

# National Airspace System Requirements Document



**Department of Transportation  
Federal Aviation Administration**

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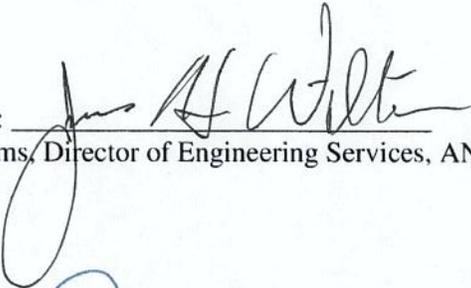
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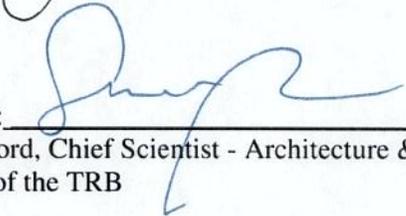
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# 1 Introduction

The National Airspace System (NAS) Requirements Document 2025 (NAS-RD-2025) is a compilation of the enterprise-level requirements for the system functions the NAS will perform in the year 2025. It is comparable to the Requirements Documents written for specific NAS equipment investment decisions. This document is a partner to the NAS Requirements Document 2010 (NAS-RD-2010) which describes the current system functionality of the NAS.

## 1.1 Purpose

The NAS-RD-2025 serves as the high-level source for programs to use to derive their respective requirements for the future NAS. It defines requirements without constraining technical alternatives, as did the NAS System Requirements (NAS-SR-1000). The document also dictates design principles where necessary to evolve more efficiently and yield the intended improvements to the services it provides. The NAS-RD-2025 supports NAS design, enterprise architecture engineering, and acquisition activities for new and upgraded systems as well as routine changes to the operational NAS equipment. It is the foundation for conducting additional functional decomposition and performance analysis.

A key goal of the NAS-RD-2025 is to map the enterprise-level NAS requirements to the future Enterprise Architecture (EA). The mapping will trace enterprise level requirements down to the systems that perform them on the 2025 roadmaps. Because new programs must create EA views per the Acquisition Management System (AMS), this mapping will help the programs stay aligned with the EA as the NAS evolves.

## 1.2 Background

NAS-SR-1000 was published in 1985 as a compilation of requirements to describe NAS operational capabilities as projected through year 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 "well written requirements" as defined in the NAS System Engineering Manual (SEM). The SEM defines well written requirements as:

- necessary
- concise
- solution non-specific
- attainable
- complete
- consistent
- traceable
- unambiguous
- verifiable

- 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. Also, 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. System and lower level requirements influence system design selection and, in many cases, may negate the correct design.

In 2010 it was decided that two documents were necessary to manage requirements at the enterprise level. The NAS-RD-2010 would replace the NAS-SR-1000 series and serve as a baseline of all the system requirements the NAS currently performs. The NAS-RD-2025 will provide the new requirements for the NAS to achieve the goals of enhancing the safety and reliability of air transportation, to improve efficiency in the NAS while reducing aviation's impact on the environment. These new capabilities described by the RD-2025 will define new system requirements that will be implemented during the far-term time frame.

In developing the NAS-RD series, the highest level requirements from NAS-SR-1000 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. New requirements were also written for artifacts on the Services Functionality View (SV-4) that are pertinent to the 2025 Architecture, but are not active today. The following products were used to derive the 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 EA products.

## 2 Scope

The NAS Enterprise Architecture (NAS EA) is a comprehensive, multiyear plan for improving, and ultimately evolving the NAS through 2025. It describes the services and capabilities that the NAS must provide in order to ensure safe and efficient Air Traffic Control services to the public. The requirements in the NAS-RD-2025 describe what system functions the NAS must provide in order to achieve these services and capabilities. The requirements contained in this document do not imply the organizational owners of the functions.

For this document, requirements are traced to all services in the SV-4, which defines seven services that enable the NAS performance. They are: Interaction Services, Mission Services, Support Services, Service Oriented Architecture (SOA) Core Services,

Technical Infrastructure Services, Enterprise Governance Services, and Administrative Services. Each service consists of lower level functions.

Additionally, each Mission Service has been assigned an Inherent Availability value. These values were derived from the expected level of risk the NAS would incur were the Mission Service not operational. The values are further defined in the Reliability, Maintainability, and Availability (RMA) section, and the glossary.

## **2.1 Intended Use**

Programs must develop architecture products that align with the NAS EA as prescribed by the AMS. These products and their associated links to the NAS-RD-2025 will provide programs with a framework to determine what enterprise-level requirements they need to fulfill. Those enterprise level requirements will be the basis for their program-level requirements.

Programs will then be able to trace their program requirements directly to the NAS-RD-2025. This direct link between these documents is vital to traceability and configuration management as the NAS evolves. When changes are made to the NAS-RD-2025, the effects on program requirements can be shown immediately. Conversely, if a program requirement change is proposed by the program office, the impact to the NAS services can also be traced.

Though program requirements will be traced to it, the NAS-RD-2025 is not meant to imply physical allocation of functions to systems. The process for allocation will be handled by a combination of requirements, EA products, and mid and Far Term products.

The NAS-RD-2025 covers not only functional requirements, but also several design principles. These principles describe key needs that newly acquired systems must have to be integrated with NextGen. In the same way program offices determine which functional requirements they are fulfilling, they must also determine which design principles to consider.

## **2.2 NAS-RD-2025 Updates**

As the vision of NextGen and the EA evolve, the NAS-RD-2025 must evolve as well. The Service Units must be engaged in developing the requirements for the document in order to reach the usability goals. Service Unit input to the level, scope, and content of the requirements is critical to successful deployment of the document.

After the initial baseline is developed, this document will be updated annually to ensure that it stays aligned with the EA and roadmaps. These updates will be bundled together with the annual updates of the NAS EA products.

We welcome your observations, ideas, and opinions regarding this initial draft NAS Requirements Document. Send comments to the following members of the NAS Requirements and Interface Management Group, AJP-14:

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## 3 Requirements

### 3.1 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 Information Systems Security Officer (ISSO), in order to determine which design principles must be followed for systems under development or for technical refreshes.

Object Number	Requirement
3.1.0-1	The NAS shall validate the accuracy, completeness, and integrity of information inputs.
3.1.0-2	The NAS shall integrate local exception event data into enterprise wide situational awareness.
3.1.0-3	The NAS shall utilize data environments for the applications of services in different Time horizons.
3.1.0-4	The NAS shall apply appropriate performance standards for the applications of services in different time horizons.
3.1.0-5	The NAS shall provide time stamps for data at predefined rates and accuracy based on the criticality of the data.
3.1.0-6	The NAS shall provide precise time and frequency to all NAS sub-systems requiring a time and/or frequency source.
3.1.0-7	The NAS shall perform mission services within a service oriented architecture environment.
3.1.0-7.0-1	The NAS shall provide enterprise-wide net-centric data management.
3.1.0-7.0-2	The NAS shall publish information in a standardized format in accordance with FAA Order 1375.1 and the NAS EA Data Reference Model.
3.1.0-7.0-3	The NAS shall provide enterprise-wide net-centric data access.
3.1.0-7.0-4	The NAS shall perform mission services in accordance with adaptable business rules and processes.
3.1.0-7.0-5	The NAS shall apply business rules and processes to implement FAA policies and procedures for real-time adaptation functions.
3.1.0-7.0-6	The NAS shall provide application services that can be used for multiple mission services.
3.1.0-8	The NAS internal client applications that communicate with public internet servers shall comply with OMB "Transition to IPv6" memorandum.
3.1.0-9	The NAS enterprise networks shall comply with OMB "Transition to IPv6" memorandum.
3.1.0-10	The NAS shall comply with all applicable FIPS, NIST, FAA, DOT, OMB and other Federal guidelines and industry best practices for Information System Security.
3.1.0-11	The NAS shall implement an Information System Security response to a security violation event.
3.1.0-12	The NAS shall identify system error conditions.
3.1.0-13	The NAS shall implement solutions to system error conditions.
3.1.0-14	The NAS shall comply with all directives, orders and policies within NAS EA Technical View-1, Standards.
3.1.0-15	The NAS shall comply with Human Factors Design Standard (HF-STD-001).

## 3.2 Mission Services

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.

### 3.2.1 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.

Inherent Availability: Safety Critical

Object Number	Requirement
3.2.1.0-1	The NAS shall project short term trajectories.
3.2.1.0-1.0-1	The NAS shall project velocity-based short term trajectories for separation management of aircraft.
3.2.1.0-1.0-2	The NAS shall determine weather-based adjustments to velocity-based short-term trajectories for separation management.
3.2.1.0-1.0-3	The NAS shall determine intent-based adjustments to velocity-based short-term trajectories for separation management.
3.2.1.0-1.0-4	The NAS shall determine conflict-based adjustments to velocity-based short-term trajectories for separation management.
3.2.1.0-2	The NAS shall assess the impact of separation constraints on separation management options.
3.2.1.0-2.0-1	The NAS shall assess the impact of aircraft capabilities on separation management options.
3.2.1.0-2.0-2	The NAS shall assess the impact of aircraft characteristics on separation management options.
3.2.1.0-2.0-3	The NAS shall assess the impact of flight objectives on separation management options.
3.2.1.0-2.0-4	The NAS shall assess the impact of airborne separation alerts on separation management options.
3.2.1.0-2.0-5	The NAS shall assess airborne separation alerts for separation management.
3.2.1.0-3	The NAS shall predict separation conflicts.
3.2.1.0-3.0-1	The NAS shall predict aircraft-to-aircraft separation conflicts.
3.2.1.0-3.0-2	The NAS shall predict aircraft-to-airspace separation conflicts.
3.2.1.0-3.0-3	The NAS shall predict aircraft-to-terrain and obstacle separation conflicts.
3.2.1.0-4	The NAS shall provide separation conflict resolutions.
3.2.1.0-4.0-1	The NAS shall identify separation conflict resolutions.
3.2.1.0-4.0-2	The NAS shall correlate separation conflict resolutions with flight objectives.

Object Number	Requirement
3.2.1.0-4.0-3	The NAS shall rank-order separation conflict resolutions.
3.2.1.0-5	The NAS shall detect separation violations.
3.2.1.0-5.0-1	The NAS shall detect aircraft-to-aircraft separation violations.
3.2.1.0-5.0-2	The NAS shall detect aircraft-to-airspace separation violations.
3.2.1.0-5.0-3	The NAS shall detect aircraft-to-terrain and obstacle separation violations.
3.2.1.0-6	The NAS shall provide separation violation resolutions.
3.2.1.0-6.0-1	The NAS shall identify separation violation resolutions.
3.2.1.0-6.0-2	The NAS shall rank-order separation violation resolutions.

