2024

NEXTGEN ANNUAL REPORT

Federal Aviation Administration

Contents

01

EXECUTIVE SUMMARY

The Next Generation Air Transportation System (NextGen) is the FAA's initiative to modernize the U.S. National Airspace System (NAS) to prepare the aviation industry for increased demand and new entrants.

Through this program, the FAA has pushed the national airspace into the next generation for which it is named by transitioning to satellite-enabled navigation and surveillance, supplementing voice with digital communications, revamping automation to improve decision-making, and creating an information-sharing architecture.

NextGen has delivered $12.3 billion worth of total benefits to the aviation industry between 2010 and 2024. This annual report highlights the status of the nine NextGen baseline programs.

The NextGen program has continued to see benefits from greater Data Communications (Data Comm) services between controllers and flight crews, enabling them to transmit complex instructions and air traffic control information more efficiently than by voice. The FAA continued to deploy en route Data Comm in 2024 and plans to complete installation at the remaining four en route centers in 2025.

The FAA has enabled flight paths using ground- or space-based navigation aids through Performance Based Navigation (PBN) that are used daily in operations. Ensuring the integrity of the NAS in the event of GPS interruption is the plan with new Distance Measuring Equipment (DME) stations that will enable aircraft to stay on their PBN route or procedure. The FAA built nine new DME stations in 2024, bringing the total number to 19.

Since the requirement for aircraft to be equipped for Automatic Dependent Surveillance–Broadcast (ADS-B) in 2020, the NextGen program has continued assessing and validating future surveillance technologies using ADS-B to improve traffic management. With this capability available, the FAA was able to take advantage of ADS-B for an affordable and quick way to deploy more runway safety technology to more airports in 2024.

En Route Automation Modernization (ERAM) technology is the heart of NextGen modernization and has helped to transform the NAS. ERAM has operated at 20 en route centers since 2015, and its hardware and software are receiving upgrades. Enhancements to the conflict probe and trajectory modeling capabilities were completed in 2024, and the flight plan processing capability is scheduled to be updated in 2025.

While NextGen's Traffic Flow Management System (TFMS) has been implemented and regularly updated since 2010, TFMS is at the end of its

lifecycle. The final investment decision for the new Flow Management Data and Services architecture is scheduled for 2025. Instead of using miles-in-trail, Time Based Flow Management (TBFM) more precisely manages traffic at 20 en route centers and has been adapted for most major airports served by those centers. Sustainment projects are planned for the future. Terminal Flight Data Manager (TFDM) improves surface traffic management by automating manual flight data processing. Four airports received the system in 2024, and it now operates at 10 locations.

The FAA's System Wide Information Management (SWIM) was developed to unite reliable aeronautical, flight and flow, surveillance, and weather information across the NAS and aviation community. Fifty-one internal and external organizations now produce data for more than 200 services sent via the SWIM network. With this framework in place, the NextGen program will continue to build more services into the system while ensuring it is secure. In 2024, the FAA selected and approved a new certificate authority product for identity and access management to enhance security.

Another NextGen goal has been to improve weather forecasting for aviation operations, as well as better dissemination of those services. The NextGen Weather Processor (NWP) and Common Support Services–Weather (CSS-Wx) began operating in 2024 and are set to complete deployment to all planned sites in 2025.

With passage of the FAA Reauthorization Act of 2024, the Office of NextGen is scheduled to operationalize all key programs under NextGen by December 31, 2025. By that date and according to the Act, the Office of NextGen will end and a new office will begin for airspace modernization.

With NextGen nearly complete, the FAA is looking toward future airspace modernization that will enable further integration of a wide variety of new entrant operations in part by reshaping information sharing. At the heart of continued NAS transformation is the harnessing of data in decision-making to make flights more efficient and improve the safety of our skies. NAS modernization will take advantage of the ongoing information revolution with increases in telecommunication, computational power, and storage, along with new technologies that secure and learn from accumulated data.

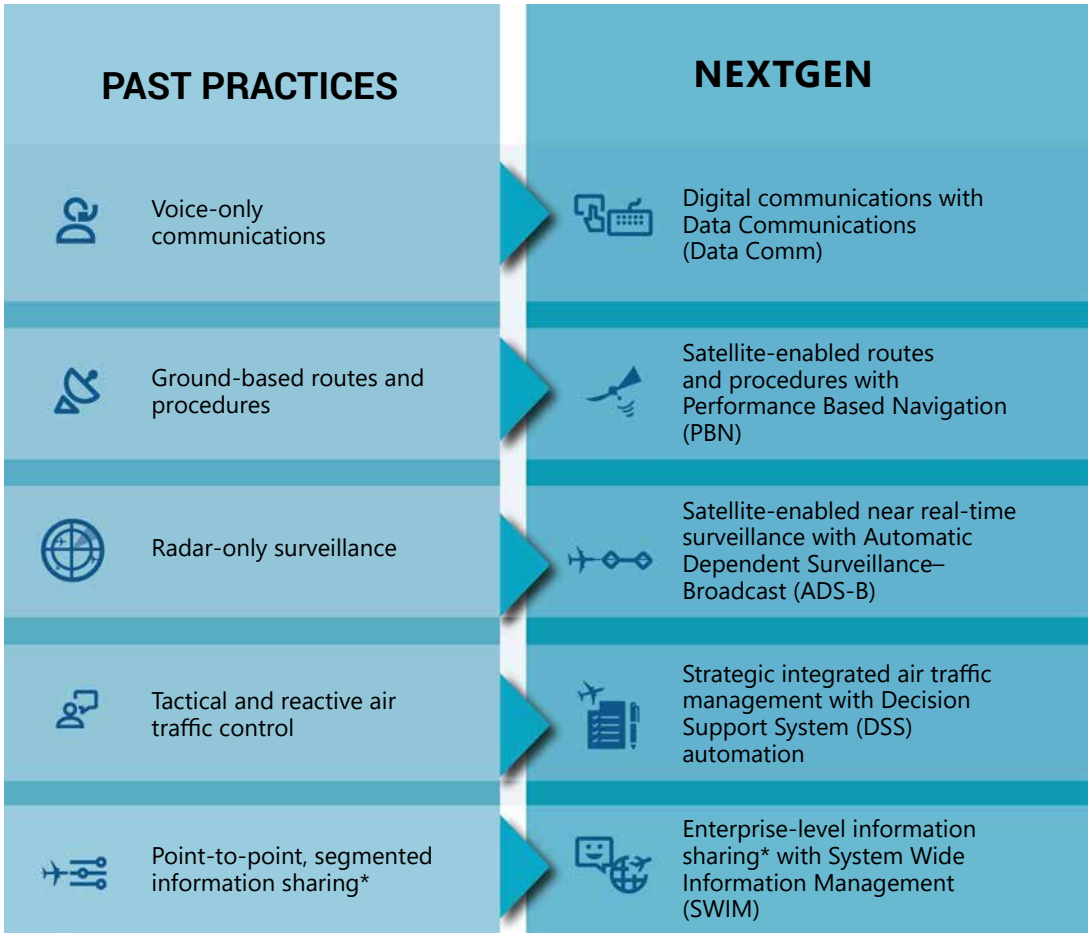
02

INTRODUCTION

This report responds to congressional reporting requirements in the Vision 100—Century of Aviation Reauthorization Act of 2003, FAA Modernization and Reform Act of 2012, and FAA Reauthorization Act of 2018. It provides the status of NextGen programs through fiscal year 2024. Whenever possible and unless otherwise stated, the data cutoff is September 30, 2024.

NextGen Today

NextGen has revamped air traffic control infrastructure for communications, navigation, surveillance, and information management, aiming to increase the safety, efficiency, capacity, predictability, flexibility, and resiliency of U.S. aviation.



NextGen innovations in communications, navigation, surveillance, automation, and information management have transformed NAS operations, fulfilling the FAA's mission to ensure a safe and efficient aerospace system.

* The FAA shares information on SWIM and other channels in accordance with our policy on protecting sensitive unclassified information.

Expected benefits have included, among others, improved flight efficiencies supported by improved flight profiles delivered through performance-based navigation procedures, improved sequencing and spacing through decision support systems that fuel-efficiently assist any needed delays, and enhanced routes in Alaska and offshore using ADS-B for "radar" service. The benefits are all measured as a product of the observed operations.

As the FAA continues to operationalize NextGen, we are adapting our strategies to accommodate increasing air traffic, expanding markets, and changing technology. Drone traffic is expected to continue to grow rapidly, and new advanced air mobility operations are expected to enter the airspace. Commercial space launch and reentry operations are also quickly expanding, with associated impacts on the national airspace.

Going forward, through research and collaboration, we seek to define new performance standards and further advance U.S. global leadership in aviation. Benefit measurements for new operators and new operations are not easily derived using the current paradigm. The development of measures to ascertain the effect of these new operations on the nation is key to the FAA's adjusting strategy and will directly support FAA efforts to foster international cooperation in evolving enhanced aviation technologies to improve airspace system safety and mobility around the world.

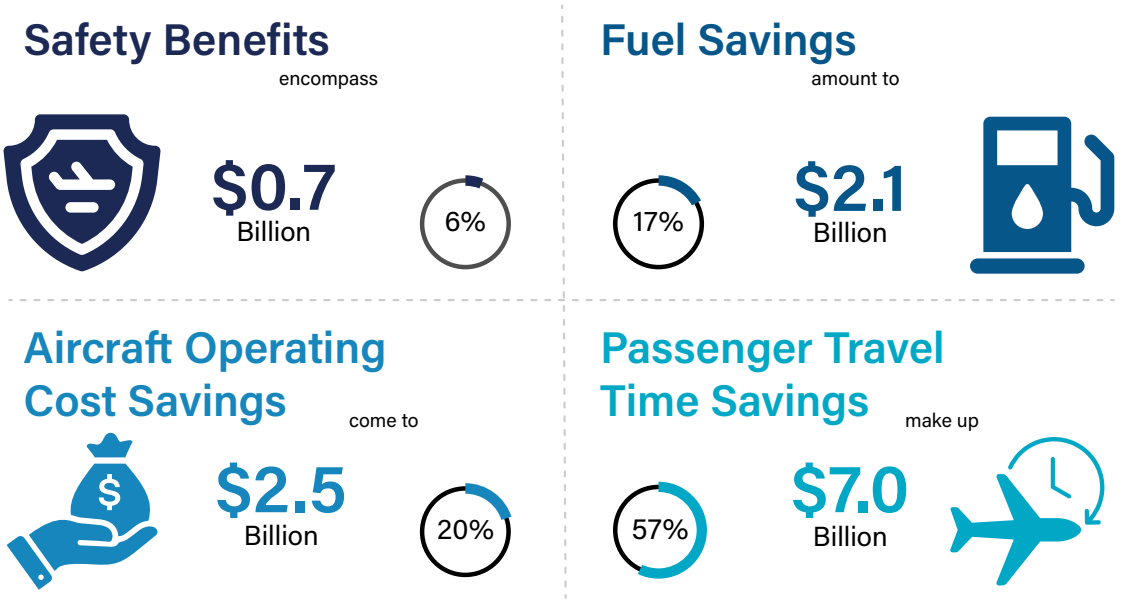
Benefits

Air traffic controllers, aircraft operators, and passengers benefit from the enhanced safety, efficiency, and capacity of airspace modernization. NextGen has delivered more than $12.3 billion worth of total benefits between calendar years 2010 and 2024 from about 20 NextGen capabilities through more than 200 implementations across the country.

NextGen improvements in communication, navigation, and surveillance are the sources for nearly $6.1 billion in benefits, automation accounts for about $2.5 billion, and reduced separation standards take credit for an estimated $2.3 billion. NextGen benefits are calculated by analyzing performance before and after implementing NextGen capabilities.

Benefits have been measured in detail since 2010 and accrue each year. Total achieved benefits measured to date are from key implementations and are the first portion of benefits expected to grow in the future. Future benefits are driven by more implemented capabilities and procedures, continued equipping of aircraft by operators, and growth in travel demand. The FAA expects benefits to continue to accrue from previously implemented capabilities as well as with the ongoing deployment through 2025 and beyond.

Between 2010 and 2024 implemented capabilities generated **$12.3 Billion** **in benefits.** *(in 2024 dollars)*



Collaboration

The success of NextGen depends on cooperation among the FAA, other government agencies, and the aviation community. The FAA works with its labor unions to prepare employees for change. The agency partners with universities and industry as well as federally sponsored research and development facilities to advance aviation technologies.

Besides interacting with the aviation industry stakeholders through research partnerships, the FAA also engages with them through trade associations, conferences, communities of interest, technical work groups, and advisory committees—the NextGen Advisory Committee (NAC), the Advanced Aviation Advisory Committee, and the Research, Engineering, and Development Advisory Committee.

