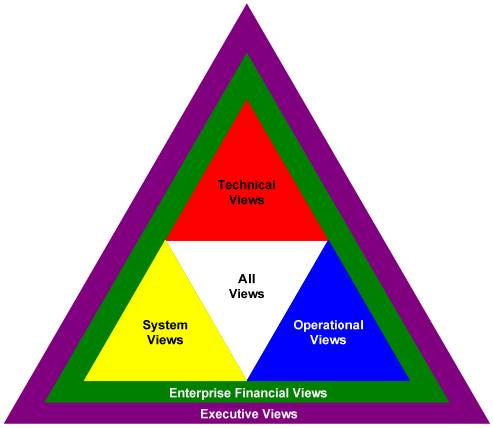
National Airspace System Enterprise Architecture (NAS EA)

Air Traffic Organization



NextGen Far-Term (2025)

To-Be Enterprise-Level Architecture

High-level Operational Concept Graphic (OV-1)

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Figure 1. NextGen 2025 OV-1

Overview

Purpose
The OV-1 provides a high-level graphical representation of the operational concepts associated with the NextGen objectives. Several elements are depicted on the OV-1 graphic and they are described below.

NextGen Overview[1]
NextGen is an umbrella term for the ongoing, wide-ranging transformation of the United States' national airspace system (NAS). At its most basic level, NextGen represents an evolution from a ground-based system of air traffic control to a satellite-based system of air traffic management. This evolution is vital to meeting future demand, and to avoid gridlock in the sky and at our nation's airports.

These goals will be realized through the development of aviation-specific applications for existing, widely-used technologies such as Global Positioning Satellite (GPS). They will also be realized through the fostering of technological enhancements in areas such as weather forecasting, data networking, and digital communications. Furthermore, goals will be realized by including innovative ideas such those discussed in the NextGen Solution Sets. Hand in hand with state-of-the-art technology will be new airport infrastructure and new procedures, including the shifting of certain decision-making responsibility from the ground to the cockpit.

NextGen Solution Sets
The following solution sets are depicted at the upper and lower portions of the OV-1 and have been defined to help realize the benefits of NextGen:

Trajectory-Based Operations (TBO)
Trajectory-based Operations represent a shift from clearance-based to trajectory-based control. Aircraft will fly negotiated trajectories and air traffic control moves to trajectory management. The traditional responsibilities and practices of pilots/controllers will evolve due to the increase in automation, support, and integration inherent in management by trajectory.

This solution set focuses primarily on en route cruise operations, although the effects of the trajectory-based operations will impact all phases of flight.

High-Density Airports (HD)
The Increase Arrivals/Departures at High-Density Airports solution set involves airports (and the airspaces that access those airports) in which:

- Demand for runway capacity is high
- There are multiple runways with both airspace and taxiing interactions, or

[1] Information regarding FAA NextGen is based on the FAA's NextGen website: http://www.faa.gov/about/initiatives/nextgen/defined/

- There are close-proximity airports with the potential for airspace or approach interference.

The above-defined airports require all the capabilities of the flexible terminals and airspace plus integrated tactical and strategic flow capabilities. They may require higher performance navigation and communications capabilities for air traffic and the aircraft to support these additional operational requirements.

Flexible Terminal and Airports
Increase Flexibility in the Terminal Environment solution set covers the terminal and airport operations ability to meet the need of both high-density terminals and other airports. Flexible terminal solutions focus on improvements to the management of separation at all airports. Such capabilities will improve safety, efficiency and maintain capacity in reduced visibility high-density terminal operations. Flexible terminal solutions will also improve trajectory management and advanced separation procedures employed when demand warrants. At airports where traffic demand is lower, and at high-density airports during times of low demand, operations requiring lesser aircraft capability are conducted, allowing access to a wider range of operators while retaining the throughput and efficiency advantages of high-density operations.

