Packaging Tomorrow’s Aviation System

Second Briefing on ICAO’s Aviation System Block Upgrades

Issued: July 2012
The 30’000 Feet View

- Air traffic growth expands two-fold once every 15 years
- Growth can be a double-edged sword
- Challenge is how to achieve both safety and operational improvements
  - Globally harmonized
  - Environmentally responsible
  - Cost-effective
A System of Systems

The Global Aviation Safety System

The Global Air Navigation System

Packaging Tomorrow’s Aviation System
Synchronizing the System of Systems

Packaging Tomorrow’s Aviation System
ICAO’s Strategic Approach
ICAO’s Strategic Approach

Packaging Tomorrow’s Aviation System
Integrated Planning through Block Upgrades

Performance Improvement Areas

Airport Operations

Globally Interoperable Systems and Data

Optimum Capacity and Flexible Flights

Efficient Flight Path

Block 0 (2013)

Block 1 (2018)

Block 2 (2023)

Block 3 (2028 onward)

Packaging Tomorrow’s Aviation System
# Near-Term Blocks & Modules

## Performance Improvement Areas

### Airport Operations
- Optimization of approach procedures
- Increased runway throughput through WT separation
- Improve traffic flow through runway sequencing
- Safety and efficiency of surface operations
- Improved airport operations through airport-CDM

### Globally Interoperable Systems and Data
- Digital aeronautical information management
- Increased interoperability, efficiency and capacity
- MET information supporting enhanced operation
- Improved flow performance through network planning
- Improved ops. through enhanced en-route trajectories

### Optimum Capacity and Flexible Flights
- Initial capability for ground surveillance
- Air traffic situational awareness (ATSA)
- Improved access to optimum flight levels
- ACAS improvements
- Increased effectiveness of ground based safety nets

### Efficient Flight Path
- Initial application of data link en-route
- Improved flexibility and efficiency in descent profiles
- Improved flexibility and efficiency in departure profiles

## Block 0 (2013)

- Optimized airport accessibility
- Increased throughput through dynamic WT separation
- Departure, surface and arrival management
- Enhanced safety and efficiency of surface ops. and EVS
- A-CDM Total Airport Management

## Block 1 (2018)

- Optimized airport accessibility
- Increased throughput through dynamic WT separation
- Departure, surface and arrival management
- Enhanced safety and efficiency of surface ops. and EVS
- A-CDM Total Airport Management

- Initial capability for ground surveillance
- Air traffic situational awareness (ATSA)
- Improved access to optimum flight levels
- ACAS improvements
- Increased effectiveness of ground based safety nets

- Initial application of data link en-route
- Improved flexibility and efficiency in descent profiles
- Improved flexibility and efficiency in departure profiles

- Improved traffic synchronization and initial trajectory based operation
- Improved flexibility and efficiency in descent profile
- Integration of RPA systems into non-segregated airspace

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Packaging Tomorrow’s Aviation System
# Increased Runway Throughput Through Optimized Wake Turbulence Separation

<table>
<thead>
<tr>
<th>Summary</th>
<th>Improved throughput on departure and arrival runways through optimized wake turbulence separation minima, revised aircraft wake turbulence categories and procedures.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Main performance impact as per Doc 9854</strong></td>
<td>KPA-02 – Capacity, KPA-06 – Flexibility.</td>
</tr>
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<td><strong>Operating environment/Phases of flight</strong></td>
<td>Arrival and departure</td>
</tr>
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<td><strong>Applicability considerations</strong></td>
<td>Least complex – Implementation of revised wake turbulence categories is mainly procedural. No changes to automation systems are needed.</td>
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<tr>
<td><strong>Global concept component(s) as per Doc 9854</strong></td>
<td>CM – conflict management</td>
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</table>
| **Global plan initiatives** | GPI-13: Aerodrome design  
GPI 14: Runway operations |
| **Main dependencies** | Nil |
| **Global readiness checklist** | Status (ready now or estimated date) |
| Standards readiness | 2013 |
| Avionics availability | N/A |
| Ground systems availability | N/A |
| Procedures available | 2013 |
| Operations approvals | 2013 |
Benefiting from All the Modules

• There is added value in using all modules
  – States should view modules in B0 & B1 as critical:
    • Formalizing a minimum track
    – They will allow for benefits down the road in B2 & B3
The Cost of Not Implementing

• Focusing on what it will cost if modules are **not** implemented:
  – Increased risk of serious incidents and accidents
  – Negative impact on operations
  – Environmental repercussions
  – etc.
Reporting Against the Global Plan...