Through the NAC, the FAA and industry collaborate in program planning and prioritize industry investments as a vital component of NextGen's success. Joint collaboration helps to improve operational capabilities, mitigate risk, and deliver benefits within the NAS.

As the global leader in aerospace, the United States collaborates with countries around the world. The FAA and its international partners work through the

International Civil Aviation Organization (ICAO), the aviation technical body of the United Nations, to adopt international aviation standards that lead to a globally connected and harmonized air traffic management system.

The FAA engages local communities and airports by participating in committees, task forces, standards bodies, and public meetings to better understand problems and identify solutions. FAA regional teams work with community engagement officers to determine how to best engage with affected communities on topics such as proposed airspace changes.


AV-3465

03

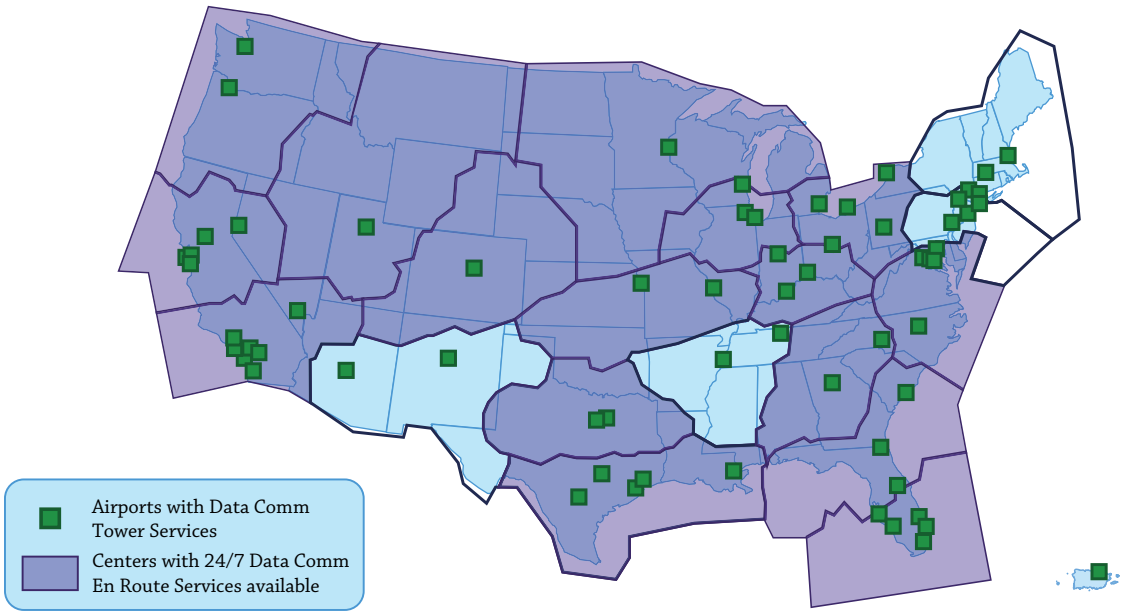
NAS MODERNIZATION UPDATES

NextGen is delivering benefits across the NAS, leading to a new way of managing air traffic known as trajectory-based operations.

Improvements in communications, navigation, surveillance, automation, and information management provide the foundation for the modern airspace system. Enhancements in safety and the environment are essential to sustain an evolving NAS. A fully operational system will implement NextGen capabilities at the right places in the NAS, with operators using aircraft equipped according to the minimum capabilities list. This increased use of NextGen capabilities will achieve maximum benefits.

Communications

Data Comm supplements voice communications with digital messages using an air-to-ground data link. Aircraft avionics and air traffic control automation systems are integrated to form a Data Comm application known as controller pilot data link communications (CPDLC). With Data Comm, NAS efficiency and throughput increase while delays, fuel consumption, and engine exhaust emissions decrease.



Data Communications

Data Comm started in 2016 with tower service, which provides CPDLC departure clearances, and is available at 65 airports. En route services function the same way as CPDLC tower service but with an array of messages available for controllers communicating with pilots at cruising altitudes. Sixteen en route centers have Data Comm initial services and the first increment of full en route services. The FAA plans to deploy these services to the remaining four centers—Albuquerque, Boston, Memphis, and New York—by May 2025.

Navigation

PBN enables aircraft to fly on any desired flight path within the coverage of ground- or space-based navigation aids, within the limits of the capability of self-contained navigation systems, or through a combination of these capabilities.

Resiliency

As more aircraft operators equip for and use satellite-enabled PBN, the legacy ground-based infrastructure is expected to decrease in some locations with enhancement in other airspace to assure PBN procedure resiliency. The NextGen DME program backs up area navigation for aircraft equipped for DME navigation during satellite service disruptions without the need for an inertial reference unit.

Redundant coverage will enable aircraft to continue flying PBN routes and procedures when a single GPS fails. Pilots and controllers can minimize the workload increase when service is interrupted while maintaining the benefits of PBN.

The NAS needs at least 126 new DME stations for maximum benefits, and the FAA will replace 50 stations with limited performance to support en route flights across the nation and terminal traffic at 62 busy locations. In 2024, the FAA built nine new DME stations, bringing the total number to 19.

Surveillance

Automatic Dependent Surveillance–Broadcast (ADS-B) uses GPS satellites, aircraft avionics, and ground stations to accurately track and monitor aircraft in real time, and it covers more territory than radar. The FAA completed the ground station network in 2015 and required aircraft flying in a large portion of controlled U.S. airspace to be equipped to transmit a signal (ADS-B Out) by 2020. When equipped for optional ADS-B In, pilots can receive real-time traffic, weather, and flight information services at no extra cost to enhance safety and efficiency. The FAA began implementing the Surface Awareness Initiative (SAI) system at several airports in 2024. SAI uses ADS-B data to display surface traffic to controllers at busy airports without a surface surveillance tool to help reduce the risk of runway incursions. More airports are scheduled to receive the system in 2025.

ADS-B In Retrofit Spacing

ADS-B In Retrofit Spacing is a project to evaluate the feasibility and value of three ADS-B In applications—Cockpit Display of Traffic Information (CDTI)-Assisted Visual Separation (CAVS), CDTI Assisted Separation on Approach (CAS-A), and Initial Interval Management (I-IM)—to help pilots and controllers manage spacing between aircraft through an avionics retrofit. The FAA partnered with American Airlines and Aviation Communications & Surveillance Systems in 2021 to start collecting data on these applications.

The CAVS benefit report was completed in September 2022, and the FAA is continuing to collect data. The trial for CAS-A was extended to February 2025 at the Dallas Terminal Radar Approach Control (TRACON) facility for arrivals at Dallas-Fort Worth International Airport, and the I-IM trial was extended to November 2024 at the Albuquerque en route center for overflights and for Phoenix International Airport arrivals.

Automation

The FAA has implemented automation systems that air traffic controllers use to safely separate aircraft in the NAS. The ERAM system enables controllers to work more productively and support NextGen with modern software architectures that serve as the foundation for new air traffic management capabilities.

Decision support systems are another type of automation. The TFMS, TBFM, and TFDM assist controllers and air traffic managers in responding more effectively to changing conditions, accommodating user preferences, and resolving traffic flow constraints.

En Route

ERAM has been operating at 20 en route centers across the country since 2015, where controllers manage high-altitude air traffic. The FAA is enhancing the software for the necessary accuracy, consistency, and usability needed during high-demand scenarios and to maintain efficient airspace usage. Enhancements to the conflict probe and trajectory modeling capabilities were completed in 2024, and the flight plan processing capability is scheduled to be updated in 2025.

Traffic Flow Management System

TFMS assists with planning and executing traffic management initiatives, which are used to balance demand with capacity in the NAS. The initiatives contribute to the safe and orderly movement of air traffic. TFMS runs custom applications on commercial hardware. Its suite of tools is used to optimize airspace capacity and fleet performance as well as the efficiency of individual flights.

TFMS has been continually updated and enhanced, but it is at the end of its lifecycle. It is scheduled to be fully replaced by Flow Management Data and Services (FMDS) in 2031. FMDS will have a modern architecture to increase reliability and reduce response time. The final investment decision for FMDS is scheduled for 2025.

Time Based Flow Management

TBFM maximizes NAS throughput by using time instead of distance to manage departing and approaching air traffic in congested airspace and at busy airports. Its core function is to schedule flights over a defined point in the airspace to achieve the desired aircraft spacing. Scheduling allows traffic to merge with minimal coordination, reducing the need for vectoring and holding. A sustainment project is underway to upgrade the hardware and software over the next 5 years.

Terminal Flight Data Manager

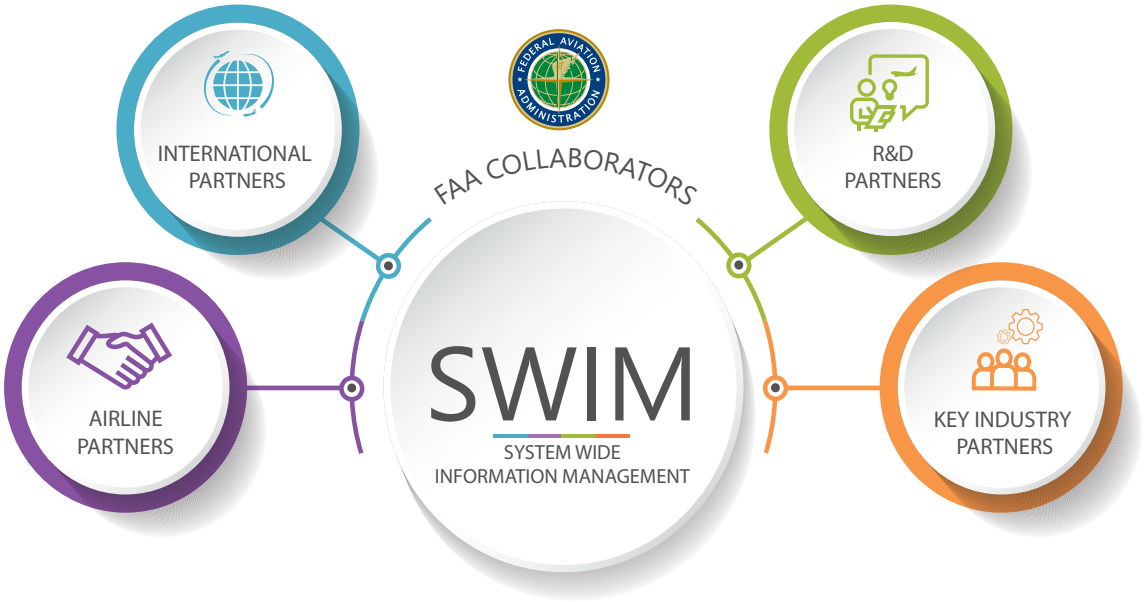
TFDM improves surface traffic management by automating manual flight data processing, therby enabling enhanced data sharing between the FAA and airline operations centers. TFDM comprises new capabilities in electronic flight data, traffic flow management, and collaborative decision-making for the surface.

TFDM is deploying to 49 airports in two configurations through 2029, but the FAA still has a goal of increasing deployment to the originally planned 89 airports. Ten sites have TFDM, with four of those receiving it in 2024.

System Wide Information Management

Started in 2007, SWIM enables the sharing of relevant and reliable aeronautical, flight and flow, surveillance, and weather information in near real-time through a single point of access. In 2024, the FAA selected and approved a new certificate authority product for identity and access management. This security capability

will allow the FAA to better manage and govern how digital certificates are used to secure information flows. Improved security and reduced cyber vulnerabilities by automating how digital certificates are issued and managed will be part of a future SWIM segment.



The FAA partners with industry, research and development organizations, airlines, and other countries to promote information-sharing in the NAS.

Weather

Weather is the leading cause of delay in the NAS. The FAA is working to provide better forecasts and weather-based initiatives to better launch and route aircraft confronted with weather. They will reduce delays and other effects of weather on aviation, resulting in safer, more efficient, and predictable NAS operations.

Processing

The NextGen Weather Processor program is replacing the legacy weather systems and bringing new capabilities. In 2024, the NWP began operating at the national enterprise management centers in Atlanta and Salt Lake City, which distribute data to aviation weather displays in multiple locations.

Full deployment is scheduled for 2025 to five en route centers and the Potomac TRACON. Aviation weather displays will be located at the Air Traffic Control System Command Center, 21 en route centers, three center radar approach control (CERAP) facilities, and 45 TRACONs. An NWP external web server will be

deployed to the William J. Hughes Technical Center to serve external users of the aviation weather display via the internet.

Disseminating

Products created by the NWP, the National Oceanic and Atmospheric Administration's NextGen Information Technology Web Services, and other weather sources available to FAA and NAS users are published through Common Support Services–Weather. It is the single provider of weather data, products, and imagery within the NAS, using standards-based weather dissemination via SWIM that reduces FAA development and operational costs and achieves enterprise-wide efficiency.

