

**National Airspace System
Requirements Document**



**Department of Transportation
Federal Aviation Administration**

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NAS-RD Revision History

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3.1 Mission Services	<ul style="list-style-type: none"> Added performance requirements 	May 13, 2011
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1 Introduction

The National Airspace System (NAS) Requirements Document (NAS-RD-2011) is a compilation of the enterprise-level requirements for today's operating NAS. A second document, the NAS-RD-2025, contains all of the anticipated requirements for the Far-Term operations of the NAS. The NAS-RD-2011 represents the "as-is" set of Air Traffic Control requirements that are being met by equipment, personnel and procedures with today's NAS. The NAS-RD-2011 document is a revision to the NAS-RD-2010, and completes the replacement of the NAS-SR-1000.

1.1 Purpose

The NAS-RD-2011 serves as the high-level source for the requirements allocated to systems operating within the current NAS. It defines requirements without constraining technical alternatives. The NAS-RD-2011 is the set of requirements that describe what the NAS does in terms of its current configuration. The NAS-RD-2011 supports NAS design, enterprise architecture engineering, and acquisition activities for routine changes to the operational NAS equipment. It is the baseline for conducting additional functional decomposition and performance analysis for modifications to the current NAS baseline. The NAS-RD-2011 is meant to be a "perform-to" document, not a "design-to" document.

A key goal of the NAS-RD-2011 is to map the enterprise-level NAS requirements to the current NAS Enterprise Architecture (EA). The mapping will trace enterprise-level requirements to the systems that perform them today.

1.2 Background

The NAS-SR-1000 was first published in 1985 as the set of requirements to describe NAS operational capabilities as projected through year the 2000. In 2005, NAS-SR-1000 Revision A was published to update terms and concepts and realign the requirements with the NAS Architecture's services and capabilities as defined at that time. The requirements were also updated to conform to the characteristics of "strong requirements" as defined in the NAS System Engineering Manual (SEM). The SEM defines good requirements as:

- necessary
- concise

- solution non-specific
- attainable
- complete
- consistent
- traceable
- unambiguous
- verifiable (testable)
- allocable

Well-written requirements at the NAS level provide a sound foundation that one may use to trace to all system-level requirements without dictating specific solutions.

In 2008, Revision B of NAS-SR-1000 provided a functional view of the requirements and included only high-level functional requirements linked to the services and capabilities of the NAS Architecture of the same timeframe. Revision B also updated the Reliability, Maintainability, and Availability requirements. Prior to Revision B, requirements were expressed at all levels of design—from the highest level of need down to requirements and specifications at both the system and design level.

In 2010, the NAS-RD-2010 was developed to replace the NAS SR-1000. The highest level requirements from Revision B were extracted—and in many cases rewritten—to bring the requirements to the highest consistent level across all NAS services defined by the EA. The requirements were also decomposed to show that the requirements that define today's NAS are sufficiently different from those describing the future system contained in the NAS-RD-2025. These products were used to derive the NAS-RD-2010 requirements: NAS SR-1000 Revision B; Next Generation Air Transportation System (NextGen) Concept of Operations (CONOPS); the Chief System Engineer Functional Analysis of the NextGen CONOPS; Draft Summary of Mid-Term Requirements; the Operational Improvements, and NAS Enterprise Architecture Views.

In order to complete the replacement of the NAS-SR-1000, the performance requirements that were previously in it had to be mapped into the EA as well. The NAS-RD-2011 upgrades the NAS-RD-2010 by incorporating those performance requirements into the document.

2 Scope

The NAS Enterprise Architecture is a comprehensive, multiyear plan for improving, and evolving the NAS through 2025. It describes the services and capabilities that the NAS requires to provide safe and efficient Air Traffic Control services. Requirements specified within the NAS-RD-2010 describe what the NAS must do to provide these services and capabilities. NAS-RD-2011 contains requirements that are currently funded by the NAS, and are enforceable by the FAA.

For this document, requirements are allocated to the Mission Services in the SV-4, which defines thirteen services that enable the NAS performance. They are Separation Management, Trajectory Management, Flight and State Data Management, Flow Contingency Management, Short Term Capacity Management, Long Term Capacity Management, System and Services Analysis, System and Services Management, Weather Information Management, Aeronautical Information Management, Surveillance Information Management, Navigation Support, and Safety Management. Each service consists of lower level functions.

Each requirement has been assigned an Inherent Availability rating. These ratings were derived from the projected level of risk the NAS would incur were the requirement not operational. Inherent Availabilities do not necessarily translate to physical implementations. Additional guidance and requirements are necessary to use these values for a physical implementation. Inherent Availabilities are defined in Section 3.2.1 Reliability, Maintainability, and Availability (RMA) and the glossary.

With the latest update to the NAS-RD-2011, the performance requirements from the NAS-SR-1000 have been mapped to the product. A future revision of this document is planned to include the NAS-SS-1000 performance requirements. Until that revision occurs and is approved, the NAS-SS-1000 should still be referred to for the appropriate performance requirements. If there is a question regarding the values, please contact AJP-1400 NAS Requirements and Interface Management Group.

2.1 *Intended Use*

The NAS-RD-2011 is intended to provide a list of the current functional services provided by the NAS. The differences in the requirements between the NAS-RD-2011 and the NAS-RD-2025 create the shortfall between today and NextGen that aligns with the shortfall defined by the “as-is” and “to-be” Enterprise Architecture.

Programs that intend to address the shortfalls between today and NextGen, as identified on the NAS EA Roadmaps, will derive their program requirements from enterprise-level NextGen requirements. The direct link between these documents is vital to traceability and configuration management as the NAS evolves. If changes are made to the NAS-RD-2025, the effects on program requirements can be shown directly. If a program office proposes a requirement that could impact enterprise-level requirements, the impact to NAS services can also be traced automatically.

As these new system requirements become applicable, the NAS-RD-2011 will be updated annually to reflect changes to the system.

2.2 NAS-RD-2011 Updates

As NextGen and the EA evolve, the NAS-RD-2011 must evolve as well. The Service Organizations must be engaged in developing the requirements for the document in order to reach the usability goals. Service Organization input to the level, scope, and content of the requirements is critical to successful deployment of the document.

After its' initial baseline, this document will be updated annually to ensure that it stays aligned with the current operational NAS. These updates will be in the form of NAS Change Proposals submitted to the NAS Configuration Control Board.

Send comments to the following members of the NAS Requirements and Interface Management Group, AJP-14:

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2.3 References

2.3.1 FAA Documents

1. National Airspace System, (NAS) System Engineering Manual v3.1, dtd October 11, 2006
2. U.S. Department of Transportation Federal Aviation Administration National Airspace System System Requirements Specification SR-1000 Revision B dtd June 06, 2008
3. U.S Department of Transportation Federal Aviation Administration National Airspace System Specification SS-1000 Volume I
4. International Civil Aviation Organization (ICAO) Annex 11, Model Civil Aviation Regulations Part 2, Personnel Licensing Version 2.5 dtd April 2007
5. FAA Order 1100.161 CHG 1 U. S Department of Transportation Federal Aviation Administration Air Traffic Safety Oversight dtd August 11, 2006
6. FAA Order 1375.1D U. S Department of Transportation Federal Aviation Administration Data Management dtd July 25, 2006
7. Air Traffic Organization (ATO) Chief Systems Engineer Functional Analysis of the NextGen CONOPS
8. Technical View (TV-1) Technical Standards v1.0 dtd January 29, 2010
9. FAA-HDBK-006A Federal Aviation Administration Handbook- Reliability, Maintainability, and Availability (RMA) dtd January 7, 2008
10. National Airspace System (NAS) Enterprise Architecture Near-Term Revision 23 dtd 26 May 2010
11. National Airspace System (NAS) Enterprise Architecture Mid-Term Revision 41 dtd 10 May 2011
12. National Airspace System (NAS) Enterprise Architecture Far-Term Revision 33 dtd 05 July 2011

2.3.2 Non-FAA Government Documents

1. 8-98 OMB No. 0704-0188 Next Generation Air Transportation System (NextGen) Concepts of Operations (CONOPS) v3.0
2. Memorandum for Chief Information Officers of Executive Departments and Agencies Transition to IPv6 September 28, 2010
- 3.

2.3.3 Non-Government Documents

None

3 Requirements

3.1 Mission Service Requirements

Mission services are the application services which provide mission business logic. They are residing in the NAS systems that support air traffic operations. Mission Services subscribe to information provided by Support Services such as single authoritative source weather information or Flight and State Data.

3.1.1 Separation Management

Separation Management is the tactical response to violations or projected violations of separation standards. It generates tactical variations of flight trajectories to resolve projected conflicts between aircraft, and between an aircraft and an aviation hazard, such as obstacles to flight, restricted airspace, or severe weather.

Object Number	Requirement	Inherent Availability
3.1.1.0-1	The NAS shall project short term trajectories.	Safety-Critical
3.1.1.0-1.0-1	The NAS shall generate short-term trajectories up to 20 minutes for each aircraft.	Safety-Critical
3.1.1.0-1.0-2	The NAS shall generate short term trajectories for each aircraft at least once every 13 seconds.	Safety-Critical
3.1.1.0-1.0-3	The NAS shall display short term predictions for aircraft position, altitude, speed and trajectory upon specialist request with a mean of less than or equal to 3 seconds.	Safety-Critical
3.1.1.0-1.0-4	The NAS shall display short term predictions for aircraft position, altitude, speed and trajectory upon specialist request within 5 seconds (99th percentile).	Safety-Critical
3.1.1.0-1.0-5	The NAS shall display short term predictions for aircraft position, altitude, speed and trajectory upon specialist request with maximum of 10 seconds.	Safety-Critical
3.1.1.0-2	The NAS shall evaluate information necessary for separation assurance.	Safety-Critical

Object Number	Requirement	Inherent Availability
3.1.1.0-2.0-1	The NAS shall evaluate traffic information for separation assurance.	Safety-Critical
3.1.1.0-2.0-2	The NAS shall evaluate Protected Airspace/Surface Volumes information for separation assurance.	Safety-Critical
3.1.1.0-2.0-3	The NAS shall evaluate Terrain/Obstacle information for separation assurance.	Safety-Critical
3.1.1.0-2.0-4	The NAS shall evaluate Flight Status for separation assurance.	Safety-Critical
3.1.1.0-3	The NAS shall predict separation conflicts.	Safety-Critical
3.1.1.0-3.0-1	The NAS shall predict aircraft-to-aircraft separation conflicts.	Safety-Critical
3.1.1.0-3.0-1.0-1	The NAS shall alert specialists of aircraft-to-aircraft separation conflicts in terminal areas at least 30 seconds prior to the violation.	Safety-Critical
3.1.1.0-3.0-1.0-2	The NAS shall alert specialists of aircraft-to-aircraft separation conflicts in en route airspace at least 80 seconds prior to the violation.	Safety-Critical
3.1.1.0-3.0-1.0-3	The NAS shall alert specialists of predicted aircraft-to-aircraft separation violations by participating aircraft within close proximity to special use airspace within 80 seconds of the actual violation.	Safety-Critical
3.1.1.0-3.0-1.0-4	The NAS shall alert participating aircraft of separation conflicts with other aircraft within 10 seconds of making the prediction.	Safety-Critical
3.1.1.0-3.0-1.0-5	The NAS shall alert users of separation conflicts in terminal airspace at least 30 seconds prior to the violation.	Safety-Critical
3.1.1.0-3.0-1.0-6	The NAS shall alert users of separation conflicts in en route airspace at least 65 seconds prior to the violation.	Safety-Critical
3.1.1.0-3.0-2	The NAS shall predict airspace separation conflicts.	Safety-Critical
3.1.1.0-3.0-2.0-1	The NAS shall alert specialists at least 5 nautical miles, and within 500 feet above or below, before the violation of separation with Special Use Airspace.	Safety-Critical
3.1.1.0-3.0-2.0-2	The NAS shall alert specialists at least 80 seconds before the violation of separation occurs with Special Use Airspace.	Safety-Critical
3.1.1.0-3.0-2.0-3	The NAS shall alert participating aircraft to predicted conflicts with Special Use Airspace within 10 seconds of making the prediction	Safety-Critical
3.1.1.0-3.0-3	The NAS shall predict terrain and obstacle separation conflicts.	Safety-Critical

