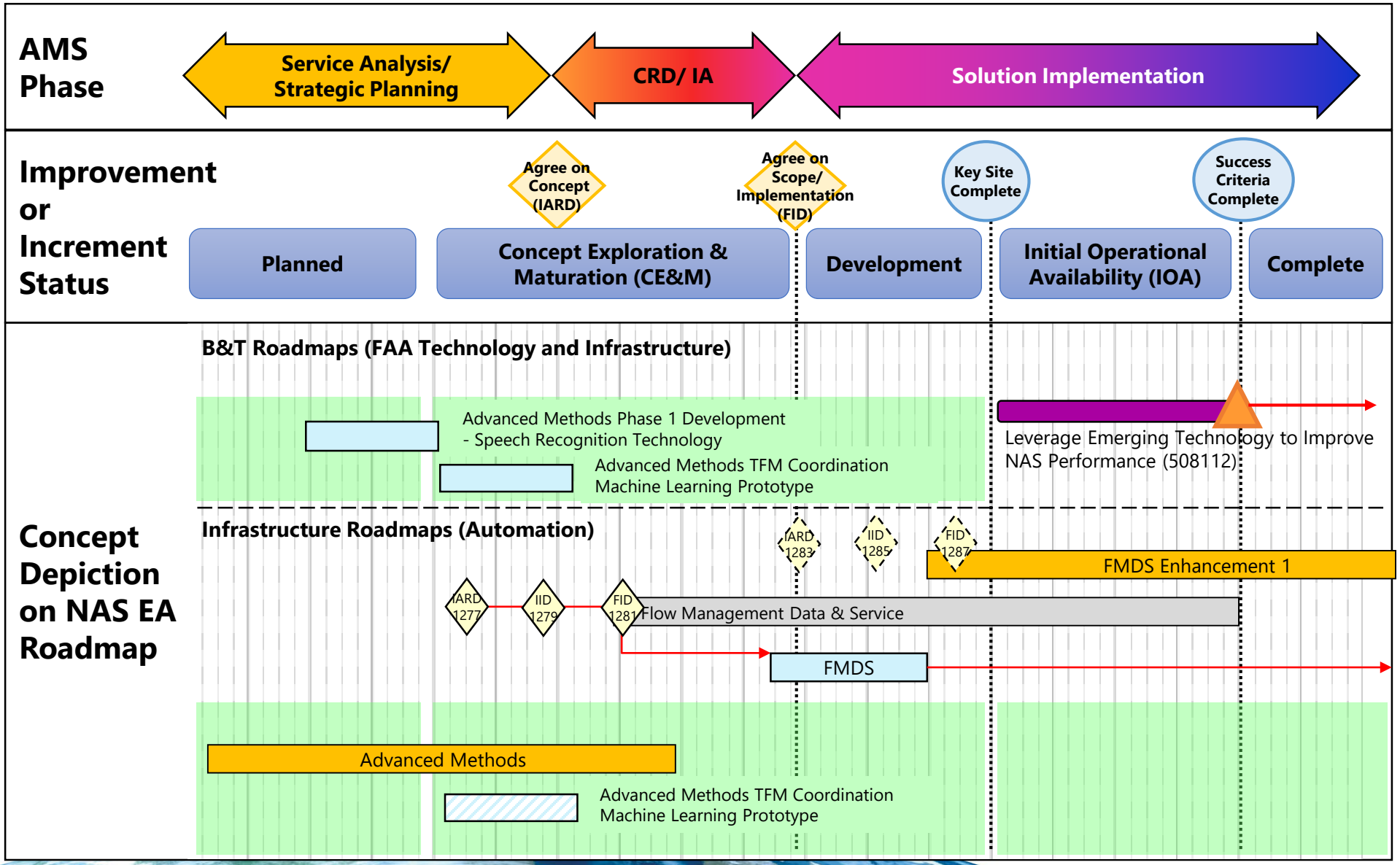
Infrastructure Pillar – Information			
Projects	***FY2021***	***FY2022***	***FY2023+***
BTI 508112 Leverage Emerging Technology to Improve NAS Performance (2024-2032)			
Advanced Methods	✓ Developed concept for use of speech recognition in TFM coordination	• Develop prototype capability for advanced automation learning/data mining capability that utilizes historical and real-time data	• Develop AI TFM Learning Capability

