

Agenda Item 5: Introduction to Aviation System Block Upgrade (ASBU), and its impact in the planning of meteorology and communications systems and services

ICAO INITIATIVES FOR THE IMPLEMENTATION OF THE ATM OPERATIONAL CONCEPT: AVIATION SYSTEM BLOCK UPGRADES (ASBU)

(Paper presented by the Secretariat)

SUMMARY

This working paper presents information on the ICAO initiative for the implementation of the ATM operational concept through the Aviation System Block Upgrades (ASBU) methodology, giving emphasis on the meteorology and communications topics.

References:

- 37th ICAO Assembly (Montreal, Canada, 28 September to 8 October 2010);
- Global Air Navigation Industry Symposium (GANIS) (Montreal, Canada, 20-23 September 2011);
- Twelfth Meeting of Civil Aviation Authorities of the SAM Region (RAAC/12) (Lima, Peru, 3-6 October 2011); and
- Workshop on Preparations for AN Conf/12 – ASBU methodology, and use of the IFSET tool (Lima, Peru, 16-20 April 2012).

ICAO strategic objectives:

A – Safety

C - Environmental Protection and Sustainable Development of Air Transport

1. Background

1.1 The ICAO 37th Assembly urged to Organization to double efforts to achieve global needs for airspace interoperability, keeping safety as its main objective.

1.2 ICAO therefore introduced the “Aviation System Block Upgrades” initiative as a programmatic framework that develops a set of air traffic management (ATM) solutions or upgrades taking advantage of current equipage; establishing a transition plan; and enabling global interoperability.

1.3 The concept of the *block upgrades* are largely based 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 Collaborative Actions for Renovation of Air Traffic Systems (CARATS) programmes for the implementation of the ATM operational concept.

1.4 Aviation system block upgrades comprise suites of modules, each having the following essential elements:

- a) a clearly defined and measurable operational improvement and success metric;
- b) necessary equipment and/or systems in aircraft and on the ground, along with an operational approval or certification plan;
- c) standards and procedures for both airborne and ground systems; and
- d) a positive business case over a clearly defined period of time.

1.5 Modules are organized into flexible and scalable building blocks that can be introduced and implemented in a State or a region depending on need and level of readiness, while recognizing that all the modules are not required in all airspaces.

1.6 The four performance improvement areas are as follows:

- a) Airports operation;
- b) Globally Interoperable Systems and Data;
- c) Optimum Capacity and Flexible Flights; and
- d) Efficient Flight Path.

1.6.2 The total number of modules identified to date within ASBU is of 52.

1.7 The block upgrades describe ways to apply the concepts defined in the ICAO Global Air Navigation Plan (Doc 9750) with the goal of achieving regional performance improvements. They will include the development of technology roadmaps to ensure that standards are mature and to facilitate synchronized implementation between air and ground systems and between regions. The ultimate goal is to achieve global interoperability. Safety demands this level of interoperability and harmonization which 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 continuing through 2028 and beyond. Such a structured approach provides a basis for sound investment strategies and will generate commitment from States, equipment manufacturers, operators and service providers.

1.8 The blocks are initially presented through four evolutionary phases named Blocks 0, 1, 2 and 3, defined hereunder:

1.8.1 *Block 0*: available now. Designed to provide operational improvements on the basis of air-ground technology. These include Performance Based Navigation (PBN), Continuous Descent Operations (CDO) and Continuous Climb Operations (CCO). Said initiatives should be implemented as a priority in order to serve as a baseline for the next blocks (2013-2018). Block 0 has 19 modules.

1.8.2 *Block 1*: available to be deployed globally from 2018. Block 1 is based on the implementation of trajectory-based operations (TBO) collaborative decision-making (CDM) and greatly depends on the implementation of the System-Wide Information Management (SWIM). It is fundamental that Block 1 develop a business case analysis in support of investment decisions. There is also the need to develop standards and material. A complete CNS/AIM plan is to be developed, as well as an avionics plan to avoid the dissemination of different technologies and to guarantee global interoperability. Block 1 has 16 modules.