The system provides weather information via web services. It filters weather information by location and time with the ability to provide the user with weather data for a specific geographic area. Weather information is presented in common, standardized formats, and can be stored, archived, and retrieved. CSS-Wx began operating at the national enterprise management centers in Atlanta and Salt Lake City in 2024 and will interface with automation systems at 21 en route centers and three CERAPs when deployment is complete in 2025.


FD DOOR POWER
OFF
CCR RESET
L
R
CARGO FIRE
ARM
FWD
AFT
EMER LIGHTS
OFF
ARMED
ON
SERV INTPH
OFF
PASS OXYGEN
IRS
LEFT
ON
OFF
RIGHT
ON
OFF
WINDOW HEAT
BACKUP
L FWD
R FWD
ON
PRIMARY
SIDE
FWD
FIRE/ OVHT TEST
DISCH
FWD CARGO
ENGINE
EEC MODE
START
NORM
PRIMARY FLIGHT COMPUTERS
DISC
AUTO
APU
START
RAM AIR TURBINE
FUEL JETTISON
NOZZLE
FUEL TO REMAIN
ARM
EQUIP COOLING
FLT DECK TEMP
HYDRAULIC
FAULT
PRESS
OFF
FWD EXT PWR
AFT EXT PWR
PRESSURIZATION
VENTILATION
100
015
3000
STAB
FUEL CONTROL

04

APPENDIX A
WORK PLAN THROUGH 2025

Appendix A describes how the FAA plans to modernize the NAS through the NextGen initiative.

The appendix summarizes the structure that our project planners and engineers use to implement NextGen. It also documents the milestones to deliver operational improvements to the NAS through 2025 when the NextGen initiative will end. Detailed work plans describe the improvements and include high-priority, ready-to-implement activities to deliver benefits for airspace users.

Appendix A contains:

- Descriptions of the NAS Enterprise Architecture (EA), NAS Segment Implementation Plan (NSIP), and NextGen portfolios
- A detailed work plan by NextGen portfolio showing related increments through 2025

NextGen is the FAA's comprehensive overhaul of the NAS, enabling operational improvements and enhancing services to the aviation community. Most notably, NextGen is transitioning the NAS to TBO, an air traffic management method for strategically planning, managing, and optimizing flights throughout the operation.

The FAA has delivered the foundational elements of NextGen with support from federal agency partners and the aviation community. These capabilities are already benefiting aviation stakeholders and travelers through reduced operating costs and time savings.

Architecture and Implementation

To identify how to transform the NAS, the FAA uses the NAS EA to describe the evolution of air traffic control through the implementation of new infrastructure, technologies, and services. The EA also contains roadmaps to help guide the identification, tracking, and maturation of concepts that will further advance the NAS.

The EA helps us transform the NAS by communicating system responsibilities and enhancing NAS operations. This architecture facilitates how we consolidate functions and systems while continuing to satisfy the aviation community's changing needs.

Functions of the EA include:

- Providing a common reference for the FAA to make informed investment decisions
- Aligning aviation systems and technologies we use as an air navigation service provider with the agency's mission
- Helping to identify duplication of effort, show interoperability, and to increase efficiency

Supporting the NAS EA is the NSIP, our blueprint for developing, integrating, and implementing new NAS capabilities. The NSIP provides the framework for understanding interdependencies among operational improvements, increments, systems, and investment decision points. The FAA defined segments to assist in planning these investments.

The NSIP serves important, distinct purposes for different NAS users. Program managers, engineers, and acquisition teams use the NSIP to plan NextGen milestones. External stakeholders, such as advisory committees, use the plan to identify and prioritize capabilities.

Portfolios

As outlined in the NSIP, the FAA organizes operational improvements into 11 portfolios to group related initiatives for assessing, developing, and implementing new capabilities. Within a NextGen portfolio, each operational improvement is divided into capabilities that are deployed in increments as the capability becomes operational. The incremental capabilities in many cases immediately benefit the aviation community and help develop operational improvements. When all the capabilities are in place, the operational improvement becomes a current operation. Primary and secondary benefits for each increment are also identified.

Portfolio Descriptions

Portfolio milestones are included in the detailed work plans section.

- **Improved Surface Operations:** Improved airport surveillance information, cockpit displays for increased situational awareness, and the deployment of a departure management decision support system tool are some of the implementations within this portfolio.
- **Improved Approaches and Low-Visibility Operations:** Increased access and flexibility for aircraft on their final phase of flight are accomplished through a combination of procedural changes, improved aircraft capabilities, and improved precision approach guidance.
- **Improved Multiple Runway Operations:** This portfolio improves runway access through the use of enhanced technology, updated standards, safety analyses, air traffic tools, and operating procedures, which enable increased arrival and departure operations.
- **Performance Based Navigation:** Improvements in aircraft navigation provide an opportunity to increase efficiency and flexibility.
- **Time Based Flow Management:** System efficiency will be enhanced by leveraging the legacy Traffic Management Advisor decision support system capabilities.
- **Collaborative Air Traffic Management:** NAS users and FAA traffic managers using advanced automation manage daily airspace and airport capacity issues caused by congestion, special activity airspace, and weather by coordinating flight and flow decision-making.

- **Separation Management:** Controllers have tools and procedures to manage aircraft in an environment of mixed navigation equipment and varying wake performance capabilities.
- **On-Demand NAS Information:** This portfolio ensures airspace and aeronautical information is consistent across applications and locations, and is available to authorized subscribers and equipped aircraft.
- **Environment and Energy:** Through collaboration with industry and academia, this portfolio develops solutions that reduce the impacts associated with aviation noise and exhaust emissions, increase energy efficiency, and support the adoption and availability of sustainable aviation fuels.
- **System Safety Management:** The FAA and industry will use policies, processes, and analytical tools developed and implemented to ensure that changes introduced with NextGen maintain or enhance safety while delivering benefits.
- **NAS Infrastructure:** Capabilities in this portfolio involve the transformation or improvement of infrastructure that supports multiple portfolios.

Detailed Work Plans

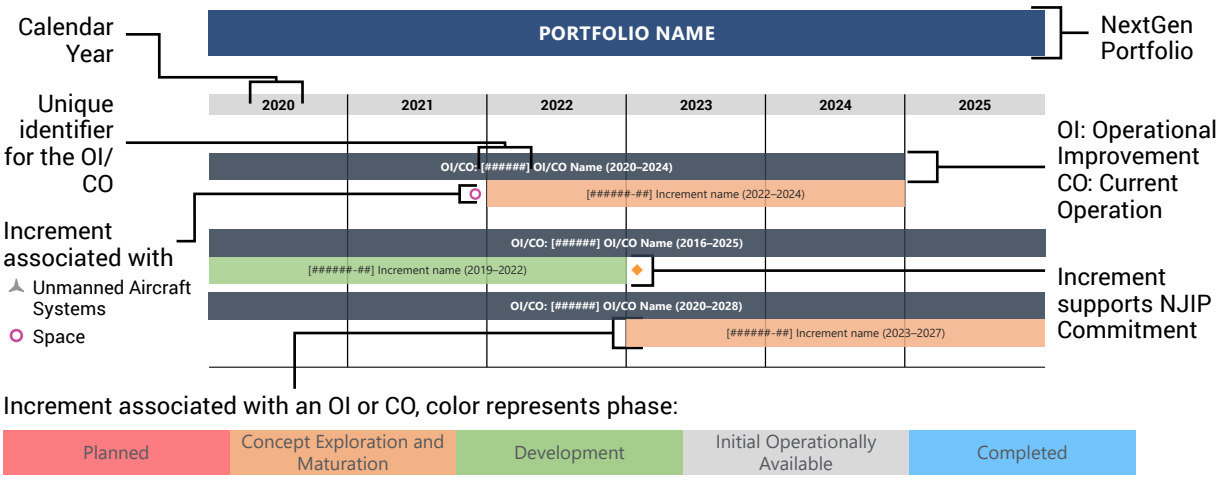
This section describes detailed work plans for the portfolios. The portfolios list current operations (CO), operational improvements (OI), and the corresponding increments that show the current state and the evolution over time to move toward the NextGen vision and meet future demand. An OI's earliest and latest dates range from its earliest associated increments to the latest implementation dates. Once all increments associated with an OI are completed, the OI achieves operational availability and becomes a CO. A current operational environment describes the current state of FAA service delivery to NAS users. These portfolio components are associated with the years in which activities occur. The dates and timelines included in the tables are only for planning purposes and are based on information from the February 2024 NSIP baseline.

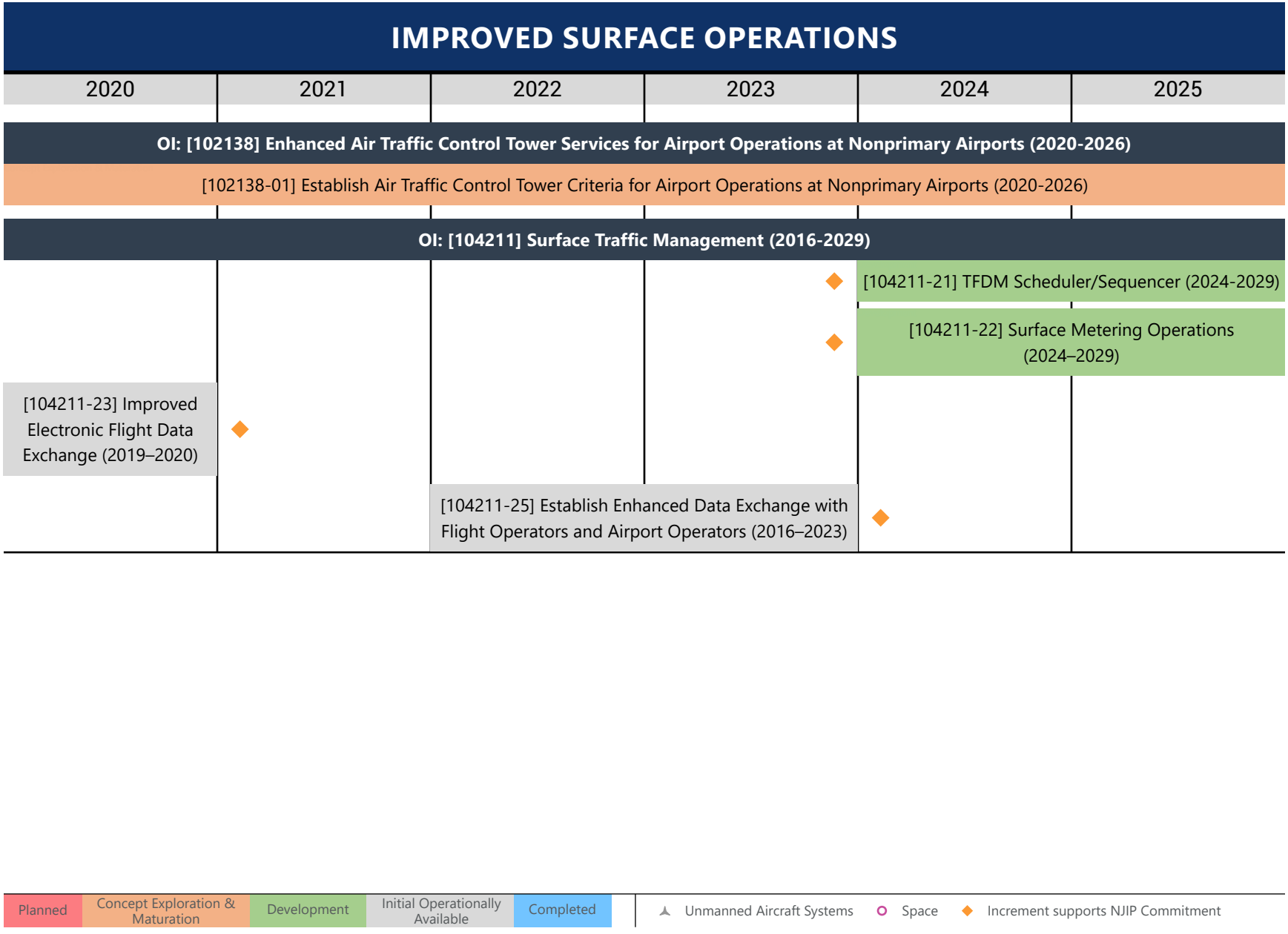
Portfolios also identify increments associated with unmanned aircraft systems, space transportation, and commitments in the NextGen Priorities Joint Implementation Plan. FAA commitments are capabilities the industry and the FAA have negotiated as key capabilities that will benefit the industry and improve NAS operations.

