NextGen: the United States’ Modernization Plan

For: ICAO Workshop on ASBUs Framework

Date: July 2013

Presented by: I. Ross, NextGen Program Office, International Programs, FAA
M. Tanino, Air Traffic Organization, International NextGen Lead, FAA
FAA’s Role in International Harmonization

- Supported the creation of ASBUs
- Support of the GANP and block upgrades at the ICAO Assembly
  - We believe that the GANP offers a solid blueprint for global modernization
  - Block upgrades can be tailored to a country’s needs, capabilities, and requirements
- Interoperability is key
- NextGen is the United States’ upgrade plan
NextGen: Delivering safety, sustainability, flexibility and economic viability

Today’s National Airspace System

- Ground-based Navigation and Surveillance
- Air Traffic Control Communications By Voice
- Disconnected Information Systems
- Cognitive-Based Air Traffic “Control”
- Fragmented Weather Forecasting
- Airport Operations Limited By Visibility Conditions
- Forensic Safety Systems
  - Focus on major airports
  - Inefficient routes & fuel consumption

NextGen

- Satellite-based Navigation and Surveillance
- Routine Information Sent Digitally
- Information More Readily Accessible
- Automation, Decision Support Tools
- Forecasts Embedded into Decisions
- Operations Continue Into Lower Visibility Conditions
- Prognostic Safety Systems
  - Focus on metropolitan areas
  - Shorter flight paths/ fuel saving procedures; alternative fuels; reduced noise
NextGen Program Organization

• Implementation Portfolios (8)
  1. Improved Surface Operations
  2. Improved Approaches and Low-Visibility Operations
  3. Improved Multiple Runway Operations
  4. On-Demand NAS Information
  5. Collaborative Air Traffic Management
  6. Separation Management
  7. Time Based Flow Management
  8. Performance Based Navigation

• Infrastructure (8)
  1. ADS-B
  2. Data Communications
  3. NAS Voice System (NVS)
  4. SWIM
  5. CATM
  6. Demonstration
  7. Future Facilities
  8. Airport Improvement
## NextGen Implementation Portfolios

<table>
<thead>
<tr>
<th>NextGen Portfolios</th>
<th>ASBUs PIA (approximate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improved Surface Operations</td>
<td>PIA 1: Airport Operations</td>
</tr>
<tr>
<td>Improved Approaches and Low-Visibility Operations</td>
<td>PIA 1: Airport Operations</td>
</tr>
<tr>
<td>Improved Multiple Runway Operations</td>
<td>PIA 1: Airport Operations</td>
</tr>
<tr>
<td>On-Demand NAS Information</td>
<td>PIA 2: Globally Interoperable Systems and Data</td>
</tr>
<tr>
<td>Collaborative Air Traffic Management</td>
<td>PIA 3: Optimum Capacity and Flexible Flights</td>
</tr>
<tr>
<td>Separation Management</td>
<td>PIA 3: Optimum Capacity and Flexible Flights</td>
</tr>
<tr>
<td>Time Based Flow Management</td>
<td>PIA 4: Efficient Flight Paths</td>
</tr>
<tr>
<td>Performance Based Navigation</td>
<td>PIA 4: Efficient Flight Paths</td>
</tr>
</tbody>
</table>
Increased Benefits of Performance Based Navigation
Expansion of ADS-B

2013

2014
### Metroplex Efforts

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$6.5M - $15.5M fuel costs</td>
<td>$6.5M - $15.5M fuel costs</td>
<td>$10.2M - $17.0M fuel costs</td>
<td>$8.3M - $22.4M fuel costs</td>
<td>$10.1M - $22.9M fuel costs</td>
<td>$6M - $16.1M fuel costs</td>
<td>$9.2M - $26.1M fuel costs</td>
<td>$23.0M - $53.4M fuel costs</td>
<td>$6.4M - $19.0M fuel costs</td>
</tr>
<tr>
<td></td>
<td>2.3M – 5.6M gallons of fuel</td>
<td>3.4M – 7.8M gallons of fuel</td>
<td>3.7M – 6.2M gallons of fuel</td>
<td>2.9M – 7.7M gallons of fuel</td>
<td>3.4M – 7.8M gallons of fuel</td>
<td>2M – 5.4M gallons fuel</td>
<td>3.0M – 8.6M gallons of fuel</td>
<td>8.0M– 18.0M gallons of fuel</td>
<td>2.5M – 7.5M gallons of fuel</td>
</tr>
<tr>
<td></td>
<td>23K – 56K metric tons of CO2</td>
<td>34K – 78K metric tons of CO2</td>
<td>35K – 59K metric tons of CO2</td>
<td>30K – 78K metric tons of CO2</td>
<td>34K – 78K metric tons of CO2</td>
<td>18.9K – 50.5k metric tons of CO2</td>
<td>31K – 87K metric tons of CO2</td>
<td>79.5k – 184.4k metric tons of carbon</td>
<td>2.5M – 7.5M gallons of fuel</td>
</tr>
<tr>
<td></td>
<td>1.5M nautical miles (filed)</td>
<td>34K – 78K metric tons of CO2</td>
<td>25M nautical miles (filed)</td>
<td>1.2M nautical miles (filed)</td>
<td>5.4M nautical miles (filed)</td>
<td>5.4M nautical miles (filed)</td>
<td>5.4M nautical miles (filed)</td>
<td>5.4M nautical miles (filed)</td>
<td>5.4M nautical miles (filed)</td>
</tr>
</tbody>
</table>