- Performance Monitoring
  - of individual modules
  - Air Navigation Report Form
- Annual Global Air Navigation Report
- Compare progress across regions
- Adjust ICAO work programme
...through the Use of GIS Tools
Aligning the Conference & the Global Air Navigation Plan

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<td>Aviation System Reporting &amp; Performance Adjustments</td>
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<td></td>
<td>• WP3 – Revised Global Air Navigation Plan (GANP) – framework for global planning</td>
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<td></td>
<td>• WP5 – High-level Conference on Aviation Security (HLCAS)</td>
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<td></td>
<td>• WP13 – Civil/military coordination/cooperation and flexible use of airspace</td>
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<td>• WP25 – Minimum Path</td>
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Aligning the Conference & the Global Air Navigation Plan

1. Global Air Navigation Policy

2. Standardization: Aviation System Block Upgrades
   - WP4 – Airport Capacity
   - WP7 – SWIM
   - WP8 – FF-ICE
   - WP9 – Service improvement through digital AIM and ATM information
   - WP10 – Network Operations
   - WP11 – Airborne Separation
   - WP12 – Airborne collision avoidance systems and ground-based safety nets
   - WP14 – Integration of RPA into non-segregated airspace
   - WP15 – Meteorological Information
   - WP17 – TBO
   - WP23 – Standardization – in support of One Sky

3. Continuing Strategic Planning

4. Implementing Globally Interoperable ATM

5. Aviation System Reporting & Performance Adjustments
Aligning the Conference & the Global Air Navigation Plan

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- WP6 – PBN for terminal and approach operations
- WP16 – PBN for en-route operations
- WP18 – CCO & CDO
- WP19 – Regional Performance Framework – planning methodologies and tools
- WP20 – Human Performance
- WP21 – GNSS implementation issues
- WP22 – Rationalization of terrestrial navigation aids
Aligning the Conference & the Global Air Navigation Plan

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- WP24 – Regional Performance Framework – alignment of areas of applicability of ANPs and regional SUPPs
Desired Outcomes of AN-Conf/12

• Endorsement of:
  – Global Air Navigation Plan, as unified planning mechanism

• Agreement on:
  – Integrated work programme
  – Structure and management of “Expert Groups”

• Recommendations on ICAO technical work programme:
  – Endorsement for short term Block Upgrades
  – Agreement on Block 1

• Clear strategic direction for future infrastructure:
  – Endorsement for medium and long term Block Upgrades
  – Agreement on Blocks 2 & 3
Today’s Priorities

• Performance-based Navigation
• Continuous Descent Operations
• Continuous Climb Operations
Further Addressing Technical Issues

- Aviation Data Link: Now and Tomorrow (2014)
  - Next steps for Data Link
- End-to-end System Demonstration of New ATM Concepts (2014)
  - Flight & Flow Information for a Collaborative Environment (FF-ICE)
  - Trajectory-based Operations
  - Human performance aspects
  - System Wide Information Management (SWIM)
Further Addressing Policies

• Synergy between 12th Air Navigation Conference & 6th Air Transport Conference:
  – Policy on access and equity
  – Consideration of possible global mandates
    • for key infrastructure needs such as datalink & SWIM
  – Funding/financing of ground equipment & avionics for Block Upgrades
Summary

• Follow-up to previous briefing:
  – Aviation System Block Upgrades
• Next steps in packaging tomorrow’s aviation system
• ICAO’s strategic approach
• Steps leading to 12th Air Navigation Conference
• ICAO Working Papers available as of 30 June 2012
• For more information: www.icao.int/anconf12
ICAO
Uniting Aviation on
Safety | Security | Environment