# NAS Enterprise Architecture



Infrastructure Roadmaps v19.0

#### **BASELINE**

February 2025



#### **Infrastructure Roadmap Overview**

#### What are the Infrastructure Roadmaps?

- The FAA 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 <u>Capital Investment Plan (CIP)</u> investment projects and systems identified in the NSIP that will deliver the necessary functionality to enable OIs and BTIs.

#### **Guidelines for Understanding the Roadmaps**

Timeline (Calendar Year)

- The Infrastructure Roadmaps are organized by Domain (Automation, Communication, etc.) and depict projects, systems, services, decision points, and support activities.
- The timeline is in calendar years and shows a 17-year outlook.
- The roadmaps have swim lanes for Infrastructure (white), Support Activities (green), and Platform/Compute (purple).
- The DP diamonds represent the quarter in which a decision will occur.
- The Support Activity bars represent the dates that work is being performed on the activity.
- The Project bars represent the dates that CIP funding is allocated to a project.
- The System and Service bars represent the dates that a system or service is operational, with red lines indicating sustainment, drawdown, or convergence

#### **Roadmap Shapes Information Decision Point Shapes Information** Milestone Decommission **Decision Point Fill Colors** Number System / Service / Support Activity AMS Decision Point (CRDR, IARD, IID, FID, BCD) **System Successor** Strategy (JRC) XYZ Project System in Draw-Down Mode Milestone (Regulatory) Strategy (Other) NextGen Project **Support Activity** XYZ (Denoted by G CIP Number) Milestone (Other) Secondary DP XYZ Other Architecture Object Support Activity which is primarily tracked on another NAS EA Roadmap XYZ Facility Type **Decision Point Border Styles** XYZ Planned Support Activity AES/2040 Vision Activities Future Baselined Completed Planned / Unfunded XYZ | Planned / Unfunded (Applies to any fill color type) 2024 2025 2026 High Visibility