### 3.2.2 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.

Inherent Availability: Efficiency Critical

Object Number	Requirement
3.2.2.0-1	The NAS shall provide the information and resources necessary for trajectory negotiation.
3.2.2.0-1.0-1	The NAS shall provide candidate trajectories to stakeholders.
3.2.2.0-1.0-2	The NAS shall acquire trajectory inputs from stakeholders.
3.2.2.0-1.0-3	The NAS shall provide trajectory analysis results.
3.2.2.0-2	The NAS shall assess constraints on trajectory development.
3.2.2.0-2.0-1	The NAS shall identify separation standards for trajectory development.
3.2.2.0-2.0-2	The NAS shall assess flight objectives for trajectory development.
3.2.2.0-2.0-3	The NAS shall assess aircraft capabilities for trajectory development.
3.2.2.0-2.0-4	The NAS shall assess aircraft characteristics for trajectory development.
3.2.2.0-2.0-5	The NAS shall assess flight status for trajectory development.
3.2.2.0-2.0-6	The NAS shall assess pilot authorization for trajectory development.
3.2.2.0-2.0-7	The NAS shall assess flow constraints for trajectory development.
3.2.2.0-	The NAS shall assess flow constraints to identify specific flights requiring trajectory

<b>Object Number</b>	<b>Requirement</b>
2.0-8	modification.
3.2.2.0-3	The NAS shall develop trajectories.
3.2.2.0-3.0-1	The NAS shall assign aircraft to runways.
3.2.2.0-3.0-2	The NAS shall assign aircraft to taxiways.
3.2.2.0-3.0-3	The NAS shall assign aircraft to routes.
3.2.2.0-3.0-4	The NAS shall assign aircraft to streams.
3.2.2.0-3.0-5	The NAS shall sequence traffic over an aeronautical fix or into a traffic flow stream.
3.2.2.0-3.0-5.0-1	The NAS shall sequence traffic over aeronautical fixes.
3.2.2.0-3.0-5.0-2	The NAS shall sequence traffic into traffic flow streams.
3.2.2.0-3.0-6	The NAS shall adjust flight paths.
3.2.2.0-3.0-7	The NAS shall assign time-to-fix for trajectories.
3.2.2.0-4	The NAS shall derive flow schedules.
3.2.2.0-4.0-1	The NAS shall derive arrival schedules.
3.2.2.0-4.0-2	The NAS shall derive departure schedules.
3.2.2.0-4.0-3	The NAS shall derive metering schedules.
3.2.2.0-5	The NAS shall project long term trajectories.
3.2.2.0-5.0-1	The NAS shall project velocity-based long term trajectories for trajectory management.
3.2.2.0-5.0-2	The NAS shall determine weather-based adjustments to velocity-based long term trajectories for trajectory management.
3.2.2.0-5.0-3	The NAS shall determine intent-based adjustments to velocity-based long term trajectories for trajectory management.
3.2.2.0-5.0-4	The NAS shall determine conflict-based adjustments to velocity-based long term trajectories for trajectory management.
3.2.2.0-6	The NAS shall predict trajectory conflicts.
3.2.2.0-6.0-1	The NAS shall predict aircraft-to-aircraft trajectory conflicts.
3.2.2.0-6.0-2	The NAS shall predict aircraft-to-airspace trajectory conflicts.
3.2.2.0-6.0-3	The NAS shall predict aircraft-to-weather trajectory conflicts.
3.2.2.0-6.0-4	The NAS shall predict aircraft-to-terrain or obstacle trajectory conflicts.
3.2.2.0-7	The NAS shall provide trajectory conflict resolutions.
3.2.2.0-7.0-1	The NAS shall identify trajectory conflict resolutions.
3.2.2.0-7.0-2	The NAS shall rank-order trajectory conflict resolutions.
3.2.2.0-8	The NAS shall evaluate trajectories.
3.2.2.0-	The NAS shall evaluate proposed trajectories.

Object Number	Requirement
8.0-1	
3.2.2.0-8.0-2	The NAS shall evaluate trial trajectories.
3.2.2.0-9	The NAS shall monitor trajectory conformance.
3.2.2.0-9.0-1	The NAS shall monitor flight path conformance.
3.2.2.0-9.0-2	The NAS shall monitor time-to-fix conformance.
3.2.2.0-9.0-3	The NAS shall monitor ground vehicle trajectory conformance.
3.2.2.0-10	The NAS shall predict trajectory non-conformance.
3.2.2.0-10.0-1	The NAS shall predict flight path non-conformance.
3.2.2.0-10.0-2	The NAS shall predict time-to-fix non-conformance.
3.2.2.0-11	The NAS shall assess procedure applicability to trajectories.
3.2.2.0-11.0-1	The NAS shall identify opportunities to apply procedures for trajectories.
3.2.2.0-11.0-2	The NAS shall monitor flight progress.
3.2.2.0-11.0-3	The NAS shall determine aircraft to aircraft flight path compatibility for procedures.
3.2.2.0-11.0-4	The NAS shall determine aircraft-to-aircraft spacing compatibility for procedures.
3.2.2.0-11.0-5	The NAS shall compare flight paths to reference points.

### 3.2.3 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.

Inherent Availability: Efficiency Critical

Object Number	Requirement
3.2.3.0-1	The NAS shall maintain flight operator information.
3.2.3.0-1.0-1	The NAS shall maintain aircraft capability information.
3.2.3.0-1.0-2	The NAS shall maintain aircraft characteristics information.
3.2.3.0-1.0-3	The NAS shall maintain pilot authorization information.
3.2.3.0-1.0-4	The NAS shall maintain flight objectives.
3.2.3.0-2	The NAS shall maintain trajectories for flights.
3.2.3.0-	The NAS shall maintain proposed trajectories.

<b>Object Number</b>	<b>Requirement</b>
2.0-1	
3.2.3.0-2.0-2	The NAS shall maintain trial trajectories.
3.2.3.0-2.0-3	The NAS shall maintain pending trajectories.
3.2.3.0-2.0-4	The NAS shall maintain intended trajectories.
3.2.3.0-2.0-5	The NAS shall maintain projected trajectories.
3.2.3.0-3	The NAS shall maintain flow management schedules.
3.2.3.0-3.0-1	The NAS shall maintain arrival schedules.
3.2.3.0-3.0-2	The NAS shall maintain departure schedules.
3.2.3.0-3.0-3	The NAS shall maintain metering schedules.
3.2.3.0-4	The NAS shall maintain flight status information.
3.2.3.0-4.0-1	The NAS shall maintain aircraft status information.
3.2.3.0-4.0-2	The NAS shall maintain flight progress information.
3.2.3.0-4.0-3	The NAS shall maintain clearance status.

### 3.2.4 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.

Inherent Availability: Efficiency Critical

<b>Object Number</b>	<b>Requirement</b>
3.2.4.0-1	The NAS shall provide the information and resources necessary for collaboration for flow contingency management plans.
3.2.4.0-1.0-1	The NAS shall provide proposed flow contingency management plans.
3.2.4.0-1.0-2	The NAS shall accept stakeholder input for flow contingency management plans.
3.2.4.0-1.0-3	The NAS shall provide analysis results of flow contingency management plans.
3.2.4.0-2	The NAS shall determine the flow situation for flow management plans.
3.2.4.0-	The NAS shall assess the impact of congestion information on flow management

<b>Object Number</b>	<b>Requirement</b>
2.0-1	plans.
3.2.4.0-2.0-2	The NAS shall assess the impact of flow constraints on flow management plans.
3.2.4.0-2.0-3	The NAS shall assess the impact of airspace status on flow management plans.
3.2.4.0-2.0-4	The NAS shall assess the impact of route status on flow management plans.
3.2.4.0-2.0-5	The NAS shall assess the impact of flight objectives on flow management plans.
3.2.4.0-2.0-6	The NAS shall assess the impact of aircraft capabilities on flow management plans.
3.2.4.0-2.0-7	The NAS shall assess the impact of aircraft characteristics on flow management plans.
3.2.4.0-2.0-8	The NAS shall assess the impact of flight status information on flow management plans.
3.2.4.0-2.0-9	The NAS shall assess the impact of pilot authorization information on flow management plans.
3.2.4.0-2.0-10	The NAS shall predict delays.
3.2.4.0-2.0-11	The NAS shall predict flow constraint non-conformance.
3.2.4.0-3	The NAS shall manage traffic flow.
3.2.4.0-3.0-1	The NAS shall manage flow constraints.
3.2.4.0-3.0-2	The NAS shall manage sequencing plans.
3.2.4.0-3.0-2.0-1	The NAS shall establish sequencing plans.
3.2.4.0-3.0-2.0-2	The NAS shall implement sequencing plans.
3.2.4.0-3.0-2.0-3	The NAS shall update sequencing plans.
3.2.4.0-3.0-2.0-4	The NAS shall disseminate sequencing plans.
3.2.4.0-3.0-3	The NAS shall manage Traffic Management Initiatives.
3.2.4.0-3.0-3.0-1	The NAS shall establish Traffic Management Initiatives.
3.2.4.0-3.0-3.0-2	The NAS shall implement Traffic Management Initiatives.
3.2.4.0-3.0-3.0-3	The NAS shall maintain Traffic Management Initiative schedules.
3.2.4.0-3.0-3.0-4	The NAS shall disseminate Traffic Management Initiatives.
3.2.4.0-3.0-4	The NAS shall select aircraft for trajectory modification.
3.2.4.0-3.0-5	The NAS shall evaluate flow management plans.
3.2.4.0-4	The NAS shall generate flow advisories.
3.2.4.0-4.0-1	The NAS shall generate flow constraint advisories.
3.2.4.0-	The NAS shall generate Traffic Management Initiative advisories.

Object Number	Requirement
4.0-2	

### 3.2.5 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.

Inherent Availability: Essential

Object Number	Requirement
3.2.5.0-1	The NAS shall provide the information and resources necessary for collaboration for short term capacity management planning.
3.2.5.0-1.0-1	The NAS shall provide proposed short term capacity management information to stakeholders.
3.2.5.0-1.0-2	The NAS shall accept stakeholder input for short term capacity management planning.
3.2.5.0-1.0-3	The NAS shall provide analysis results of short term capacity management information.
3.2.5.0-2	The NAS shall manage airspace restrictions.
3.2.5.0-2.0-1	The NAS shall manage special activity airspace (SAA).
3.2.5.0-2.0-1.0-1	The NAS shall monitor SAA status.
3.2.5.0-2.0-1.0-2	The NAS shall collaborate with SAA owners on SAA Information.
3.2.5.0-2.0-2	The NAS shall manage altitude reservations.
3.2.5.0-2.0-3	The NAS shall manage airspace restrictions in response to airspace security events.
3.2.5.0-2.0-4	The NAS shall manage airspace restrictions in response to airspace restriction requests.
3.2.5.0-3	The NAS shall determine airspace capacity.
3.2.5.0-3.0-1	The NAS shall assess airspace status to determine airspace capacity.
3.2.5.0-3.0-2	The NAS shall assess staffing resources to determine airspace capacity.
3.2.5.0-3.0-3	The NAS shall assess weather information to determine airspace capacity.
3.2.5.0-3.0-4	The NAS shall assess NAS status to determine airspace capacity.
3.2.5.0-3.0-5	The NAS shall assess planned outages to determine airspace capacity.
3.2.5.0-4	The NAS shall determine operational demand.

<b>Object Number</b>	<b>Requirement</b>
3.2.5.0-5	The NAS shall evaluate airspace capacity against demand.
3.2.5.0-5.0-1	The NAS shall predict congestion.
3.2.5.0-5.0-2	The NAS shall detect congested areas.
3.2.5.0-6	The NAS shall manage airspace capacity.
3.2.5.0-6.0-1	The NAS shall manage airspace status.
3.2.5.0-6.0-2	The NAS shall manage route status.
3.2.5.0-6.0-3	The NAS shall coordinate planned outages.
3.2.5.0-6.0-4	The NAS shall manage staffing resources.
3.2.5.0-6.0-5	The NAS shall evaluate capacity management plans.
3.2.5.0-7	The NAS shall generate airspace advisories.
3.2.5.0-7.0-1	The NAS shall generate airspace restriction advisories.
3.2.5.0-7.0-2	The NAS shall generate route status advisories.

