



International Civil Aviation Organization

**The Twenty-First Meeting of the APANPIRG ATM/AIS/SAR Sub-Group  
(ATM/AIS/SAR/SG/21)**

Bangkok, Thailand, 27 June – 01 July 2011

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**Agenda Item 6: Provision of ATM/AIS/SAR in the Asia/Pacific Region, including associated  
CNS matters**

**STATUS OF NEXTGEN**

(Presented by United States of America)

**SUMMARY**

This paper presents information on the status of the USA's modernization programme.

This paper relates to –

**Strategic Objectives:**

A: *Safety – Enhance global civil aviation safety*

C: *Environmental Protection and Sustainable Development of Air Transport –  
Foster harmonized and economically viable development of international civil  
aviation that does not unduly harm the environment*

**Global Plan Initiatives:**

*All GPIs*

**1. INTRODUCTION**

1.1 The U.S. has embarked upon a major air transportation system transformation through an initiative known as Next Generation Air Transportation System (NextGen). NextGen will provide benefit as early as possible to users of the U.S. national airspace system who are equipped and trained to operate using NextGen capabilities, while at the same time continuing to serve operators with legacy equipment. To achieve these benefits, the FAA is committed to ensuring that the NextGen improvements are harmonized with international standards and the modernization efforts of other States. This will be accomplished by working through ICAO and with other international bodies to achieve an integrated global air navigation system and by making U.S. NextGen plans and intentions transparent

1.2 NextGen is the United States' comprehensive overhaul of its national airspace system, which is designed to meet the future demands of air transportation. It is a continuous roll-out of improvements and upgrades over the next 15 or more years that will transform the U.S. national airspace system and allow air traffic to operate more safely, efficiently, and with less impact on the environment.

### 1.3 NextGen will:

- Improve safety by using advanced Safety Management Systems that will allow both government agencies and aviation partners to better predict and mitigate risks,
- Improve environmental sustainability through introducing airframes, engines, and avionics capable of exploiting NextGen efficiencies to reduce emissions, noise, and airport runoff.
- Enhance security with a Security Management System approach that identifies and mitigates threats and vulnerabilities,
- Increase safety and efficiency by improving the quality and availability of weather related information.
- Provide secure Network Centric information sharing of real time operational information to all stakeholders, based on the ICAO concept of System Wide Information Management (SWIM),
- Increase the operational efficiency of aircraft movements through use of advanced automation for Air Traffic Management and Collaborative Decision Making.

## 2. DISCUSSION

2.1 The FAA is currently developing the NextGen Segment Implementation Plan (NSIP). The first phase of the NSIP, Segment Alpha, provides the blueprint to implement the mid-term Operational Improvements until 2015. The second phase, Segment Bravo, covers the implementation between 2016 and 2018. The NSIP is organized into functional portfolios, each of which contains a set of capabilities that share a common benefit pool.

2.2 The FAA identified eight functional portfolios and one set of common services in NSIP Segment Alpha. The functional portfolios include: Collaborative Air Traffic Management (CATM), Improved Surface Operations, Time-Based Flow Management (TBFM), Closely Spaced, Parallel, Converging, and Intersection Runway Operations, Improved Vertical Profiles and Low Visibility Operations, Performance-Based Navigation (PBN), On-Demand NAS Information, Automation Support for Separation Management.

2.3 To support the implementation of these functional portfolios in the mid term timeframe, NextGen sponsored engineering and demonstration activities to validate the implementation of these capabilities. Demonstrations such as AIRE and ASPIRE with the international community ensure harmonization of technologies and procedures. The FAA also continues to work closely with ICAO and the international community in areas such as wake re categorization, future communication capabilities and data exchange standards for aeronautical, flight and weather information.

2.4 The FAA has initiated development of six NextGen Transformational Programs which will fundamentally change the way that air traffic is managed, being communicated to and the way data is being exchanged. These programs, often working in conjunction with each other, will facilitate the capabilities developed through the NextGen solutions sets. The six NextGen Transformational Programs include: Automatic Dependent Surveillance – Broadcast (ADS-B), Collaborative Air Traffic Management Technology (CATM-T), Data Communications (DataComm), National Airspace System Voice Switch (NVS), NextGen Network Enabled Weather (NNEW), and System-Wide Information Management (SWIM).