Object Number	Requirement	Inherent Availability
3.1.1.0-3.0-3.0-1	The NAS shall alert specialists of aircraft-terrain separation conflicts in terminal airspace at least 40 seconds prior to the violation.	Safety-Critical
3.1.1.0-3.0-3.0-2	The NAS shall alert specialists of aircraft-obstacle separation conflicts in terminal airspace at least 40 seconds prior to the violation.	Safety-Critical
3.1.1.0-3.0-3.0-3	The NAS shall alert specialists of aircraft-terrain separation conflicts in en route airspace at least 75 seconds prior to the violation.	Safety-Critical
3.1.1.0-3.0-3.0-4	The NAS shall alert specialists of aircraft-obstacle separation conflicts in en route airspace at least 75 seconds prior to the violation.	Safety-Critical
3.1.1.0-3.0-3.0-5	The NAS shall alert users to separation conflicts with obstructions within 10 seconds of making the prediction.	Safety-Critical
3.1.1.0-3.0-3.0-6	The NAS shall alert users of aircraft-terrain separation conflicts in terminal airspace at least 30 seconds prior to the violation.	Safety-Critical
3.1.1.0-3.0-3.0-7	The NAS shall alert users of aircraft-obstacle separation conflicts in terminal airspace at least 30 seconds prior to the violation.	Safety-Critical
3.1.1.0-3.0-3.0-8	The NAS shall alert users of aircraft-terrain separation conflicts in en route airspace at least 65 seconds prior to the violation.	Safety-Critical
3.1.1.0-3.0-3.0-9	The NAS shall alert users of aircraft-obstacle separation conflicts in en route airspace at least 65 seconds prior to the violation.	Safety-Critical
3.1.1.0-4	The NAS shall detect separation violations.	Safety-Critical
3.1.1.0-4.0-1	The NAS shall detect aircraft-to-aircraft separation violations.	Safety-Critical
3.1.1.0-4.0-1.0-1	The NAS shall alert specialists of aircraft-to-aircraft separation violations with a mean of less than or equal to 0.6 seconds after the violation is detected.	Safety-Critical
3.1.1.0-4.0-1.0-2	The NAS shall alert specialists of aircraft-to-aircraft separation violations within 1.2 seconds (99th percentile) after the violation is detected.	Safety-Critical
3.1.1.0-4.0-1.0-3	The NAS shall alert specialists of aircraft-to-aircraft separation violations with a maximum of 3 seconds after the violation is detected.	Safety-Critical
3.1.1.0-4.0-1.0-4	The NAS shall alert appropriately equipped users to the collision danger within 10 seconds after the prediction is made.	Safety-Critical

Object Number	Requirement	Inherent Availability
3.1.1.0-4.0-2	The NAS shall detect airspace separation violations.	Safety-Critical
3.1.1.0-4.0-3	The NAS shall detect terrain and obstacle separation violations.	Safety-Critical
3.1.1.0-5	The NAS shall provide control instructions.	Safety-Critical
3.1.1.0-5.0-1	The NAS shall display recommended avoidance maneuvers with a mean of less than or equal to 0.6 seconds after the detection of an aircraft-to-aircraft separation violation.	Safety-Critical
3.1.1.0-5.0-2	The NAS shall display recommended avoidance maneuvers within 1.2 seconds (99th percentile) after the detection of an aircraft-to-aircraft separation violation.	Safety-Critical
3.1.1.0-5.0-3	The NAS shall display recommended avoidance maneuvers with a maximum of 3 seconds after the detection of an aircraft-to-aircraft separation violation.	Safety-Critical
3.1.1.0-5.0-4	The NAS shall disseminate recommended collision avoidance maneuvers to specialists within 5 seconds of detection of an aircraft-to-terrain separation violation.	Safety-Critical
3.1.1.0-5.0-5	The NAS shall disseminate recommended collision avoidance maneuvers to specialists within 5 seconds of detection of an aircraft-to-obstacle separation violation.	Safety-Critical

3.1.2 Trajectory Management

Trajectory Management is the means through which 4-D trajectories are generated, assessed, and modified for use in trajectory-based operations. It supports the implementation of flow management strategies by managing changes to trajectories required by localized changes in capacity and demand.

Object Number	Requirement	Inherent Availability
3.1.2.0-1	The NAS shall associate flight paths with flight plans.	Efficiency-Critical
3.1.2.0-1.0-1	The NAS shall associate flight plans of known inbound aircraft with aircraft penetrating an ADIZ within a maximum of 8 seconds of initial detection.	Efficiency-Critical
3.1.2.0-1.0-2	The NAS shall alert specialists of aircraft that cannot be associated with a flight plan with a mean of less than or equal to 0.6 seconds.	Efficiency-Critical
3.1.2.0-1.0-3	The NAS shall alert specialists of aircraft that cannot be associated with a flight plan within 1.2 seconds (99th percentile).	Efficiency-Critical
3.1.2.0-1.0-4	The NAS shall alert specialists of aircraft that cannot be associated with a flight plan with a maximum of 3 seconds.	Efficiency-Critical
3.1.2.0-2	The NAS shall monitor flight path conformance.	Efficiency-Critical
3.1.2.0-3	The NAS shall predict flight path non-conformance.	Efficiency-Critical
3.1.2.0-3.0-1	The NAS shall disseminate to users non-adherence to ATC clearance within 10 seconds of the prediction of the deviation.	Efficiency-Critical

3.1.3 Flight and State Data Management

Flight & State Data Management is the means through which the NAS maintains and distributes all flight information, including, aircraft characteristics and capabilities, flight plans and trajectories, flight status, and clearance delivery status.

Object Number	Requirement	Inherent Availability
3.1.3.0-1	The NAS shall process flight plans.	Efficiency-Critical
3.1.3.0-1.0-1	The NAS shall acquire flight information for flight planning.	Efficiency-Critical
3.1.3.0-1.0-1.0-1	The NAS shall validate proposed flight plans and amendments with a mean of less than or equal to 4 seconds.	Efficiency-Critical

Object Number	Requirement	Inherent Availability
3.1.3.0-1.0-1.0-2	The NAS shall validate proposed flight plans and amendments within 6 seconds (99th percentile).	Efficiency-Critical
3.1.3.0-1.0-1.0-3	The NAS shall validate proposed flight plans and amendments with a maximum of 12 seconds.	Efficiency-Critical
3.1.3.0-1.0-2	The NAS shall provide feedback on proposed flight plans.	Efficiency-Critical
3.1.3.0-1.0-2.0-1	The NAS shall notify users of changes in the availability of their preferred flight routes.	Efficiency-Critical
3.1.3.0-2	The NAS shall collaborate with users on flight plans.	Efficiency-Critical
3.1.3.0-3	The NAS shall activate flight plans.	Efficiency-Critical
3.1.3.0-4	The NAS shall disseminate flight plans.	Efficiency-Critical
3.1.3.0-5	The NAS shall validate flight information.	Efficiency-Critical
3.1.3.0-5.0-1	The NAS shall update flight information within 12 seconds of receiving a flight plan.	Efficiency-Critical
3.1.3.0-5.0-2	The NAS shall validate active flight plan amendments with a mean of less than or equal to 0.6 seconds.	Efficiency-Critical
3.1.3.0-5.0-3	The NAS shall validate active flight plan amendments within 1.2 seconds (99th percentile).	Efficiency-Critical
3.1.3.0-5.0-4	The NAS shall validate active flight plan amendments with a maximum of 3 seconds.	Efficiency-Critical
3.1.3.0-5.0-5	The NAS shall validate flight plan actions with a mean of less than or equal to 1.5 seconds.	Efficiency-Critical
3.1.3.0-5.0-6	The NAS shall validate flight plan actions within 3 seconds (99th percentile).	Efficiency-Critical
3.1.3.0-5.0-7	The NAS shall validate flight plan actions with a maximum of 6 seconds.	Efficiency-Critical
3.1.3.0-5.0-7.0-1	The NAS shall detect amended flight plan conflicts with a mean of less than or equal to 1.5 seconds.	Efficiency-Critical
3.1.3.0-5.0-7.0-2	The NAS shall detect amended flight plan conflicts within 3 seconds (99th percentile).	Efficiency-Critical

Object Number	Requirement	Inherent Availability
3.1.3.0-5.0-7.0-3	The NAS shall detect amended flight plan conflicts with a maximum of 6 seconds.	Efficiency-Critical
3.1.3.0-6	The NAS shall monitor aircraft status.	Efficiency-Critical

3.1.4 Flow Contingency Management

Flow Contingency Management is the means through which demand is adjusted to meet system resource capacity constraints. Such adjustments are accomplished through the establishment of temporary flow constraints, traffic management initiatives, and the shifting of flights from one flow to another, matching aircraft capabilities to the performance requirements of specific airspace segments and routes. It works in coordination with Short Term Capacity Management to resolve predicted congestion by identifying potential airspace and route configurations that could support specific flow initiatives.

Object Number	Requirement	Inherent Availability
3.1.4.0-1	The NAS shall provide the information and resources necessary for flow contingency management collaboration.	Efficiency-Critical
3.1.4.0-1.0-1	The NAS shall provide the information and resources necessary for stakeholder collaboration for flow contingency management.	Efficiency-Critical
3.1.4.0-1.0-2	The NAS shall provide the information and resources necessary for user collaboration for flow contingency management.	Efficiency-Critical
3.1.4.0-2	The NAS shall assess traffic flow.	Efficiency-Critical
3.1.4.0-2.0-1	The NAS shall evaluate congestion information.	Efficiency-Critical
3.1.4.0-2.0-2	The NAS shall evaluate flow constraints.	Efficiency-Critical
3.1.4.0-2.0-3	The NAS shall evaluate airspace status.	Efficiency-Critical
3.1.4.0-2.0-4	The NAS shall evaluate route status.	Efficiency-Critical
3.1.4.0-2.0-5	The NAS shall predict delays.	Efficiency-Critical
3.1.4.0-2.0-6	The NAS shall monitor flow constraint conformance.	Efficiency-Critical

Object Number	Requirement	Inherent Availability
3.1.4.0-3	The NAS shall manage operational capacity.	Efficiency-Critical
3.1.4.0-3.0-1	The NAS shall manage flow constraints.	Efficiency-Critical
3.1.4.0-3.0-2	The NAS shall manage sequencing plans.	Efficiency-Critical
3.1.4.0-3.0-2.0-1	The NAS shall establish sequencing plans.	Efficiency-Critical
3.1.4.0-3.0-2.0-2	The NAS shall implement sequencing plans.	Efficiency-Critical
3.1.4.0-3.0-2.0-2.0-1	The NAS shall process sequencing and spacing inputs from specialists with a mean of less than or equal to 0.6 seconds.	Efficiency-Critical
3.1.4.0-3.0-2.0-2.0-2	The NAS shall process sequencing and spacing inputs from specialists within 1.2 seconds (99th percentile).	Efficiency-Critical
3.1.4.0-3.0-2.0-2.0-3	The NAS shall process sequencing and spacing inputs from specialists with a maximum of 3 seconds.	Efficiency-Critical
3.1.4.0-3.0-2.0-3	The NAS shall update sequencing plans.	Efficiency-Critical
3.1.4.0-3.0-2.0-4	The NAS shall disseminate sequencing plans.	Efficiency-Critical
3.1.4.0-3.0-3	The NAS shall manage Traffic Management Initiatives (TMI).	Efficiency-Critical
3.1.4.0-3.0-3.0-1	The NAS shall establish TMIs.	Essential
3.1.4.0-3.0-3.0-2	The NAS shall implement TMIs.	Efficiency-Critical
3.1.4.0-3.0-3.0-3	The NAS shall maintain TMI schedules.	Efficiency-Critical
3.1.4.0-3.0-3.0-4	The NAS shall disseminate TMIs.	Efficiency-Critical
3.1.4.0-4	The NAS shall generate flow advisories.	Efficiency-Critical

3.1.5 Short Term Capacity Management

Short Term Capacity Management is the means through which strategic planning is performed for applying available assets to adjust system capacity to meet the demand. It involves the assessment of demand within an operational timeframe, and the allocation of available resources to provide sufficient capacity to meet that demand. It also predicts congestion where capacity cannot be increased sufficiently to meet demand. It works in coordination with Flow Contingency Management to resolve predicted congestion by adjusting airspace and route configurations to match the needs of specific flow initiatives.