### 3.2.6 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.

Inherent Availability: Routine

<b>Object Number</b>	<b>Requirement</b>
3.2.6.0-1	The NAS provide the information and resources necessary for stakeholder collaboration for capacity improvement plans.
3.2.6.0-1.0-1	The NAS shall provide proposed capacity improvement plans.
3.2.6.0-1.0-2	The NAS shall acquire stakeholder input for capacity improvement plans.
3.2.6.0-1.0-3	The NAS shall provide analysis results of capacity improvement plans.
3.2.6.0-2	The NAS shall project capacity needs.
3.2.6.0-2.0-1	The NAS shall identify current performance shortfalls.
3.2.6.0-2.0-1.0-1	The NAS shall identify specific airspace that consistently has high levels of congestion based on post-operational data.
3.2.6.0-2.0-1.0-2	The NAS shall identify airspace that is under configuration based on post-operational data.
3.2.6.0-2.0-2	The NAS shall forecast strategic demand.

<b>Object Number</b>	<b>Requirement</b>
3.2.6.0-2.0-3	The NAS shall forecast NAS capacity.
3.2.6.0-2.0-4	The NAS shall predict strategic airspace design performance.
3.2.6.0-3	The NAS shall evaluate capacity improvement plans.
3.2.6.0-3.0-1	The NAS shall evaluate proposed airspace and route performance.
3.2.6.0-3.0-2	The NAS shall evaluate environmental impacts of proposed capacity improvement plans.
3.2.6.0-3.0-3	The NAS shall evaluate the security impacts of proposed capacity improvement plans.
3.2.6.0-3.0-4	The NAS shall evaluate safety impacts of proposed capacity improvement plans.
3.2.6.0-3.0-5	The NAS shall evaluate infrastructure impacts on proposed capacity improvement plans.
3.2.6.0-3.0-6	The NAS shall evaluate terrain and obstacle information for proposed capacity improvement plans.
3.2.6.0-4	The NAS shall develop capacity improvement plans.
3.2.6.0-4.0-1	The NAS shall forecast strategic staffing needs.
3.2.6.0-4.0-2	The NAS shall design airspace configurations and routes.
3.2.6.0-4.0-3	The NAS shall design air traffic procedures.
3.2.6.0-4.0-4	The NAS shall plan NAS infrastructure.
3.2.6.0-4.0-5	The NAS shall translate capacity improvement plans into adaptation data.

### 3.2.7 System and Service 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.

Inherent Availability: Routine

<b>Object Number</b>	<b>Requirement</b>
3.2.7.0-1	The NAS shall manage post-operational data.
3.2.7.0-1.0-1	The NAS shall manage operational metrics.
3.2.7.0-1.0-2	The NAS shall manage recorded data.
3.2.7.0-1.0-2.0-1	The NAS shall record all operational data.
3.2.7.0-1.0-2.0-2	The NAS shall maintain all operational data.

Object Number	Requirement
3.2.7.0-1.0-3	The NAS shall manage voice recordings.
3.2.7.0-1.0-4	The NAS shall perform data mining.
3.2.7.0-1.0-5	The NAS shall provide information and resources necessary to support accident/incident investigations.
3.2.7.0-1.0-6	The NAS shall provide information and resources necessary to support search and rescue operations.
3.2.7.0-2	The NAS shall perform operational analysis.
3.2.7.0-2.0-1	The NAS shall analyze operational performance information.
3.2.7.0-2.0-2	The NAS shall analyze operational trends.
3.2.7.0-2.0-3	The NAS shall analyze airspace security.
3.2.7.0-2.0-4	The NAS shall analyze environmental impacts.
3.2.7.0-3	The NAS shall perform operational modeling.
3.2.7.0-3.0-1	The NAS provide the information and resources necessary for training simulations.
3.2.7.0-3.0-2	The NAS provide the information and resources necessary for problem prediction.
3.2.7.0-3.0-3	The NAS provide the information and resources necessary for problem definition.
3.2.7.0-3.0-4	The NAS provide the information and resources necessary for alternative evaluation.

### 3.2.8 System and Service 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.

Inherent Availability: Essential

Object Number	Requirement
3.2.8.0-1	The NAS provide the information and resources necessary for stakeholder collaboration for systems and services management.
3.2.8.0-1.0-1	The NAS shall provide maintenance situation information to stakeholders.
3.2.8.0-1.0-2	The NAS shall accept proposed maintenance inputs from stakeholders.
3.2.8.0-1.0-3	The NAS shall provide analysis results of system and service management information.
3.2.8.0-2	The NAS shall monitor service status.
3.2.8.0-	The NAS shall monitor system status.

Object Number	Requirement
2.0-1	
3.2.8.0-2.0-2	The NAS shall monitor external system status.
3.2.8.0-2.0-3	The NAS shall perform diagnostic testing.
3.2.8.0-2.0-4	The NAS shall measure system parameters.
3.2.8.0-2.0-5	The NAS shall detect failures.
3.2.8.0-2.0-6	The NAS shall assess failure probability.
3.2.8.0-2.0-7	The NAS shall derive service status from system status.
3.2.8.0-3	The NAS shall manage service performance.
3.2.8.0-3.0-1	The NAS shall reconfigure systems.
3.2.8.0-3.0-2	The NAS shall adjust system parameters.

### 3.2.9 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.

Inherent Availability: Essential

Object Number	Requirement
3.2.9.0-1	The NAS shall maintain NAS configuration information.
3.2.9.0-1.0-1	The NAS shall maintain airport configuration information.
3.2.9.0-1.0-2	The NAS shall maintain airspace configuration information.
3.2.9.0-1.0-3	The NAS shall maintain aircraft performance requirements necessary to operate in each airspace.
3.2.9.0-1.0-4	The NAS shall maintain route information.
3.2.9.0-1.0-5	The NAS shall maintain aircraft performance requirements necessary to operate in each route.
3.2.9.0-1.0-6	The NAS shall maintain SAA configuration information.
3.2.9.0-1.0-7	The NAS shall maintain NAS infrastructure information.
3.2.9.0-1.0-8	The NAS shall maintain terrain and obstacle information.
3.2.9.0-1.0-9	The NAS shall maintain separation standards information.
3.2.9.0-	The NAS shall maintain procedure information.

Object Number	Requirement
1.0-10	
3.2.9.0-2	The NAS shall maintain NAS configuration status and schedules.
3.2.9.0-2.0-1	The NAS shall maintain airport configuration status.
3.2.9.0-2.0-2	The NAS shall maintain airspace activation schedules.
3.2.9.0-2.0-3	The NAS shall maintain route activation schedules.
3.2.9.0-2.0-4	The NAS shall maintain SAA activation schedules.
3.2.9.0-2.0-5	The NAS shall maintain procedures status information.
3.2.9.0-2.0-6	The NAS shall maintain systems status information.
3.2.9.0-3	The NAS shall maintain air traffic advisories.
3.2.9.0-3.0-1	The NAS shall maintain airspace restriction advisories.
3.2.9.0-3.0-2	The NAS shall maintain route status advisories.
3.2.9.0-3.0-3	The NAS shall maintain flow constraint advisories.
3.2.9.0-3.0-4	The NAS shall maintain Traffic Management Initiative advisories.

### 3.2.10 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.

Inherent Availability: Essential

Object Number	Requirement
3.2.10.0-1	The NAS shall acquire weather information.
3.2.10.0-1.0-1	The NAS shall observe atmospheric and space weather conditions.
3.2.10.0-1.0-2	The NAS shall accept weather information from stakeholders.
3.2.10.0-1.0-3	The NAS shall integrate weather information.
3.2.10.0-	The NAS shall analyze weather information.

Object Number	Requirement
2	
3.2.10.0-2.0-1	The NAS shall analyze climatology products for strategic planning.
3.2.10.0-2.0-2	The NAS shall forecast the probability of atmospheric and space weather conditions.
3.2.10.0-2.0-3	The NAS shall determine the effect of weather conditions on operational capacity.
3.2.10.0-2.0-4	The NAS shall provide weather enterprise decision support services.
3.2.10.0-3	The NAS shall generate weather products.
3.2.10.0-3.0-1	The NAS shall generate trajectory-based weather products.
3.2.10.0-3.0-2	The NAS shall generate climatology products.
3.2.10.0-3.0-3	The NAS shall generate weather products for decision support tools (DST).
3.2.10.0-3.0-4	The NAS shall generate area weather products.
3.2.10.0-3.0-5	The NAS shall generate weather advisories.

### 3.2.11 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.

Inherent Availability: Safety Critical

Object Number	Requirement
3.2.11.0-1	The NAS shall acquire surveillance information.
3.2.11.0-1.0-1	The NAS shall acquire dependent surveillance information.
3.2.11.0-1.0-2	The NAS shall acquire independent surveillance information.
3.2.11.0-1.0-3	The NAS shall acquire cooperative surveillance information.
3.2.11.0-1.0-4	The NAS shall integrate multilateral information.
3.2.11.0-2	The NAS shall process surveillance information.
3.2.11.0-2.0-1	The NAS shall track aircraft.
3.2.11.0-	The NAS shall determine the position of aircraft.

Object Number	Requirement
2.0-1.0-1	
3.2.11.0-2.0-1.0-1.0-1	The NAS shall comply with the accuracy and update requirements for the airspace in determining aircraft position.
3.2.11.0-2.0-1.0-1.0-2	The NAS provide the information and resources necessary for the manual entry of aircraft position information.
3.2.11.0-2.0-1.0-2	The NAS shall determine the velocity for all aircraft detected by surveillance sources.
3.2.11.0-2.0-1.0-2.0-1	The NAS shall comply with the accuracy and update requirements for the airspace in determining aircraft velocity.
3.2.11.0-2.0-1.0-2.0-2	The NAS provide the information and resources necessary for the manual entry of aircraft velocity information.
3.2.11.0-2.0-1.0-3	The NAS shall identify all aircraft receiving air traffic services.
3.2.11.0-2.0-1.0-3.0-1	The NAS shall provide aircraft-supplied identity information when the information is available from the aircraft.
3.2.11.0-2.0-1.0-3.0-2	The NAS provide the information and resources necessary for the manual entry of identity information when not supplied by the aircraft.
3.2.11.0-2.0-2	The NAS shall track ground vehicles.
3.2.11.0-2.0-3	The NAS shall integrate surveillance information from multiple sources.
3.2.11.0-2.0-3.0-1	The NAS shall integrate surveillance information from multiple types of sources.
3.2.11.0-2.0-3.0-2	The NAS shall integrate surveillance information from multiple instances of the same type of source.

### 3.2.12 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.

Inherent Availability: Efficiency Critical

Object Number	Requirement
3.2.12.0-1	The NAS shall provide electronic spatial references.
3.2.12.0-1.0-1	The NAS shall provide electronic signals that provide route guidance to aircraft.
3.2.12.0-1.0-2	The NAS shall provide electronic signals to enable approach and landing operations.