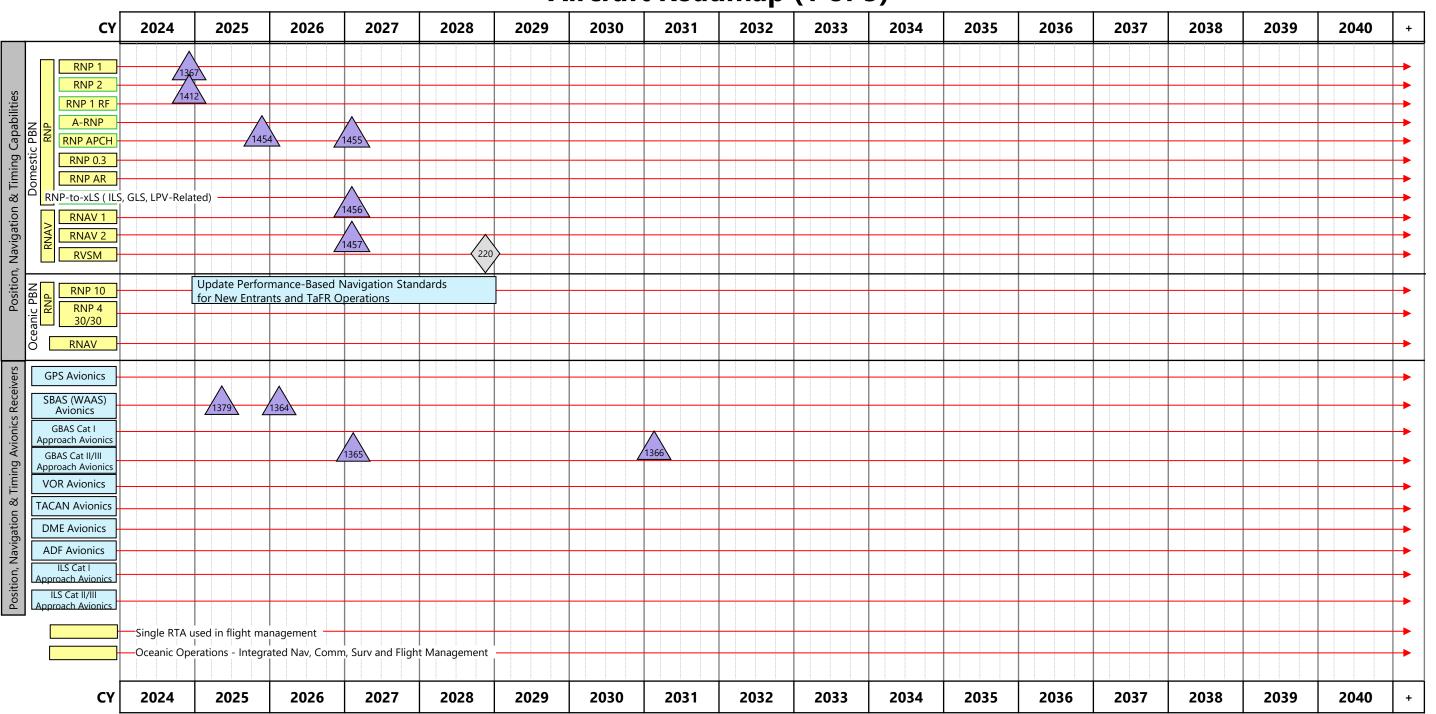
**Infrastructure Roadmap Legend** 

# **Aircraft**

The Aircraft roadmap presents planned advances in Airframe and Avionics in