Aviation’s Impact on the U.S. Economy Drives the Importance of NextGen

• 12 Million Jobs

• 5.6% of GDP

• $1.3 Trillion in Economic Activity
NextGen Budget Growth Highlights Strong Support

<table>
<thead>
<tr>
<th>Year</th>
<th>Transformational Programs</th>
<th>Enabling Activities</th>
<th>R,E&amp;D Programs</th>
<th>Operations</th>
<th>Programs</th>
<th>Personnel</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY07</td>
<td>$127.6M</td>
<td>$18.1</td>
<td>$109.5</td>
<td>24.3</td>
<td>53.7</td>
<td>8.0</td>
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<tr>
<td>FY08</td>
<td>$215.5M</td>
<td>$229.3</td>
<td>$369.3</td>
<td>72.0</td>
<td>480.0</td>
<td>0.7</td>
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<tr>
<td>FY09</td>
<td>$695.1M</td>
<td>$56.5</td>
<td>$392.7</td>
<td>7.4</td>
<td>77.5</td>
<td>26.3</td>
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<tr>
<td>FY10</td>
<td>$867.7M</td>
<td>$127.6M</td>
<td>$42.5</td>
<td>27.0</td>
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<tr>
<td>FY11 Request</td>
<td>$1,142.8M</td>
<td>$480.0</td>
<td></td>
<td></td>
<td>M 31.7%</td>
<td></td>
</tr>
</tbody>
</table>

Δ: Growth percentage

$Δ: Change in Budget

Strong support is evident in the budget growth across various programs and activities, highlighting the ongoing commitment to NextGen initiatives.
NextGen Capabilities – Broad Ranging for Broad Benefits

- **New Infrastructure & Procedures**
  - Aircraft
  - Air Traffic Control
  - Airports

  **Increased Efficiency, Safety, Security, and Environmental Performance**

- **New Safety Tools**
  (e.g., ASIAS)

- **New Security Tools**
  (SITS)

- **New Environmental Tools**
  (e.g., CLEEN, Alt. Fuels)
What Does The System Look Like in 2018?

INTEGRATED FLIGHT PLANNING

STREAMLINED DEPARTURE MANAGEMENT

EFFICIENT CRUISE

ENHANCED SURFACE TRAFFIC MANAGEMENT

ENHANCED SURFACE TRAFFIC OPERATIONS

STREAMLINED ARRIVAL MANAGEMENT

Gate-to-Gate

PHASES OF FLIGHT Mid-Term 2018
# Keys to Implementing NextGen

## Technical Strategy
(Enterprise Architecture & Roadmaps)

## Operational Capabilities/Benefits

<table>
<thead>
<tr>
<th>NEXTGEN Portfolio</th>
<th>Transformational Programs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ADS-B</td>
</tr>
<tr>
<td>TBO</td>
<td>X</td>
</tr>
<tr>
<td>HIGH DEN</td>
<td>X</td>
</tr>
<tr>
<td>FLEX</td>
<td>X</td>
</tr>
<tr>
<td>CATM</td>
<td>X</td>
</tr>
<tr>
<td>RWI</td>
<td>X</td>
</tr>
<tr>
<td>SSE</td>
<td>X</td>
</tr>
<tr>
<td>NET FAC</td>
<td>X</td>
</tr>
</tbody>
</table>

## Stakeholder Partnership

## Integrated Management Framework

ANSP automation enhancements will take advantage of improved communication, navigation, and surveillance coverage in the oceanic domain. When authorized by the controller, pilots of equipped aircraft will use established procedures for climbs and descents.
Incremental Approach to Implementing NextGen

Produce Benefits and Builds a Foundation

Wake Turbulence

RNAV/RNP Deconflict

Surface Management

Tailored Arrivals

3D PAM

4-D FMS

Staffed NextGen Tower

ADS-B in the Gulf

Tailored Arrivals

RNAV/RNP Deconflict

Surface Management

Surface Management

UAS

GBAS
Delivering Benefits Today & Tomorrow

2018
ESTIMATES

Reduce Delays
21%

Reduce CO₂ Emissions
14M Tons Cumulative

Reduce Fuel Use
1.4B Gallons Cumulative

$22B in benefits
NextGen Equipage: *Critical to Success*

Avionics needed to obtain full NextGen capabilities

Performance Based Navigation

ADS-B

Data Communications

FAA & operator investment required to realize NextGen benefits
Data Communications

Data Comm will replace radio-voice communications for most routine exchanges between controllers and pilots

**Benefit:**

– More efficient communications
– Reduced aircraft gate and taxi delay by eliminating time-consuming delivery of clearances

**Strategy:**

– **Near Term:** Leverage latent capabilities (i.e., FANS 1/A+) of many of today’s jetliners for immediate benefit
  • Delivery of taxi clearances - 2014
– **Mid Term:** Expand to delivery of en route data communications services - 2016
Near-term NextGen Applications

Automatic Dependent Surveillance – Broadcast (ADS-B)

Performance Based Navigation

Airfield and Surface Improvements

NextGen Initiatives
Surveillance:
Automatic Dependent Surveillance-Broadcast (ADS-B) & Wide Area Multilateration (WAM)

Completed

ATC Services
ADS-B integrated with ASDE-X
Broadcast Services

ADS-B Operational
ADS-B integrated with ASDE-X
WAM Operational
Constructed Ground Stations
Current Coverage from Radio Stations

Today: 120 radio stations collecting data on the East Coast and in Alaska

Data from May 6, 2010
Surveillance:
Automatic Dependent Surveillance-Broadcast (ADS-B) & Wide Area Multilateration (WAM)