<b>Object Number</b>	<b>Requirement</b>
3.2.12.0-1.0-3	The NAS shall provide electronic signals that enable aircraft to determine their position on the airport surface.
3.2.12.0-2	The NAS shall provide visual spatial references.
3.2.12.0-2.0-1	The NAS shall provide visual spatial references for airport surface navigation.
3.2.12.0-2.0-2	The NAS shall provide visual approach guidance.
3.2.12.0-2.0-2.0-1	The NAS shall provide visual spatial references along the extended runway centerline.
3.2.12.0-2.0-2.0-2	The NAS shall provide visual spatial references for vertical descent guidance to runways.
3.2.12.0-2.0-2.0-3	The NAS shall provide visual spatial references for runway ends, centerlines, and edges.

### 3.2.13 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.

Inherent Availability: Essential

<b>Object Number</b>	<b>Requirement</b>
3.2.13.0-1	The NAS provide the information and resources necessary for stakeholder collaboration of safety management.
3.2.13.0-1.0-1	The NAS shall provide safety issues to stakeholders.
3.2.13.0-1.0-2	The NAS shall accept safety issue inputs from stakeholders.
3.2.13.0-1.0-3	The NAS shall provide analysis results of safety management information.
3.2.13.0-2	The NAS shall manage the operational safety of Air Traffic Services.
3.2.13.0-2.0-1	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.
3.2.13.0-2.0-1.0-1	The NAS shall develop metrics for monitoring the levels of safety.
3.2.13.0-2.0-1.0-2	The NAS shall monitor conformance to safety metrics.
3.2.13.0-2.0-1.0-3	The NAS shall analyze safety trends.
3.2.13.0-2.0-1.0-4	The NAS shall determine operational risks.
3.2.13.0-2.0-1.0-5	The NAS shall mitigate operational risks.
3.2.13.0-2.0-2	The NAS shall manage safety data.

Object Number	Requirement
3.2.13.0-2.0-2.0-1	The NAS shall acquire safety data.
3.2.13.0-2.0-2.0-2	The NAS shall derive safety data from post-operational data.
3.2.13.0-2.0-2.0-3	The NAS shall maintain safety data.
3.2.13.0-2.0-3	The NAS shall conduct Safety Risk Management (SRM) assessments on all proposed NAS changes.
3.2.13.0-2.0-3.0-1	The NAS shall conduct Integrated Safety Risk Management (SRM) on all proposed NAS operational improvements to ensure holistic hazard analysis of all potentially interacting systems

Object Number	Requirement
3.2.13.0-2.0-3.0-1	The NAS shall conduct Integrated Safety Risk Management (SRM) on all proposed NAS operational improvements to ensure holistic hazard analysis of all potentially interacting systems
3.2.13.0-2.0-3	The NAS shall conduct Safety Risk Management (SRM) assessments on all proposed NAS changes.
3.2.13.0-2.0-2.0-3	The NAS shall maintain safety data.
3.2.13.0-2.0-2.0-2	The NAS shall derive safety data from post-operational data.
3.2.13.0-2.0-2.0-1	The NAS shall acquire safety data.

Object Number	Requirement
3.2.13.0-2.0-3.0-1	The NAS shall conduct Integrated Safety Risk Management (SRM) on all proposed NAS operational improvements to ensure holistic hazard analysis of all potentially interacting systems
3.2.13.0-2.0-3	The NAS shall conduct Safety Risk Management (SRM) assessments on all proposed NAS changes.
3.2.13.0-2.0-2.0-3	The NAS shall maintain safety data.
3.2.13.0-2.0-2.0-2	The NAS shall derive safety data from post-operational data.
3.2.13.0-2.0-2.0-1	The NAS shall acquire safety data.

### 3.3 Non-Mission Service Requirements

#### 3.3.1 RMA requirements

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.

#### 3.3.1.1 Service Availability

Object Number	Requirement
3.3.1.1-1	Safety-Critical NAS Services shall have an availability equal to or greater than .99999.
3.3.1.1-2	Efficiency-Critical NAS Services shall have availability equal to or greater than .9999
3.3.1.1-3	Essential NAS Services shall have availability equal to or greater than .999.
3.3.1.1-4	Routine NAS Services shall have availability equal to or greater than .99.
3.3.1.1-5	The NAS shall restore efficiency-critical services within 6 seconds of failure.
3.3.1.1-6	The NAS shall restore essential services within 10 minutes of failure.
3.3.1.1-7	The NAS shall restore routine services within 72 hours of failure.

#### 3.3.1.2 Service Thread Availability

Object Number	Requirement
3.3.1.2.0-1	Service threads supporting a Safety-Critical Service shall have availability equal to or greater than .99999.
3.3.1.2.0-2	Efficiency-Critical Service threads shall have availability equal to or greater than .9999.
3.3.1.2.0-3	Essential Service threads shall have availability equal to or greater than .999.
3.3.1.2.0-4	Routine Service threads shall have availability equal to or greater than .99.
3.3.1.2.0-5	The Mean Time to Restore for service thread components shall be less than or equal to 0.5 hours.
3.3.1.2.0-6	The Mean Time Between Failure for service threads with automatic recovery requirements and whose recovery time is greater or equal to the automatic recovery time shall be equal to or greater than 50,000 hours.
3.3.1.2.0-7	The Mean Time Between Failure for service threads that have no automatic recovery requirement shall be equal to or greater than 5,000 hours.

#### 3.3.2 Interaction Services

Interaction Services provide human observation and interaction using workstation elements such as display and keyboard. Purpose of Interaction service is to provide situation awareness and decision support. It often relies on information provided by the business logic of the Mission services and Support Services. Interaction service utilizes

Browser and Client to access services which may be hosted remotely on Application servers and Portals on the NAS network.

### 3.3.2.1 Presentation

#### 3.3.2.1.1 Browser

For accessing information in the form of web pages provided by web servers in the NAS/SWIM network or content from NAS Information Domain systems. In term, the browser displays the provided web page to the user. A web page may contain hyperlinks to other information.

Object Number	Requirement
3.3.2.1.1.0-1	The NAS provide the information and resources necessary for browser applications used for accessing NAS Information from domain systems.
3.3.2.1.1.0-2	The NAS provide the information and resources necessary for browser applications used for accessing information in the NAS network.

#### 3.3.2.1.2 Client

An application on an end-system that accesses a remote service on another computer system, known as a server, by way of a network. A client application also provides user interfaces with display and keyboard services.

Object Number	Requirement
3.3.2.1.2.0-1	The NAS provide the information and resources necessary for client applications that access the NAS server.

#### 3.3.2.1.3 Web Application

An application that is accessed via browser or client over a network such as the NAS network. It is also a computer software application that is coded in a browser-supported language (such as HTML, Java Script, Java, etc.) and reliant on a common web browser to render the application executable.

Object Number	Requirement
3.3.2.1.3.0-1	The NAS shall provide the infrastructure for distributed application processing.
3.3.2.1.3.0-2	The NAS shall maintain the infrastructure for distributed application processing.
3.3.2.1.3.0-3	The NAS shall provide a secure interface to access NAS databases.

#### 3.3.2.1.4 On-Demand NAS Portal

Provides a secure unified access point, often in the form of a web-based user interface, and is designed to aggregate and personalize information through application-specific portlets.

Object Number	Requirement
3.3.2.1.4.0-1	The NAS shall provide a secure interface to the NAS service directory.

### 3.3.2.1.5 Admin Portal

A special kind of portal for administration purpose, i.e. Runtime Management, or Data/Network Support Services.

Object Number	Requirement
3.3.2.1.5.0-1	The NAS shall provide an administration portal to support runtime management and data/network support services.

## 3.3.2.2 Notifications and Alerts

### 3.3.2.2.1 Weather Notification

Provides web based user interface to subscribe real-time notification of significant weather condition changes.

Object Number	Requirement
3.3.2.2.1.0-1	The NAS shall provide a web based user interface to subscribe to real-time notification of significant weather changes.

### 3.3.2.2.2 Flow Constraint Notification

Provides web based user interface to subscribe real-time notification of significant Flow Constraint changes.

Object Number	Requirement
3.3.2.2.2.0-1	The NAS shall provide a web based user interface to subscribe to real-time notification of significant flow constraint changes.

### 3.3.2.2.3 Airport Status and Mission Critical Notification

Provides web based user interface to subscribe real-time notification of airport status and mission critical information.

Object Number	Requirement
3.3.2.2.3.0-1	The NAS shall provide a web based user interface to subscribe to real-time notification of significant airport changes.

3.3.2.2.3.0-2	The NAS shall provide a web based user interface to subscribe to real-time notification of mission critical information.
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### 3.3.3 Support Services

Data Logic supporting Mission Services. The logic exists at two levels: Data access to the persistent data required by the Mission Services and management of data flow to and between Mission Services. This logic is available to the mission applications as services and may be constructed with domain model semantics.

#### 3.3.3.1 Data Access

##### 3.3.3.1.1 Content Discovery

Content Discovery is the generic capability, re-used within various information domains, to identify and access specific data/information provided by the Support and Mission Services.

Object Number	Requirement
3.3.3.1.1.0-1	The NAS shall identify data provided by operational services.
3.3.3.1.1.0-2	The NAS shall identify data needed to support operational services.
3.3.3.1.1.0-3	The NAS shall provide access to data needed to support operational services.

##### 3.3.3.1.2 Data Acquisition

Mechanisms for queries or passive receipt of persistent data required by the Mission Services.

Object Number	Requirement
3.3.3.1.2.0-1	The NAS shall acquire data needed to support operational services.

##### 3.3.3.1.3 Service Adaptation

Adaptation or transformation required to enable legacy applications to use SOA Core Services to exchange information with other services. Service Adaptation allows legacy applications to achieve service orientation without change to the legacy application logic.

Object Number	Requirement
3.3.3.1.3.0-1	The NAS shall adapt legacy services to use SOA Core Services.
3.3.3.1.3.0-2	The NAS shall adapt legacy applications to use SOA Core Services.

### 3.3.3.2 Data Flow Management

#### 3.3.3.2.1 Data Composition

Manipulation of data to required to match the composition of Mission Services and to support performance and scalability. Examples might include sorting or compression of data.

Object Number	Requirement
3.3.3.2.1.0-1	The NAS shall manage data composition to support service performance and scalability.

#### 3.3.3.2.2 Data Flow Mechanisms

Movement of information as needed to satisfy data flow requirements of the Mission Services. Examples might include bulk transfers or unique domain driven batching of data.

Object Number	Requirement
3.3.3.2.2.0-1	The NAS shall manage the secure movement of information.

### 3.3.4 Enterprise Governance

Enterprise Governance Provides the mechanisms for establishing how well services must work (Strategic Governance) and for ensuring that the services meet the Strategic Governance requirements (Runtime Management).

#### 3.3.4.1 Run-Time Management Enterprise Governance

##### 3.3.4.1.1 Service Choreography

Establishes service interchange patterns for collaborative purposes for interacting services from different provider entities that are not centrally managed.

Object Number	Requirement
3.3.4.1.1.0-1	The NAS shall establish community message interchange patterns for entities that are not centrally managed.

##### 3.3.4.1.2 Service Orchestration

Establishes service interaction patterns for combined, centrally managed services.

Object Number	Requirement
3.3.4.1.2.0-1	The NAS shall establish message interchange pattern for entities that are centrally managed.

#### 3.3.4.1.3 Security Policy Management

Provides management and storing of the rules that allow and limit access privileges to NAS data resources.

