ASBU Block 0 Modules- An analysis

Air Navigation Bureau
Outline

- Block understanding
- Block Maturity cycle
- Block 0 perspective
- Block 0 Modules
- Block 0 implementation
Understanding the Relationships

Performance Improvement Areas

- Airport Operations
- Globally Interoperable Systems and Data
- Optimum Capacity and Flexible Flights
- Efficient Flight Path

Module

Block 0 (2013)

Block 1 (2018)

Block 2 (2023)

Block 3 (2028 & >)

B0-RSEQ

B1-RSEQ

B2-RSEQ

B3-RSEQ

Tutorial on ASBU methodology
Block Maturity Lifecycle

Planning Decisions
based on business case and validation results as developed during the previous phase

SIMPLIFIED LIFECYCLE

R&D

Implementation

Operations

V0: Identification of Needs
V1: Concept Definition
V2: Feasibility
V3: Pre-Industrial Development and Integration
V4: Industrialisation
V5: Deployment
V6: Operations
V7: Decommissioning

Decision

Decision

Decision

Decision

Decision

Standardisation activities

Initial Operational Capability

B0: Capabilities available in 2013
Focus on Block 0

Performance Improvement Areas

- Airport Operations
- Globally Interoperable Systems and Data
- Optimum Capacity and Flexible Flights
- Efficient Flight Path

Block 0 (2013)
Global Readiness Checklist

<table>
<thead>
<tr>
<th>Global Readiness Checklist</th>
<th>Status (ready or date)</th>
</tr>
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<tbody>
<tr>
<td>Standards Readiness</td>
<td>√</td>
</tr>
<tr>
<td>Avionics Availability</td>
<td>√</td>
</tr>
<tr>
<td>Infrastructure Availability</td>
<td>√</td>
</tr>
<tr>
<td>Ground Automation Availability</td>
<td>√</td>
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<tr>
<td>Procedures Available</td>
<td>√</td>
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<tr>
<td>Operations Approvals</td>
<td>√</td>
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- Each Module is evaluated for its readiness
- If any component is not found to be ready it moves to a future Block for implementation
- Those Modules that are not specifically ready at a Block release are noted as “dates of readiness”

All Block 0 Modules Have Met the Readiness Criteria
Block 0

• 4 Main Performance improvement areas
  – Airport Operations (5 modules)
  – Globally interoperable systems & data (3 modules)
  – Optimum capacity & flexible flights (7 modules)
  – Efficient flight path (3 modules)

• Block 0 will serve as the enabler and foundation for the envisioned future aviation systems.
### B0-15 RSEQ
Improved Runway Traffic Flow through Sequencing (AMAN/DMAN)
Time-based metering to sequence departing and arriving flights

### B0-65 APTA  Optimization of Approach Procedures including Vertical Guidance
This is the first step toward universal implementation of GNSS-based approaches

### B0-70 WAKE  Increased Runway Throughput through Wake Turbulence Separation
Improved throughput on departure and arrival runways through the revision of current ICAO wake vortex separation minima and procedures (from 3 to 6 categories: re-categorization and CSPR)

### B0-75 SURF
Improved Runway Safety (A-SMGCS)
Airport surface surveillance for ANSP

### B0-80 ACDM
Improved Airport Operations through ACDM
Airport operational improvements through the way operational partners at airports work together

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**The combined Block 0 Modules reduce fuel consumption and noise by improving arrival efficiencies and improving information sharing**
<table>
<thead>
<tr>
<th><strong>B0-25 FICE</strong></th>
<th><strong>B0-30 DATM</strong></th>
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</thead>
<tbody>
<tr>
<td>Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration</td>
<td>Service Improvement through Digital Aeronautical Information Management</td>
</tr>
<tr>
<td>Supports the coordination of ground-ground data communication between ATSU based on ATS Inter-facility Data Communication (AIDC) defined by ICO Document 9694</td>
<td>Transition from product centric to data centric. Introduction of digital processing and management of information, by the implementation of AIS/AIM making use of AIXM, moving to electronic AIP and better quality and availability of data</td>
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</tbody>
</table>

**B0-105 AMET**

Meteorological information supporting enhanced operational efficiency and safety

This module includes meteorological information supporting ATM decision support such as WAFS, IAVW, TCAC, Aerodrome warnings, Wind shear and SIGMET. This module enables the reliable identification of applicable ATM solutions when meteorological conditions are impacting (observed) or expected to impact (forecast) aerodromes or airspace.