### Accomplishments

2.5 A few NextGen Accomplishments, as of January 2011, are highlighted below:

2.6 Surveillance/ADS-B:

- In-Service decision issued in September 2010, authorizing the use of ADS-B for critical services (aircraft separation) nationwide
- ADS-B is operational and being used to control live traffic over Louisville, KY; Philadelphia, PA; Juneau, AK; and the Gulf of Mexico
- ADS-B Out Final Rule published in May 2010 — requires all aircraft flying in most controlled airspace to be equipped to broadcast their position to the ADS-B network by 2020
- The findings of the FAA's ADS-B In Aviation Rulemaking Committee are due in the fall of 2011. Those findings are expected to provide a clear definition on how the aviation community should proceed with ADS-B In, while ensuring compatibility with the ADS-B Out Final Rule
- Traffic and Weather information available in the cockpit today for pilots of properly equipped aircraft along much of the east coast, along with locations throughout the sunbelt, west coast and upper Midwest
- Nationwide deployment of the ADS-B ground infrastructure on schedule to be completed by 2013
- Demonstrations are ongoing of new ADS-B applications, such as Surface Indications and Alerts, which can enhance safety through increased situational awareness of runway activity

2.7 Performance-Based Navigation:

- RNAV/RNP departures, approaches, and routes are being developed and implemented, working to reduce delays, increase airport throughput, and curb fuel burn and carbon emissions
- In FY10, we published 51 high altitude RNAV routes and 90 RNAV arrival and departure routes. Of those 90, 10 were designed to accommodate an OPD for properly equipped aircraft
- Tailored Arrivals, a type of OPD, have been demonstrated at San Francisco, Los Angeles, and Miami; and are expected to operational in spring 2011
- We also published 59 RNP approach procedures
- Procedures are key to grappling with Metroplex issues, such as deconflicting traffic around multiple major metropolitan airports, including New York's LaGuardia and JFK
- In 2011, the FAA is deploying study teams to begin facilitating Metroplex PBN procedure development in the airspace around the Washington, D.C. and north Texas areas
- WAAS LPV procedures are opening up many more airports to the general aviation community, particularly under instrument conditions
  - Today, more than 2,300 LPV procedures are available at more than 1,200 airports

## 2.8 Surface:

- The ADSE-X program was initiated to improve runway safety. We've demonstrated, however, that ASDE-X — while not a NextGen program — can also be used to increase surface efficiency under NextGen.
- ASDE-X already installed at 29 of the nation's 35 busiest airports, including JFK Newark, and LaGuardia
- All 35 of the country's largest airports are expected to have ASDE-X installed by the end of 2011
- ASDE-X has been extended to the ramp areas at JFK as part of a demonstration project; surface demos have also been conducted at Boston, Memphis, and Orlando
- These demos have all resulted in reduced taxi time and fuel savings, and those are results we think we can replicate elsewhere
- Data Distribution Units are being deployed to ASDE-X airports, to enable the data sharing infrastructure that will lead to collaborative decision making and air traffic management
- The airlines, FAA, and NY Port Authority collaboratively built upon NextGen capabilities to significantly alleviate the impact of JFK's closure of Runway 13R/31L. That runway reopened in the summer of 2010 after a major resurfacing project expected to extend the life of that runway for another four decades. The collaboration was so successful, it has been extended.

2.9 An important aspect of NextGen is how to provide predictable financial and operating benefits to the airspace user who either voluntarily equips or equips earlier than the published mandates for advanced avionics, while at the same time offer continued service to aircraft operating with legacy equipment. The U.S. plans to offer an incentive of “best equipped, best served” that will result in operational benefits to those who have the equipage required to employ NextGen air navigation procedures.