Example alignment of Advanced Methods to BTI 508112: Leverage Emerging Tech to Improve NAS Performance

Tracing ICN Concepts Across Roadmaps

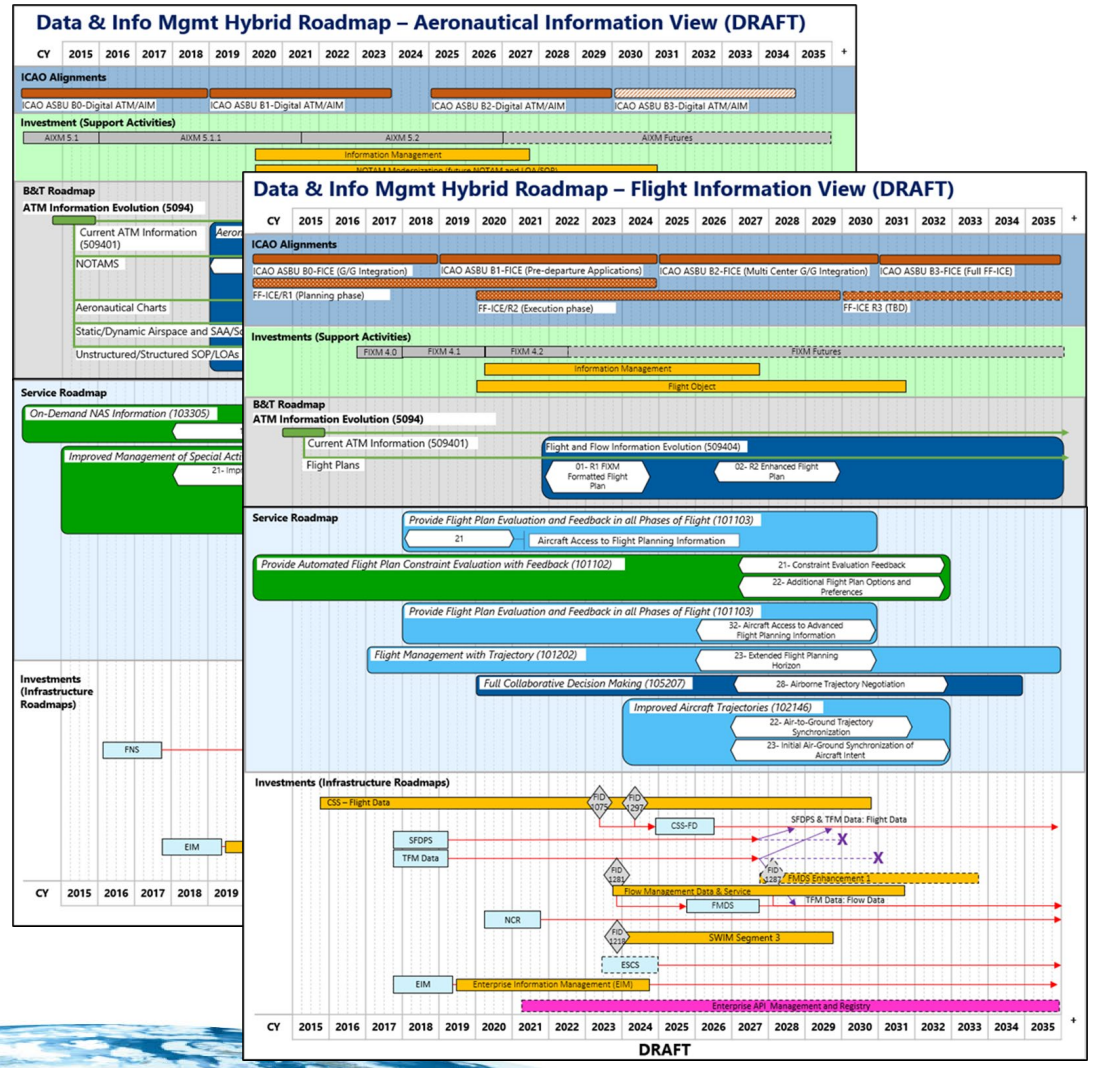
The full lifecycle of a concept spans Roadmaps