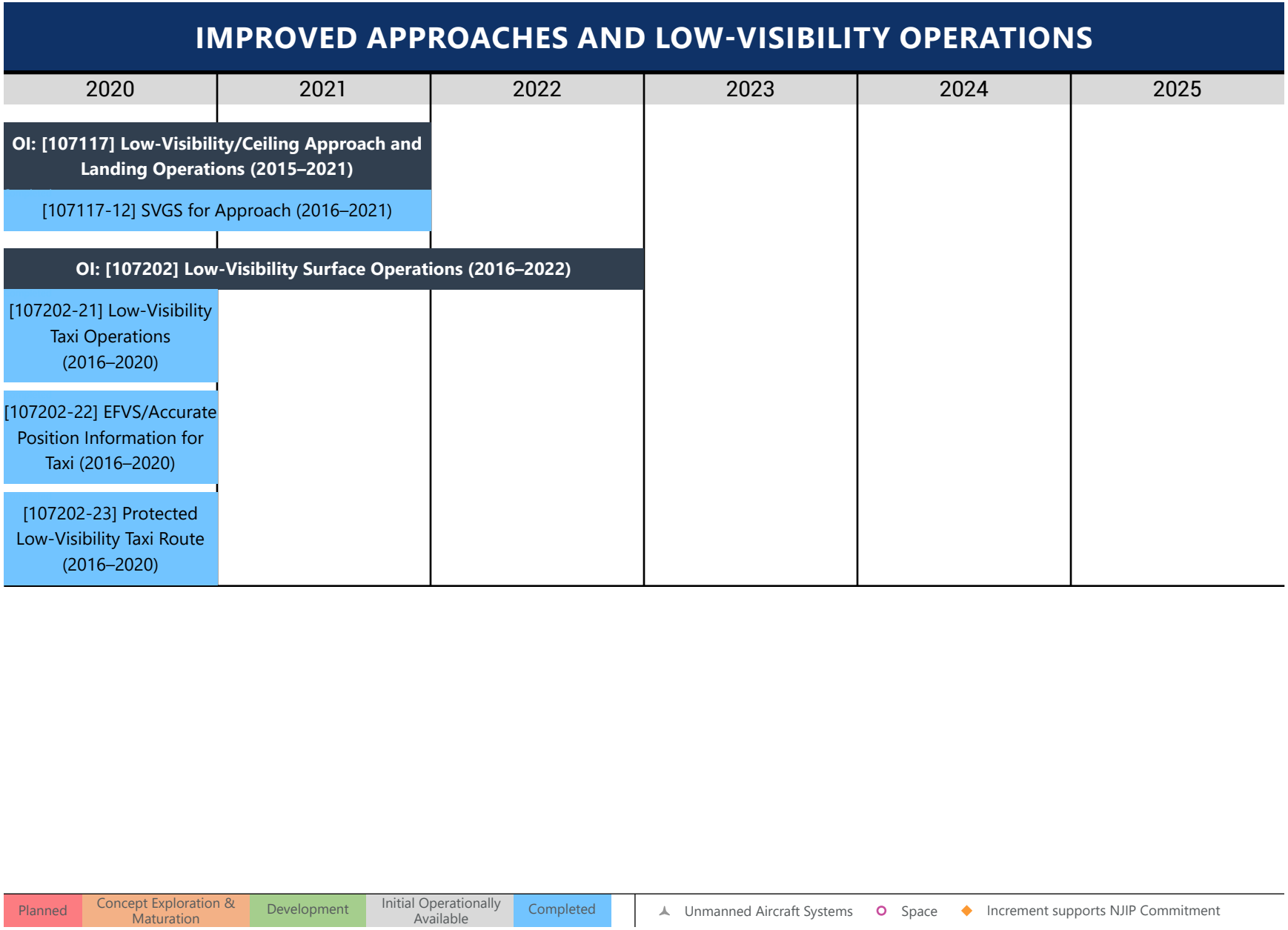
See the graphic below for how to read the detailed work plans.

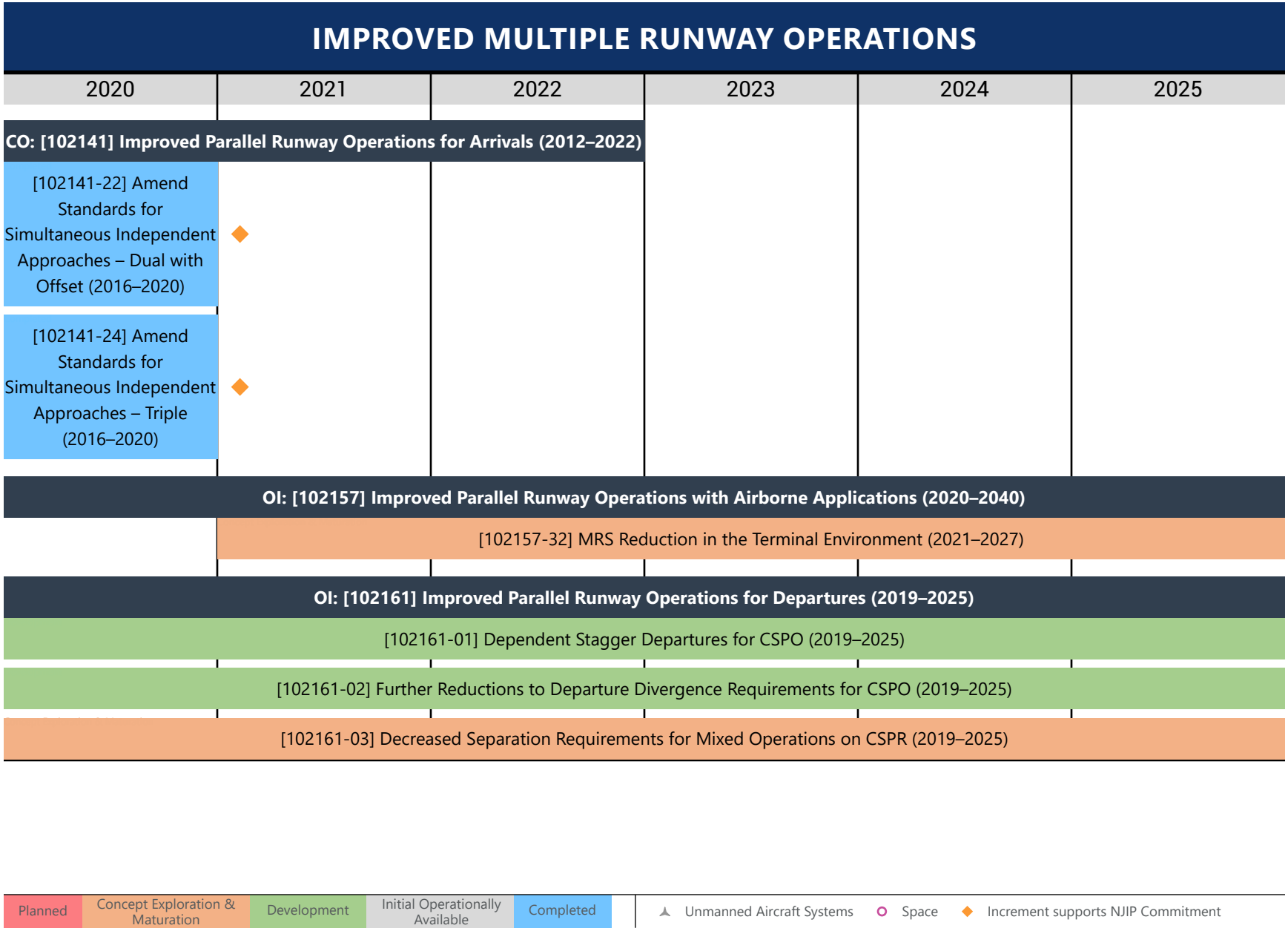
Appendix B defines the airport identifiers and acronyms, initialisms, or abbreviations associated with each OI, CO, or increment.