coordination with NAS NextGen improvements.

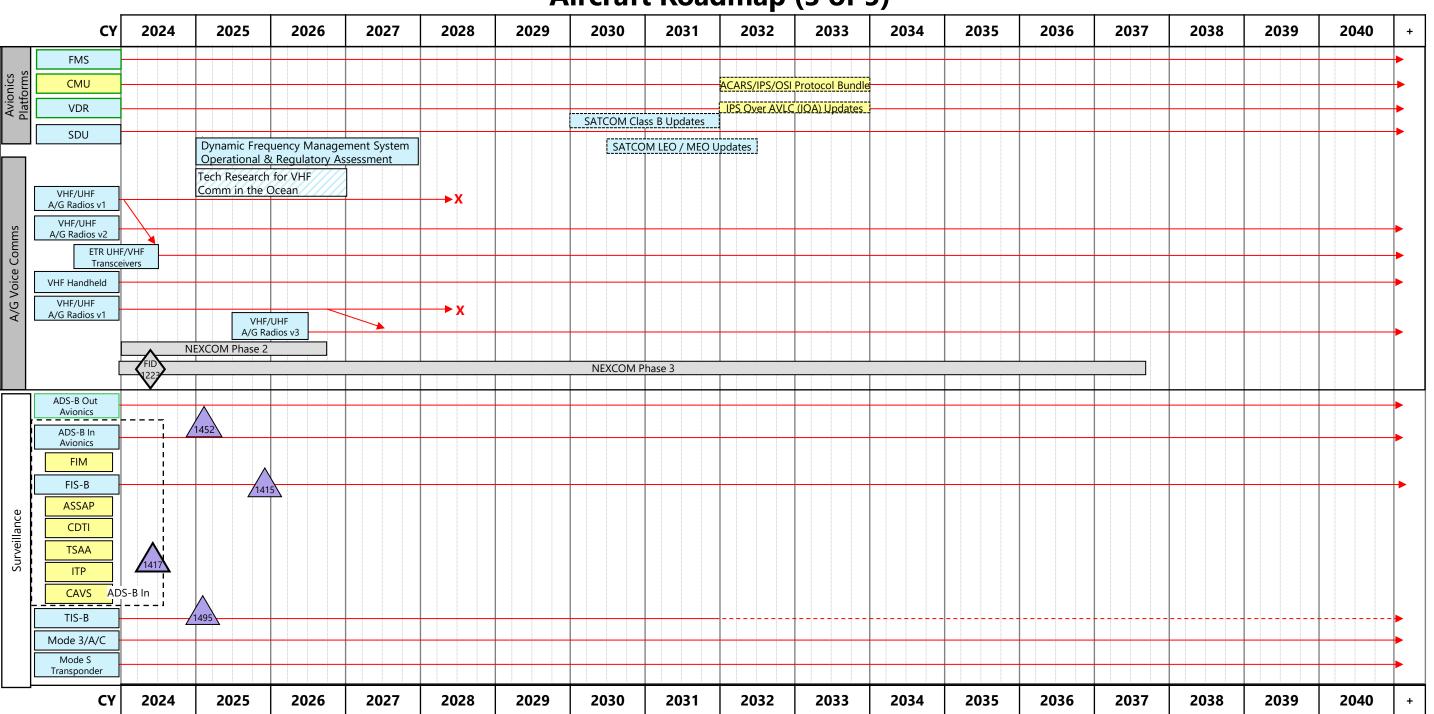
Items with a green outline are components of the FAA Minimum Capability List (MCL)