Object Number	Requirement
3.3.4.1.3.0-1	The NAS shall manage permission levels to NAS data resources.
3.3.4.1.3.0-1.0-1	The NAS shall manage enterprise wide security policy rules that permit and limit user access to NAS data resources.
3.3.4.1.3.0-1.0-2	The NAS shall restrict dissemination of navigation guidance information in accordance with military/FAA agreements.

#### 3.3.4.1.4 Service Policy Management

Storing, categorizing, updating, and distributing policies to control monitoring of faults and quality of services.

Object Number	Requirement
3.3.4.1.4.0-1	The NAS shall store enterprise wide services policies.
3.3.4.1.4.0-2	The NAS shall update enterprise wide services policies.
3.3.4.1.4.0-3	The NAS shall distribute enterprise wide services policies.
3.3.4.1.4.0-4	The NAS shall manage service faults and performance via enterprise wide service policy monitoring.

#### 3.3.4.1.5 Service SLA Management

Storing, updating, and distributing SLA to control monitoring of faults and quality of services.

Object Number	Requirement
3.3.4.1.5.0-1	The NAS shall store enterprise wide service level agreements.
3.3.4.1.5.0-2	The NAS shall update enterprise wide service level agreements.
3.3.4.1.5.0-3	The NAS shall distribute enterprise wide service level agreements.
3.3.4.1.5.0-4	The NAS shall manage service faults and performance via enterprise wide service level agreement monitoring.

**3.3.4.1.6 Service Scorecard Generation and Publication**

Collect information from Service Enforcement Point to review performance, capacity, reliability and availability of NAS systems and services and verify Service Policy and SLA are fulfilled.

<b>Object Number</b>	<b>Requirement</b>
3.3.4.1.6.0-1	The NAS shall collect quality of service information.
3.3.4.1.6.0-2	The NAS shall validate compliance with security policies.
3.3.4.1.6.0-3	The NAS shall validate compliance with service level agreements.

**3.3.4.2 Strategic Governance**

**3.3.4.2.1 Strategic SOA Governance**

Includes strategic planning, funding, budgeting, portfolio management, enterprise architecture, and business and technology alignment.

<b>Object Number</b>	<b>Requirement</b>
3.3.4.2.1.0-1	The NAS shall create processes for strategic SOA management
3.3.4.2.1.0-2	The NAS shall execute processes for strategic SOA management.

**3.3.4.2.2 Service Design Governance**

Creates and executes governance process including procedures for the design, implementation, test, and run-time management of the NAS SOA Services.

<b>Object Number</b>	<b>Requirement</b>
3.3.4.2.2.0-1	The NAS shall create enterprise wide service oriented architecture design-time governance processes.
3.3.4.2.2.0-2	The NAS shall execute enterprise wide service oriented architecture design-time governance processes.
3.3.4.2.2.0-3	The NAS shall validate compliance with policies for enterprise wide service oriented architecture design-time governance.

**3.3.4.2.3 Run-Time and Operations Governance**

Creates and executes governance process including procedures for runtime management and operations.

Object Number	Requirement
3.3.4.2.3.0-1	The NAS shall create enterprise wide service oriented architecture run-time governance processes.
3.3.4.2.3.0-2	The NAS shall execute enterprise wide service oriented architecture run-time governance processes.
3.3.4.2.3.0-3	The NAS shall validate compliance with policies for enterprise wide service oriented architecture run-time governance.

#### 3.3.4.2.4 SOA Governance Service Desk Support

Provides a single point of contact to meet the needs and satisfy objectives of both SOA implementers and SOA governance management.

Object Number	Requirement
3.3.4.2.4.0-1	The NAS shall establish an enterprise wide service oriented architecture single point of contact help desk to resolve technical problems for governing bodies and subordinates.

### 3.3.5 SOA Core Services

SOA Core Services layer primarily provides interfaces and interoperability to support the upper layers. The prime components are messaging services, collaboration services, security services and Enterprise Service Management.

#### 3.3.5.1 Messaging Services

##### 3.3.5.1.1 Publish/Subscribe

Provides support for publish/subscribe message exchange pattern.

Object Number	Requirement
3.3.5.1.1.0-1	The NAS shall enable authorized users to acquire service data using a publish/subscribe message exchange pattern.
3.3.5.1.1.0-2	The NAS shall publish service data using a publish/subscribe message exchange pattern.

##### 3.3.5.1.2 Request/Response

Provides support for request/response message exchange pattern.

Object Number	Requirement
3.3.5.1.2.0-1	The NAS shall enable authorized users to acquire service data using request/response message exchange pattern.
3.3.5.1.2.0-2	The NAS shall publish service data using a request/response message exchange pattern.

### 3.3.5.1.3 Message Routing

Provides support for message routing between service providers and service consumers.

Object Number	Requirement
3.3.5.1.3.0-1	The NAS shall route messages between service providers and service users.

### 3.3.5.1.4 Mediation

Provides the capability for various types of mediation, such as data format transformation, between message senders and receivers.

Object Number	Requirement
3.3.5.1.4.0-1	The NAS shall convert data formats for compatibility and readability.

## 3.3.5.2 Enterprise Services Management

### 3.3.5.2.1 Service Level Agreement Compliance and Metrics Collection

Monitors services to determine if factors specified in Service Level Agreements (SLAs) are out of the permitted range, including but not limited to resource utilization, fault behaviors, and performance metrics.

Object Number	Requirement
3.3.5.2.1.0-1	The NAS shall monitor Service Level Agreement resource utilization.
3.3.5.2.1.0-2	The NAS shall monitor Service Level Agreement fault behaviors.
3.3.5.2.1.0-3	The NAS shall monitor Service Level Agreement performance metrics.

### 3.3.5.2.2 Performance Monitoring and Reporting

Monitors services to determine level of performance including but not limited to throughput and response time. It also generates threshold based alerts and reports performance based metrics.

Object Number	Requirement
3.3.5.2.2.0-1	The NAS shall acquire enterprise services usage and performance data.
3.3.5.2.2.0-2	The NAS shall store enterprise services performance data.

3.3.5.2.2.0-3	The NAS shall catalog enterprise services performance data.
3.3.5.2.2.0-4	The NAS shall generate metrics based performance reports on enterprise services.
3.3.5.2.2.0-5	The NAS shall generate threshold based alerts based on enterprise service performance.

**3.3.5.2.3 Policy Enforcement and Metrics Collection**

Enforces policies set by the governance process including SLA compliance and message QoS compliance.

Object Number	Requirement
3.3.5.2.3.0-1	The NAS shall execute policies necessary to maintain SLA compliance.

**3.3.5.2.4 Fault Monitoring and Reporting**

Monitor services to determine if a service has a fault and report the fault.

Object Number	Requirement
3.3.5.2.4.0-1	The NAS shall monitor enterprise services faults.
3.3.5.2.4.0-2	The NAS shall report enterprise services faults.

**3.3.5.3 Interface Management**

**3.3.5.3.1 Service Discovery**

Provides the capability for service consumers to be able to easily find information about services including the service access point.

Object Number	Requirement
3.3.5.3.1.0-1	The NAS shall enable service users to find service information.

**3.3.5.3.2 Service Registration**

Provide Service Registry for the providers to register service description including service SLA and QoS characteristics, and meta-data for Service Interfaces.

Object Number	Requirement
3.3.5.3.2.0-1	The NAS shall register service descriptions.

3.3.5.3.2.0-2	The NAS shall register SLA and Quality of Service (QoS) characteristics.
3.3.5.3.2.0-3	The NAS shall register meta-data for service interfaces.

### 3.3.5.4 Security Services

#### 3.3.5.4.1 Security Policy Enforcement and Data Access Management

Provides management of access to data resources that are based on the requesting entity’s identity, organizational role, or other considerations such as transaction state or application. Provides mechanisms to enforce security policies based on rules set by the NAS SOA Governance body.

Object Number	Requirement
3.3.5.4.1.0-1	The NAS shall execute security service rules and procedures.
3.3.5.4.1.0-2	The NAS shall authorize data access in accordance with the requesting entity's identity, organizational role, transaction state, or application.
3.3.5.4.1.0-3	The NAS shall ensure non-repudiation of messaging.

#### 3.3.5.4.2 Security Monitoring

Provides monitoring of NAS services for any systems events that may indicate security breach or fraudulent use of NAS system resources.

Object Number	Requirement
3.3.5.4.2.0-1	The NAS shall monitor services for system events that may indicate a security breach or fraudulent use of NAS system resources.
3.3.5.4.2.0-2	The NAS shall identify system service security events.
3.3.5.4.2.0-3	The NAS shall generate audit records for all security-related events.
3.3.5.4.2.0-4	The NAS shall provide time stamps for use in security audit record generation.
3.3.5.4.2.0-5	The NAS shall protect security audit information from unauthorized access, modification, and deletion.

### 3.3.5.5 Collaboration Services

#### 3.3.5.5.1 Instant Messaging

Allows any number of authorized users operating on different computers to collaborate with each other through textual messages delivered in real-time.

Object Number	Requirement
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3.3.5.5.1.0-1	The NAS shall transmit real-time textual messages.
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**3.3.5.5.2 White Board**

Allows session users to view common files and provide the ability for users to collectively draw, annotate and mark “on top” of the common files view.

Object Number	Requirement
3.3.5.5.2.0-1	The NAS shall provide collective file modification capability for white board session users.

**3.3.6 Technical Infrastructure Services**

Enterprise Governance Provides the mechanisms for establishing how well services must work (Strategic Governance) and for ensuring that the services meet the Strategic Governance requirements (Runtime Management).

**3.3.6.1 External Boundary Protection**

Provides appropriate mechanisms that monitor and control communications at the external boundary of the NAS to prevent and detect malicious and other unauthorized communications.

Object Number	Requirement
3.3.6.1.0-1	The NAS shall provide mechanisms to facilitate the adjudication of interconnected system security policies.
3.3.6.1.0-2	The NAS shall monitor communications at the external boundary of an information system to prevent malicious and other unauthorized communications.
3.3.6.1.0-3	The NAS shall monitor communications at the external boundary of an information system to detect malicious and other unauthorized communications.
3.3.6.1.0-4	The NAS shall control communications at the external boundary of an information system to prevent malicious and other unauthorized communications.
3.3.6.1.0-5	The NAS shall authenticate specific devices before establishing a connection.
3.3.6.1.0-6	The NAS shall protect the integrity of information that is transmitted from unintended modifications according to FIPS 180-2 defined secure hash standards or its successors.

**3.3.6.2 Information System Security (INFOSEC) Support Infrastructure**

Provides capabilities for managing keys and supporting access control in the NAS

Object Number	Requirement
3.3.6.2.0-1	The NAS shall manage NAS local encryption keys.

3.3.6.2.0-2	The NAS provide the information and resources necessary to maintain access controls to message information.
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### 3.3.6.3 SOA Support Platforms

Provides an execution environment for operating systems including a Virtual Machine, common language runtime API, and runtime class library for application and Web Services (Java, Microsoft .Net, etc.)

Object Number	Requirement
3.3.6.3.0-1	The NAS shall provide an execution environment for Operating Systems.

### 3.3.6.4 Web Application Hosting Capability

Provides hosting functions and platforms that can be used to deploy Interaction Services.

Object Number	Requirement
3.3.6.4.0-1	The NAS shall provide web hosting functions.
3.3.6.4.0-2	The NAS shall provide web hosting platforms.

### 3.3.6.5 Data Storage

Primarily considered as the secondary storage for computer files and relational database.