1.8.3 *Block 2*: available to be deployed globally from 2023 and *Block 3*, available to be deployed globally from 2028 and beyond. Operational improvements of Blocks 2 and 3 are still under a concept definition phase and depend on the efforts in investigation and development (I+D). Blocks 2 y 3 foresee full integration of flight and ground systems through the Exchange of data in real time. This data exchange will enable 4 D paths, air separation, UAV integration in non-segregated airspace, and complex traffic management. Block 2 has 10 modules, and Block 3 has 7 modules.

1.9 The block upgrades will be formalized at the Twelfth Air Navigation Conference in November 2012 and will form the basis of the new or revised Global Air Navigation Plan (GANP). Information on the AN-Conf/12 can be found at the following ICAO site: (<http://www.icao.int/Meetings/anconf12/Pages/default.aspx>).

2. Analysis

2.1 In follow-up to GREPECAS Conclusion 15/1, urging for the development of a performance-based regional plan in accordance with the Global Air Navigation Plan and the Global ATM Operational Concept, the SAM Region drafted the *Air Navigation System Performance-Based Implementation Plan for the SAM Region (SAM PBIP)*.

2.2 The SAM PBIP was approved by the Twelfth Meeting of Civil Aviation Authorities of the SAM Region (RAAC/12) held in Lima, Peru, from 3 to 6 October 2011. Same is aimed towards establishing an implementation strategy destined to achieve benefits for the ATM community in the medium and short term (2012–2018) on the basis of ATM-related infrastructure and the capability of current and future aircraft.

2.3 The document takes under consideration the various air navigation fields (ATM, CNS, AIS, MET, SAR and AGA/AOP), as well as other relevant aspects necessary to accompany this evolution, such as human resources and safety management.

2.4 As consequence of the ICAO initiative on ASBU, the SAM PBIP needs to be harmonized with the ASBU in order to achieve global airspace interoperability. To carry out this activity, the *Performance Framework Forms (PFF)* in the SAM PBIP will have to be adapted with the Blocks modules, mostly Block 0, as the SAM PBIP covers the 2012-2018 period. To carry out this task, the *Seminar/Workshop for the Harmonization of the Air Navigation System Performance-Based Implementation Plan for the SAM Region with the New Global Air Navigation Plan approved by AN-Conf/12*, has been scheduled to be conducted (Lima, 15-19 April 2012), with the support of project RLA/06/901.

2.5 In strictly referring to the meteorology field, ASBU takes under consideration modules B0-105, B1-105 and B3-105. In these modules, associated to data and systems global interoperability performance improvements, a description is made of the evolution in automation and the integration of meteorological information, with the aim of increasing safety and efficiency in air navigation along the four blocks. Block B0-105 is a requirement of B1-105 and so on, for the other modules. A detailed description is shown in **Appendix A** to this working paper.

2.6 In Block 0, the communications field counts with Modules B0-25 - *Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration* and B0-30 - *Service Improvement through Digital Aeronautical Information Management*.

2.7 In Block 1, we have B1-25 - *Increased Interoperability, Efficiency and Capacity through FF-ICE/1 Application before Departure*, B1-30 - *Service Improvement through Integration of All Digital ATM Information* and B1-31 - *Performance Improvement through the Application of System-Wide Information Management (SWIM)*. Block 2 has B2-25 - *Improved Coordination through Multi-centre Ground-Ground Integration: (FF-ICE/1 and Flight Object, SWIM)* and B2-31 - *Enabling Airborne Participation in Collaborative ATM through SWIM*. In Block 3, Module B3-25 - *Improved Operational Performance through the Introduction of Full FF-ICE*. **Appendix B** to this working paper presents further information on these modules.

3. **Action suggested**

3.1 The Meeting is invited to take note of the information presented in this working paper and in Appendices A and B, with the aim of taking into account this initiative, following-up on same and taking them in consideration when planning for the implementation of the regional and domestic meteorological and communications services and systems.