#### Aircraft Roadmap (1 of 5)



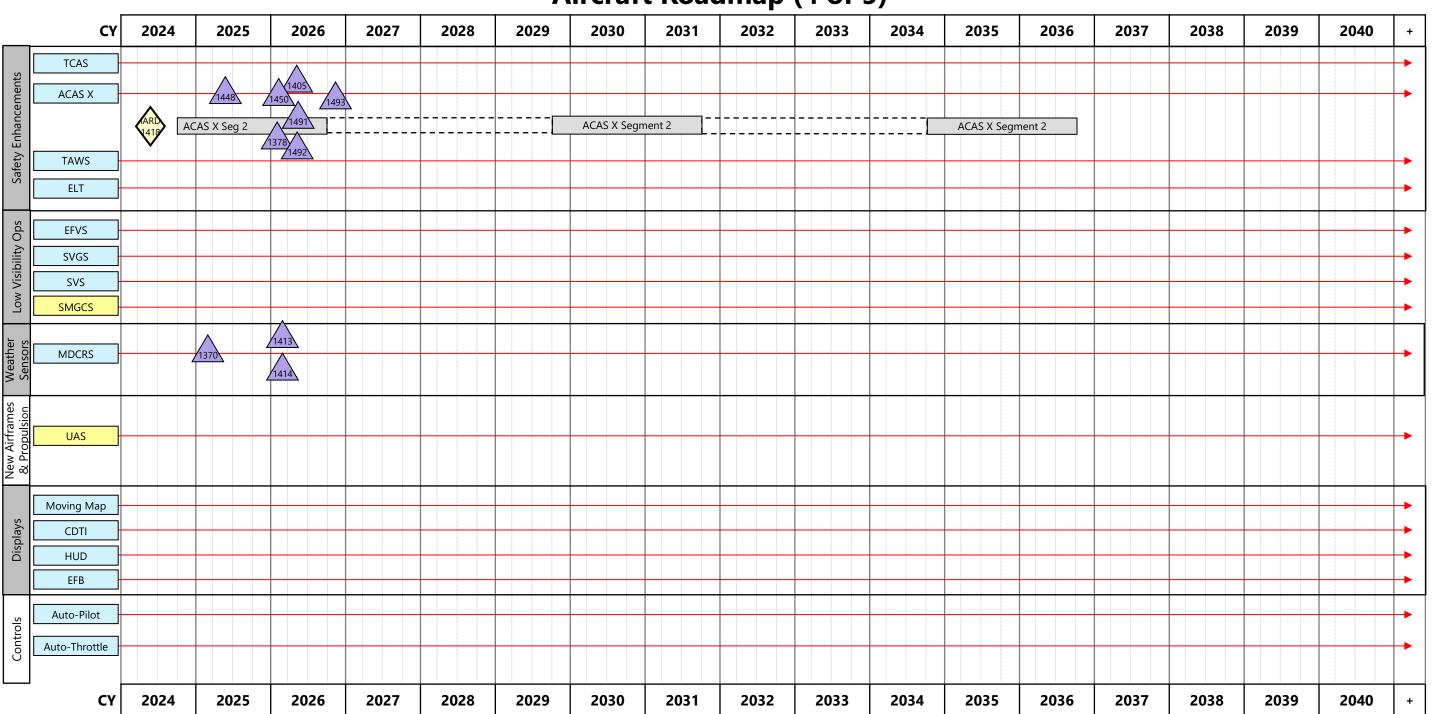
Aircraft Roadmap (2 of 5) Items with a green outline are components of the FAA Minimum Capability List (MCL) 2029 2030 2031 2024 2025 2026 2027 2028 2032 2033 2034 2035 2036 2037 2038 2039 2040 CY **FANS CPDLC Full Services Initial Services FANS CPDLC Enhanced Services** Domestic & Oceanic Ops ADS-C Oceanic Ops AFN B2 CPDLC Accommodation B2 CPDLC v. 4 4DTRAD Svcs 1372 **CPDLC** Initial / Full / Enhanced Services B2 CPDLC v. 4 Interval Mgmt 1416 ADS-C CM MIS Mobile IFR Svcs CATI A/G Traj Sync (Advisory) CDM Airborne CDM Surface CDM Connected Aircraft Engineering Taxi Info Taxi Info **ATS Legacy** PDC & D-ATIS Communications **AOC Safety** -Weight & Balance AOC TWIP, MDCRS Non-safety Commercial IPv6 Commercial IPv6 Non-Safety Services Safety Services IPS Security Data ACARS/IPS/OSI Protocol Bundle 1494 A/G ACARS Oceanic & HF /1357 Remote Ops SATCOM Oceanic & Remote Ops Class C VDL-0 1358 VDL-2 ACARS Over AVLC (AOA) IPS Over AVLC (IOA) Updates Oceanic / Offshore / Remote Ops SATCOM Oceanic Ops SATCOM Class B Updates Class B Domestic & Oceanic Ops 1375 1374 5G Terrestrial 5G Terrestrial Non-Terrestria Non-Terrestrial Safety Services Non-Protected Investigation into Methods to Use Smart SATCOM Routing for Commercial Networks for SATCOM LEO / MEO Performance-Based Services LEO / MEO Safety Services Non-Safety Services 2036 2026 2028 2029 2030 2031 2032 2033 2034 2037 2039 2024 2025 2027 2035 2038 2040 Items with a green outline are components of the FAA Minimum Capability List (MCL)