Object Number	Requirement
3.3.6.5.0-1	The NAS shall maintain a secondary storage for computer files and relational database.
3.3.6.5.0-2	The NAS shall store A/G and G/G communications.

### 3.3.6.6 Computing Platforms

Includes a computer's architecture, operating system, programming languages and related runtime libraries or graphic user interface.

Object Number	Requirement
3.3.6.6.0-1	The NAS shall provide computer platforms capable of interfacing with SOA based and SOA enabled applications.

### 3.3.6.7 Terrestrial Network Communications

The NAS IP network primarily used for data communication between NAS applications, web servers, computer platforms and Data Storage.

Object Number	Requirement
3.3.6.7.0-1	The NAS shall provide an IP network for communication between NAS applications, web servers, computer platforms, and data storage.
3.3.6.7.0-2	The NAS shall provide ground-to-ground communications.
3.3.6.7.0-3	The NAS shall communicate with vehicles on the airport surface.

### 3.3.6.8 Air/Ground Communications

Includes data and voice communications services between ground and aircraft systems.

Object Number	Requirement
3.3.6.8.0-1	The NAS shall provide air-to-ground communications.
3.3.6.8.0-2	The NAS shall provide air-to-ground communications security.

### 3.3.6.9 Sensor Systems

Includes systems that convert measurements of physical phenomena into data representation. Examples include radar sensors and atmospheric sensors.

Object Number	Requirement
3.3.6.9.0-1	The NAS shall provide systems that convert measurements of physical phenomena into data representation.
3.3.6.9.0-2	The NAS shall provide systems that convert measurements of atmospheric phenomena into data representations
3.3.6.9.0-3	The NAS shall provide systems that convert surveillance measurements into data representations
3.3.6.9.0-4	The NAS shall provide systems that convert system performance measurements into data representations

## 3.3.7 Administrative Services

Administrative Services provide the mechanisms for establishing and implementing (Services Provisioning and Management) and for keeping the services running properly (Data/Network Support Services).

### 3.3.7.1 Data/Network Support Services

#### 3.3.7.1.1 Database Admin Services

Providing the environmental aspects for databases including recoverability, integrity, security, availability, performance, development, and testing support.

Object Number	Requirement
3.3.7.1.1.0-1	The NAS shall provide database recovery.

3.3.7.1.1.0-2	The NAS shall ensure database integrity.
3.3.7.1.1.0-3	The NAS shall ensure database security.
3.3.7.1.1.0-4	The NAS shall ensure database availability.
3.3.7.1.1.0-5	The NAS shall ensure database performance.
3.3.7.1.1.0-6	The NAS shall provide development of databases.
3.3.7.1.1.0-7	The NAS shall provide testing support of databases.

### 3.3.7.1.2 Network Support Services

Providing maintenance of computer hardware and software that comprises a computer network, including deployment, configuration, maintenance, and monitoring.

Object Number	Requirement
3.3.7.1.2.0-1	The NAS shall deploy computer network hardware.
3.3.7.1.2.0-2	The NAS shall configure computer network hardware.
3.3.7.1.2.0-3	The NAS shall maintain computer network hardware.
3.3.7.1.2.0-4	The NAS shall monitor computer network hardware.
3.3.7.1.2.0-5	The NAS shall deploy computer network software.
3.3.7.1.2.0-6	The NAS shall configure computer network software.
3.3.7.1.2.0-7	The NAS shall maintain computer network software.
3.3.7.1.2.0-8	The NAS shall monitor computer network software.

### 3.3.7.1.3 Information System Security Support Management

Managing the Information System Security Support Infrastructure within the Technical Infrastructure Services area.

Object Number	Requirement
3.3.7.1.3.0-1	The NAS shall manage the Information System Security Support Infrastructure.

### 3.3.7.1.4 Incident Detection and Response Services

Monitoring, analyzing and correlating incident detection sensor data from throughout the NAS, as well as reporting and coordinating response activities when an incident does occur.

Object Number	Requirement
3.3.7.1.4.0-1	The NAS shall monitor incident detection sensor data.
3.3.7.1.4.0-2	The NAS shall analyze incident detection sensor data.
3.3.7.1.4.0-3	The NAS shall correlate incident detection sensor data.
3.3.7.1.4.0-4	The NAS shall report response activities when an incident occurs.
3.3.7.1.4.0-5	The NAS shall coordinate response activities when an incident occurs.

### 3.3.7.1.5 Business Continuity Management Enterprise Governance

Providing mechanisms to do an orderly restoration of NAS services when there is a disastrous disruption of NAS facility.

Object Number	Requirement
3.3.7.1.5.0-1	The NAS shall restore, to a partial or complete state, interrupted NAS services within a predetermined time after a disruption has occurred.
3.3.7.1.5.0-2	The NAS shall implement the backup operations within two minutes of an ARTCC failure.
3.3.7.1.5.0-3	The NAS shall provide automatic track initiation and flight plan correlation in the backup facility within 60 seconds of an ARTCC failure.

### 3.3.7.1.6 Help Desk

Providing a single point of contact to support NAS personnel in the use of NAS services and to resolve reported problems.

Object Number	Requirement
3.3.7.1.6.0-1	The NAS shall provide a single point of contact for service problems to be reported.

## 3.3.7.2 Services Provisioning Management

### 3.3.7.2.1 Services Diagnostics

Collects fault and performance data to perform diagnostics of services in NAS operation.

Object Number	Requirement
3.3.7.2.1.0-1	The NAS shall collect real-time fault and performance data of services in NAS operation.

3.3.7.2.1.0-2	The NAS shall collect post analysis fault and performance data of services in NAS operation.
3.3.7.2.1.0-3	The NAS shall analyze real-time fault and performance data of services in NAS operation.
3.3.7.2.1.0-4	The NAS shall analyze post analysis fault and performance data of services in NAS operation.
3.3.7.2.1.0-5	The NAS shall provide service diagnostic reports.

**3.3.7.2.2 Services Integration and Testing**

Prototyping, Developmental Testing and Operational Testing for service qualities including reliability, availability ,and SLA policies before deployment.

Object Number	Requirement
3.3.7.2.2.0-1	The NAS shall conduct prototype testing for service qualities before deployment.
3.3.7.2.2.0-2	The NAS shall conduct operational testing for service qualities before deployment.

**3.3.7.2.3 Services Provisioning**

Perform deployment, configuration and maintenance in the lifecycle of certified NAS services.

Object Number	Requirement
3.3.7.2.3.0-1	The NAS shall deploy certified NAS services throughout the service lifecycle.
3.3.7.2.3.0-2	The NAS shall configure certified NAS services throughout its lifecycle.
3.3.7.2.3.0-3	The NAS shall maintain certified NAS services throughout its lifecycle.

**3.3.7.2.4 Certified Software Management**

Providing a central repository of approved software for use in the NAS, including the ability to ensure the integrity of the software.

Object Number	Requirement
3.3.7.2.4.0-1	The NAS shall provide a central source for certified software management.

**3.3.7.2.5 Training Support**

Supports training of NAS personnel to understand the characteristics and functionality of NAS application services.

Object Number	Requirement
3.3.7.2.5.0-1	The NAS shall provide training support for NAS services.

## 4 Appendix B: Glossary

Term	Definition
<b>A</b>	
Administration Portal	A special kind of portal for administration purpose, i.e. Runtime Management, or Data/Network Support Services.
Advisory	Advice and information provided to assist pilots in the safe conduct of flight and aircraft movement.
Aeronautical Fix	A geographical position that is determined by visual reference to the surface, by reference to one or more radio NAVAIDs, by celestial plotting, or by another navigational device.
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	<p>a. Flight Information Service.  b. Alerting Service.  c. Air Traffic Advisory Service.  d. Air Traffic Control Service.</p> <p>Provides for:</p> <ol style="list-style-type: none"> <li>1. Preventing collisions. <ol style="list-style-type: none"> <li>a). Between aircraft; and</li> <li>b). On the maneuvering area between aircraft and obstructions.</li> </ol> </li> <li>2. Expediting and maintaining a safe orderly and efficient flow of air traffic; and</li> <li>3. Minimize delays.</li> </ol>
Airborne Separation Alerts	A warning of a predicted violation of separation standards between one aircraft and another aircraft.

<b>Term</b>	<b>Definition</b>
Airborne Weather Information	Measurements of atmospheric parameters collected by airborne sensors on stakeholder aircraft.
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 Capabilities	The navigation, communications and surveillance capabilities specified in the flight plan.
Aircraft Characteristics	Inherent information about the aircraft that detail its performance capabilities. This information includes, Aircraft Type, Aircraft Configuration, Equipage, Current Weight, and Crew Certifications.
Aircraft Performance Requirements	A set of maneuvers that an aircraft and crew must be able to perform in order to fly a specific route or into a specific airspace.
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.
Aircraft Velocity	The current heading and rate of travel of the aircraft with respect to the ground.
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	A volume of air that is given specific dimensions, a classification, and a set of standards that dictate aircraft operations within that volume.
Airspace Activation Schedule	The current and scheduled use of specific airspace configurations, and includes contingency plans and alerts for implementing changes in status.
Airspace Advisories	Information provided to assist pilots in the safe conduct of flight and aircraft movement.
Airspace Capacity	The number of aircraft that can occupy an airspace at a given time given physical space and controller workload.
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.

<b>Term</b>	<b>Definition</b>
Airspace Restriction	Airspace with limited use possibly due to weather, security initiatives, traffic density, complexity, aircraft capabilities or air navigation system infrastructure requirements.
Airspace Restriction Advisory	Alerts regarding the implementation and schedule of airspace restrictions and contingency plans.
Airspace Restriction Request	Request from authorized external stakeholders for information regarding a current or scheduled airspace restriction and contingency plans.
Airspace Security Event	The occurrence of any aircraft entering an airspace without proper authorization or a valid transponder code.
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.
Alternative Evaluation	the modeling of a proposed airspace system configurations (airspace structures, routes, procedures, etc.) in conjunction with projected traffic demand scenarios to support the evaluation of the proposal.
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.
Atmospheric Phenomenon	A physical event that occurs in the atmosphere. Including clouds, air pockets, condensation, fronts, greenhouse warming, inversion, storms, atmospheric electricity, and meteor showers.
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.

<b>Term</b>	<b>Definition</b>
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.
<b>B</b>	
Backup Operational Plan	An ATC contingency plan used when the normal function of an ATC facility fails.
Browser	A person who browses; or - A software application for retrieving, presenting, and traversing information resources on the World Wide Web.
Business Rule	A statement that defines or constrains some aspect of the business intended to assert business structure or to control or influence the behavior of the business.
<b>C</b>	
Candidate Trajectories	Planned and proposed 4-D trajectories to provide common situational awareness during the trajectory development process, presented in the context of other known trajectories.
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 Management Plan	A plan used to balance capacity with demand that can include schedules and associated contingency plans for airspace and route reconfigurations, personnel allocation, planned system outages.
Capacity Needs	The shortfall produced by the comparison of demand for airspace resources (both projected and historical) to existing and planned system capacity and analyzaition of the impact of proposed airspace restrictions that accommodate airspace security events.
Capacity Projections	The predicted number of aircraft that an airspace volume can accommodate.
Clearance Status	Information regarding the state or condition of a clearance.
Client	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.