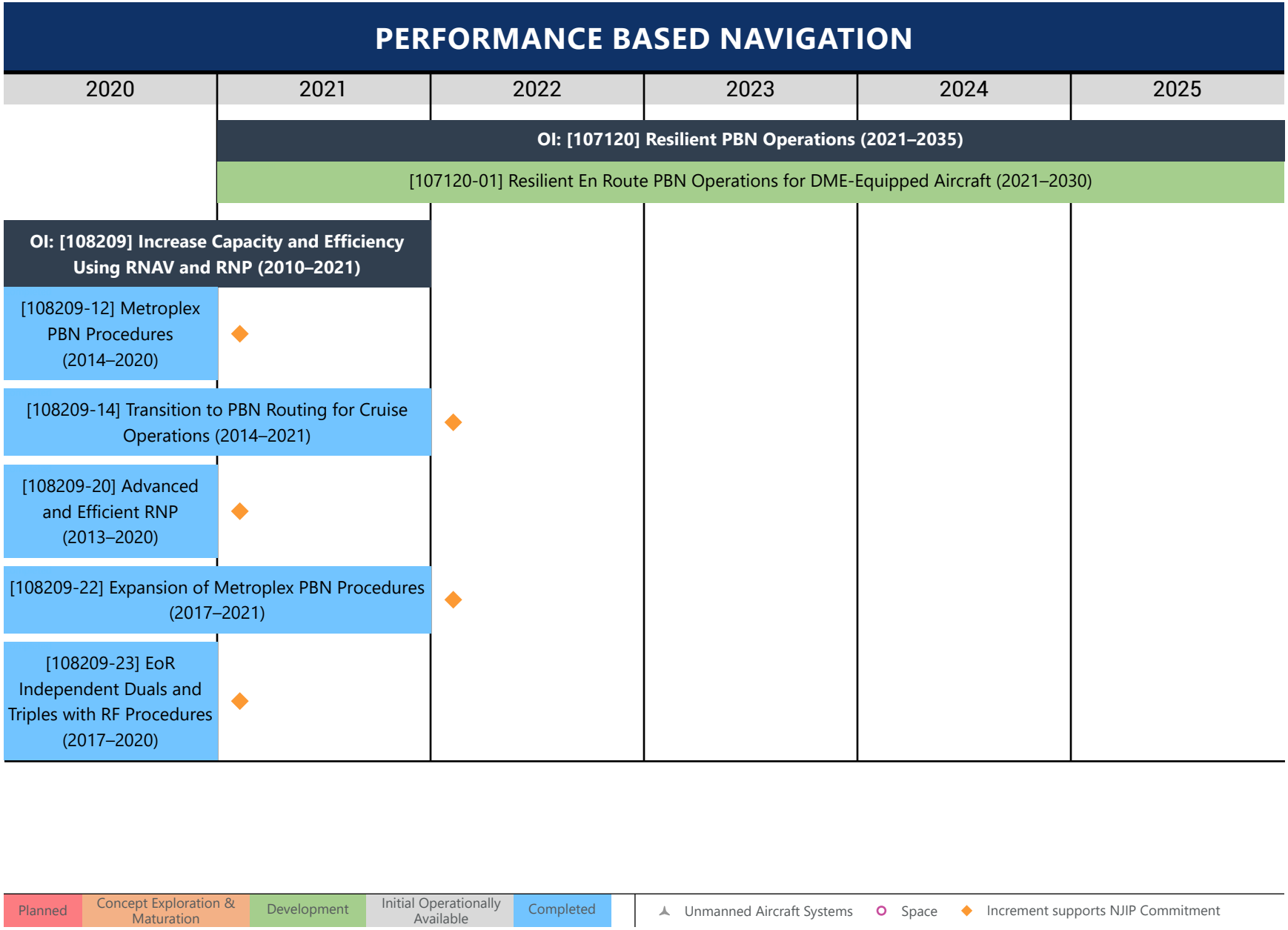
How to Read Detailed Work Plans

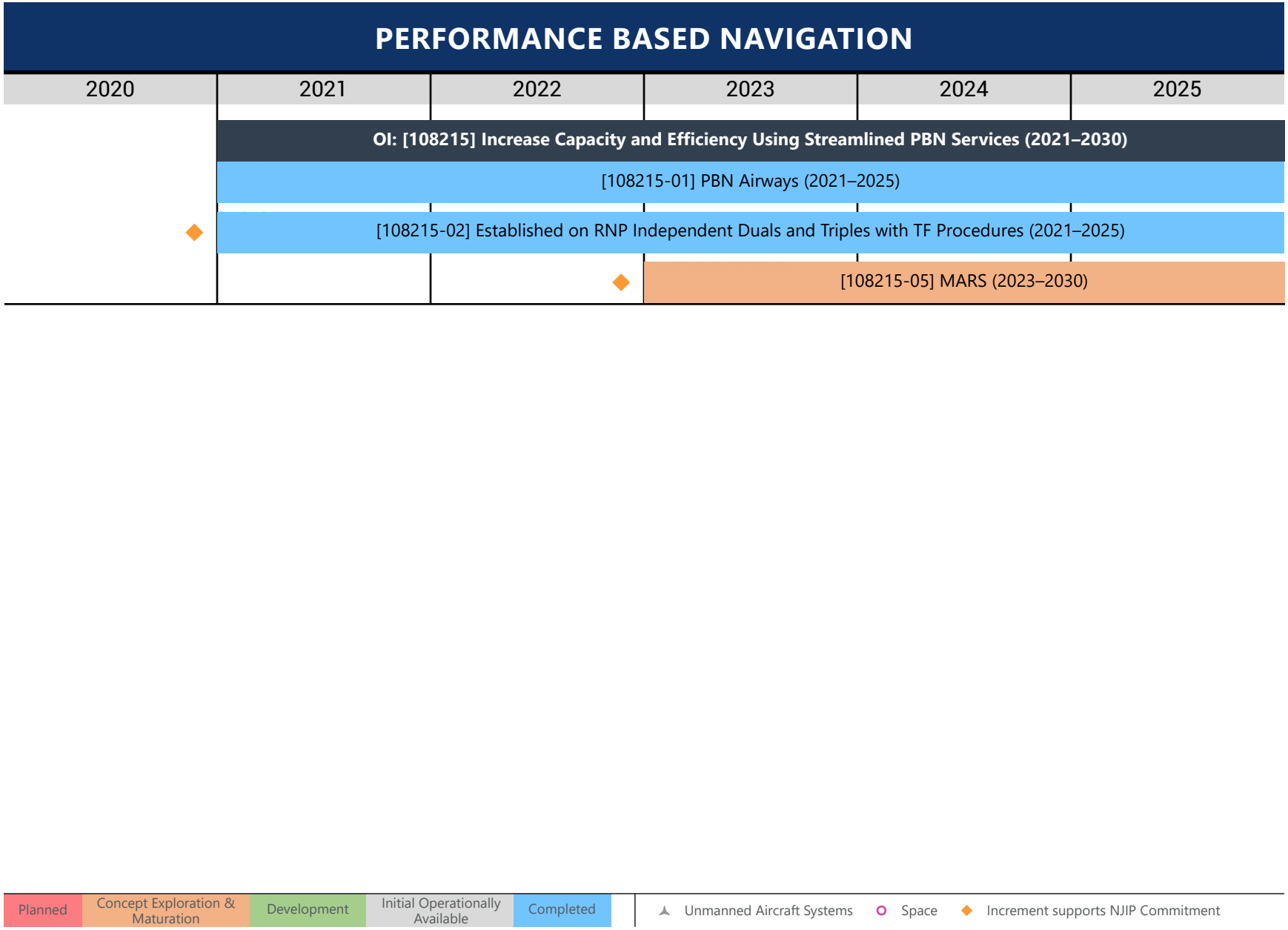



IMPROVED SURFACE OPERATIONS
2020
2021
2022
2023
2024
2025
OI: [102138] Enhanced Air Traffic Control Tower Services for Airport Operations at Nonprimary Airports (2020-2026)
[102138-01] Establish Air Traffic Control Tower Criteria for Airport Operations at Nonprimary Airports (2020-2026)
OI: [104211] Surface Traffic Management (2016-2029)
[104211-21] TFDM Scheduler/Sequencer (2024-2029)
[104211-22] Surface Metering Operations (2024–2029)
[104211-23] Improved Electronic Flight Data Exchange (2019–2020)
[104211-25] Establish Enhanced Data Exchange with Flight Operators and Airport Operators (2016–2023)
Planned
Concept Exploration & Maturation
Development
Initial Operationally Available
Completed
Unmanned Aircraft Systems
Space
Increment supports NJIP Commitment


IMPROVED APPROACHES AND LOW-VISIBILITY OPERATIONS
2020
2021
2022
2023
2024
2025
OI: [107117] Low-Visibility/Ceiling Approach and Landing Operations (2015–2021)
[107117-12] SVGS for Approach (2016–2021)
OI: [107202] Low-Visibility Surface Operations (2016–2022)
[107202-21] Low-Visibility Taxi Operations (2016–2020)
[107202-22] EFVS/Accurate Position Information for Taxi (2016–2020)
[107202-23] Protected Low-Visibility Taxi Route (2016–2020)
Planned
Concept Exploration & Maturation
Development
Initial Operationally Available
Completed
Unmanned Aircraft Systems
Space
Increment supports NJIP Commitment


IMPROVED MULTIPLE RUNWAY OPERATIONS
2020
2021
2022
2023
2024
2025
CO: [102141] Improved Parallel Runway Operations for Arrivals (2012–2022)
[102141-22] Amend Standards for Simultaneous Independent Approaches – Dual with Offset (2016–2020)
[102141-24] Amend Standards for Simultaneous Independent Approaches – Triple (2016–2020)
OI: [102157] Improved Parallel Runway Operations with Airborne Applications (2020–2040)
[102157-32] MRS Reduction in the Terminal Environment (2021–2027)
OI: [102161] Improved Parallel Runway Operations for Departures (2019–2025)
[102161-01] Dependent Stagger Departures for CSPO (2019–2025)
[102161-02] Further Reductions to Departure Divergence Requirements for CSPO (2019–2025)
[102161-03] Decreased Separation Requirements for Mixed Operations on CSPR (2019–2025)
Planned
Concept Exploration & Maturation
Development
Initial Operationally Available
Completed
Unmanned Aircraft Systems
Space
Increment supports NJIP Commitment


PERFORMANCE BASED NAVIGATION
2020
2021
2022
2023
2024
2025
OI: [107120] Resilient PBN Operations (2021–2035)
[107120-01] Resilient En Route PBN Operations for DME-Equipped Aircraft (2021–2030)
OI: [108209] Increase Capacity and Efficiency Using RNAV and RNP (2010–2021)
[108209-12] Metroplex PBN Procedures (2014–2020)
[108209-14] Transition to PBN Routing for Cruise Operations (2014–2021)
[108209-20] Advanced and Efficient RNP (2013–2020)
[108209-22] Expansion of Metroplex PBN Procedures (2017–2021)
[108209-23] EoR Independent Duals and Triples with RF Procedures (2017–2020)
Planned
Concept Exploration & Maturation
Development
Initial Operationally Available
Completed
Unmanned Aircraft Systems
Space
Increment supports NJIP Commitment


PERFORMANCE BASED NAVIGATION
2020
2021
2022
2023
2024
2025
OI: [108215] Increase Capacity and Efficiency Using Streamlined PBN Services (2021–2030)
[108215-01] PBN Airways (2021–2025)
[108215-02] Established on RNP Independent Duals and Triples with TF Procedures (2021–2025)
[108215-05] MARS (2023–2030)
Planned
Concept Exploration & Maturation
Development
Initial Operationally Available
Completed
Unmanned Aircraft Systems
Space
Increment supports NJIP Commitment

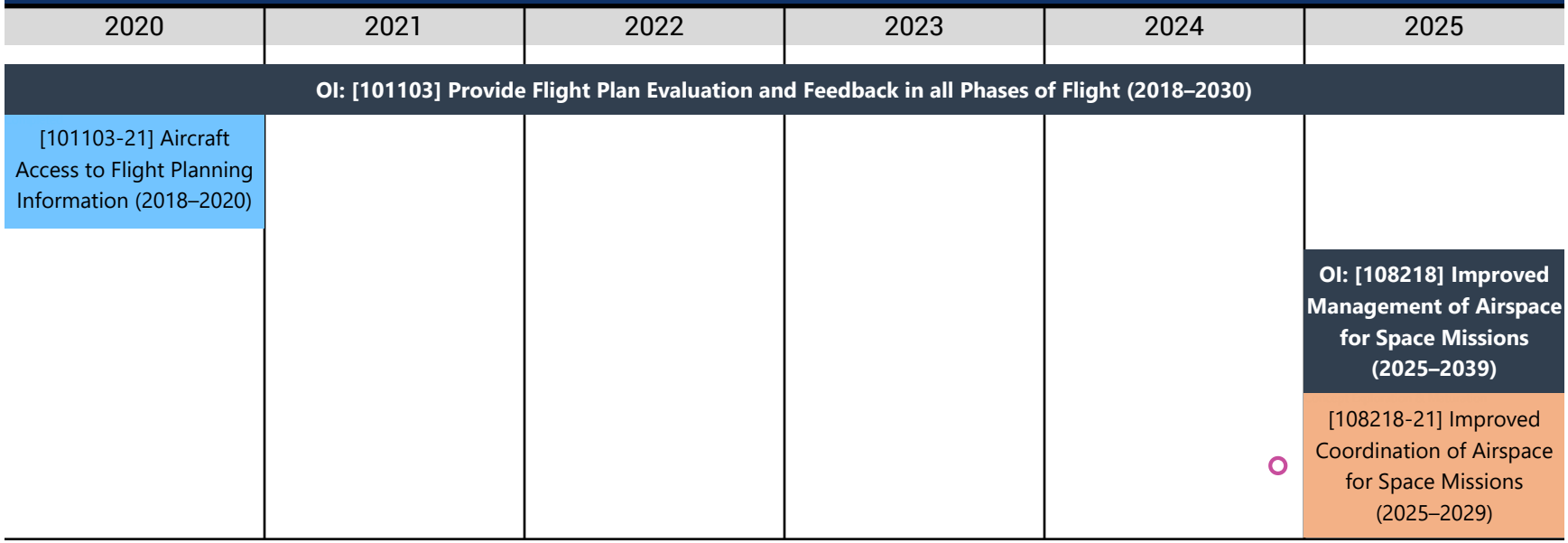
TIME BASED FLOW MANAGEMENT

2020	2021	2022	2023	2024	2025
OI: [104117] Improved Departure Scheduling into Overhead Streams (2015–2035)					
	[104117-21] Expansion of the IDAC (2021–2025)				

Planned | Concept Exploration & Maturation | Development | Initial Operationally Available | Completed

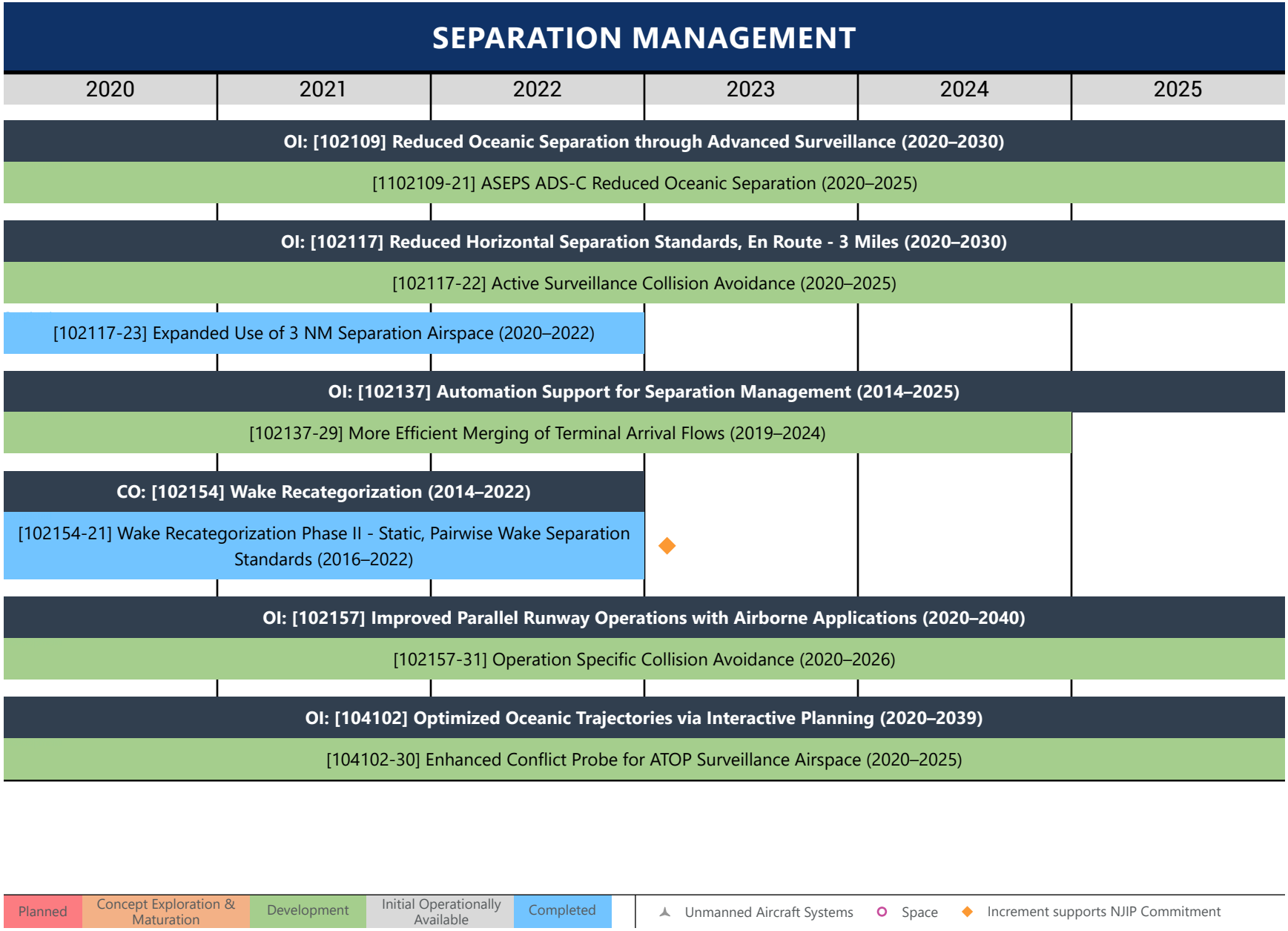
Unmanned Aircraft Systems | Space | Increment supports NJIP Commitment