### NextGen International Collaboration

2.10 The FAA recognizes that NextGen must harmonize with international aviation and the modernization activities of other States. As a result, the U.S. is working closely with ICAO to identify CNS/ATM programs and requirements that need to undergo an ICAO due process of Standards, Recommended Practices and Procedures development. The U.S. is also committed to work through ICAO to ensure that NextGen integrates harmoniously into the global air navigation system. To that end, the FAA and JPDO are supporting the ICAO Aviation System Block Upgrade initiative, an outcome of the 37th General Assembly.

2.11 The 37th Session of the International Civil Aviation Organization (ICAO) General Assembly (2010) directed the Organization to double its efforts for meeting the global needs for airspace interoperability while sustaining its focus on safety. ICAO therefore initiated the “Aviation System Block Upgrades” initiative as a programmatic framework that develops a set of air traffic management (ATM) solutions or upgrades, takes advantage of current equipage, establishes a transition plan, and enables global interoperability.

2.12 The concept of the block upgrades originates from existing near-term implementation plans and access to benefits in many regions of the world. Block upgrades are based largely on operational concepts extracted from the United States' Next Generation Air Transportation System (NextGen), Europe's Single European Sky ATM Research (SESAR) and Japan's Civil Aviation Reform of Air Traffic Services (CARATS) programmes. It is also aligned with the ICAO *Global Air Traffic Management Operational Concept* (Doc 9854). The intent is to apply key capabilities and performance improvements, drawn from these programmes, across other regional and local environments with the same level of performance and associated benefits on a global scale.

2.13 Block upgrades describe a way to apply the concepts defined in the ICAO *Global Air Navigation Plan* (Doc 9750) with the goal of implementing regional performance improvements. It includes the development of technology roadmaps, to ensure that standards are mature and to facilitate the synchronization between air and ground systems, as well as between regions. The ultimate goal is to achieve global interoperability. Safety demands this level of interoperability and harmonization. Safety must be achieved at a reasonable cost with commensurate benefits. Leveraging upon existing technologies, block upgrades are organized in five-year time increments starting in 2013 through 2028 and beyond. Such a structured approach provides a basis for sound investment strategies and commitment from equipment manufacturers, States and operators/service providers.

2.14 Aviation System Block Upgrades comprise a suite of modules, each having the essential qualities of:

- A clearly-defined measurable operational improvement and success metric;
- Necessary equipment and/or systems in aircraft and on ground along with an operational approval or certification plan;
- Standards and procedures for both airborne and ground systems; and
- A positive business case over a clearly defined period of time.

2.15 In terms of bilateral international collaboration, On March 3, 2011, the FAA and the EU signed a Memorandum of Cooperation in civil aviation R&D and an annex facilitating cooperation in NextGen-SESAR harmonization and interoperability. This agreement is a major step forward in advancing FAA cooperation with the European Commission in air traffic modernization. Some of the activities the U.S. and European Union will be working on harmonizing under this agreement include avionics, communication protocols and procedures, and operational methods between NextGen and SESAR.

#### Benefits of NextGen

2.16 In addition to safety, efficiency, and capacity improvements, NextGen efficiencies will also provide material environmental benefits. Latest estimates indicate that by 2018, NextGen will reduce total flight delays by about 35 percent, providing \$23 billion in cumulative benefits to the traveling public, aircraft operators, and the FAA. During this same period, estimates suggest savings of 1.4 billion gallons of fuel from air traffic operations that cut carbon emissions by nearly 14 million tons. Note: These estimates are highly sensitive to traffic and fuel price forecasts which have been variable in recent years.

2.17 The NextGen planning documents and expectations for future equipage are available on the FAA website [www.faa.gov/nextgen](http://www.faa.gov/nextgen).

**3. ACTION BY THE MEETING**

3.1 The meeting is invited to:

- a) note the information contained in this paper;
- b) note the U.S. is committed to achieving the benefits of the transformation of operations within the national airspace system delivered by NextGen improvements. It desires to provide as early as possible benefits to those equipped and trained to utilize NextGen capabilities while also assuring equitable access to those equipped and trained to pre-NextGen capabilities; and
- c) discuss any relevant matters as appropriate.

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