Object Number	Requirement	Inherent Availability
3.1.5.0-1	The NAS shall provide the information and resources necessary for short term capacity management collaboration.	Essential
3.1.5.0-1.0-1	The NAS shall provide the information and resources necessary for stakeholder collaboration for short term capacity management.	Essential
3.1.5.0-1.0-2	The NAS shall provide the information and resources necessary for user collaboration for short term capacity management.	Essential
3.1.5.0-2	The NAS shall manage airspace restrictions.	Efficiency-Critical
3.1.5.0-2.0-1	The NAS shall manage special activity airspace (SAA).	Efficiency-Critical
3.1.5.0-2.0-1.0-1	The NAS shall monitor SAA status.	Efficiency-Critical
3.1.5.0-2.0-1.0-2	The NAS shall update SAA information after collaborating with the SAA owners.	Efficiency-Critical
3.1.5.0-2.0-1.0-2.0-1	The NAS shall approve special use airspace reservations within 30 minutes of initial receipt of request.	Efficiency-Critical
3.1.5.0-2.0-2	The NAS shall manage altitude reservations.	Efficiency-Critical
3.1.5.0-2.0-3	The NAS shall respond to airspace security events.	Efficiency-Critical
3.1.5.0-2.0-4	The NAS shall respond to airspace restriction requests.	Efficiency-Critical

Object Number	Requirement	Inherent Availability
3.1.5.0-3	The NAS shall determine airspace capacity.	Efficiency-Critical
3.1.5.0-3.0-1	The NAS shall evaluate airspace status to determine airspace capacity.	Efficiency-Critical
3.1.5.0-3.0-2	The NAS shall evaluate flow constraints to determine airspace capacity.	Efficiency-Critical
3.1.5.0-3.0-3	The NAS shall evaluate weather information to determine airspace capacity.	Efficiency-Critical
3.1.5.0-3.0-4	The NAS shall evaluate NAS status to determine airspace capacity.	Efficiency-Critical
3.1.5.0-4	The NAS shall determine operational demand.	Efficiency-Critical
3.1.5.0-5	The NAS shall evaluate airspace capacity against demand.	Efficiency-Critical
3.1.5.0-5.0-1	The NAS shall predict congestion.	Efficiency-Critical
3.1.5.0-5.0-2	The NAS shall detect congested areas.	Efficiency-Critical
3.1.5.0-6	The NAS shall manage airspace capacity.	Efficiency-Critical
3.1.5.0-6.0-1	The NAS shall manage airspace status.	Efficiency-Critical
3.1.5.0-6.0-2	The NAS shall manage route status.	Efficiency-Critical
3.1.5.0-6.0-3	The NAS shall coordinate planned outages.	Efficiency-Critical
3.1.5.0-7	The NAS shall generate airspace advisories.	Efficiency-Critical

3.1.6 Long Term Capacity Management

Long Term Capacity Management is the means through which new system capacity is generated or developed. It provides the tools that support the management of capacity during operations, including airspace configurations, pre-defined routes and fixes, procedures, airport infrastructure improvements, and staffing structures.

Object Number	Requirement	Inherent Availability
3.1.6.0-1	The NAS shall provide the information and resources necessary for stakeholder collaboration for long term capacity management.	Routine
3.1.6.0-2	The NAS shall project capacity needs.	Routine
3.1.6.0-2.0-1	The NAS shall identify current performance shortfalls.	Routine

Object Number	Requirement	Inherent Availability
3.1.6.0-2.0-1.0-1	The NAS shall identify specific airspace that consistently has high levels of congestion based on post-operational data.	Routine
3.1.6.0-2.0-1.0-2	The NAS shall identify airspace that is under utilized based on post-operational data.	Routine
3.1.6.0-2.0-1.0-3	The NAS shall utilize operational information to improve the strategic use of airports and en route airspace.	Routine
3.1.6.0-2.0-2	The NAS shall provide the information and resources necessary for strategic demand forecasting.	Routine
3.1.6.0-2.0-3	The NAS shall evaluate capacity projections against demand projections to determine strategic system needs	Routine
3.1.6.0-3	The NAS shall assess strategic capacity constraints.	Routine
3.1.6.0-3.0-1	The NAS shall assess the impact of proposed airspace changes to existing configurations.	Routine
3.1.6.0-3.0-2	The NAS shall assess environmental impacts of proposed airspace changes.	Routine
3.1.6.0-3.0-3	The NAS shall assess the security impacts of proposed airspace changes.	Routine
3.1.6.0-3.0-4	The NAS shall assess safety impacts of proposed airspace changes.	Routine
3.1.6.0-3.0-5	The NAS shall assess infrastructure impacts on proposed airspace changes.	Routine
3.1.6.0-3.0-6	The NAS shall assess terrain and obstacle information for proposed airspace changes.	Routine
3.1.6.0-4	The NAS shall provide the information and resources necessary for the establishment of capacity improvement plans.	Routine
3.1.6.0-4.0-1	The NAS shall provide the information and resources necessary for the design of airspace configurations.	Routine
3.1.6.0-4.0-1.0-1	The NAS shall display geographical structure information to within .26 NM (99th percentile) of its actual position.	Routine
3.1.6.0-4.0-1.0-2	The NAS shall display airspace structure information to within .26 NM (99th percentile) of its actual position.	Routine
3.1.6.0-4.0-1.0-3	The NAS shall use map outlines of runways that are accurate to within 12 feet of the actual edges of the runways.	Routine

Object Number	Requirement	Inherent Availability
3.1.6.0-4.0-2	The NAS shall provide the information and resources necessary for the design of air traffic procedures.	Routine
3.1.6.0-4.0-3	The NAS shall provide the information and resources necessary for the planning of strategic infrastructure.	Routine
3.1.6.0-4.0-3.0-1	The NAS shall assess the benefits of proposed system changes.	Routine
3.1.6.0-4.0-3.0-2	The NAS shall generate business cases for proposed system changes.	Routine
3.1.6.0-4.0-4	The NAS shall assess proposed capacity improvement plans.	Routine

3.1.7 System and Services Analysis

System & Services Analysis includes both real-time and off-line analysis of information gathered throughout the system and from external entities. It is used to assess system performance and to support investigations of accidents, incidents, and criminal activity. It also includes the recording of operational information (including voice communications) for analysis and archival purposes.

Object Number	Requirement	Inherent Availability
3.1.7.0-1	The NAS shall manage post operational data.	Essential
3.1.7.0-1.0-1	The NAS shall manage operational metrics.	Routine
3.1.7.0-1.0-2	The NAS shall record operational system information.	Essential
3.1.7.0-1.0-3	The NAS shall record voice communications	Essential
3.1.7.0-1.0-4	The NAS shall conduct data mining.	Routine
3.1.7.0-1.0-5	The NAS shall provide the information and resources necessary for accident/incident investigations.	Routine
3.1.7.0-2	The NAS shall perform operational analysis.	Routine
3.1.7.0-2.0-1	The NAS shall analyze operational performance information.	Routine

Object Number	Requirement	Inherent Availability
3.1.7.0-2.0-2	The NAS shall analyze operational trends.	Routine
3.1.7.0-2.0-3	The NAS shall analyze airspace security.	Routine
3.1.7.0-2.0-4	The NAS shall analyze environmental impacts.	Routine
3.1.7.0-3	The NAS shall provide the information and resources necessary for search and rescue operations.	Essential

3.1.8 System and Services Management

System & Services Management represents the enterprise-wide maintenance and system management function. It monitors the health of all system elements, identifies the impact of system issues on operational services, responds to failures and degradations of service, and provides logistics and preventative maintenance support to minimize system outages and degradation of services. It also monitors the health of external entities critical to the success of collaborative operations.

Object Number	Requirement	Inherent Availability
3.1.8.0-1	The NAS shall monitor service status.	Essential
3.1.8.0-1.0-1	The NAS shall monitor system status.	Essential
3.1.8.0-1.0-2	The NAS shall monitor external system status.	Essential
3.1.8.0-1.0-3	The NAS shall perform diagnostic testing.	Essential
3.1.8.0-1.0-4	The NAS shall measure system parameters.	Essential
3.1.8.0-1.0-5	The NAS shall detect failures.	Essential
3.1.8.0-1.0-5.0-1	The NAS shall alert users to a navigation system failure affecting NAS operations within 10 seconds of the detected failure.	Essential
3.1.8.0-1.0-5.0-2	The NAS shall alert specialists to a navigation system failure affecting NAS operations within 10 seconds of the detected failure.	Essential

Object Number	Requirement	Inherent Availability
3.1.8.0-1.0-5.0-3	The NAS shall terminate operation of navigation systems operating outside of allowable tolerances within 10 seconds of detection.	Essential
3.1.8.0-1.0-6	The NAS shall assess failure probability.	Essential
3.1.8.0-1.0-7	The NAS shall derive service status from system status.	Essential
3.1.8.0-2	The NAS shall manage service performance.	Essential
3.1.8.0-2.0-1	The NAS shall configure systems.	Essential
3.1.8.0-2.0-1.0-1	The NAS shall provide automatic track initiation and flight plan correlation in the backup facility within 60 seconds of an Air Route Traffic Control Center (ARTCC) failure.	Essential
3.1.8.0-2.0-1.0-2	The NAS shall implement operational services at backup facilities in less than or equal to two minutes of the failure of an ARTCC.	Essential
3.1.8.0-2.0-2	The NAS shall adjust system parameters.	Essential
3.1.8.0-3	The NAS shall provide the information and resources necessary for logistics planning.	Essential
3.1.8.0-4	The NAS shall provide the information and resources necessary for preventative maintenance scheduling.	Essential
3.1.8.0-5	The NAS shall disseminate system updates.	Essential

3.1.9 Aeronautical Information Management

Aeronautical Information Management is the means to ensure that all stakeholders have access to critical information about system resources, procedures, constraints, and other factors impacting the use of the airspace system. It is the authoritative source for information produced by other functions and external entities.

Object Number	Requirement	Inherent Availability
3.1.9.0-1	The NAS shall manage NAS configuration information.	Essential

Object Number	Requirement	Inherent Availability
3.1.9.0-1.0-1	The NAS shall acquire NAS configuration information.	Essential
3.1.9.0-1.0-2	The NAS shall analyze NAS configuration information.	Essential
3.1.9.0-1.0-3	The NAS shall process NAS configuration information.	Essential
3.1.9.0-1.0-4	The NAS shall disseminate NAS configuration information.	Essential
3.1.9.0-1.0-4.0-1	The NAS shall respond to NAS configuration information requests with a mean of less than or equal to 3 seconds.	Essential
3.1.9.0-1.0-4.0-2	The NAS shall respond to NAS configuration information requests within 5 seconds (99th percentile).	Essential
3.1.9.0-1.0-4.0-3	The NAS shall respond to NAS configuration information requests with a maximum of 10 seconds.	Essential
3.1.9.0-2	The NAS shall manage NAS status information.	Essential
3.1.9.0-2.0-1	The NAS shall acquire NAS status information.	Essential
3.1.9.0-2.0-2	The NAS shall analyze NAS status information.	Essential
3.1.9.0-2.0-3	The NAS shall process NAS status information.	Essential
3.1.9.0-2.0-4	The NAS shall disseminate NAS status information.	Essential
3.1.9.0-2.0-4.0-1	The NAS shall process NAS status information requests with a mean of less than or equal to 3 seconds.	Essential
3.1.9.0-2.0-4.0-2	The NAS shall process NAS status information requests within 5 seconds (99th percentile).	Essential
3.1.9.0-2.0-4.0-3	The NAS shall process NAS status information requests with a maximum of 10 seconds.	Essential
3.1.9.0-3	The NAS shall maintain air traffic advisories.	Essential
3.1.9.0-3.0-1	The NAS shall maintain airspace restriction advisories.	Essential
3.1.9.0-3.0-2	The NAS shall maintain route status advisories.	Essential
3.1.9.0-3.0-3	The NAS shall maintain flow constraint advisories.	Essential
3.1.9.0-3.0-4	The NAS shall maintain TMI advisories.	Essential
3.1.9.0-4	The NAS shall disseminate air traffic advisories.	Essential

Object Number	Requirement	Inherent Availability
3.1.9.0-4.0-1	The NAS shall respond to air traffic advisory requests with a mean of less than or equal to 3 seconds.	Essential
3.1.9.0-4.0-2	The NAS shall respond to air traffic advisory requests within 5 seconds (99th percentile).	Essential
3.1.9.0-4.0-3	The NAS shall respond to air traffic advisory requests with a maximum of 10 seconds.	Essential
3.1.9.0-5	The NAS shall maintain weather advisories.	Essential
3.1.9.0-5.0-1	The NAS shall maintain airspace weather advisories.	Essential
3.1.9.0-5.0-2	The NAS shall maintain route weather advisories.	Essential
3.1.9.0-5.0-3	The NAS shall maintain terminal weather advisories.	Essential
3.1.9.0-6	The NAS shall disseminate weather advisories.	Essential
3.1.9.0-6.0-1	The NAS shall respond to weather advisory requests with a mean of less than or equal to 3 seconds.	Essential
3.1.9.0-6.0-2	The NAS shall respond to weather advisory requests within 5 seconds (99th percentile).	Essential
3.1.9.0-6.0-3	The NAS shall respond to weather advisory requests with a maximum of 10 seconds.	Essential

3.1.10 Weather Information Management

Weather Information Management is the means for processing raw weather information and transforming it into an integrated, comprehensive, and authoritative source for all consumers and service providers. The processing includes interpolation between sources to provide complete lateral and vertical coverage, and probabilistic extrapolation from current conditions into the future so as to provide a 4-D representation of the weather situation that can be used for decision making related to the current traffic situation and for planning to accommodate projected demand. It also includes the derivation of products and data that can be applied to decision support tools, support trajectory-based operations, and provide advisories of hazardous weather to consumers.