- Planned ADS-B Coverage
- Planned ADS-B Ground Stations
ADS-B Out Final Rule

• **Published May 27, 2010**
  – FAA adjudicated comments responding to notice of proposed rulemaking, issued October 5, 2007

• **Establishes Equipage Requirement for Aircraft in Controlled Airspace**
  – Applies in Class A, B and C airspace, near busy airports and above 10,000 feet

• **Sets Avionics Performance Standards**
  – Manufacturers can design to broadcast-signal requirements for accuracy, integrity, power and response time

• **Compliance Deadline is January 1, 2020**
Airport Improvements (FY09-FY10)

Already Contributing to Delay Reduction

- Seattle-Tacoma 16R/34L
- Portland 10L/28R extension
- Chicago O’Hare 9L/27R
- Dallas Fort Worth end-around taxiway
- New York JFK:
  - Taxiway K/KA, YA, FB extension
  - 13R/31L reconstruction (in progress)
- Washington Dulles 1L/19R
- Philadelphia 17/35 extension
- Charlotte 18R/36L
- Boston centerfield taxiway M

Key Benefits
- Increased capacity and reduced delays
- In 2009, contributed to:
  ✓ 65% delay reduction at O’Hare
  ✓ 58% delay reduction at Seattle
  ✓ 43% delay reduction at Dulles
Surface Management
Leverage Safety Infrastructure for Efficiency

Key Benefits
- Increased situational awareness and safety
- 2009: 50% reduction in serious runway incursions
Surface Surveillance and Data Sharing

Surface data sharing for ASDE-X infrastructure under way for 2010

- Leverage installed ASDE-X infrastructure
- Will provide surface traffic data sharing
- Stepping stone for more robust collaborative decision support tools

Benefits

- Delay reduction
- Reduced fuel burn and environmental footprint
- Improved situational awareness and decision making
- Collaborative planning at airport

Leveraging demos at JFK and MEM
Surface Management
Leverage Safety Infrastructure for Efficiency
Collaborative Departure Management During JFK’s Runway Closure – A Success Story

- JFK Runway 31L/13R closed for reconstruction March 1
- FAA, PANYNJ, airlines collaborate to allocate takeoff slots. Airline with \( x \) percent of scheduled departures gets \( x \) percent of available slots
- In place of first-come-first-served, a ‘reservation’ system divides one hour of departures into four 15-minute buckets
- Aircraft stay at the gate until their bucket arrives.
- Taxi delays, fuel consumption, \( \text{CO}_2 \) emissions are reduced
Performance Based Navigation (PBN)

Enables Greater Efficiency and Access

**RNAV**: General purpose satellite navigation

**RNP**: High-precision satellite navigation for congested airspace

- Provides aircraft with the ability to fly shorter, more efficient flight paths
- Increases capacity of runways and in the airspace – ability to “de-conflict” airports, avoid sensitive areas
- Reduces delays, fuel burn, and aircraft noise

**LPV**: Provides ILS-like capability without ILS infrastructure costs
FY09 Accomplishments:
- 55 RNAV routes
- More than 90 Q-, T-, and GPS Minimum En Route Altitude RNAV routes nationwide since 2009
- 54 RNP approach procedures

Dallas/FW (DFW) RNAV Departures
- Departure Delay: 45% reduction
- Operator Savings: $30M in 3 years
- Capacity: 10 additional departures per hour per runway

Atlanta (ATL) RNAV Arrivals
- Fuel Savings: 700,000 gallons per year
- Carbon Emissions Reduction: 6,700 tons per year
Performance Based Navigation (PBN)

FY10: Initiate Transition to Metroplex Integrated Airspace and Procedures

FY09 Accomplishments:
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Examples
Gate-to-Gate Oceanic Demonstrations Illustrate NextGen Value

Average Fuel Savings of 3% - 5% per Flight

ASPIRE Benefits

- **Fuel Savings To Date:** 5,659 gallons
- **Carbon Emissions Reduction:** 19 tons to date

AIRE Benefits

- **Fuel Savings Per Flight:** 230 gallons
- **Fuel Savings To Date:** 27,000 gallons
- **Carbon Emissions Reduction:** 2 tons per flight (238 tons to date)
Tailored Arrivals (TAs) and Optimized Profile Descents (OPDs) Will Result in Significant Benefits When Operationalized Nationwide

TA Demo Results (MIA,SFO,LAX)
- **Fuel Savings**: 100-340 gallons per flight (over 220,000 to date)
- **Carbon Emissions Reduction**: Average 1.3 tons per flight

Operational OPDs (LAX)
- **Flight Time Reduction**: 25% during level flight
- **Fuel Savings**: 2-3 million gallons per year (25 gallons per flight)
NextGen Implementation is Advancing

JFK
EWR
PHL

Federal Aviation Administration
Resources Available to Stay Informed

NextGen Implementation Plan Summarizes:
- Target for NextGen - 2018
- Work accomplished
- NextGen benefits
- FAA’s work plan through 2015

www.faa.gov/nextgen

Overviews
News
Videos
Interactive Map
And more…
NextGen
Next Generation Air Transportation System
Discussion
TIS-B provides traffic information to ADS-B In equipped aircraft
ADS-B In: Flight Information Service – Broadcast (FIS-B)

FIS-B transmits graphical National Weather Service products, temporary flight restrictions (TFRs), and special use airspace
ADS-B: Building Block for Advanced NextGen Applications

Indications and Alerts

Situational Awareness

Spacing

Interval running

Enhanced Visual Acquisition

In Trail Procedure