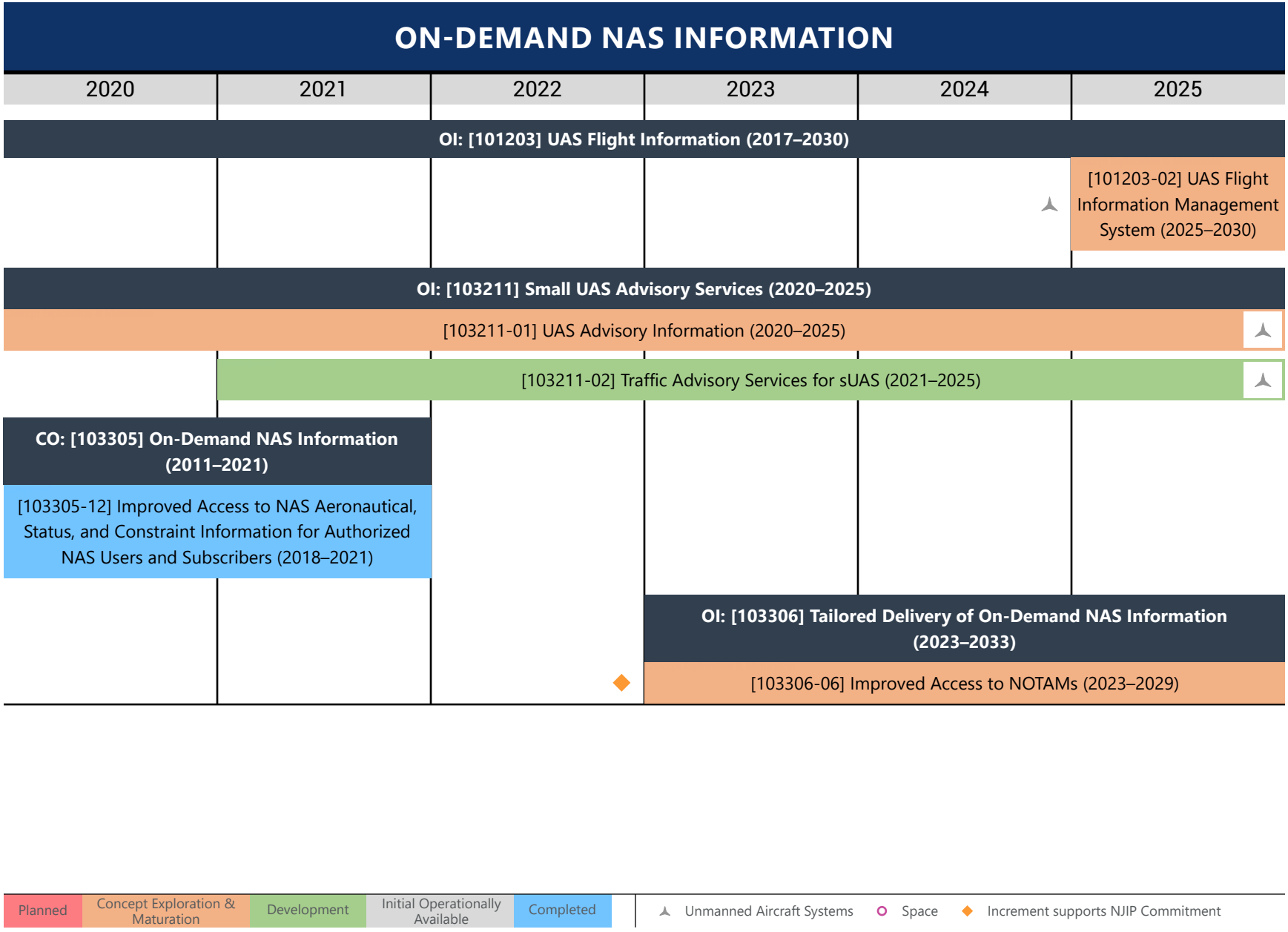
COLLABORATIVE AIR TRAFFIC MANAGEMENT



Planned | Concept Exploration & Maturation | Development | Initial Operationally Available | Completed

Unmanned Aircraft Systems | Space | Increment supports NJIP Commitment


SEPARATION MANAGEMENT
2020
2021
2022
2023
2024
2025
OI: [102109] Reduced Oceanic Separation through Advanced Surveillance (2020–2030)
[1102109-21] ASEPS ADS-C Reduced Oceanic Separation (2020–2025)
OI: [102117] Reduced Horizontal Separation Standards, En Route - 3 Miles (2020–2030)
[102117-22] Active Surveillance Collision Avoidance (2020–2025)
[102117-23] Expanded Use of 3 NM Separation Airspace (2020–2022)
OI: [102137] Automation Support for Separation Management (2014–2025)
[102137-29] More Efficient Merging of Terminal Arrival Flows (2019–2024)
CO: [102154] Wake Recategorization (2014–2022)
[102154-21] Wake Recategorization Phase II - Static, Pairwise Wake Separation Standards (2016–2022)
OI: [102157] Improved Parallel Runway Operations with Airborne Applications (2020–2040)
[102157-31] Operation Specific Collision Avoidance (2020–2026)
OI: [104102] Optimized Oceanic Trajectories via Interactive Planning (2020–2039)
[104102-30] Enhanced Conflict Probe for ATOP Surveillance Airspace (2020–2025)
Planned
Concept Exploration & Maturation
Development
Initial Operationally Available
Completed
Unmanned Aircraft Systems
Space
Increment supports NJIP Commitment

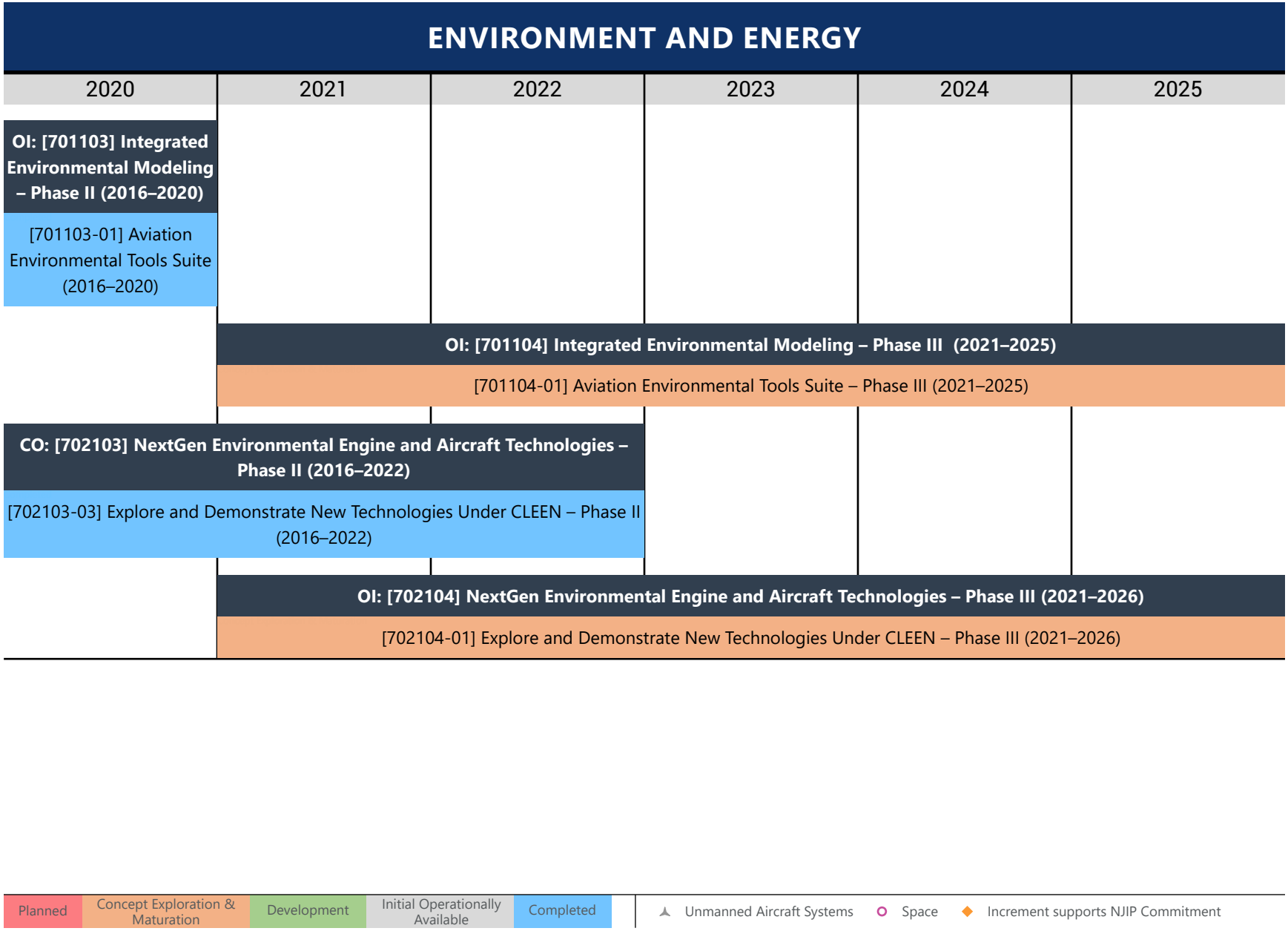

ON-DEMAND NAS INFORMATION
2020
2021
2022
2023
2024
2025
OI: [101203] UAS Flight Information (2017–2030)
[101203-02] UAS Flight Information Management System (2025–2030)
OI: [103211] Small UAS Advisory Services (2020–2025)
[103211-01] UAS Advisory Information (2020–2025)
[103211-02] Traffic Advisory Services for sUAS (2021–2025)
CO: [103305] On-Demand NAS Information (2011–2021)
[103305-12] Improved Access to NAS Aeronautical, Status, and Constraint Information for Authorized NAS Users and Subscribers (2018–2021)
OI: [103306] Tailored Delivery of On-Demand NAS Information (2023–2033)
[103306-06] Improved Access to NOTAMs (2023–2029)
Planned
Concept Exploration & Maturation
Development
Initial Operationally Available
Completed
Unmanned Aircraft Systems
Space
Increment supports NJIP Commitment