Collaborative Air Traffic Management (CATM)
This solution set covers strategic and tactical flow management, including interactions with operators to mitigate situations when the desired use of capacity cannot be accommodated. Collaborative Air Traffic Management (CATM) solution set includes flow programs and collaboration on procedures that will shift demand to alternate resources (e.g. routings, altitudes, and times). CATM also includes the foundational information elements for managing National Airspace System (NAS) flights. These elements include development and management of aeronautical information, management of airspace reservation, and management of flight information from pre-flight to post-analysis.

Reduced Weather Impact (RWI)
This solution set includes improvements to weather information and its use to improve safety, capacity, and efficiency.

Transform Facilities
This NextGen activity focuses on delivering a facility infrastructure that supports the transformation of air navigation service delivery unencumbered by legacy constraints. NextGen facilities will provide for expanded services; service continuity; optimal deployment and training of the workforce; all supported by cost-effective and flexible systems for information sharing and back-up. Traffic is assigned to facilities on both a long-term and daily basis with service continuity a foremost requirement. Business continuity is built into the system and provides for a more resilient infrastructure, better contingency operations, and a higher degree of service.

Air Traffic Services (ATS)[2]

[2] The Air Traffic Services described was based on the FAA's NAS 6 Architecture Air Traffic Services description: http://www.nas-architecture.faa.gov/nas/view_service/displayServiceGroup.cfm?svhid=1

The center of the OV-1 describes the type of operations and Air Traffic Services that will be provided which include:

Air Traffic Control (ATC) Advisory
Air traffic control and other facilities provide advice and information to assist pilots in the safe conduct of flight and aircraft movement. These advisories include providing weather information, traffic, and NAS status information to pilots, flight planners, and the general public.

Air Traffic Control (ATC) Separation Assurance
The separation assurance service ensures that aircraft maintain a safe distance from other aircraft, vehicles, terrain, obstacles, and certain airspace not designated for routine air travel. Separation assurance involves the application of separation standards to ensure safety.

Airspace Management
The airspace management service ensures the safe and efficient organization and use of the national airspace resource.

Emergency and Alerting
The emergency and alerting service monitors the NAS for distress or urgent situations, evaluates the nature of the distress, and provides an appropriate response to the emergency.

Flight Planning
The Flight Planning Service provides both flight plan support and flight plan data processing to support the safe and efficient use of the nation's airspace through the development and use of coordinated flight plans.

Infrastructure Information Management
Infrastructure management ensures a safe and efficient NAS through management and operation of the infrastructure and optimal use of resources.

Traffic Management (TM)-Strategic Flow
The strategic flow service provides for orderly flow of air traffic from a system perspective. NAS demand and capacity is analyzed and balanced to minimize delays, avoid congestion, and maximize overall NAS throughput, flexibility, and predictability.

Traffic Management (TM)-Synchronization
Traffic synchronization supports expeditious flight for the large number of aircraft using the NAS during any given period of time. NAS processes operate to maximize efficiency and capacity in response to weather, NAS infrastructure, runway availability or other conditions.

<u>International Harmonization</u>
The ATM system is globally harmonized through collaborative development and implementation of identified best practices in both standards and procedures. International harmonization also requires advocating for the highest operational standards for aircraft operators and air navigation service providers (ANSPs) to ensure the safest global air transportation system. ICAO Planning and Implementation Regional Groups (PIRGs) or multilateral agreements coordinate planning and

implementation of NextGen transformations to harmonize the application of technology and procedures. This harmonization allows airspace users to realize the maximum benefits of the NextGen transformations.

Commercial Spaceport

A spaceport is a site for launching (or receiving) spacecraft, by analogy with seaport for ships or airport for aircraft. The word spaceport has traditionally been used for sites capable of launching spacecraft into orbit around Earth or on interplanetary trajectories. However, rocket launch sites for purely sub-orbital flights are sometimes called spaceports. In recent years new and proposed sites for suborbital human flights have commonly been named spaceports. Space stations are sometimes called spaceports, in particular if intended as a base for further journeys

Other elements of the OV-1 (e.g., Net-Centric Operations and Enterprise Operations at bottom of OV-1) are described in the SV-1p NAS EA view.