1. Early concept research is first shown on Service/ B&T Roadmaps as Support Activities or on Infrastructure Roadmaps as G-CIP (planned or funded)
2. Future OI or BTI also shown on Service and B&T Roadmaps
3. The systems Investments, Support Activities, Decision Points required to develop the concept are shown on Infrastructure Roadmaps



Hybrid Roadmaps*

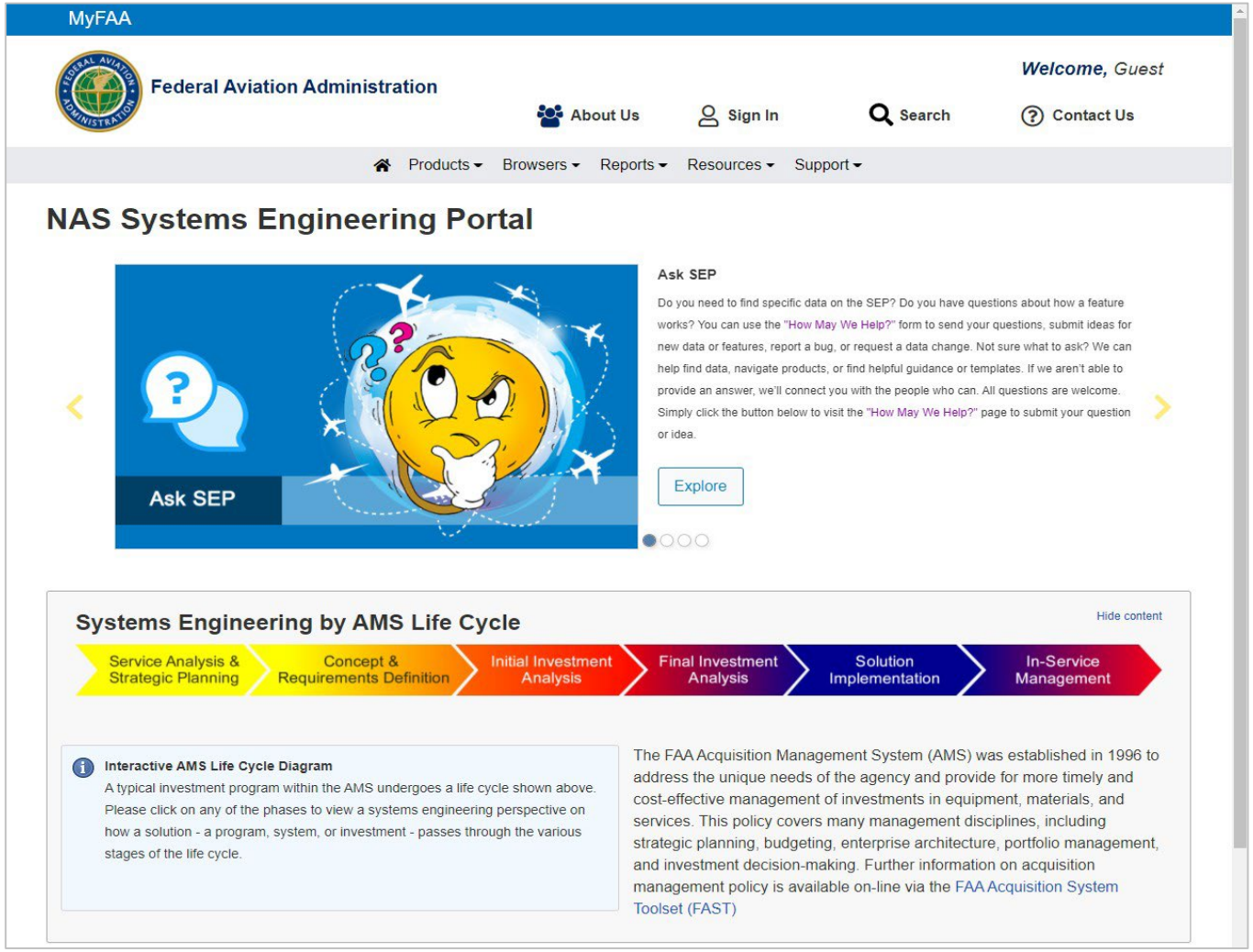
- Hybrid Roadmaps address the need to present an integrated view of data elements across NAS EA products
- They **aggregate EA data** related to a particular focus area (e.g., Data and Information Management) **into a single diagram**, rather than distributed across multiple products
- Hybrid Roadmaps offer a holistic and integrated view to facilitate communication and planning for a future info-centric NAS