- **Northern California**: $6.5M - $15.5M fuel costs, 23K – 56K metric tons of CO2, 1.5M nautical miles filed.
- **Southern California**: $10.1M - $22.9M fuel costs, 3.4M – 7.8M gallons of fuel, 34K – 78K metric tons of CO2, 1.5M nautical miles filed.
- **North Texas**: $10.2M - $17.0M fuel costs, 3.7M – 6.2M gallons of fuel, 35K – 59K metric tons of CO2, 2.5M nautical miles (filed).
- **Atlanta**: $8.3M - $22.4M fuel costs, 2.9M – 7.7M gallons of fuel, 30K – 78K metric tons of CO2, 1.2M nautical miles (filed).
- **Southern California**: $10.1M - $22.9M fuel costs, 3.4M – 7.8M gallons of fuel, 34K – 78K metric tons of CO2, 1.5M nautical miles filed.
- **Phoenix**: $6M - $16.1M fuel costs, 2M – 5.4M gallons fuel, 18.9K – 50.5k metric tons of CO2, 2M nautical miles filed.
- **Houston**: $9.2M - $26.1M fuel costs, 3.0M – 8.6M gallons of fuel, 31K – 87K metric tons of CO2, 648K nautical miles (filed).
- **South/Central Florida**: $23.0M - $53.4M fuel costs, 8.0M– 18.0M gallons of fuel, 79.5k – 184.4k metric tons of carbon, 5.4M nautical miles (filed).
- **Washington DC**: $6.4M - $19.0M fuel costs, 2.5M – 7.5M gallons of fuel, 25K – 75K metric tons of CO2, 1.5M nautical miles filed.
New NextGen satellite procedures over Elliott Bay in Seattle are saving airlines money and fuel, and getting passengers on the ground quicker.

- **Greener Skies**
- **Sea**

**SAVE**
- 06 minutes per flight
- 112,420 barrels annually
- $13,490,400 annual savings potential

**Alaska Airlines**
- 154 flights per day
- 2 barrels per flight

www.faa.gov/nextgen
Other Airport Improvements

More Efficient Ground Operations
Latest on Data Comm – Strategy Roadmap

<table>
<thead>
<tr>
<th>CY</th>
<th>12</th>
<th>14</th>
<th>16</th>
<th>18</th>
<th>20</th>
<th>22</th>
<th>24</th>
<th>26</th>
<th>28</th>
<th>30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Segment 1 Phase 1</td>
<td>Tower Service</td>
<td>Tower IOC</td>
<td>Departure Clearances (DCL)</td>
<td>Best Equipped Best Served DCL</td>
<td>RTCA TF5 Operation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Segment 1 Phase 2</td>
<td>Initial Services &amp; Infrastructure</td>
<td>En Route IOC</td>
<td>Transfer of Communications</td>
<td>Initial Check-In</td>
<td>Altitudes / Altimeter Settings</td>
<td>Go Button / Airborne Reroutes</td>
<td>Data Comm Routine Communications (OI#17)</td>
<td>TFM Data Comm (OI#44)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Segment 2</td>
<td>Advanced Services</td>
<td>4D Trajectories</td>
<td>Tailored Arrivals</td>
<td>Controller Initiated Routes</td>
<td>Direct-to-Fix</td>
<td>Crossing Restrictions</td>
<td>Advisory Messages</td>
<td>Speed and Headings</td>
<td>Beacon Codes</td>
<td>Stuck Microphone</td>
</tr>
</tbody>
</table>

- Full En Route Services

Avionics

Ground System

FANS 1/A+ over VDL-2 transitioning to ATN Baseline 2

Range for start of deployment based upon funding and Baseline 2 availability
LPV & ADS-B: Improving General Aviation
## NextGen Priorities based on ASBUs

(As of July 2013)

<table>
<thead>
<tr>
<th>PIA 1</th>
<th>PIA 2</th>
<th>PIA 3</th>
<th>PIA 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>B0-WAKE (8)</td>
<td>B1-SWIM (1)</td>
<td>B2-ACAS (6)</td>
<td>B0-CCO (3)</td>
</tr>
<tr>
<td>B0-RSEQ (12)</td>
<td>B1-FICE (2)</td>
<td>B1-ASEP (7)</td>
<td>B1-CDO (4)</td>
</tr>
<tr>
<td>B1-RSEQ (12)</td>
<td>B1-DAIM (10)</td>
<td></td>
<td>B1-TBO (5)</td>
</tr>
<tr>
<td>B1-SURF (13)</td>
<td>B1-AMET (11)</td>
<td></td>
<td>B1-RPAS (9)</td>
</tr>
<tr>
<td>B1-APTA (14)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B1-RATS (15)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

FAA

NextGEN
NextGen: America’s Plan for Modernization

www.FAA.Gov/nextgen

2013 NextGen Implementation Plan now available online