ON-DEMAND NAS INFORMATION

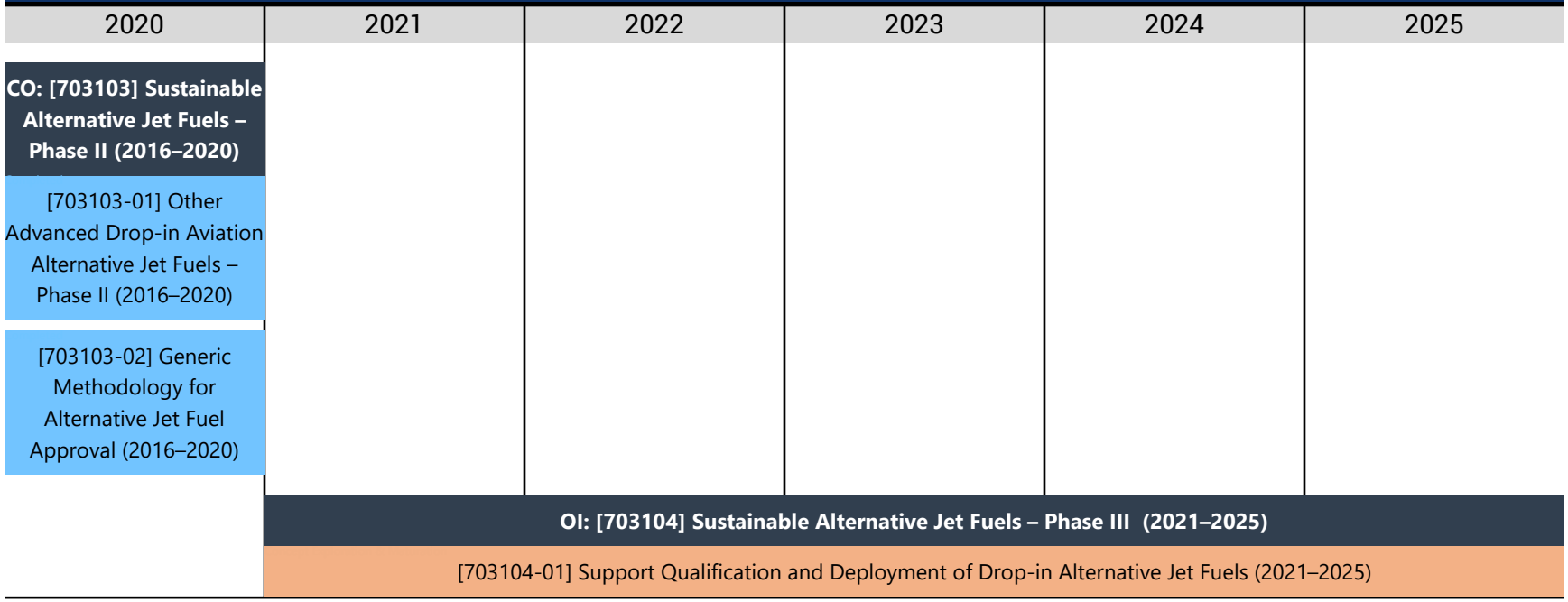
2020	2021	2022	2023	2024	2025
OI: [108212] Improved Management of SAA (2015–2030)					
					[108212-11] ANSP Real-Time Status for SAAs (2025–2029)
	[108212-21] Improved Access to SAA Information (2021–2029)				

Planned | Concept Exploration & Maturation | Development | Initial Operationally Available | Completed

Unmanned Aircraft Systems | Space | Increment supports NJIP Commitment

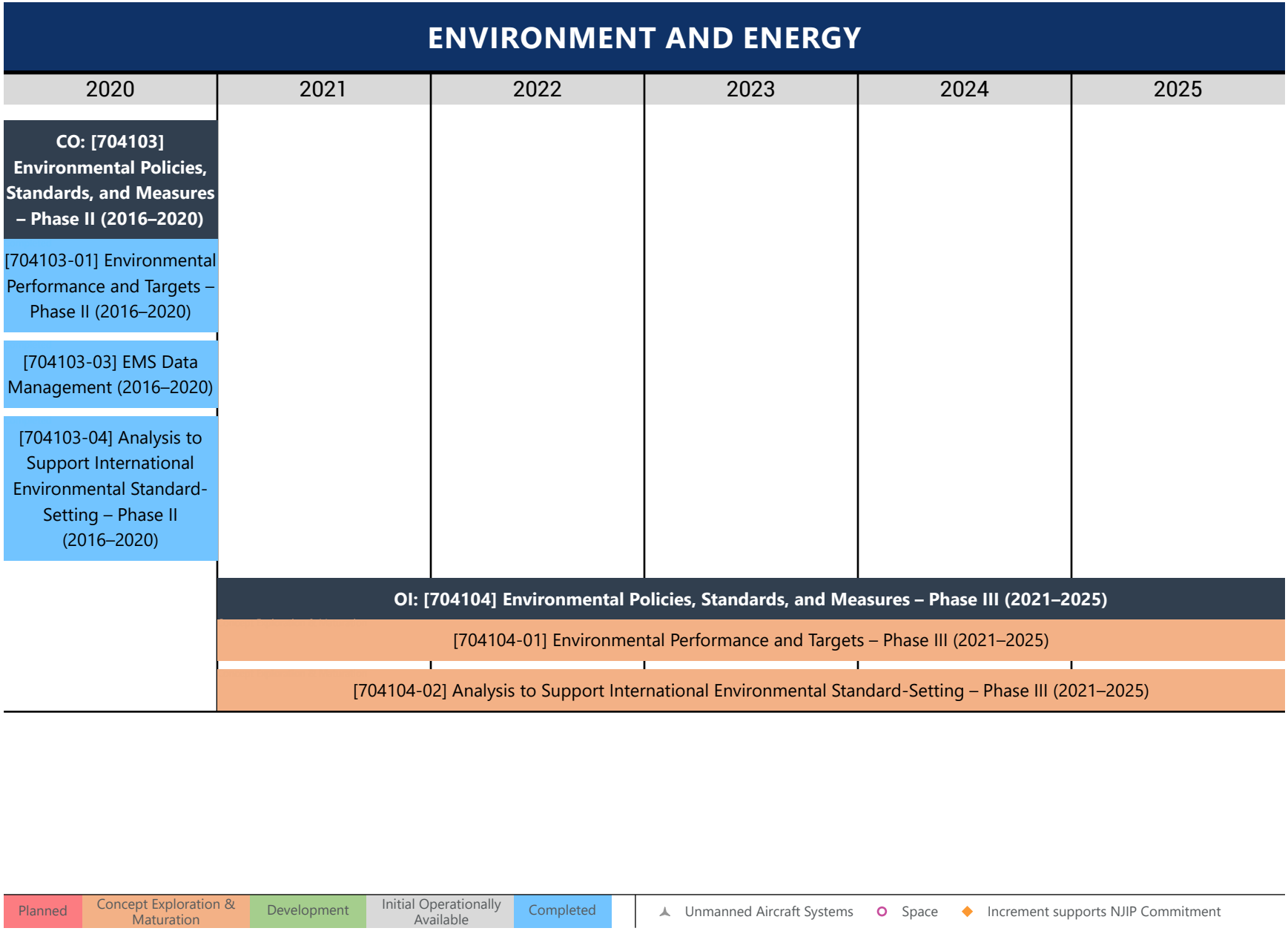

ENVIRONMENT AND ENERGY
2020
2021
2022
2023
2024
2025
OI: [701103] Integrated Environmental Modeling – Phase II (2016–2020)
[701103-01] Aviation Environmental Tools Suite (2016–2020)
OI: [701104] Integrated Environmental Modeling – Phase III (2021–2025)
[701104-01] Aviation Environmental Tools Suite – Phase III (2021–2025)
CO: [702103] NextGen Environmental Engine and Aircraft Technologies – Phase II (2016–2022)
[702103-03] Explore and Demonstrate New Technologies Under CLEEN – Phase II (2016–2022)
OI: [702104] NextGen Environmental Engine and Aircraft Technologies – Phase III (2021–2026)
[702104-01] Explore and Demonstrate New Technologies Under CLEEN – Phase III (2021–2026)
Planned
Concept Exploration & Maturation
Development
Initial Operationally Available
Completed
Unmanned Aircraft Systems
Space
Increment supports NJIP Commitment

ENVIRONMENT AND ENERGY

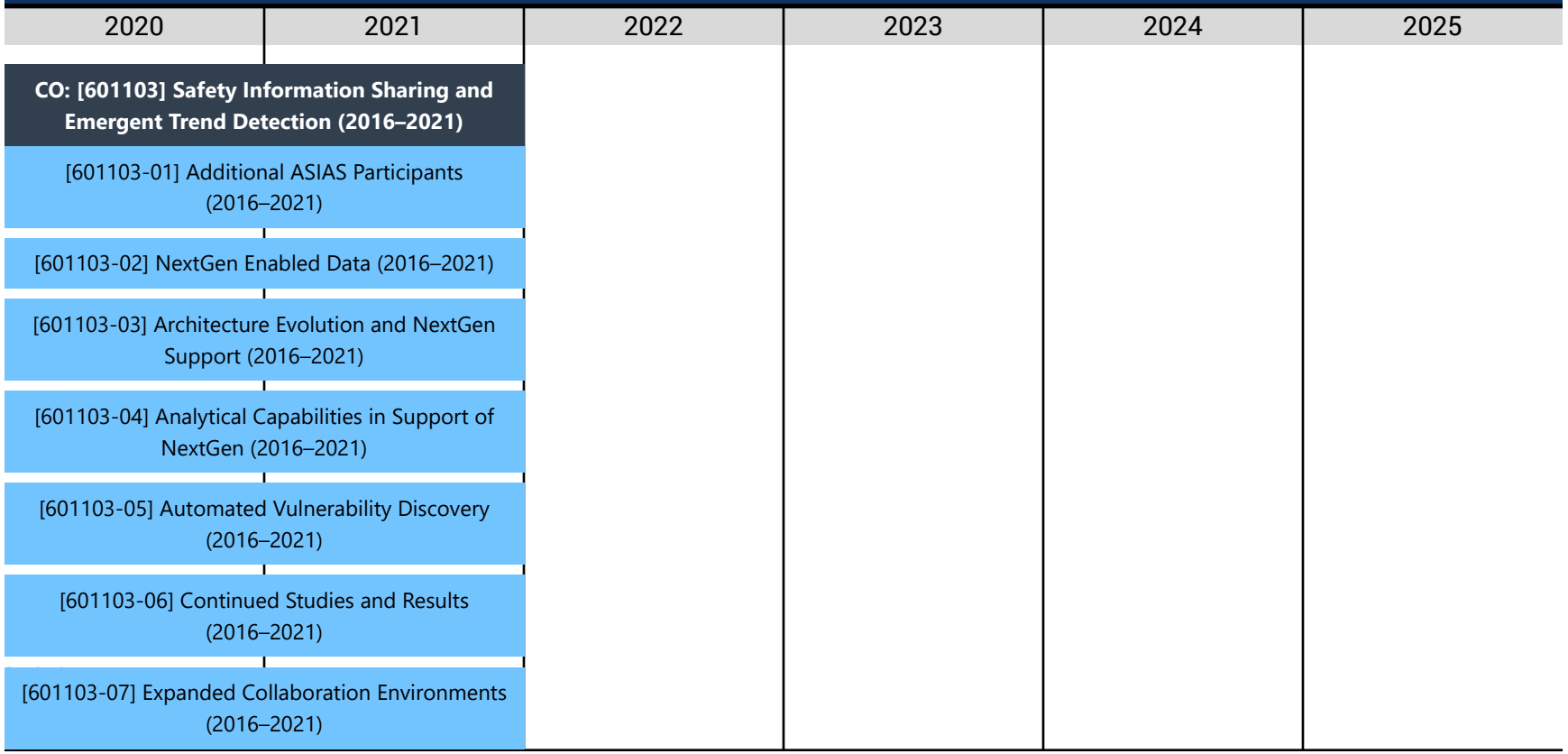


Planned | Concept Exploration & Maturation | Development | Initial Operationally Available | Completed