<b>Term</b>	<b>Definition</b>
Climate Information	The statistics of temperature, humidity, atmospheric pressure, wind, rainfall, atmospheric particle count and other meteorological elemental measurements in a given region over long periods of time.
Collaboration	A process to allow multiple users to group and collaborate, share and negotiate.
Collective File Modification Capability	The ability for users to collectively draw, annotate and mark “on top” of the common file views.
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 approaching the capacity for the area.
Congestion Information	Information pertaining to the areas where the volume of traffic exceeds the capacity.
Cooperative Surveillance	A surveillance system which requires airborne compatible equipment (e.g., ATCRBS, Mode S).
Current Performance Shortfalls	An identified deficiency in system capacity based on an analysis of post-operations data.
<b>D</b>	
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 Mining	The process of extracting patterns from data.
Decision Support Tool	An application that reads and analyzes information provided to provide a recommendation to a controller.
Demand	The number of aircraft currently in the system requiring services either in the air or on the airport surface.
Departure Schedule	The list of times derived by Trajectory Management from the projected, intended, and pending trajectories of multiple aircraft departing from the same airport.

<b>Term</b>	<b>Definition</b>
Dependent Surveillance	A surveillance system that requires input from navigation equipment aboard the aircraft either via a data link (e.g., LOFF) or via voice (transmission pilot reports).
Diagnostic Testing	The process through which the cause of faults, failures or errors is determined.
Distributed Application Processing	The use of multiple autonomous computing platforms that interact with each other to achieve a common goal.
<b>E</b>	
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.
Electronic Signals	A self-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.
Enterprise Wide Service Oriented Architecture Design-time Governance Processes	Creates and executes governance process including procedures for the design, implementation, test, and run-time management of the NAS SOA Services.
Enterprise Wide Service Oriented Architecture Run-time Governance Processes	Creates and executes governance process including procedures for runtime management and operations.
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.
Environmental Impact	The effect of noise, particulates, and gases produced by aircraft which contribute to climate change.

<b>Term</b>	<b>Definition</b>
Error Condition	A situation where user intervention is required or a desired operation has failed.
Essential	A service that if lost would significantly raise the risk associated with providing safe and efficient NAS operations.
Execution Environment	An environment for operating systems for application and Web Services (Java, Microsoft .Net,..etc.).
Extended Runway Centerline	An extension of the runway center line beyond the runway threshold.
External System Status	The current performance quality as compared to the predefined optimal behavior of a set of infrastructure components that belong to other government agencies or stakeholders.
<b>F</b>	
Failure	The event, or inoperable state, in which any item or part of an item does not, or would not, perform as previously 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.

<b>Term</b>	<b>Definition</b>
Flight Information (examples)	<p>Examples of Flight Information are:</p> <ul style="list-style-type: none"> <li>- Aircraft identification.</li> <li>- Current position.</li> <li>- Altitude.</li> <li>- Speed.</li> <li>- Heading.</li> <li>- Vertical velocity.</li> <li>- Horizontal acceleration.</li> <li>- Vertical acceleration.</li> <li>- Actual or reported Altitude.</li> <li>- Assigned altitude.</li> <li>- Source of altitude information.</li> <li>- Aircraft Velocity.</li> <li>- Aircraft Type.</li> <li>- Altitude conformance.</li> <li>- Handoff status.</li> <li>- Track status.</li> <li>- Ground speed.</li> <li>- Beacon code.</li> <li>- Computer identification information.</li> <li>- Conflict resolution advisory.</li> <li>- Source of altitude information.</li> <li>- Heavy jet indicator.</li> <li>- Remarks.</li> <li>- Alert special aircraft status.</li> <li>- Conflict alert.</li> <li>- Minimum safe altitude warning.</li> <li>- Conflict probe violation.</li> <li>- Failure of attempted data transmission indication.</li> </ul>
Flight Objectives	<p>The information of a flight including departure point and time, arrival point and time, preferred routes, preferred altitudes, preferred procedures, etc.</p>

Term	Definition
Flight Path	A course along which an aircraft is flying or has flown.

Term	Definition
Flight Plan	<p>Specified information relating to the intended flight of an aircraft that is filed orally or in writing with an ATC facility.</p> <p>Flight Plan information includes:</p> <ul style="list-style-type: none"> <li>- Aircraft Call sign.</li> <li>- Aircraft type.</li> <li>- Aircraft position.</li> <li>- Aircraft Altitude.</li> <li>- Direction of flight.</li> <li>- Aircraft velocity.</li> <li>- Beacon code.</li> <li>- Departure point.</li> <li>- Destination.</li> <li>- Altitude.</li> <li>- Route of flights.</li> <li>- Times relative to the movement of the flight.</li> <li>- Clearance limit.</li> <li>- ETA at reported fixes.</li> <li>- Holding information.</li> <li>- Approach information.</li> <li>- Fixes.</li> <li>- Handoff indicator.</li> <li>- Vector information.</li> <li>- Scratch pad.</li> <li>- Remarks.</li> </ul>
Flight Plan Correlation	The correlation of a flight plan to its associated position-tracking file (track file).
Flight Progress	Information about progress of a specific flight, including the portion of flight plan achieved, distance from a fix or operational event (handoff, procedure initiation, clearance, etc.), and alerts for initiating procedures.
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 Constraint Advisory	A message informing users of a unavailable flow patterns due to weather, capacity shortfalls, etc.

<b>Term</b>	<b>Definition</b>
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.
Flow Management Plan	A set of adjustments made to the current NAS Configuration in order to balance current capacity with demand.
Flow Schedule	An arrival, departure, or metering schedule derived from trajectory information.
Flow Situation	The combination of circumstances that describe the current flow performance.
Function	A set of organized actions that produce a defined automated output when given specific data inputs.
<b>G</b>	
Governance	Accountability for consistent, cohesive policies, processes and decision rights.
Ground-Ground Communications	Communication between vehicles and ground based facilities.
<b>H</b>	
<b>I</b>	
Identity Information	The callsign or designation of a flight based upon the operator, purpose, and equipment.
Incident	An occurrence other than an accident associated with the operation of an aircraft, which affects or could affect the safety of operations.

<b>Term</b>	<b>Definition</b>
Independent Surveillance	A surveillance system which requires no airborne compatible equipment.
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 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 System	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.
Intended Trajectories	Trajectories that have been cleared for execution or currently being executed.
Integrity	The ability of a system to provide timely warnings when the system should not be used for navigation as a result of errors or failures in the system.
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.
<b>J</b>	
<b>K</b>	
<b>L</b>	
Legacy Applications	Hardware or applications that have been previously established within the NAS.
Legacy Services	Services that have been previously established within the NAS.
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.

<b>Term</b>	<b>Definition</b>
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.
<b>M</b>	
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 (Act)	Set of actions intended to harm another person, organization or state.
Message Content	The information contained in all FAA Messages.  FAA Messages include: Official Messages. Unofficial Messages. Technical Messages. Non-technical Messages.
Message Exchange Patterns	A set of templates that provide a group of already mapped out sequences for the exchange of messages

<b>Term</b>	<b>Definition</b>
Meta-data	Information or data about a set of objects that is used for cataloguing and indexing.
Metering Schedules	A time-regulated schedule for aircraft to arrive at a fix so as not to exceed a predetermined terminal acceptance rate.
Metrics	A qualitative or <u>quantitative measurement</u> of an objective or desired outcome.
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.
Multilateration	Process of locating an object by accurately computing the time difference of arrival (TDOA) of a signal emitted from that object to three or more receivers.
N	The arrangement of the parts or elements of the NAS at a particular time.
NAS Airspace Capacity	The predicted capacity of an airspace.
NAS Configuration	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.
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.
NAS Infrastructure	NAS assets used to aid in air traffic control, such as navigational aids and communications frequencies.
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.

Term	Definition
Navigation Guidance	<p>Information or position data to aircraft in flight.</p> <p>Navigation Guidance information can include:</p> <ul style="list-style-type: none"> <li>- Horizontal (azimuth) guidance.</li> <li>- Vertical (glide slope) guidance.</li> <li>- Distance/range.</li> <li>- Bearing.</li> <li>- Latitude.</li> <li>- Longitude.</li> <li>- Altitude.</li> <li>- Rho/Theta coordinates referenced to the location of the navigational aid and true magnetic north respectively.</li> </ul>
Navigation Support	<p>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.</p>
Non-repudiation	<p>The acceptance of a duty or obligation.</p>
<b>O</b>	
Obstacle	<p>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.</p>
Operational Analysis	<p>The process by which the NAS assesses its performance.</p>
Operational Capacity	<p>The capability of performing a service at this moment or a future time or day.</p>
Operational Demand	<p>The current demand on the NAS infrastructure, airspace, or facilities.</p>
Operational Metrics	<p>The measure for quantitatively assessing the air traffic system for the interpretation of the assessment in the light of previous or comparable assessments.</p>
Operational Modeling	<p>Operational scenarios and configurations that support system improvements, training, and the identification of operational problems.</p>
Operational Performance Information	<p>Quantitative information on how well a system or service meets design requirements.</p>
Operational Risk	<p>Potential hazard to the system</p>

<b>Term</b>	<b>Definition</b>
Operational Safety	The collective level of safety provided by all systems, policies, and procedures within the NAS
Operational Trends	Patterns in conditions or processes within an operational environment.
<b>P</b>	
Pending Trajectories	Trajectories that have been negotiated and approved/accepted, but are awaiting execution. Pending trajectories can consist of a portion of an intended trajectory for which a clearance has not yet been issued.
Performance Standard	The required quality of service that must be delivered for a given function.
Physical Phenomenon	Any event that is an observable feature of matter, energy, or space-time that requires the use of instrumentation to observe, record, or compile data concerning the event.
Pilot Authorization	A set of constraints imposed on a flight based on the training of the crew and pilot, certification, security clearance, etc.
Planned Outage	A pre-scheduled shut down of a system or service.
Post-Operational Data	The set of data that is collected after a complete day's operations.
Probabilistic Forecast	The modeling of existing airspace system configurations (airspace structures, routes, procedures, etc.) in conjunction with projected traffic demand scenarios to determine the parameters associated with identified potential operational problems, including scope of problem, interdependencies with other proposed or planned changes, constraints on problems resolutions, etc.
Problem Definition	The modeling of existing airspace system configurations (airspace structures, routes, procedures, etc.) in conjunction with projected traffic demand scenarios to determine the parameters associated with identified potential operational problems, including scope of problem, interdependencies with other proposed or planned changes, constraints on problems resolutions, etc.
Problem Prediction	Use of projected traffic demand scenarios to identify potential operational issues or risks that will need to be mitigated.
Procedure Information	The specific airspace configurations, routes, aircraft capabilities, and operations associated with pre-defined procedures
Projected Trajectories	Projection of a specific flight trajectory based on surveillance and other factors affecting the flight path. Projected trajectories consist of two types - a short-term rapid-update trajectory projection used to support Separation Management, and a long-term less frequently updated trajectory projection used to support Trajectory Management.