Object Number	Requirement	Inherent Availability
3.1.10.0-1	The NAS shall acquire weather information.	Essential
3.1.10.0-1.0-1	The NAS shall acquire surface weather information.	Essential
3.1.10.0-1.0-2	The NAS shall acquire weather radar information.	Essential
3.1.10.0-1.0-3	The NAS shall acquire airborne weather information.	Essential
3.1.10.0-2	The NAS shall analyze weather information.	Essential
3.1.10.0-2.0-1	The NAS shall analyze the impact of weather on operational capacity.	Essential
3.1.10.0-2.0-2	The NAS shall forecast surface weather.	Essential
3.1.10.0-2.0-3	The NAS shall forecast weather aloft.	Essential
3.1.10.0-2.0-3.0-1	The NAS shall update storm cell predictions every 5 minutes for flight planning.	Essential
3.1.10.0-3	The NAS shall generate weather products.	Essential
3.1.10.0-3.0-1	The NAS shall generate area weather products.	Essential
3.1.10.0-3.0-1.0-1	The NAS shall update en route weather conditions aloft every 5 minutes for flight planning.	Essential
3.1.10.0-3.0-2	The NAS shall generate weather advisories.	Essential
3.1.10.0-3.0-2.0-1	The NAS shall update hazardous weather information within 2 minutes of receipt.	Essential
3.1.10.0-3.0-2.0-2	The NAS shall update terminal area hazardous flight planning weather information within one minute of receiving an update.	Essential
3.1.10.0-3.0-2.0-3	The NAS shall update national hazardous flight planning weather information within 30 minutes.	Essential
3.1.10.0-3.0-2.0-4	The NAS shall update hazardous weather advisory broadcasts at least once every 30 minutes.	Essential
3.1.10.0-3.0-2.0-5	The NAS shall update hazardous weather advisory broadcasts within 5 minutes of a significant change.	Essential
3.1.10.0-4	The NAS shall disseminate weather information.	Essential
3.1.10.0-4.0-1	The NAS shall disseminate terminal area hazardous weather information to specialists within 1 minute of detection.	Essential

Object Number	Requirement	Inherent Availability
3.1.10.0-4.0-2	The NAS shall respond to weather information request with a mean of less than or equal to 3 seconds.	Essential
3.1.10.0-4.0-3	The NAS shall respond to weather information request within 5 seconds (99th percentile).	Essential
3.1.10.0-4.0-4	The NAS shall respond to weather information request with a maximum of 10 seconds	Essential
3.1.10.0-4.0-5	The NAS shall respond to hazardous weather information requests for 100 NM area with a mean of less than or equal to 1.5 seconds.	Essential
3.1.10.0-4.0-6	The NAS shall respond to hazardous weather information requests for 100 NM area within 3 seconds (99th percentile).	Essential
3.1.10.0-4.0-7	The NAS shall respond to hazardous weather information requests for 100 NM area with a maximum of 6 seconds.	Essential
3.1.10.0-4.0-8	The NAS shall respond to hazardous weather information requests for the continental US with a mean of less than or equal to 3 seconds.	Essential
3.1.10.0-4.0-9	The NAS shall respond to hazardous weather information requests for the continental US within 5 seconds (99th percentile).	Essential
3.1.10.0-4.0-10	The NAS shall respond to hazardous weather information requests for the continental US with a maximum of 10 seconds.	Essential

3.1.11 Surveillance Information Management

Surveillance Information Management is the means for processing raw surveillance information and transforming it into an integrated, comprehensive, and authoritative source for all consumers and service providers. The processing includes correlating surveillance information with flight data to provide continuous identification and tracking of each flight. It also involves the derivation of information from the surveillance data, such as velocity and intent.

Object Number	Requirement	Inherent Availability
3.1.11.0-1	The NAS shall acquire surveillance information.	Safety-Critical
3.1.11.0-1.0-1	The NAS shall acquire dependent surveillance information.	Safety-Critical
3.1.11.0-1.0-2	The NAS shall acquire independent surveillance information.	Safety-Critical
3.1.11.0-1.0-3	The NAS shall acquire cooperative surveillance information.	Safety-Critical
3.1.11.0-2	The NAS shall process surveillance information.	Safety-Critical
3.1.11.0-2.0-1	The NAS shall track aircraft.	Safety-Critical
3.1.11.0-2.0-1.0-1	The NAS shall determine the position for all aircraft.	Safety-Critical
3.1.11.0-2.0-1.0-1.0-1	The NAS shall detect aircraft entering an ADIZ within 13 seconds.	Safety-Critical
3.1.11.0-2.0-1.0-1.0-2	The NAS shall detect aircraft entering an ADIZ up to and including an altitude of 100,000 feet above MSL, from ground level to +30 degrees relative to an earth tangential plane at the sensor site.	Safety-Critical
3.1.11.0-2.0-1.0-1.0-3	The NAS shall detect aircraft entering an ADIZ up to and including surface ranges of 250 NM, from ground level to +30 degrees relative to an earth tangential plane at the sensor site.	Safety-Critical
3.1.11.0-2.0-1.0-1.0-4	The NAS shall display aircraft position to within a 2.04 NM (99th percentile) of the actual position over the ground for en route aircraft.	Safety-Critical
3.1.11.0-2.0-1.0-1.0-5	The NAS shall display the position of aircraft in terminal environments with an accuracy of 0.28 NM (99th percentile).	Safety-Critical
3.1.11.0-2.0-1.0-1.0-6	The NAS shall monitor non-participating aircraft that are within 5 NM lateral, and 500 feet vertical of Special Use Airspace.	Safety-Critical
3.1.11.0-2.0-1.0-1.0-7	The NAS shall determine the altitude of aircraft entering an ADIZ within 5000 feet of actual pressure altitude.	Safety-Critical
3.1.11.0-2.0-1.0-1.0-8	The NAS shall display the reported altitude for each controlled aircraft to within 103 feet (68th percentile) of their actual pressure altitude.	Safety-Critical
3.1.11.0-2.0-1.0-1.0-9	The NAS shall display position of aircraft operating within an ADIZ with an accuracy of 0.176 degrees azimuth.	Safety-Critical

3.1.11.0-2.0-1.0-1.0-10	The NAS shall display the position of aircraft operating within an ADIZ with a range of 0.125 NM.	Safety-Critical
3.1.11.0-2.0-1.0-1.0-11	The NAS shall update the position of aircraft in NAS controlled airspace with a maximum time between updates of 13 seconds.	Safety-Critical
3.1.11.0-2.0-1.0-1.0-12	The NAS shall provide the information and resources necessary for the manual entry of aircraft position information.	Safety-Critical
3.1.11.0-2.0-1.0-1.0-13	The NAS shall generate flight paths.	Safety-Critical
3.1.11.0-2.0-1.0-1.0-13.0-1	The NAS shall project each aircraft's flight path at least every 13 seconds.	Safety-Critical
3.1.11.0-2.0-1.0-1.0-13.0-2	The NAS shall update each aircraft's flight path at least every 13 seconds.	Safety-Critical
3.1.11.0-2.0-1.0-2	The NAS shall determine the velocity for all aircraft detected by surveillance sources.	Safety-Critical
3.1.11.0-2.0-1.0-2.0-1	The NAS shall determine the ground speed of aircraft entering an ADIZ within 20 knots (99th percentile) of its actual ground speed.	Safety-Critical
3.1.11.0-2.0-1.0-2.0-2	The NAS shall determine the ground speed of each controlled aircraft in US delegated airspace to within 20 knots of the aircraft's true speed during steady-level flight.	Safety-Critical
3.1.11.0-2.0-1.0-2.0-3	The NAS shall determine the ground speed of each controlled aircraft in US delegated airspace to within 60 knots of the true speed during aircraft acceleration in level flight.	Safety-Critical
3.1.11.0-2.0-1.0-2.0-4	The NAS shall determine the ground speed of each controlled aircraft in terminal areas to within 10 knots of the aircraft's true speed during steady-level flight at constant speed.	Safety-Critical
3.1.11.0-2.0-1.0-2.0-5	The NAS shall determine the ground speed of each controlled aircraft in terminal areas to within 30 knots of its true speed during aircraft acceleration in level flight.	Safety-Critical
3.1.11.0-2.0-1.0-2.0-6	The NAS shall detect aircraft track accurate to within 5 degrees (99th percentile) of actual course.	Safety-Critical

3.1.11.0-2.0-1.0-2.0-7	The NAS shall provide the information and resources necessary for the manual entry of aircraft velocity information.	Safety-Critical
3.1.11.0-2.0-1.0-3	The NAS shall identify all aircraft receiving air traffic services.	Safety-Critical
3.1.11.0-2.0-1.0-3.0-1	The NAS shall provide aircraft-supplied identity information when the information is available from the aircraft.	Safety-Critical
3.1.11.0-2.0-1.0-3.0-2	The NAS shall provide the information and resources necessary for the manual entry of identity information.	Safety-Critical
3.1.11.0-2.0-1.0-3.0-3	The NAS shall transfer control responsibilities.	Safety-Critical
3.1.11.0-2.0-2	The NAS shall integrate surveillance information from multiple sources.	Safety-Critical
3.1.11.0-2.0-2.0-1	The NAS shall generate common surveillance situation information for use by all operations.	Safety-Critical
3.1.11.0-3	The NAS shall disseminate surveillance information.	Safety-Critical
3.1.11.0-3.0-1	The NAS shall respond to current aircraft position, altitude, and speed requests from specialists with a mean of less than or equal to 3 seconds.	Safety-Critical
3.1.11.0-3.0-2	The NAS shall respond to current aircraft position, altitude, and speed requests from specialists within 5 seconds (99th percentile).	Safety-Critical
3.1.11.0-3.0-3	The NAS shall respond to current aircraft position, altitude, and speed requests from specialists with a maximum of 10 seconds.	Safety-Critical
3.1.11.0-3.0-4	The NAS shall display terminal area surveillance data to specialists within a maximum of 2.2 seconds of its detection.	Safety-Critical
3.1.11.0-3.0-5	The NAS shall display en route area surveillance data to specialists within a maximum 3.0 seconds of its detection.	Safety-Critical
3.1.11.0-3.0-6	The NAS shall display identification information received from aircraft in remote areas within 15 seconds of receipt.	Safety-Critical
3.1.11.0-3.0-7	The NAS shall display position reports received from aircraft in remote areas within 15 seconds of receipt.	Safety-Critical
3.1.11.0-3.0-8	The NAS shall display the position of aircraft in terminal environments with an accuracy of 0.28 NM (99th percentile).	Safety-Critical

3.1.11.0-3.0-9	The NAS shall display horizontal position information with an accuracy of 2.04 (99th percentile) NM or less for target ranges greater than 100 NM of the primary surveillance source.	Safety-Critical
3.1.11.0-3.0-10	The NAS shall display horizontal position information with accuracy of 1.0 (99th percentile) NM or less for target ranges less than 100 NM of the primary surveillance source.	Safety-Critical
3.1.11.0-3.0-11	The NAS shall display requested aircraft track with accuracy of 5 degrees or less for aircraft in steady-level flight.	Safety-Critical
3.1.11.0-3.0-12	The NAS shall display requested aircraft speed with accuracy of 20 knots or less for an aircraft in constant steady-level flight.	Safety-Critical

3.1.12 Navigation Support

Navigation Support includes functions performed by navigation and landing systems that provide electronic reference signals to assist an aircraft in determining its position relative to navigation aids, fixes, airways or runways, or by latitude/longitude/elevation. It also includes the provision of visual references to flight crews.