#### Aircraft Roadmap (3 of 5)



Items with a green outline are components of the FAA Minimum Capability List (MCL)

#### Aircraft Roadmap (4 of 5)



#### Aircraft Roadmap (5 of 5)

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	CY	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	+
	Airworthiness		1446																
	i i	Detect and Avoid (DAA) for all UAS																	
UAS SC-228	Detect and Avoid (DAA)		1447	1450															
	Command and Control (C2)		369																
	Workgroups 3 & 4																		
Human Performance		1134	Enhanced H Heads-Up/I	Helicopter Visio Head-Worn Di	on Systems: Hu splay Technolog	man Factors Ex gies and Conce	amination of ots												
	CY	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	+

## **Aircraft Roadmap: Assumptions**

Identifier	Description
AC-01	The roadmap identifies four phases  a) CONOPs development and R&D in required areas  b) Standards development  c) AVS Approval  d) ATC Procedure development  e) Deployment. After the standards process is complete, and manufacturers have developed, integrated, fully tested and made new avionics available, aircraft, engines and fuels available, an additional 7 to 10 years is needed to achieve wide scale equipage of a new capability  1. Different aircraft are expected to equip with different equipment. This roadmap does not currently distinguish between aircraft types.
AC-02	The aircraft roadmap includes environment research areas and assumptions and linkage to Mission Support EA.
AC-03	Any aircraft to include any UAS that participates in the NAS must operate in a way that is transparent to the ANSP and ATSP.
AC-04	The Minimum Capability (MCL) items documented in the Aircraft roadmap are accurate as of the September 2019 draft of the MCL.
AC-05	<ul> <li>The Minimum Capabilities List (MCL) provides clear and comprehensive guidance to support equipage across all fleets operating in the National Airspace System (NAS). The MCL's purpose is to:</li> <li>Define the minimum aircraft capabilities and associated equipment needed to maximize benefits from FAA investment and operational improvements</li> <li>Guide "forward-fit" aircraft equipage and inform operator investment decisions</li> <li>Maximize the return on investment for both the FAA and airspace users</li> </ul>
AC-06	The yellow roadmap symbol is being utilized as aircraft operational capabilities on this roadmap.

## **Aircraft Roadmap: Decision Points**

DP#	Target Date CY	Primary Domain	Туре	Name	
220	2028 Q4	Navigation	Strategy (Other)	Decision to cut over to Dual Frequency IOC Operations	
1129	2030 Q4	Communication	FID	Final Investment Decision (FID) for Data Comm IP Gateway	
1134	2024 Q3	Human Systems Integration	Strategy (Other)	Decision on the Approval and Implementation Strategy of Human Factors Guidance for Helicopter Advanced Vision Systems	
1223	2024 Q2	Communication	FID	Final Investment Decision (FID) for NEXCOM Phase 3	
1360	2024 Q2	Aircraft	Other Milestone	DO-351B, Interoperability Standard for Baseline 2 ATS Data Communications (Baseline 2 Interop Standard)	
1361	2024 Q1	Aircraft	Other Milestone	DO-352B, Interoperability Standard for Baseline 2 ATS Data Communications, FANS 1/A Accommodation (FANS 1/A - Baseline 2 Interop Standard)	
1362	2024 Q1	Aircraft	Other Milestone	DO-353B, Interoperability Standard for Baseline 2 ATS Data Communications, ATN Baseline 1 Accommodation (ATN Baseline 1 - Baseline 2 Interop Standard)	
1364	2025 Q4	Aircraft	Other Milestone	GNSS (SBAS) L1/L5 MOPS Update to GPS/Galileo/SBAS MOPS for dual-frequency equipment	
1365	2027 Q1	Aircraft	Other Milestone	GNSS (GBAS) L1/L5 MOPS and ICD Initial MOPS and ICD for Verification and Validation	
1366	2031 Q1	Aircraft	Other Milestone	GNSS (GBAS) L1/L5 MOPS and ICD Validated GPS/Galileo/GBAS MOPS and ICD for dual-frequency equipment	
1367	2024 Q4	Aircraft	Other Milestone	MOPS DO-283C	
1369	2025 Q1	Aircraft	Other Milestone	C2 Link MOPS for Cellular Networks	
1370	2025 Q1	Aircraft	Other Milestone	DO-364A / ED-XXX Minimum Aviation System Performance Standards (MASPS) for Aeronautical Information / Meteorological Data Link Services	
1372	2025 Q4	Aircraft	Other Milestone	DO-XXX, ATS Data Communication Verification Test Standard	
1373	2026 Q4	Aircraft	Other Milestone	DO-383A, Guidance on VDL Mode 2 Air/Ground Interoperability	
1374	2024 Q2	Aircraft	Other Milestone	DO-343E MASPS – Inmarsat SBB and Iridium Certus Updates	
1375	2024 Q2	Aircraft	Other Milestone	DO-262G MOPS - Inmarsat SBB and Iridium Certus Updates	
1376	2027 Q2	Aircraft	Other Milestone	DO-343F MASPS – Iridium Certus updates for network update	
1377	2027 Q2	Aircraft	Other Milestone	DO-262H MOPS – Iridium Certus updates for network update	
1378	2026 Q1	Aircraft	Other Milestone	Minimal Operational Performance Standards (MOPS) for Active Surveillance Systems	
1379	2025 Q2	Aircraft	Other Milestone	White Paper on BeiDou System and BeiDou SBAS	
1380	2024 Q3	Aircraft	Other Milestone	DO-406 - Minimum Operational Performance Standards for Ultra High Frequency Airborne Radio Systems Supporting UAS C2 Link Systems	
1405	2026 Q1	Aircraft	Other Milestone	Minimal Operational Performance Standards (MOPS) for ACAS Xr	
1411	2024 Q4	Aircraft	Other Milestone	C2 Link MOPS (Terrestrial) (DO-362B)	
1412	2024 Q4	Aircraft	Other Milestone	MASP DO-236E	