<b>Term</b>	<b>Definition</b>
Proposed Airspace Changes	The design of airspace boundaries, routes, procedures, etc. prior to the time of implementation into the NAS.
Proposed Trajectories	Trajectories submitted by an external stakeholder that have not been accepted/ approved
<b>Q</b>	
<b>R</b>	
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
Reference Point	Any defined point or place on the ground used for reference in navigating, defining a flight path, or determining a procedure for an aircraft.
Reliability	The probability that an item can perform its intended function for a specified interval under stated conditions.
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 Status Advisory	A alert on the current traffic flow status of routes (current and projected congestion, projected weather impacts, airport reconfigurations), including contingency plans and alerts for implementing changes in status
Routine	A service which, if lost, would have a minor impact on the risk associated with providing safe and efficient NAS operations.
Runtime Management	The administration of applications while they are executing.
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.
<b>S</b>	
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 Data	Information related to the occurrence of Operational Errors, Runway Incursions, Operational Deviations, Proximity Events, Pilot Deviations, Near Mid-Air Collisions, and Mid-Air Collisions.
Safety Issue	An event that creates a increased risk for the lost of human life

<b>Term</b>	<b>Definition</b>
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.
Safety Trend	A correlation between safety data and operations that establish a pattern for the operational safety of the NAS.
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"> <li>1. Measures taken to protect the NAS from all acts designed to, or that may, impair its effectiveness.</li> <li>2. A condition that results from the establishment and maintenance of measures to protect designated information, personnel, equipment, and installations.</li> <li>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.</li> </ol>
Security Event	The occurrence of unauthorized access, use, disclosure, disruption, modification, perusal, inspection, recording or destruction of NAS information.
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 Conflict	Prediction of less than standard separation.
Separation Conflict Resolution	Options for resolving predicted separation conflicts, including modifications to, or deviations from, existing trajectories.

<b>Term</b>	<b>Definition</b>
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 Standards	The minimum safe distance that is allowed between two aircraft.
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.
Separation Violation Resolution	Options for resolving separation violations, including modifications to, or deviations from, existing trajectories.
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.
Service Performance	The performance of system elements and the of the services they support.
SOA Core Services	The fundamental SWIM mechanisms that enable information sharing: Interface Management, Messaging, Enterprise Service Management (ESM) and Security. These services are solution-agnostic (not limited to a single process or solution environment) and have a high degree of autonomy so that they support reuse within the NAS. Also referred to as “core services.” (System-Wide Information Management (SWIM) Service Registry Requirements. Release 1.3 March 10, 2009).
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.

<b>Term</b>	<b>Definition</b>
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.
Special Activity Airspace (SAA)	Any airspace with defined dimensions within the NAS wherein limitations may be imposed upon aircraft operations.
Special Activity Airspace (SAA) Configuration Information	Information regarding the status, location, and geometry of Special Activity Airspace.
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.
Staffing Resources	The personnel available to provide a NAS Service at a given performance parameter.
Strategic Demand	The predicted demand on the NAS and /or one of its components.
Strategic SOA Management	The provision of specific web services for each domain of flight or individual airspace sectors.
Strategic Staffing Needs	The required personnel resources that are needed to strategically improve the operations of a specific airspace sector.
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.).
Surface Weather Information	Information generated from measurements of atmospheric parameters by ground-based sensors.

Term	Definition
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"> <li>1. Independent Surveillance - A system which requires no airborne compatible equipment.</li> <li>2. Independent Cooperative Surveillance - A system which requires airborne compatible equipment (e.g., ATCRBS, Mode S).</li> <li>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).</li> </ol>
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"> <li>- 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.</li> <li>- 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.</li> </ul>
System and Service Analysis	<p>System &amp; 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.</p>

<b>Term</b>	<b>Definition</b>
System and Service 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.
<b>T</b>	
Taxiway	A movement area on an airport.
Terrain	The vertical and horizontal dimension of land surface.
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.
Time-to-Fix	The amount of time it is expected to take an aircraft to reach an aeronautical fix.

<b>Term</b>	<b>Definition</b>
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 Flow Stream	A route of flight assigned to aircraft to manage capacity and demand for a specific area of the NAS.
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.
Training Simulation	A model of specific airspace system configurations (airspace structures, routes, procedures, etc.) in conjunction with various traffic demand scenarios to provide training for ATC and ATM personnel.
Trajectory	The projected path of an aircraft as a function of time.
Trajectory Conflict	An issue resulting from the comparison of planned and projected trajectories with other planned and projected trajectories, and the comparison of planned and projected trajectories with obstacles to flight (including terrain, obstacles, restricted airspace, and airspace impacted by weather).
Trajectory Conflict Resolution	Options for resolving predicted trajectory conflicts.
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.
Trajectory-Based Weather Products	Weather information provided for specific routes and trajectories.
Trial Trajectories	Trajectories generated by the NAS that are not accepted or approved.

<b>Term</b>	<b>Definition</b>
<b>U</b>	
User	The external individual or group that receives services from the NAS (e.g., Pilot, Air Carrier, General Aviation, Military, Law Enforcement Agencies).
<b>V</b>	
Vehicle	A conveyance, other than an aircraft, that transports people or objects.
Velocity Based Long Term Trajectory	The extrapolated the long term trajectory of a vehicle from the last known position based on the velocity of the vehicle.
Velocity Based Short Term Trajectory	The extrapolated the short term trajectory of a vehicle (airborne and surface) from the last known surveillance-based position based on the velocity of the vehicle.
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.
Violation Event	An occurrence of non-conformance with rules or standards.
Visual Approach Guidance	A system of lights on the side of an airport runway threshold that provides visual descent guidance information during the approach to a runway
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.
<b>W</b>	
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.

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"> <li>- 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.</li> </ul>
Web Hosting Functions	The services that allow individuals and organizations to make their information accessible via the World Wide Web.
Web Hosting Platform	The hardware that provides information to the world wide web for viewing.
White Board	A collaboration method allowing collective file modification.
X	
Y	
Z	

## 5 Appendix C: Action Verbs

Action Verb	Definition
<b>A</b>	
Accept	To take or receive something offered.
Acquire	Gain possession of, obtain.
Adapt	To make suitable to requirements or conditions; adjust or modify fittingly.
Adjust	1. To change so as to match or fit; cause to correspond. 2. To notify someone of a condition that may require action.
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.
Assess	To examine a situation for the purposes of characterizing it or identifying specific events or conditions.
Assign	To give out as a task; allot. To set apart for a particular purpose; designate; select.
Authenticate	To establish as genuine.
Authorize	To give authority for.
<b>B</b>	
Be	To exist in a state
<b>C</b>	
Check	To inspect or test the performance, condition, safety, etc., of something.
Collaborate	To work, one with another; cooperate.
Collect	To accumulate; make a collection of.
Compare	To examine the character or qualities of two or more items in order to discover similarities, differences, or convergences.
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.
Convert	To change (something) from one use, function, or purpose to another; adapt to a new or different purpose.

<b>Action Verb</b>	<b>Definition</b>
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.
Correlate	To put in relation with each other; to connect together by the disclosure of a mutual relation.
Create	To cause to come into being.
<b>D</b>	
Derive	To reach or obtain by reasoning; deduce; infer.
Design	To plan the form and structure of.
Deploy	To arrange in a position of readiness.
Detect	To discover or discern the existence of something, to become aware of something.
Determine	A process that uses information in order to establish some fact, happening, or event.
Develop	To bring into being or activity; generate; evolve.
Disseminate	The act of providing information to one or more users.
<b>E</b>	
Enable	To make possible or accessible.
Ensure	To make sure or certain.
Establish	To bring into existence.
Evaluate	To examine and judge carefully; appraise. Assigning a status based on set criteria.
Execute	To carry out; accomplish.
<b>F</b>	
Forecast	To predict (a future condition or occurrence); calculate in advance.
<b>G</b>	
Generate	To bring into being; to create.
<b>H</b>	
Have	To possess as a characteristic, quality, or function.
<b>I</b>	
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.
<b>J</b>	
<b>K</b>	
<b>L</b>	
Log	To enter in a log; compile; amass; keep a record of.
<b>M</b>	

<b>Action Verb</b>	<b>Definition</b>
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.
Mitigate	To make less severe.
Monitor	To keep track of systematically with a view to collecting information. To keep close watch over.
<b>N</b>	
<b>O</b>	
Operate	To work or use.
<b>P</b>	
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 treat or prepare by a defined set of steps.
Project	To set forth or calculate.
Protect	To defend or guard from attack, invasion, or loss.
Provide	To make available.
Publish	To issue and prepare for public distribution, to bring to public notice or issue a publication.
<b>Q</b>	
<b>R</b>	
Rank-Order	To arrange in chronological order based on a particular position, station, class, etc..
Recover	To get back or regain.
Register	To cause to be recorded upon delivery for safeguarding against loss, theft, damage, etc.
Report	To provide information in a prescribed manner.
Restrict	To confine within bounds.
Restore	To bring back to a former, original, or normal condition.
<b>S</b>	
Sequence	Serial arrangement in which things follow in logical order.
Store	To accumulate or put away for future use.
Support	To maintain, supplying with things necessary to existence.
<b>T</b>	
Track	To observe or monitor the course or path of.

Action Verb	Definition
Translate	To convert from one to another.
Transmit	Send out a message, such as a call, acknowledgement, response, suggestion, direction, information, instruction, message, or request.
<b>U</b>	
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.
<b>V</b>	
Validate	To recognize, establish, or illustrate the worthiness or legitimacy of.
<b>W</b>	
<b>X</b>	
<b>Y</b>	
<b>Z</b>	

## 6 Appendix D: Acronyms

Acronym	Meaning
#	
4-D	Four Dimensional
<b>A</b>	
A/G	Air-to-Ground
ADF	Automatic Direction Finder
AMS	Acquisition Management System
ANSP	Air Navigation Service Provider
API	Application Programming Interface
ARTCC	Air Route Traffic Control Center
ATC	Air Traffic Control
ATCRBS	Air Traffic Control Radar Beacon System
ATM	Air Traffic Management
<b>B</b>	
<b>C</b>	
CONOPS	Concept of Operations
COI	Community of Interest
<b>D</b>	
<b>E</b>	
EA	Enterprise Architecture
ETA	Estimated Time of Arrival
<b>F</b>	
FAA	Federal Aviation Administration
FCM	Flow Contingency Management
<b>G</b>	
G/G	Ground-to-Ground
<b>H</b>	
HTML	HyperText Markup Language
<b>I</b>	
ICAO	International Civil Aviation Organization
INOFSEC	Information Security
IP	Internet Protocol
<b>J</b>	
<b>K</b>	

<b>Acronym</b>	<b>Meaning</b>
<b>L</b>	
LOFF	LORAN C Offshore Flight Following
<b>M</b>	
MDA	Minimum Descent Altitude
MTBF	Mean Time Between Failure
MTTR	Mean Time to Restore
<b>N</b>	
NAS	National Airspace System
NAVAID	Navigational Aid
NextGen	Next Generation Air Transportation
NIST	National Institute of Standards and Technology
<b>O</b>	
OMB	Office of Management and Budget
<b>P</b>	
<b>Q</b>	
QoS	Quality of Service
<b>R</b>	
R&D	Research and Development
RMA	Reliability, Maintainability, and Availability
<b>S</b>	
SAA	Special Activity Airspace
SAR	Search and Rescue
SEM	Systems Engineering Manual
SLA	Service Level Agreement
SMS	Safety Management System
SOA	Service Oriented Architecture
SRM	Safety Risk Management
STCM	Short Term Contingency Management
SWIM	System Wide Information Management
<b>T</b>	
TACAN	Tactical Air Navigation System
TMI	Traffic Management Initiative
<b>U</b>	
<b>V</b>	
VFR	Visual Flight Rules

<b>Acronym</b>	<b>Meaning</b>
VOR	VHF Omni-directional Radio Rang
<b>W</b>	
<b>X</b>	
<b>Y</b>	
<b>Z</b>	