Object Number	Requirement	Inherent Availability
3.1.12.0-1	The NAS shall provide electronic spatial references.	Efficiency-Critical
3.1.12.0-1.0-1	The NAS shall provide electronic signals that enable aircraft to determine their position in the airspace.	Efficiency-Critical
3.1.12.0-1.0-2	The NAS shall provide electronic signals to enable approach and landing operations.	Efficiency-Critical
3.1.12.0-2	The NAS shall provide visual spatial references.	Efficiency-Critical
3.1.12.0-2.0-1	The NAS shall provide visual references along the extended runway centerline.	Efficiency-Critical
3.1.12.0-2.0-2	The NAS shall provide visual references for vertical descent guidance to runways.	Efficiency-Critical
3.1.12.0-2.0-3	The NAS shall provide visual references for runway ends, centerlines, and edges.	Efficiency-Critical
3.1.12.0-2.0-4	The NAS shall provide visual references for airport surface navigation.	Efficiency-Critical

3.1.13 Safety Management

Safety Management Service is the means through which safety information is collected, derived from other system data, and analyzed to determine relative risk and appropriate means for mitigation.

Object Number	Requirement	Inherent Availability
3.1.13.0-1	The NAS shall manage the safe provision of Air Traffic Services.	Essential
3.1.13.0-1.0-1	The NAS shall operate a Safety Management System (SMS) in accordance with International Civil Aviation Organization (ICAO) Annex 11, FAA Order 1100.161, and any other pertinent FAA orders, policies, guidance documents, and standards that govern the safe provision of Air Traffic Services.	Essential
3.1.13.0-1.0-1.0-1	The NAS shall provide the information and resources necessary for the development of metrics to monitor levels of safety.	Essential
3.1.13.0-1.0-1.0-2	The NAS shall monitor conformance to safety metrics.	Essential
3.1.13.0-1.0-1.0-3	The NAS shall analyze safety trends.	Essential
3.1.13.0-1.0-1.0-4	The NAS shall provide the information and resources necessary for the determination of operational risks.	Essential
3.1.13.0-1.0-1.0-5	The NAS shall provide the information and resources necessary for the mitigation of operational risks.	Essential
3.1.13.0-1.0-2	The NAS shall manage safety data.	Essential
3.1.13.0-1.0-2.0-1	The NAS shall integrate safety data.	Essential
3.1.13.0-1.0-2.0-2	The NAS shall acquire requests for safety data.	Essential

Object Number	Requirement	Inherent Availability
3.1.13.0-1.0-2.0-3	The NAS shall respond to requests for safety data.	Essential
3.1.13.0-1.0-2.0-4	The NAS shall disseminate response to safety data request.	Essential
3.1.13.0-1.0-3	The NAS shall conduct Safety Risk Management (SRM) on all proposed NAS changes.	Essential

3.2 Support Requirements

3.2.1 Reliability, Maintainability, and Availability

Reliability, Maintainability, and Availability (RMA) requirements are used to maintain consistency of NAS services. FAA RMA Handbook – 006A allocates the RMA requirements to the Services and Capabilities which are supported by one or more strings of systems called Service Threads. Service Threads bridge the gap between un-allocated functional requirements and the specifications for systems that support them.

3.2.1.1 Service Availability

Object Number	Requirement	Inherent Availability
3.2.1.1-1	Safety-Critical NAS Services shall have a minimum availability of .99999.	N/A
3.2.1.1-2	Efficiency-Critical NAS Services shall have a minimum availability of .9999	N/A
3.2.1.1-3	Essential NAS Services shall have a minimum availability of .999.	N/A
3.2.1.1-4	Routine NAS Services shall have a minimum availability of .99.	N/A
3.2.1.1-5	The NAS shall restore efficiency-critical services within 6 seconds of failure.	N/A
3.2.1.1-6	The NAS shall restore essential services within 10 minutes of failure.	N/A
3.2.1.1-7	The NAS shall restore routine services within 72 hours of failure.	N/A

3.2.1.2 Service Thread Availability

Object Number	Requirement	Inherent Availability
3.2.1.2.0-1	Safety-Critical Service threads shall be accomplished by greater than or equal to two service threads.	N/A

Object Number	Requirement	Inherent Availability
3.2.1.2.0-2	Efficiency-Critical Service threads shall have availability equal to or greater than .9999.	N/A
3.2.1.2.0-3	Essential Service threads shall have availability equal to or greater than .999.	N/A
3.2.1.2.0-4	Routine Service threads shall have availability equal to or greater than .99.	N/A
3.2.1.2.0-5	The Mean Time to Restore (MTTR) for non-routine service thread components shall be less than or equal to 0.5 hours.	N/A
3.2.1.2.0-6	The Mean Time Between Failure (MTBF) for efficiency-critical service threads shall be equal to or greater than 50,000 hours.	N/A
3.2.1.2.0-7	The MTBF for essential service threads shall be equal to or greater than 5,000 hours.	N/A
3.2.1.2.0-8	The MTBF for routine service threads shall be equal to or greater than 500 hours.	N/A

3.2.2 Communications

NAS communications requirements encompass extensive capabilities for providing voice and data communications throughout the NAS and with external facilities and government agencies. These requirements address the air-ground, ground-ground interfacility and ground-ground intrafacility voice and data communications between aircraft and air traffic control and flight service facilities, between FAA and external facilities, and within NAS facilities.

The inherent availability of each requirement will be commensurate with NAS function being supported (e.g. if the NAS function has a routine availability the supporting communication function will also have a routine availability).

Object Number	Requirement	Inherent Availability
3.2.2.0-1	The NAS shall provide air-ground communications within the NAS.	N/A
3.2.2.0-2	The NAS shall provide ground-to-ground communications.	N/A

3.2.2.0-3	The NAS shall provide communications with stakeholders.	N/A
3.2.2.0-4	The NAS shall configure communication capabilities to support changes in operational conditions.	N/A
3.2.2.0-5	The NAS shall manage voice communication delay between users and specialists.	N/A
3.2.2.0-5.0-1	The NAS shall have a voice communication delay between users and specialists with a mean less than or equal to 250 ms.	N/A
3.2.2.0-5.0-2	The NAS shall have a voice communication delay between users and specialists less than or equal to 300 ms (99th percentile).	N/A
3.2.2.0-5.0-3	The NAS shall have a voice communication delay between users and specialists with a maximum of 350 ms.	N/A
3.2.2.0-6	The NAS shall establish emergency communications for providing ATC services.	Safety-Critical
3.2.2.0-7	The NAS shall assure the data integrity of air-ground data communications within the NAS.	Safety-Critical
3.2.2.0-8	The NAS shall assure the data integrity of ground-to-ground data communications within the NAS.	Safety-Critical
3.2.2.0-9	The NAS shall assure the data integrity of data communications with stakeholders.	Safety-Critical

3.2.3 Security Requirements

The NAS must prevent disclosure to unauthorized persons or processes of information that are either classified in the interest of national security or sensitive because of its operational or administrative nature. Access to information, facilities, and equipment must be controlled.

Object Number	Requirement	Inherent Availability
3.2.3.0-1	The NAS shall control physical access to equipment and facilities.	Essential
3.2.3.0-2	The NAS shall manage access to information.	Essential

Object Number	Requirement	Inherent Availability
3.2.3.0-3	The NAS shall detect malicious activity.	Essential
3.2.3.0-4	The NAS shall deter malicious activity.	Essential
3.2.3.0-5	The NAS shall manage security audit logs during all operational states.	Essential

3.2.4 Spectrum Management

This section establishes a requirement for frequency and spectrum allocation and management assistance programs. National policy dictates that prior to the procurement of telecommunication systems which involve the use of radio frequencies, the developers must ensure that adequate radio spectrum is available and that harmful interference from such systems will be neither caused to nor received from other authorized users.

Object Number	Requirement	Inherent Availability
3.2.4.0-1	The NAS shall coordinate national spectrum allocation programs.	Routine
3.2.4.0-2	The NAS shall comply with international standards to avoid interference of new systems with existing systems.	Routine
3.2.4.0-3	The NAS shall coordinate international spectrum allocation programs.	Routine

4 Appendix A: Design Principles

Design principles are necessary to allow the NAS to evolve more efficiently to yield the intended improvements to the services it provides. Programs should contact their Enterprise Architecture (EA) and ISSO in order to determine which design principles must be followed for systems under development or for technical refreshes. The inherent availability of the requirement will be commensurate with NAS function being supported (e.g. if the NAS function has a routine availability the supporting design principle will also have a routine availability).

Object Number	Requirement	Inherent Availability
4.0-1	The NAS shall validate the accuracy, completeness, and integrity of information inputs.	N/A
4.0-2	The NAS shall integrate local exception event data into enterprise wide situational awareness.	N/A
4.0-3	The NAS shall utilize data environments for the applications of services in different Time horizons.	N/A
4.0-4	The NAS shall apply appropriate performance standards for the applications of services in different time horizons.	N/A
4.0-5	The NAS shall perform mission services within a service oriented architecture environment.	N/A
4.0-5.0-1	The NAS shall provide enterprise-wide net-centric data management.	N/A
4.0-5.0-2	The NAS shall publish information in a standardized format in accordance with FAA Order 1375.1 and the NAS EA Data Reference Model.	N/A
4.0-5.0-3	The NAS shall provide enterprise-wide net-centric data access.	N/A
4.0-5.0-4	The NAS shall perform mission services in accordance with adaptable business rules and processes.	N/A
4.0-5.0-5	The NAS shall apply business rules and processes to implement FAA policies and procedures for real-time adaptation functions.	N/A
4.0-5.0-6	The NAS shall provide application services that can be used for multiple mission services.	N/A

4.0-6	The NAS internal client applications that communicate with public internet servers shall comply with OMB “Transition to IPv6” memorandum.	N/A
4.0-7	The NAS enterprise networks shall comply with OMB “Transition to IPv6” memorandum.	N/A
4.0-8	The NAS shall comply with all applicable FIPS, NIST, FAA, DOT, OMB and other Federal guidelines and industry best practices for Information System Security.	N/A
4.0-9	The NAS shall comply with all directives, orders and policies within NAS EA Technical View-1, Standards.	N/A

5 Appendix B: Glossary

Term	Definition
A	
Actual Pressure Altitude	The actual altitude as defined by measuring static pressure
Advisory	Advice and information provided to assist pilots in the safe conduct of flight and aircraft movement.
Aeronautical Information	The establishment, condition, or change in an component of the NAS; boundaries and time of restriction for special use airspace, preferred, fuel-efficient, and/or low altitude routes, traffic management information, and alternate routing to avoid conditions precluding original route availability.
Aeronautical Information Management	Aeronautical Information Management is the means to ensure that all stakeholders have access to critical information about system resources, procedures, constraints, and other factors impacting the use of the airspace system. It is the authoritative source for information produced by other functions and external entities.
Air Traffic	Aircraft operating in the air or on an airport surface, exclusive of loading ramps and parking areas.
Air Traffic Advisories	Information provided to assist pilots in the safe conduct of flight and aircraft movement.
Air Traffic Procedures	Describes the standardized process by which air traffic control is implemented.
Air Traffic Services	<ul style="list-style-type: none"> a. Flight Information Service. b. Alerting Service. c. Air Traffic Advisory Service. d. Air Traffic Control Service. <p>Provides for:</p> <ul style="list-style-type: none"> 1. Preventing collisions. <ul style="list-style-type: none"> a). Between aircraft; and b). On the maneuvering area between aircraft and obstructions. 2. Expediting and maintaining a safe orderly and efficient flow of air traffic; and 3. Minimize delays.