**In Block 0 we improve overall operations and continue to enable Collaborative Decision Making through improved interfacilities communications using standard information formats and baseline Met Services**
Optimum Capacity and Flexible Flights (PIA 3)

B0-10: FRTO Improved Operations through Enhanced En-Route Trajectories
Implementation of performance-based navigation (PBN concept) and flex tracking to avoid significant weather and to offer greater fuel efficiency, flexible use of airspace (FUA) through special activity airspace allocation, airspace planning and time-based metering, and collaborative decision-making (CDM) for en-route airspace with increased information exchange among ATM stakeholders.

B0-35: NOPS Improved Flow Performance through Planning based on a Network-Wide view
Collaborative ATFM measure to regulate peak flows involving departure slots, managed rate of entry into a given piece of airspace for traffic along a certain axis, requested time at a waypoint or an FIR/sector boundary along the flight.

B0-85: ASEP Air Traffic Situational Awareness (ATSA)
ATSA provides a cockpit display of a graphical depiction of traffic to assist the pilot in out-the-window visual acquisition of traffic: AIRB and VSA.

B0-86: OPFL Improved access to Optimum Flight Levels through Climb/Descent Procedures using ADS-B
The use of In Trail Procedure (ITP) facilitates en-route climb or descent to enable better use of optimal flight levels in environments where a lack of ATC surveillance and/or the large separation minima currently implemented is a limiting factor.

Using procedural concepts (e.g. RNP, FUA, etc.) and Air Traffic Situational Awareness - combined with enhanced planning tools and information sharing, the enroute phase of flight supports additional capacity and flexibility using the Modules of Block 0

B0-101 ACAS ACAS Improvements
This addresses short term improvements to the performance of the existing airborne collision avoidance systems (ACAS). Transition form ACAS II version 7.0 to 7.1. Mandatory by Annex 6 provisions. New- by 1/1/2014 and all by 1/1/2017.
Through ground based safety nets combined with ground surveillance the enroute phase of flight supports additional capacity, flexibility and safety.

B0-84 – **ASUR Initial surveillance capability ADS-B Out, MLAT**
 Ground surveillance supported by ADS-B OUT and/or wide area multilateration systems will improve safety, especially search and rescue and capacity through separation reductions.

B0-102 – **SNET Baseline Ground-based Safety Nets**
 To monitor the operational environment during airborne phases of flight, the alerts such as Short Term Conflict Alert, Area Proximity Warnings and Minimum Safe Altitude Warnings are proposed in this module. Ground-based safety nets make an essential contribution to safety and remain required as long as the operational concept remains human-centred.
B0-05 CDO
Improved Flexibility and Efficiency in Descent Profiles (CDOs)
It is aircraft operating technique. CDO allows the aircraft to descend continuously from TOD to FAF with minimum engine thrust.

B0-20 CCO
Improved Flexibility and Efficiency in Departure Profiles
Deployment of departure procedures that allow the aircraft to fly their optimum aircraft profile taking account of airspace and traffic complexity with continuous climb operations (CCOs)

B0-40 TBO
Improved Safety and Efficiency through the initial application of Data Link En-Route
Implementation of an initial set of data link applications for surveillance and communications in ATC

The use of procedurally based Optimized Profile Climbs and Descents as well as an initial Data Link Capability helps to establish a Block 0 capability for improved operational efficiencies
Block 0: Priority

• Block 0 initiatives must leverage on existing on-board avionics

• 3 Priorities have been agreed to by the Global community:
  – Performance Based Navigation (PBN)
  – Continuous Descent Operations (CDO)
  – Continuous Climb Operations (CCO)
Challenges - How to Get There?

- It is all about managing risk
- Block 0 risks are minimum
  - Global Readiness Checklist is complete
  - The Modules are well understood and supported
- But risks do exist
  - States may not be capable of ensuring successful deployment of Block 0
  - If Block 0 is not implemented as a foundation, certain functionalities may not be available as enablers for future blocks
  - We must Identify and resolve policies necessary to enable the future blocks now
Implementation – The Time is Now

• The Modules of Block 0 are ready for implementation today
  – Standards are ready
  – Avionics are ready
  – Procedures and Operational Approvals are in place
  – The Infrastructure is available
  – Ground Automation is ready
• Establishing the foundation for the future is now
• Care was taken to ensure that regional implementation of the Blocks or the Modules are well described and ready for implementation
ASBU Modules relationship Chart
# New ASBU Modules Identifiers

<table>
<thead>
<tr>
<th>Old ASBU Modules Numbering System</th>
<th>New ASBU Modules Identifiers</th>
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i(implementation) kits – Detailed guidance

http://www.icao.int/sustainability/Pages/ASBU-Framework.aspx

http://www.icao.int/safety/pbn/ASBU%20iKit/story.html
Thank You