Unmanned Aircraft Systems | Space | Increment supports NJIP Commitment

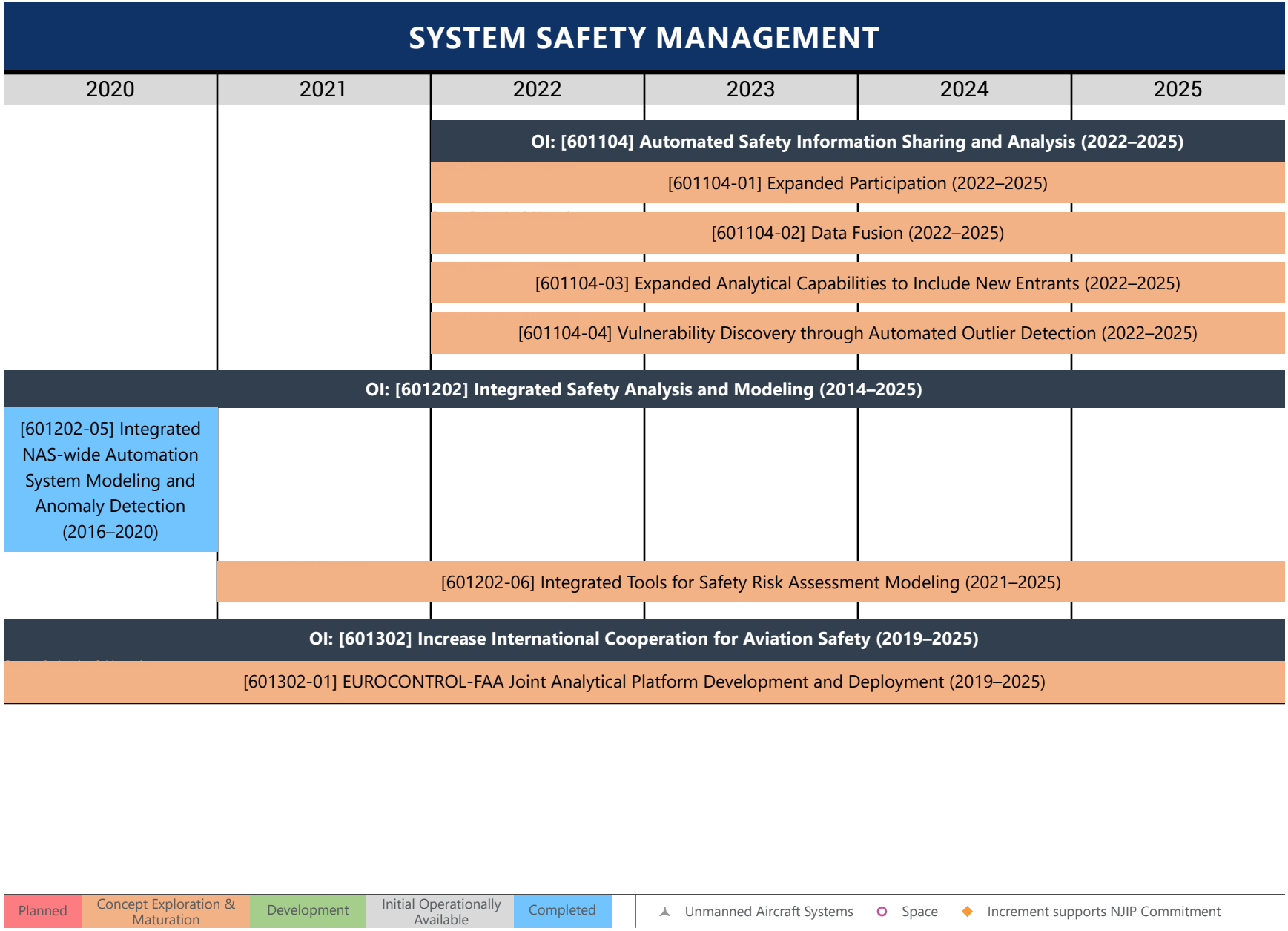

ENVIRONMENT AND ENERGY
2020
2021
2022
2023
2024
2025
CO: [704103] Environmental Policies, Standards, and Measures – Phase II (2016–2020)
[704103-01] Environmental Performance and Targets – Phase II (2016–2020)
[704103-03] EMS Data Management (2016–2020)
[704103-04] Analysis to Support International Environmental Standard-Setting – Phase II (2016–2020)
OI: [704104] Environmental Policies, Standards, and Measures – Phase III (2021–2025)
[704104-01] Environmental Performance and Targets – Phase III (2021–2025)
[704104-02] Analysis to Support International Environmental Standard-Setting – Phase III (2021–2025)
Planned
Concept Exploration & Maturation
Development
Initial Operationally Available
Completed
Unmanned Aircraft Systems
Space
Increment supports NJIP Commitment

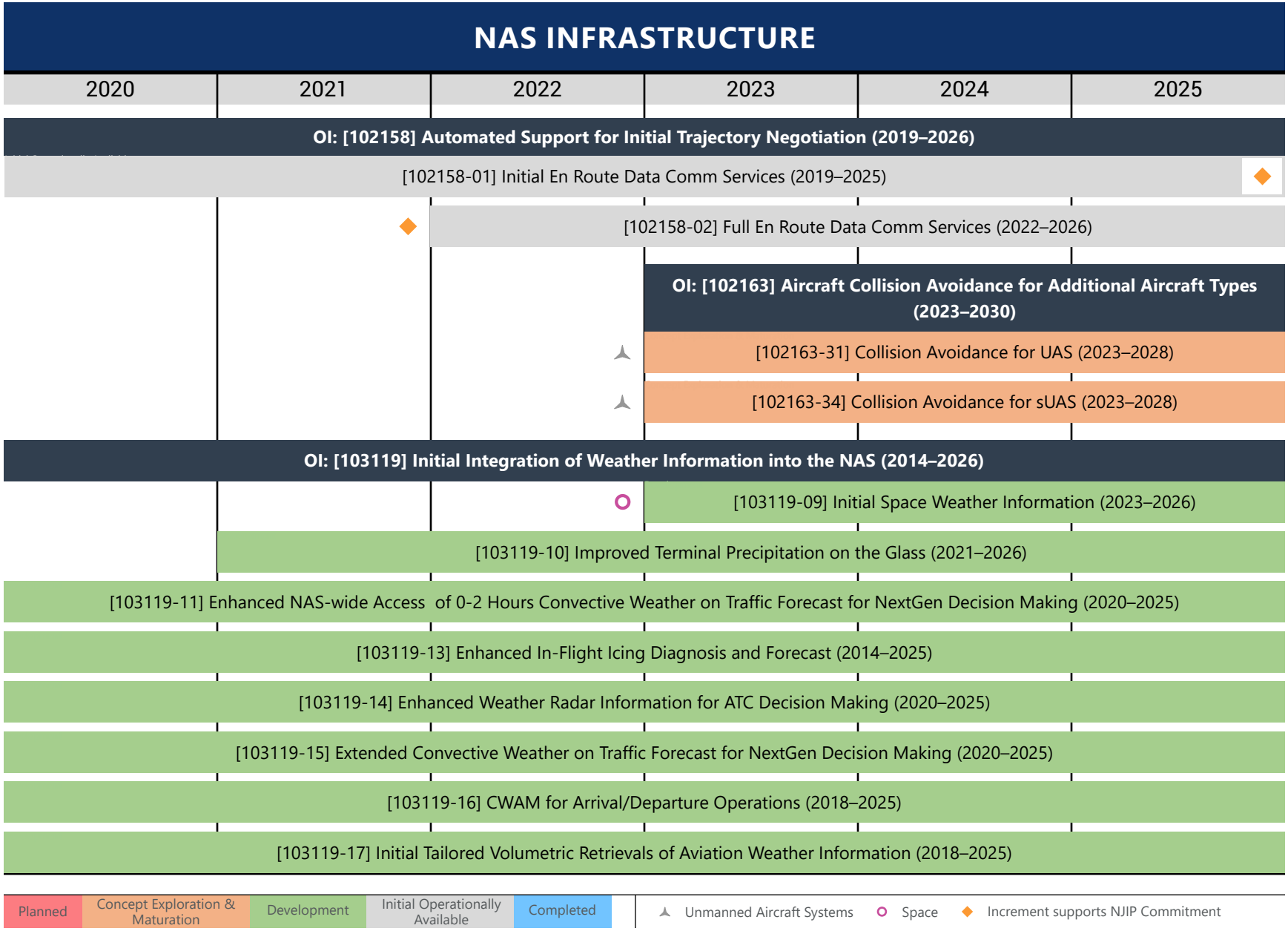
SYSTEM SAFETY MANAGEMENT



Planned | Concept Exploration & Maturation | Development | Initial Operationally Available | Completed

Unmanned Aircraft Systems | Space | Increment supports NJIP Commitment


SYSTEM SAFETY MANAGEMENT
2020
2021
2022
2023
2024
2025
OI: [601104] Automated Safety Information Sharing and Analysis (2022–2025)
[601104-01] Expanded Participation (2022–2025)
[601104-02] Data Fusion (2022–2025)
[601104-03] Expanded Analytical Capabilities to Include New Entrants (2022–2025)
[601104-04] Vulnerability Discovery through Automated Outlier Detection (2022–2025)
OI: [601202] Integrated Safety Analysis and Modeling (2014–2025)
[601202-05] Integrated NAS-wide Automation System Modeling and Anomaly Detection (2016–2020)
[601202-06] Integrated Tools for Safety Risk Assessment Modeling (2021–2025)
OI: [601302] Increase International Cooperation for Aviation Safety (2019–2025)
[601302-01] EUROCONTROL-FAA Joint Analytical Platform Development and Deployment (2019–2025)
Planned
Concept Exploration & Maturation
Development
Initial Operationally Available
Completed
Unmanned Aircraft Systems
Space
Increment supports NJIP Commitment


NAS INFRASTRUCTURE
2020
2021
2022
2023
2024
2025
OI: [102158] Automated Support for Initial Trajectory Negotiation (2019–2026)
[102158-01] Initial En Route Data Comm Services (2019–2025)
[102158-02] Full En Route Data Comm Services (2022–2026)
OI: [102163] Aircraft Collision Avoidance for Additional Aircraft Types (2023–2030)
[102163-31] Collision Avoidance for UAS (2023–2028)
[102163-34] Collision Avoidance for sUAS (2023–2028)
OI: [103119] Initial Integration of Weather Information into the NAS (2014–2026)
[103119-09] Initial Space Weather Information (2023–2026)
[103119-10] Improved Terminal Precipitation on the Glass (2021–2026)
[103119-11] Enhanced NAS-wide Access of 0-2 Hours Convective Weather on Traffic Forecast for NextGen Decision Making (2020–2025)
[103119-13] Enhanced In-Flight Icing Diagnosis and Forecast (2014–2025)
[103119-14] Enhanced Weather Radar Information for ATC Decision Making (2020–2025)
[103119-15] Extended Convective Weather on Traffic Forecast for NextGen Decision Making (2020–2025)
[103119-16] CWAM for Arrival/Departure Operations (2018–2025)
[103119-17] Initial Tailored Volumetric Retrievals of Aviation Weather Information (2018–2025)
Planned
Concept Exploration & Maturation
Development
Initial Operationally Available
Completed
Unmanned Aircraft Systems
Space
Increment supports NJIP Commitment

Beyond 2024

NextGen fundamentally changes aviation communications, navigation, and surveillance. It provides the integrated information environment to enable the transition to a future NAS that will enable the next iteration of airspace modernization. More work will still need to be accomplished as Data Communications, Terminal Flight Data Manager, and Weather programs continue to be implemented or conclude in FY 2025. Unfinished programs will transition to a new FAA office in charge of airspace modernization.

Future efforts will enable more integration of a wide range of new entrant operations in the NAS in part by reshaping information sharing. Continued NAS transformation will harness data in decision-making to make flights more efficient and improve air travel safety. NAS modernization will take advantage of the ongoing information revolution with increases in telecommunication, computational power, and storage, along with new technologies that secure and learn from accumulated data.

05

APPENDIX B
ABBREVIATIONS, ACRONYMS, INITIALISMS

ADS-B	Automatic Dependent Surveillance–Broadcast
ADS-C	Automatic Dependent Surveillance–Contract
ANSP	Air Navigation Service Provider
ASEPS	Advanced Surveillance - Enhanced Procedural Separation
ASIAS	Aviation Safety Information Analysis and Sharing
ATC	Air Traffic Control
ATOP	Advanced Technologies and Oceanic Procedures
CAS-A	CDTI-Assisted Separation on Approach
CAVS	CDTI-Assisted Visual Separation
CDTI	Cockpit Display of Traffic Information
CERAP	Center Radar Approach Control
CLEEN	Continuous Lower Energy, Emissions, and Noise
CO	Current Operation
CPDLC	Controller Pilot Data Link Communications
CSPO	Closely Spaced Parallel Operations
CSPR	Closely Spaced Parallel Runways
CSS-Wx	Common Support Services–Weather
CWAM	Convective Weather Avoidance Model
Data Comm	Data Communications
DME	Distance Measuring Equipment
EA	Enterprise Architecture
EFVS	Enhanced Flight Vision System
EMS	Environmental Management Systems
EoR	Established on Required Navigation Performance
ERAM	En Route Automation Modernization
FAA	Federal Aviation Administration
FMDS	Flow Management Data and Services
FY	Fiscal Year
GPS	Global Positioning System
IDAC	Integrated Departure/Arrival Capability
I-IM	Initial Interval Management

MARS	Multiple Airport Route Separation
MRS	Minimum Radar Separation
NAC	NextGen Advisory Committee
NAS	National Airspace System
NextGen	Next Generation Air Transportation System
NJIP	NextGen Priorities Joint Implementation Plan
NM	Nautical Mile
NOTAM	Notice to Air Missions
NSIP	NAS Segment Implementation Plan
NWP	NextGen Weather Processor
OI	Operational Improvement
PBN	Performance Based Navigation
RF	Radius-to-Fix
RNAV	Area Navigation
RNP	Required Navigation Performance
SAA	Special Activity Airspace
sUAS	Small Unmanned Aircraft Systems
SVGS	Synthetic Vision Guidance Systems
SWIM	System Wide Information Management
TBFM	Time Based Flow Management
TBO	Trajectory Based Operations
TF	Track-to-Fix
TFDM	Terminal Flight Data Manager
TFMS	Traffic Flow Management System
TRACON	Terminal Radar Approach Control
UAS	Unmanned Aircraft Systems

U.S. Department of Transportation

Federal Aviation Administration

800 Independence Ave, SW

Washington, DC 20591

www.faa,gov/nextgen