Term	Definition
Aircraft	Device(s) that are used or intended to be used for flight in the air; when used in air traffic control terminology may include the flight crew.
Aircraft Position	The location of the aircraft in relation to VOR, TACAN, ADF, Approach Markers, airways, trajectories transmitted by the pilot or observed on surveillance equipment.
Aircraft Status	Whether an aircraft is under control, has communications and operational avionics, and is conforming to a cleared route of flight.
Air-Ground Communications	Communication between in-flight aircraft and ground based facilities.
Airport	An area on land or water that is used or intended to be used for the landing and takeoff of aircraft, including its buildings and facilities, if any.
Airport Configuration	The operational arrangement of airport assets, such as active runways and taxiway usage, which have an overall affect on the flow of air traffic in and out of the airport.
Airspace Advisories	Information provided to assist pilots in the safe conduct of flight and aircraft movement.
Airspace Configuration	A volume of airspace with assigned properties known to air traffic control entities.
Airspace Designs	The configuration of airspace to meet operational needs.
Airspace Restriction	Airspace with limited use possibly due to weather, security initiatives, traffic density, complexity, aircraft capabilities or air navigation system infrastructure requirements.
Airspace Status	The condition of airspace volume including whether the airspace is active, the existing design , current and projected traffic use, radio frequency, congestion, etc.
Airspace Volume	The designed three-dimension constraints of a volume of airspace.
Airway/Route Usage	The procedure or conduct of a control area or portion thereof established in the form of a corridor, the centerline of which is defined by navigational aids.
Altitude Reservations	Airspace utilization under prescribed conditions.
Application Service	Considered basic service type that is referred to as supporting services. These concrete services are usually fine-grained and are associated with a specific application. Application Services are typically identified and defined by application developers and are specific to the application scope they are defined under and are generally used to perform fine-grained application-specific functions such as validation, data collection, and data transfer.
Area Weather Products	Weather information for a particular region/location.

Term	Definition
ARTCC Failure	The occurrence of an ARTCC no longer being able to effectively provide air traffic control services.
Authoritative Source	A source of data or information that is recognized by members of a COI to be valid or trusted because it is considered to be highly reliable or accurate or is from an official publication or reference (e.g., the United States (U.S.) Postal Service is the official source of U.S. mailing ZIP codes).
Automatic Recovery Requirements	Where recovery times have been specified in the body of a requirement, the number provided will be identified as a mean, 99th percentile, or maximum value, either explicitly or from the context.
Automatic Recovery Time	The goal for a single loss of service to a user/specialist shall not exceed the duration set forth in the recovery requirement.
Availability	The probability that a system or constituent piece may be operational during any randomly selected instant of time or, alternatively, the fraction of the total available operating time that the systems or constituent piece is operational. A fraction whose numerator is the Mean Time Between Failures (MTBF) and whose denominator is the sum of the MTBF plus the Mean Time To Restore (MTTR) a service.
Azimuth	The angular distance measured on a horizontal circle in a clockwise direction from either north or south.
B	
Backup Operational Plan	An ATC contingency plan used when the normal function of an ATC facility fails.
C	
Cancel Flight Plan	Request from pilots to terminate ATC services for their proposed or active flight.
Capacity	The number of aircraft that can be accommodated in a given time period by the system or one of its components.
Capacity Improvement Plans	Strategic enhancement of system capacity.
Capacity Projections	The predicted number of aircraft that an airspace volume can accommodate.
Client/Client Application	The client component of client-server relationship. Or - A client is an application or system that accesses a remote service on another computer system, known as a server, by way of a network.
Collaboration	A process to allow multiple users to group and collaborate, share and negotiate.

Term	Definition
Collaborative Decision Making	The means by which the NAS interacts with its stakeholders in a cooperatively effort between the various components of aviation transportation, both government and industry, to exchange information for better decision making.
Communication Delay	Combinations of delays induced by electromagnetic radiation, voice switching, radio, transmission equipment, media, and distance.
Conflict	The recognition of the predicated loss of separation minima.
Conformance	Techniques in applying or complying with the rules.
Congested Area	An area where demand is exceeds the capacity for the area.
Congestion Information	Information pertaining to the areas where the volume of traffic exceeds the capacity.
Control Instructions	Instructions for safe movement of aircrafts.
Controlled Aircraft	Aircraft under ATC control.
D	
Data	A representation of facts, concepts, or instructions in a formalized manner suitable for communication, interpretation, or processing by human or automated means. Data are the fundamental components of information. (FAA Order 1375.1)
Data Environment	A shared file that other programs and even other applications can retrieve information (data) via a name.
Data Management	The function of managing data used in manual or automated information systems. It includes the activities of strategic data planning, data element standardization, information management control, and data synchronization (e.g., arranging data to indicate coincidence or coexistence, data quality assurance, and database development and maintenance). (FAA Order 1375.1)
Data Integrity	The property that data has not been altered or destroyed in an unauthorized manner and includes ensuring information non-repudiation and authenticity. Data integrity covers data in storage, during processing, and while in transit.
Data Mining	The process of extracting patterns from data.
Demand	The number of aircraft currently in the system requiring services either in the air or on the airport surface.
Demand Projections	The predicted number of aircraft that an airspace volume is expected to incur.

Term	Definition
Dependent Surveillance Environment	The environment in which aircraft position information is detected via means reliant on the aircraft.
Designated Hazardous Areas	Areas established to expedite search and rescue where regularly traveled VFR routes cross large bodies of water, swamps, and mountains.
Diagnostic Testing	The process through which the cause of faults, failures or errors is determined.
E	
Efficiency-Critical	A key service that is use in present operation of the NAS. Loss of an Efficiency-Critical service has a major impact in the present operational capacity.
Efficient	Competent, capable, that which is suitable to satisfy the requirements.
Electronic Signals	A propagating wave made to carry information by varying a combination of the amplitude, frequency and phase of the wave within a frequency band.
Electronic Spatial References	Navigational guidance information propagated throughout a given airspace transmitted within the limits of the radio frequency spectrum.
Emergency	A safety condition of being threatened by serious and/or imminent danger that requires immediate or timely assistance.
En Route	One of the three phases of flight services. En route service is provided outside of terminal airspace and is exclusive of oceanic control.
Enterprise-Wide Net-Centric Data	The elements of a robust globally interconnected network environment in which information (data) is shared in a timely and consistent manner among users, applications, and platforms. This includes Shared Situational Awareness, Security Management, Safety Management, Environmental Management, and Performance Management Services.
Enterprise-Wide Situational Awareness	Information systems that allow the agency to integrate information across operations, users and applications on an agency-wide basis to assure a common awareness of the system.
Equipment	Hardware, software, or systems tools and/or apparatus.
Essential	A service that if lost would significantly raise the risk associated with providing safe and efficient NAS operations.
Essential Information	That data or information that is pertinent to facilitate an action.
Extended Runway Centerline	An extension of the runway center line beyond the runway threshold.

Term	Definition
F	
Failure	The event, or inoperable state, in which any item or part of an item does not perform as specified.
Flight & State Data Management	Flight & State Data Management is the means through which the NAS maintains and distributes all flight information, including, aircraft characteristics and capabilities, flight plans and trajectories, flight status, and clearance delivery status.
Flight Information	Data relevant to a specific flight including: the aircraft identification/call sign, aircraft type, current and projected location (position), altitude of aircraft, clearance limit, speed of aircraft, track for each controlled aircraft in controlled airspace, track for each controlled aircraft expected to enter controlled airspace (e.g. terminal, En Route, oceanic), and the ETA at reported fixes.

Term	Definition
Flight Information (examples)	<p>Examples of Flight Information are:</p> <ul style="list-style-type: none"> - Aircraft identification. - Current position. - Altitude. - Speed. - Heading. - Vertical velocity. - Horizontal acceleration. - Vertical acceleration. - Actual or reported Altitude. - Assigned altitude. - Source of altitude information. - Aircraft Velocity. - Aircraft Type. - Altitude conformance. - Handoff status. - Track status. - Ground speed. - Beacon code. - Computer identification information. - Conflict resolution advisory. - Source of altitude information. - Heavy jet indicator. - Remarks. - Alert special aircraft status. - Conflict alert. - Minimum safe altitude warning. - Conflict probe violation. - Failure of attempted data transmission indication.
Flight Path	A course along which an aircraft is flying or has flown.

Term	Definition
Flight Plan	Specified information relating to the intended flight of an aircraft that is filed orally or in writing with an ATC facility.
Flight Plan Correlation	The correlation of a flight plan to its associated position-tracking file (track file).
Flight Risk Profile	The dynamic and static summarization of the security characteristics of flights. It is the integration of information from the flight object with information from security partners that is an assessment of the risk of a flight based on established rules.
Flight Status	The operational status of an aircraft.
Flow Advisories	Information on any constraint on the movement of traffic through the NAS.
Flow Constraint	A maximum number of aircraft that can be accommodated in a given time period by the system or one of its components. These constraints come as a result of situations such as large demand, capacity imbalance, congestion, high degree of complexity, blocked or constrained air space, or other off-normal conditions.
Flow Contingency Management	Flow Contingency Management is the means through which demand is adjusted to meet system resource capacity constraints. Such adjustments are accomplished through the establishment of temporary flow constraints, traffic management initiatives, and the shifting of flights from one flow to another, matching aircraft capabilities to the performance requirements of specific airspace segments and routes. It works in coordination with Short Term Capacity Management to resolve predicted congestion by identifying potential airspace and route configurations that could support specific flow initiatives.
Flow Management	The monitoring and management of traffic.
Forecast Weather	The predicted atmospheric conditions.
Function	A set of organized actions that produce a defined automated output when given specific data inputs.
G	
Governance	Accountability for consistent, cohesive policies, processes and decision rights.
Ground Speed	The speed at which an aircraft moves over the ground.
Ground-Ground Communications	Communication between facilities, within facilities, and between ground vehicles on the ground and facilities.
H	

Term	Definition
Hazardous Weather	Weather conditions that have the potential to significantly increase the likelihood of aviation accidents. Hazardous weather conditions include moderate to severe icing, moderate to severe turbulence, moderate to severe precipitation, wind shear, thunderstorms, sustained high winds near the surface, or widespread areas of low visibility.
Horizontal Position Information	The 2-D position of an aircraft that does not include its altitude.
I	
Identity Information	The callsign or designation of a flight based upon the operator, purpose, and equipage.
Information	Any communication or representation of knowledge such as facts, data, or opinions in any medium or form, including textual, numerical, graphic, cartographic, narrative, or audiovisual form. Data processed in such a way that it can increase the knowledge of the person who receives it. Information is the output, or finished goods, of information systems. (FAA Order 1375.1)
Information Assurance	Measures that protect and defend information and information systems by ensuring their availability, integrity, authentication, confidentiality, and non-repudiation. These measures include providing for restoration of information systems by incorporating protection, detection, and reaction capabilities.
Information Management	The planning, structuring, describing, and controlling of the collection of data from one or more sources within a business process and the distribution of that information to one or more audiences. (FAA Order 1375.1)
Information Systems	Information systems receive inputs from one or more external inputs, process that information, and prepare it for output on one or more output devices.
Inherent Availability	The degree to which a system, subsystem, or equipment is in a specified operable and committable state.
Interface Management	The systematic control of all communications that support a process operation.
International Civil Aviation Organization/ICAO	A specialized agency of the United Nations whose objective is to develop the principles and techniques of international air navigation and to foster planning and development of international civil air transport.

Term	Definition
International Spectrum Allocation Program	An international program responsible for coordinating the shared global use of the radio spectrum and promote international cooperation in assigning satellite orbits.
J	
K	
L	
Local Exception Event Data	The information needed to support the exception to adapted parameters i.e. waivers that are approved for reduced separation for a fly-in at an airport need to be adapted to the system to maintain the situational awareness.
Long Term Capacity Management	Means through which new system capacity is generated or developed. It provides the tools that support the management of capacity during operations, including airspace configurations, pre-defined routes and fixes, procedures, airport infrastructure improvements, and staffing structures. Long Term Capacity Management solutions requiring the development of new operational procedures, design of airspace, or implementation of a new technology require the ANSP to perform pre-implementation activities including R&D, environmental impact assessment and mitigation, and safety and security analysis. The solutions typically also involve external collaboration with manufacturers, flight operators, regulators, or other stakeholders.
Long Term Trajectory	An ordered union of all converted fixes and route segments for a Flight Plan or Trial Plan.
Loss of Service	The condition in which a service is considered to be unavailable, or when a service cannot be provided at the required performance levels.
M	
Maintainability	A characteristic of design and installation that is expressed as the probability that an item will be retained in, or restored to a specified condition within a given period of time, when the maintenance is performed in accordance with prescribed procedures and resources.
Maintenance	All actions necessary for retaining an item in, or restoring it to, a specified condition. Types of maintenance area: - Corrective - Actions performed, as a result of failure, to restore an item to a specified condition. - Preventive - Actions performed in an attempt to retain an item in a specified condition by providing systematic inspection, detection, and prevention of incipient failure.
Malicious Activity	Set of actions intended to harm another person, organization or state.