# **Aircraft Roadmap: Decision Points**

DP#	Target Date CY	Primary Domain	Туре	Name						
1413	2026 Q1	Aircraft	Other Milestone	DO-XXX / ED-XXX Minimum Aviation System Performance Standards (MASPS) for Automated Atmospheric Turbulence Derivation Techniques						
1414	2026 Q1	Aircraft	Other Milestone	RTCA Report - Recommendation(s) Regarding Possible Standards to Support Aircraft-Based Meteorological Observation Dependent Applications						
1415	2025 Q4	Aircraft	Other Milestone	DO-358C Minimum Operational Performance Standards (MOPS) for Flight Information Services Broadcast (FIS-B) with Universal Access Transceiver (UAT)						
1416	2024 Q3	Aircraft	Other Milestone	DO-280B Change 2: Interoperability Requirements Standard for Aeronautical Telecommunication Network Baseline 1 (ATN B1 Interop Standard) Change 2						
1417	2024 Q2	Aircraft	Other Milestone	Change 1 to DO-317C, Aircraft Surveillance Applications (ASA) MOPS						
1418	2024 Q2	Aircraft	IARD	Investment Analysis Readiness Decision (IARD) for ACAS-X Segment 2						
1446	2025 Q3	Aircraft	Other Milestone	MASPS: Navigation for Automatic Taxi (DO-VVV)						
1447	2025 Q1	Aircraft	Other Milestone	DAA MOPS (DO-365C Change 1)						
1448	2025 Q2	Aircraft	Other Milestone	DAA Radar MOPS Update (DO-366B)						
1449	2025 Q3	Aircraft	Other Milestone	MASPS for DAA Supporting Taxi Operations (DO-WWW)						
1450	2026 Q1	Aircraft	Other Milestone	DAA MOPS (DO-365D)						
1451	2025 Q2	Aircraft	Other Milestone	RTCA Report (RR) for Users of DO- 377B for Deriving C2 Link System Requirements						
1452	2025 Q1	Aircraft	Other Milestone	DO-260C						
1453	2024 Q3	Aircraft	Other Milestone	DO-379A - Technical Standard of Aviation Profiles for Internet Protocol Suite Update						
1454	2025 Q2	Aircraft	Other Milestone	MOPS DO-ZZT						
1455	2027 Q1	Aircraft	Other Milestone	MOPS DO-"ZZT" Revision A						
1456	2027 Q1	Aircraft	Other Milestone	MOPS DO-283D						
1457	2027 Q1	Aircraft	Other Milestone	MASPS DO-236F						
1491	2026 Q2	Aircraft	Other Milestone	Minimum Operational Performance Standards (MOPS) for Cooperative Surveillance Systems						
1492	2026 Q2	Aircraft	Other Milestone	Minimum Operational Performance Standards (MOPS) for ACAS Xu Revision A DO386(A)/ED275(A)						
1493	2026 Q4	Aircraft	Other Milestone	Guidance for Validation of Collision Avoidance Systems						
1494	2026 Q4	Aircraft	Other Milestone	Internal Report IR-XXX						
1495	2025 Q1	Aircraft	Other Milestone	Change 2 to DO-260C, 1090MHz ADS-B / TIS-B MOPS						