*Under Development

NAS Systems Engineering Portal

- The NAS Systems Engineering Portal (SEP) (https://sep.faa.gov) is the virtual environment that houses, amongst other things, Enterprise Architecture and NAS Planning information
- The SEP can only be accessed on the FAA network

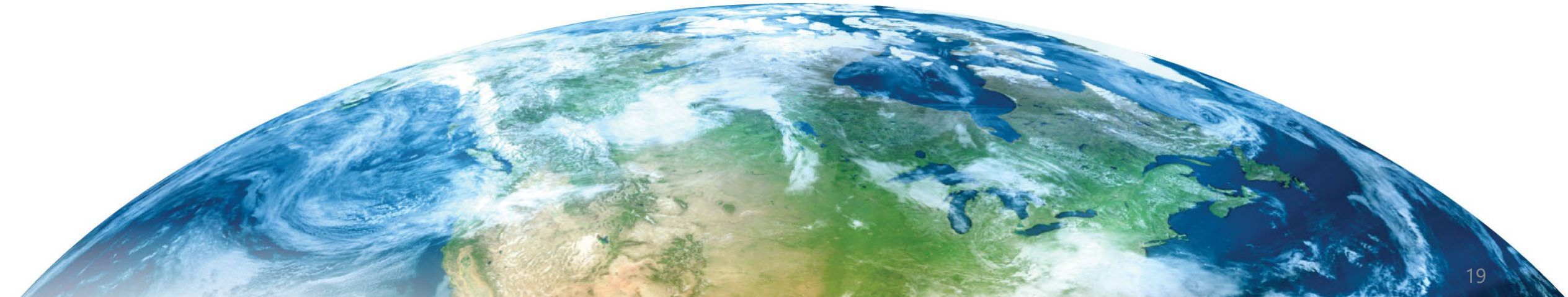


NAS EA Points of Contact

ANG-B1 NAS EA and Requirements Services	ANG-B2 NAS Enterprise Planning and Analysis
Models, Views, Requirements	FAA Services Hierarchy, Roadmaps
Kimberly Gill kimberly.gill@faa.gov	Annie Augustin annie.augustin@faa.gov

ANG-B5 Systems Engineering Information Management	ANG-C7 NAS Lifecycle Planning
Systems Engineering Portal	NSIP
Rita Estrada-Cavallini rita.estrada-cavallini@faa.gov	Vaughn Yates vaughn.yates@faa.gov

Backup



Support Activity Types and Definitions

Type	Definition
Operational Concept Exploration	To identify potential and promising new concepts of operations within the NAS environment
Concept Development	Description of a new operational concept (Level I-III)
Operational Research	Research that develops technical or operational artifacts that are needed to determine how a concept will be implemented
Operational Concept Validation	Studies that prove whether or not a concept will meet the operational objectives of the improvement described in the concept
Concept Demonstration	Major demonstrations of new Operational changes to the NAS
Policy Assessment/Development	Assessment of whether policy changes are needed to achieve the operational improvement or to define or develop new policies.
Major Training	Activities to determine how to train the workforce on how to control traffic differently to achieve a new capability
Technical Concept Validation	Validation that a proposed system solution is feasible and will meet the objectives
Technology Opportunity Investigation	Research that determines whether a proposed technical solution is feasible. (e.g. MPAR research)
Technology Demonstration & Prototyping	Demonstrate the technical capabilities of future NAS systems
Standards/Certification Development	Develop or implementing technical standards that may impact current or future NAS systems