Term	Definition
Metrics	A qualitative or quantitative measurement of an objective or desired outcome.
Military Operations	<p>Military Operation: Any sanctioned DoD activity within the NAS. This can include:</p> <ul style="list-style-type: none"> - Reservation of airspace for special use, including both permanently dedicated areas and areas allocated temporarily to support special military missions - Permanently delegated approach control airspace. - En route training refueling, and deployment missions. - Aircraft surge launch and recovery missions. - Logistic support and administrative missions. - Supersonic operations. - Remotely piloted vehicle operations. - Artillery missile operations. - Other military operations requiring NAS support.
Minimum Availability	An availability value a service must have greater than or equal to the value of
Mission Critical	Services that provide the NAS the capability to exercising safe separation and control over aircraft.
Mission Services	The application services which provide mission business logic. They are residing in the NAS systems that support air traffic operations. Mission Service subscribes information provided by Support Services such as single authoritative source weather information or Flight and State Data.
Monitoring	Certain aeronautical advisory services made available by the NAS to airborne aircraft. Service consists of VFR flight following and the providing of various degrees of traffic and weather information to requesting pilots.
Movement Area	A facility that is normally occupied by Specialist, Technicians, or other FAA personnel for the conduct or support of NAS operations.
N	
NAS Configuration Information	The status of a specific number and type of major components and peripheral devices which make up a computer system. This may be information on an operational configuration or non-operational configuration. Data regarding the arrangement of NAS elements.

Term	Definition
NAS Status Information	The state or set of descriptors that describe the current capabilities of air navigation and air traffic control encompassing facilities, airways, controlled air space, special use airspace etc.
National	The United States and its territories.
National Airspace System/NAS	The NAS as used herein describes the FAA facilities, hardware, and software that are a predominant part of the NAS infrastructure and the personnel who operate and maintain that equipment to provide services to the user.
National Spectrum Allocation Programs	A national program responsible for assigning frequencies and maintaining spectrum use databases.
Navigation Aid/NAVAID	Any visual or electronic device, airborne or on the surface which provides guidance information or position data to aircraft in flight.
Navigation Guidance	Information or position data to aircraft in flight. Navigation Guidance information can include: <ul style="list-style-type: none"> - Horizontal (azimuth) guidance. - Vertical (glide slope) guidance. - Distance/range. - Bearing. - Latitude. - Longitude. - Altitude. - Rho/Theta coordinates.
Navigation Services	Providing point-to-point guidance information or position data using electronic devices (airborne or on the surface) to aircraft in flight.
Navigation Support	Navigation Support includes functions performed by ground-based navigation and landing systems that provide electronic reference signals to assist an aircraft in determining its position relative to a navigation fix or runway. It also includes the provision of visual reference to flight crews.
O	

Term	Definition
Obstacle	An existing object, object of natural growth, or terrain at a fixed geographical location, or which may be expected at a fixed location within a prescribed area, with reference to which vertical clearance is or must be provided during flight operation.
Operational Analysis	The process by which the NAS assesses its performance.
Operational Capacity	The capability of performing a service at this moment or a future time or day.
Operational Metrics	The measure for quantitatively assessing the air traffic system for the interpretation of the assessment in the light of previous or comparable assessments.
Operational Performance Information	Quantitative information on how well a system or service meets design requirements.
Operational Procedures	A sequence of activities, tasks, steps, decisions, calculations and processes, that when undertaken in the sequence laid down produces the described result, product or outcome.
Operational Risk	Potential hazard to the system
Operational System Information	Data generated about NAS equipment and interfaces.
Operational Trends	Patterns in conditions or processes within an operational environment.
P	
Participating Aircraft	An aircraft that meets the conditions for receiving some assistance or service from Air traffic control. Alternatively, an aircraft that is participating in the operations of special use airspace.
Position Information	The location of the aircraft including altitude.
Predicted	That which is expected at some future time, postulated on analysis of past experience and tests.
Proposed Flight Plan	The state of a plan of flight proposed by a pilot to the NAS prior to the time the flight plan becomes active.
Protected Airspace	The airspace on either side of a route, track or maneuvering area that assures separation.
Q	
R	
Real-Time	Of or relating to computer systems that update information at the same rate as they receive data, enabling them to direct or control a process

Term	Definition
Recommended Avoidance Maneuvers	Automatically generated maneuvers to avoid separation conflicts and separation violations.
Reliability	The probability that an item can perform its intended function for a specified interval under stated conditions.
Remote Control	Control of an operation from a distance, involving a link, usually electrical, between the control device and the apparatus to be operated.
Required Navigation Performance	A statement of the navigation performance necessary for operation within a defined airspace.
Route	A defined path, consisting of one or more courses in horizontal plane, which aircraft traverse over the surface of the earth.
Route Status	The availability of a route.
Route Usage	Route usage, airspace that may be the most desirable for a safe and expeditious transition free of hazardous weather and volumes of aircraft.
Routine	A service which, if lost, would have a minor impact on the risk associated with providing safe and efficient NAS operations.
Runway	A defined rectangular area on a land airport prepared for the landing and takeoff run of aircraft along its length. Runways are normally numbered in relation to the magnetic direction.
S	
Safety	General term denoting an acceptable level of risk, relative freedom from, and low probability of harm. The associated risks that have been identified have been accepted provided that all identified controls are implemented and enforced.
Safety Management	Safety Management is the means through which safety information is collected, derived from other system data, and analyzed to determine relative risk and appropriate means for mitigation.
Safety Management System (SMS)	A systematic and integrated method for managing the safety of air traffic control (ATC) and navigation services in the NAS. It integrates current FAA safety-related operational policies, processes, and procedures, as well as introduces new elements necessary for a systems approach to managing safety risk.
Safety Risk Management (SRM)	A methodology that ensures all hazards are identified and all associated safety risks are mitigated to an acceptable level prior to a NAS change being made.

Term	Definition
Safety-Critical	A key service in the protection of human life. Loss of a Safety-Critical service increases the risk in the lost of human life.
Search and Rescue/SAR	A service that seeks missing aircraft and assists those found to be in need of assistance. It is a cooperative effort using the facilities and services of available Federal, state, and local agencies.
Secure/Security	<ol style="list-style-type: none"> 1. Measures taken to protect the NAS from all acts designed to, or that may, impair its effectiveness. 2. A condition that results from the establishment and maintenance of measures to protect designated information, personnel, equipment, and installations. 3. A condition that prevents unauthorized disclosure of information that is safeguarded as NAS-sensitive (designated operational/administrative) or is classified in the interests of national security.
Secure Communication Protocol	A communication protocol that provides the appropriate confidentiality, authentication and content integrity protection.

Term	Definition
Security Partners	<p><u>National Airspace System (NAS) customers</u>: This group includes the commercial airlines, cargo airlines, general aviation, and other elements of the flying public. The Department of Defense (DOD) entities that transit the NAS, or use the NAS to conduct training in airspaces designated for special used are also included in this category.</p> <p><u>Department of Transportation (DOT)</u>: Key stakeholders within the Department of Transportation include the Department of Transportation itself; and the Federal Aviation Administration’s Air Traffic Organization (ATO), the Aviation Safety and Hazardous Materials organization (ASH), and the Aviation Security organization (AVS).</p> <p><u>Department of Defense</u>: Department of Defense stakeholders include the North American Air Defense Command (NORAD) with its subordinate Regional Commands, Air Defense Sectors, and alert sites that are involved in surveillance and interdiction of potential airspace security threats. The US Northern Command (NORTHCOM) and its subordinate elements responsible for responding to threats to the homeland are also included among DoD stakeholders.</p> <p><u>Department of Homeland Security (DHS)</u>: Key stakeholders under DHS include the Transportation Security Administration (TSA), the United States Coast Guard (USCG), the US Customs and Border Protection (CBP) Agency, the Federal Emergency Management Agency (FEMA), and the United States Secret Service (USSS).</p> <p><u>Department of Justice (DOJ)</u>: The primary stakeholder in DOJ is the Federal Bureau of Investigation (FBI).</p>

Term	Definition
Security Partners (continued)	<p><u>Office of the Director of National Intelligence (ODNI)</u>: The ODNI is a key stakeholder in providing early indications of potential airspace threats. An important stakeholder within the ODNI is the National Counter Terrorism Center (NCTC).</p> <p><u>State, Local, and Tribunal Governments</u>: This category includes local and state law enforcement organizations and their assets. These organizations frequently play an important role in the investigation and interrogation of airspace security violators.</p> <p><u>National Aeronautics and Space Administration (NASA)</u>: NASA is largely a stakeholder due to airspace security required during space launches and space recovery operations.</p> <p><u>Others organizations</u> include the Department of State (DOS), Department of Energy (DOE), Department of Health and Human Services (HHS) and Department of Commerce (DOC).</p>
Security Services	Approved measures adapted to the system to insure an acceptable level of security.
Separation	In air traffic control, the spacing of aircraft to achieve their safe and orderly movement in flight and while landing and taking off.
Separation Assurance	This service ensures that aircraft maintain a safe distance from other aircraft, terrain, obstacles, and certain airspace not designated for routine air travel.
Separation Conflict	Prediction of a Separation Violation or less than standard separation.
Separation Management	Tactical response to violations or projected violations of separation standards. It generates tactical variations of flight trajectories to resolve projected conflicts between aircraft, and between an aircraft and an aviation hazard, such as obstacles to flight, restricted airspace, or severe weather.
Separation Violation	An event in which the distance between an aircraft and either another aircraft, an obstacle, the ground, or specified airspace is less than prescribed standards.
Sequencing Plans	The ordering of aircrafts for arrival and departure.
Service	A mechanism to enable access to one or more capabilities, where the access is provided using a prescribed interface and is exercised consistent with constraints and policies as specified by the service description.

Term	Definition
Service Oriented Architecture Environment	A comprehensive framework that provides all the software technology that an enterprise might need to build and run an SOA, including both the design-time and run-time environments.
Service Status	The current quality of a delivered service as compared to its predefined optimal behavior.
Service Threads	Service threads are strings of systems that support one or more service/capabilities to a user/specialist.
Short Term Capacity Management	Short Term Capacity Management is the means through which strategic planning is performed for applying available assets to adjust system capacity to meet the demand. It involves the assessment of demand within an operational timeframe, and the allocation of available resources to provide sufficient capacity to meet that demand. It also predicts congestion where capacity cannot be increased sufficiently to meet demand. It works in coordination with Flow Contingency Management to resolve predicted congestion by adjusting airspace and route configurations to match the needs of specific flow initiatives.
Short Term Prediction	An estimated of specific information up to two hours in the future.
Short Term Trajectory Management	A route based separation handled by air traffic controllers using radar screens to visualize aircraft flight path and make cognitive operational judgments, with some automation decision support to help identify and resolve aircraft conflicts, manage specific aircraft movements and to manage the overall flow of all aircraft.
Special Activity Airspace (SAA)	Any airspace with defined dimensions within the NAS wherein limitations may be imposed upon aircraft operations.
Specialist	An internal stakeholder who is an expert in providing Air Traffic Control services.
Stakeholders	A group or individual that is affected by or is in some way accountable for the outcome of an undertaking; an interested party having a right, share or claim in a product or service, or in its success in processing qualities that meet that party's needs and/or expectations.
Steady-Level Flight	A flight characteristic of an aircraft that is operating under the following conditions: <ol style="list-style-type: none"> 1) The aircraft is maintaining a constant altitude and its wings are level to the horizon. (Level Flight) 2) The aircraft has a constant velocity and direction. (Steady Flight)
Storm Cell	An air mass that contains up and down drafts in convective loops, moves and reacts as a single entity, and functions as the smallest unit of a storm-producing system.

Term	Definition
Surface Volumes	Also known as surface capacity; refers to the number of aircraft that can move about the airport surface area (taxi ways, runways, gates, staging areas, etc.).
Surveillance	<p>The detection, location, and tracking of aircraft within NAS airspace for the purposes of control, separation, and identification. Surveillance systems are electronic in nature; visual methods are purposely excluded. In the case of dependent surveillance, the aircraft provides all flight information. Surveillance systems are differentiated as independent, independent cooperative, and dependent:</p> <ol style="list-style-type: none"> 1. Independent Surveillance - A system which requires no airborne compatible equipment. 2. Independent Cooperative Surveillance - A system which requires airborne compatible equipment (e.g., ATRBS, Mode S). 3. Dependent Surveillance - A system that requires input from navigation equipment aboard the aircraft either via a data link (e.g., LOFF) or via voice (transmission pilot reports).
Surveillance Information	<p>Consists of two types, cooperative and non-cooperative: Cooperative surveillance data is derive from the constant transmission of position information by an aircraft. Non-cooperative surveillance data is derived from integrated federal surveillance systems.</p>
Surveillance Information Management	<p>Means for processing raw surveillance information and transforming it into an integrated, comprehensive, and authoritative source for all consumers and service providers. The processing includes correlating surveillance information with flight data to provide continuous identification and tracking of each flight. It also involves the derivation of information from the surveillance data, such as velocity and intent.</p> <ul style="list-style-type: none"> - Surveillance Information Services are derived from integrated cooperative and non-cooperative surveillance systems to permit the creation of real-time situational awareness (the capability to detect, identify, and monitor air vehicles) on the surface of an airport and in the air. - To enable the operational improvements envisioned in NextGen, Surveillance Services must be able to detect, monitor, track, and identify all airborne objects—anything that could present a safety risk to the community of airspace users or could be a risk to national security.

Term	Definition
System and Services Analysis	System & Services Analysis includes both real-time and off-line analysis of information gathered throughout the system and from external entities. It is used to assess system performance and to support investigations of accidents, incidents, and criminal activity. It also includes the recording of operational information (including voice communications) for analysis and archival purposes.
System and Services Management	System & Services Management represents the enterprise-wide maintenance and system management function. It monitors the health of all system elements, identifies the impact of system issues on operational services, responds to failures and degradations of service, and provides logistics and preventative maintenance support to minimize system outages and degradation of services. It also monitors the health of external entities critical to the success of collaborative operations.
System Parameters	The selectable options for a set of components functioning as a single entity.
System Security	Degree to which a system is protected against attack or unauthorized disclosure.
System Status	The current performance quality of a set of infrastructure components as compared to their predefined optimal behavior.
T	
Taxiway	A movement area on an airport.
Terrain and Obstacle Information	An existing object, object of natural growth, or terrain at a fixed position.
Time Horizon	Time Horizons account for all current and future defined states of a flight necessary to support NextGen services. Expectation is that many states will exist for flights that have filed plans leading up to clearance delivery and that many new states will exist for surface management as well as airborne flights. New specific states are expected to be defined as data and services are available that are actionable by humans or automation. It is expected that predictive states that are utilized in the pre-clearance delivery time horizon will be processed utilizing the same functions used for active flights with modeled or projected NAS environmental data. It is expected that the modeled or projected NAS environmental data will be replaced in different time horizons by policy or as a result of actionable real data as it becomes available and meets any quality metrics that are required.

Term	Definition
Track Initiation	The creation of a recorded history of an aircraft's location.
Traffic	A term used by ATC to refer to one or more aircraft. The term may be used by specialists to transfer radar identification of an aircraft to another specialist for the purpose of coordinating separation action. Traffic is normally issued (a) in response to a handoff or point out, (b) in anticipation of a handoff or point out, or (c) in conjunction with a request for control of an aircraft.
Traffic Flow	The state of aircraft movement throughout the NAS.
Traffic Information	The relative position of other aircraft.
Traffic Management Initiative (TMI)	A plan put in place to accommodate flow restrictions and relieve congestion, such as ground holds or decisions to split a flow among multiple routes.
Trajectory	The projected path of an aircraft as a function of time.
Trajectory Management	Means through which 4-D trajectories are generated, assessed, and modified for use in trajectory-based operations. It supports the implementation of flow management strategies by managing changes to trajectories required by localized changes in capacity and demand. - This function includes two levels of scope – national and local. Both levels support plans developed by STCM and FCM and respond to changing situations, including flow contingency plans, traffic management initiatives, security-related airspace restrictions, severe weather, and changes in demand for airspace resources. The local level focuses on small, localized variations in trajectories, and adjustments related to the sequencing and spacing of flights through specific airspace resources. The national level focuses on end-to-end trajectory management in support of STCM and FCM.
U	
User	The external individual or group that receives services from the NAS (e.g., Pilot, Air Carrier, General Aviation, Military, Law Enforcement Agencies).
V	
Vehicle	A conveyance, other than an aircraft, that transports people or objects.
Velocity	The ground speed and current heading of an aircraft.

Term	Definition
Vertical Descent Guidance or Visual Descent Point	A defined point on the final approach course of a non-precision straight-in approach procedure from which normal descent from the MDA to the runway touchdown point may be commenced, provided the approach threshold of that runway, or approach lights, or other markings identifiable with the approach end of that runway are clearly visible to the pilot.
Visual Spatial References	A collection of lights or markings configured to provide visual guidance and information to pilots approaching/departing a runway. These configurations can be used to identify the extended centerline of a runway, or mark the approach edge/end of the runway, etc.
W	
Weather	A category of atmospheric phenomena that includes tornadoes, funnel clouds, waterspouts, thunderstorms, squalls, precipitation, and obscurations.
Weather Advisory	In aviation weather forecast practice, an expression of hazardous weather conditions not predicted in the area forecast, as they affect the operation of air traffic and as prepared by the National Weather Service.
Weather Aloft	Weather conditions aloft include: 1. Wind speed and direction. 2. Temperature. 3. Clear air turbulence. 4. Thunderstorms. 5. Thunderstorm associated with turbulence. 6. Hail. 7. Icing. 8. Mountain wave turbulence.

Term	Definition
Weather Information Management	<p>Means for processing raw weather information and transforming it into an integrated, comprehensive, and authoritative source for all consumers and service providers. The processing includes interpolation between sources to provide complete lateral and vertical coverage, and probabilistic extrapolation from current conditions into the future so as to provide a 4-D representation of the weather situation that can be used for decision making related to the current traffic situation and for planning to accommodate projected demand. It also includes the derivation of products and data that can be applied to decision support tools, support trajectory-based operations, and provide advisories of hazardous weather to consumers:</p> <ul style="list-style-type: none"> - This function includes two levels of scope – national and local. The local level integrates raw data from local sources and provides time-sensitive data to critical local functions, such as Separation Management. The national level integrates the output from the various local-level functions into a single, authoritative source for all consumers and service providers. It also provides an extended forecast capability that integrates climatology into the projection process that supports capacity management operations.
X	
Y	
Z	

6 Appendix C: Action Verbs

Action Verb	Definition
A	
Accept	To take or receive something offered.
Acquire	Gain possession of, obtain.
Activate	To put into operation or effect.
Adjust	1. To change so as to match or fit; cause to correspond. 2. To notify someone of a condition that may require action.
Alert	To advise or warn; cause to be on guard.
Analyze	Examine methodically so as to determine the nature and components of a matter via categorization, calculation, itemization, comparison, or tabulation.
Apply	To make use of as relevant, suitable, or pertinent.
Approve	To confirm or sanction formally; ratify.
Assess	To examine a situation for the purposes of characterizing it or identifying specific events or conditions.
Associate	To connect or bring into relation.
Assure	To secure or confirm; render safe or stable.
B	
Be	To exist in a state
C	
Collaborate	To work, one with another; cooperate.
Comply	To act or be in accordance with requirements.
Conduct	To direct or take part in the operation or management of.
Configure	To design or adapt to form a specific configuration for some specific purpose.
Control	To exercise direction over.

Action Verb	Definition
Coordinate	Bring into common action, movement, or condition. The exchange information and the participation in the planning of a common or joint action that requires consensus or cooperation.
D	
Derive	To reach or obtain by reasoning; deduce; infer.
Design	To plan the form and structure of.
Detect	To discover or discern the existence of something, to become aware of something.
Deter	To prevent
Determine	A process that uses information in order to establish some fact, happening, or event.
Develop	To bring into being or activity; generate; evolve.
Display	To show or exhibit; make visible.
Disseminate	The act of providing information to one or more users.
E	
Establish	To bring into existence.
Evaluate	To examine and judge carefully; appraise. Assigning a status based on set criteria.
F	
Forecast	To predict (a future condition or occurrence); calculate in advance.
G	
Generate	To bring into being; to create.
H	
Have	To possess as a characteristic, quality, or function.
I	
Identify	To recognize or establish as being a particular person or thing.
Implement	To put into practical effect; carry out.
Integrate	To bring together or incorporate (parts) into a whole.
J	
K	
L	
M	

Action Verb	Definition
Maintain	To keep in an existing state; preserve or retain.
Manage	To direct or control the use of; handle.
Measure	To ascertain the extent, dimensions, quantity, capacity, etc., of, esp. by comparison with a standard.
Meet	To comply with; fulfill; satisfy.
Mitigate	To make less severe.
Monitor	To keep track of systematically with a view to collecting information. To keep close watch over.
N	
Notify	To give notice to; inform.
O	
Operate	To work or use.
P	
Perform	To carry out; execute.
Plan	To formulate a way to achieve a given objective.
Predict	To make known in advance, especially on the basis of special knowledge.
Process	To input data or information and apply appropriate changes to products and databases.
Project	To set forth or calculate.
Provide	To make available.
Publish	To issue and prepare for public distribution, to bring to public notice or issue a publication.
Q	
R	
Record	To register information for preservation.
Respond	To reply or answer.
Restore	To bring back to a former, original, or normal condition.
S	
Support	To maintain, supplying with things necessary to existence.
T	
Terminate	To bring to an end; put an end to.

Action Verb	Definition
Track	To observe or monitor the course or path of.
Transfer	To convey or cause to pass from one place, person, or thing to another.
U	
Update	Replace some information or data with information or data that is more current.
Use	To put into service or action; to employ.
Utilize	To put to use.
V	
Validate	To recognize, establish, or illustrate the worthiness or legitimacy of.
W	
X	
Y	
Z	

7 Appendix D: Acronyms

Acronym	Meaning
#	
2-D	Two Dimensional
4-D	Four Dimensional
A	
ADIZ	Air Defense Identification Zone
ADF	Automatic Direction Finder
ANSP	Air Navigation Service Provider
ARTCC	Air Route Traffic Control Center
ASH	Aviation Safety and Hazardous Materials organization
ATC	Air Traffic Control
ATCRBS	Air Traffic Control Radar Beacon System
ATO	Air Traffic Organization
AVS	Aviation Security organization
B	
C	
CONOPS	Concept of Operations
CBP	US Customs and Border Protection
COI	Community of Interest
D	
DHS	Department of Homeland Security
DOC	Department of Commerce
DoD	Department of Defense
DOE	Department of Energy
DOJ	Department of Justice

Acronym	Meaning
DOS	Department of State
DOT	Department of Transportation
E	
EA	Enterprise Architecture
ETA	Estimated Time of Arrival
F	
FAA	Federal Aviation Administration
FBI	Federal Bureau of Investigation
FCM	Flow Contingency Management
FEMA	Federal Emergency Management Agency
G	
H	
HHS	Health and Human Services
I	
ICAO	International Civil Aviation Organization
ISSO	Information System Security Officer
J	
K	
L	
LOFF	LORAN C Offshore Flight Following
M	
MDA	Minimum Descent Altitude
ms	Millisecond
MSL	Mean Sea Level
MTBF	Mean Time Between Failure
MTTR	Mean Time to Restore
N	
NAS	National Airspace System

Acronym	Meaning
NASA	National Aeronautics and Space Administration
NAVAID	Navigational Aid
NCTC	National Counter Terrorism Center
NextGen	Next Generation Air Transportation
NIST	National Institute of Standards and Technology
NM	Nautical Mile
NORAD	North American Air Defense Command
NORTHCOM	The US Northern Command
O	
ODNI	Office of the Director of National Intelligence
OMB	Office of Management and Budget
P	
R	
R&D	Research and Development
RMA	Reliability, Maintainability, and Availability
S	
SAA	Special Activity Airspace
SAR	Search and Rescue
SEM	Systems Engineering Manual
SMS	Safety Management System
SOA	Service Oriented Architecture
SRM	Safety Risk Management
STCM	Short Term Contingency Management
T	
TACAN	Tactical Air Navigation System
TMI	Traffic Management Initiative
TSA	Transportation Security Administration
U	

Acronym	Meaning
US	United States
USCG	United States Coast Guard
USSS	United States Secret Service
V	
VFR	Visual Flight Rules
VOR	VHF Omni-directional Radio Range
W	
X	
Y	
Z	