



INTERNATIONAL CIVIL AVIATION ORGANIZATION
EASTERN AND SOUTHERN AFRICAN OFFICE

TENTH MEETING OF THE AERODROME OPERATIONS PLANNING SUB-GROUP
(AOP/SG/10) (NAIROBI, KENYA, 5-7 AUGUST 2013)

Agenda Item 5: Aviation System Block Upgrade (ASBU) Concept

(Presented by Secretariat)

SUMMARY

This Working Paper discusses categorization, priorities, timelines, performance monitoring and measurement concerning Aviation System Block Upgrades (ASBUs) Block 0 Modules pertaining to Aerodrome Operations in the AFI Region, for consideration by the AOP Sub-Group when developing a regional air navigation implementation action plan aligned with the ASBU methodology in accordance with Recommendation 6/1 of the Twelfth Air Navigation Conference (19-30 November 2012).

Action by the meeting is at Paragraph 3.

References

- Report on the Eighteenth meeting of APIRG (APIRG/18).
- Report of the Twelfth Air Navigation Conference (AN-Conf/12)

Related ICAO Strategic Objective: A: Safety.

1. INTRODUCTION

Implementation strategy within ASBU framework

1.1 The Fourth Edition of the *Global Air Navigation Plan* (Doc 9750) introduces ICAO's ASBU methodology and supporting technology roadmaps based on a rolling fifteen-year planning horizon. Although the GANP has a global perspective, it is not intended that all ASBU modules are to be applied around the globe. Some of the ASBU modules contained in the GANP are specialized packages that should be applied where specific operational requirements or corresponding benefits exist.

2. DISCUSSION

2.1 Description of the ASBU Concept

2.1.1 An ASBU designates a set of improvements that can be implemented globally from a defined point in time to enhance the performance of the ATM system. There are four components of a block upgrade.

2.1.2 **Module** – is a deployable package (performance) or capability. A module will offer an understandable performance benefit, related to a change in operations, supported by procedures, technology, regulations/standards as necessary, and a business case. A module will be also be characterized by the operating environment within which it may be applied. The date allocated to a module in a block is that of the initial operating capability (IOC).

2.1.3 Of some importance is the need for each of the modules to be both flexible and scalable to the point where their application could be managed through any set of regional plans and still realize the intended benefits. The preferential basis for the development of the modules relied on the applications being adjustable to fit many regional needs as an alternative to being made mandated as a one-size-fits-all application. Even so, it is clear that many of the modules developed in the block upgrades will not be necessary to manage the complexity of air traffic management in many parts of the world.

2.1.4 **Thread** – describes the evolution of a given capability through the successive block upgrades, from basic to more advanced capability and associated performance, while representing key aspects of the global ATM concept

2.1.5 **Block** – is made up of modules that when combined enable significant improvements and provide access to benefits.

2.1.6 The notion of blocks introduces a form of date segmentation in five year intervals. However, detailed considerations will call for more accurate implementation dates, often not at the exact assigned block date. The purpose is not to indicate when a module implementation must be completed unless dependencies among modules logically suggest such a completion date.

2.1.7 **Performance improvement area (PIA)** – sets of modules in each block are grouped to provide operational and performance objectives in relation to the environment to which they apply, thus forming an executive view of the intended evolution. The PIAs facilitate comparison of ongoing programmes.

2.1.8 The four PIAs are as follows:

- a) airport operations;
- b) globally interoperable systems and data – through globally interoperable system-wide information management;
- c) optimum capacity and flexible flights – through global collaborative ATM; and
- d) efficient flight paths – through trajectory-based operations.

2.1.9 Figure 1 illustrates the relationships between the modules, threads, blocks, and PIAs, and explains the concept of the thread.

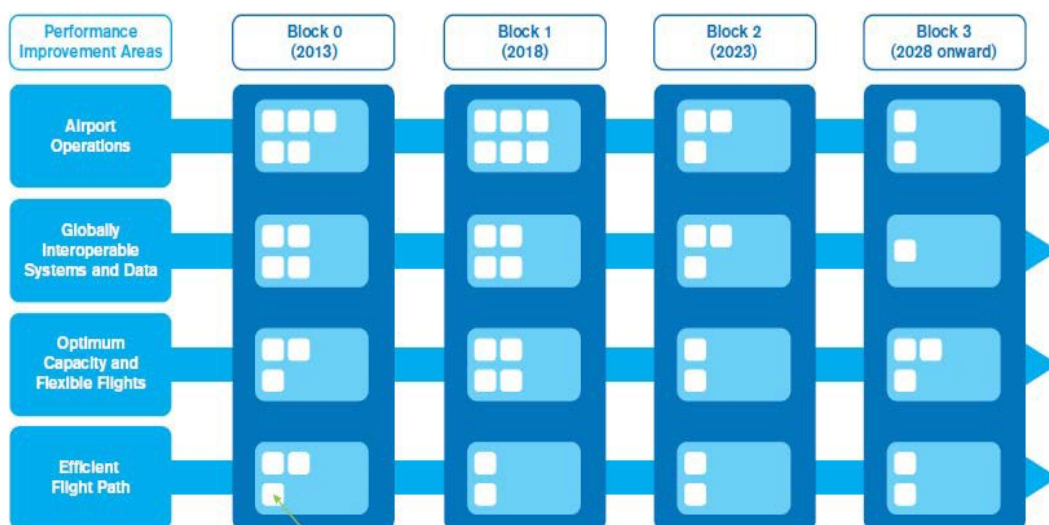


Figure 1. Summary of blocks mapped to performance improvement areas

Modules (actual number of modules per Block/Performance Area may vary)

2.1.10 The modules under each block carry the same module number indicating that they are a part of the same thread. Each block includes a target date reference for its availability. Each of the modules that form the Blocks must meet a readiness review that includes the availability of standards (to include performance standards, approvals, advisory/guidance documents, etc.), avionics, infrastructure, ground automation and other enabling capabilities. In order to provide a community perspective, each module should have been fielded in two regions and include operational approvals and procedures. This allows States wishing to adopt the Blocks to draw on the experiences gained by those already employing those capabilities.

2.1.11 Figure 2 illustrates the timing of each block relative to each other. Note that early lessons learned are included in preparation for the IOC date. The Conference recognized that Blocks 0 and 1 represent the most mature of the modules. Blocks 2 and 3 provide the necessary vision to ensure that earlier implementations are on the path to the future.

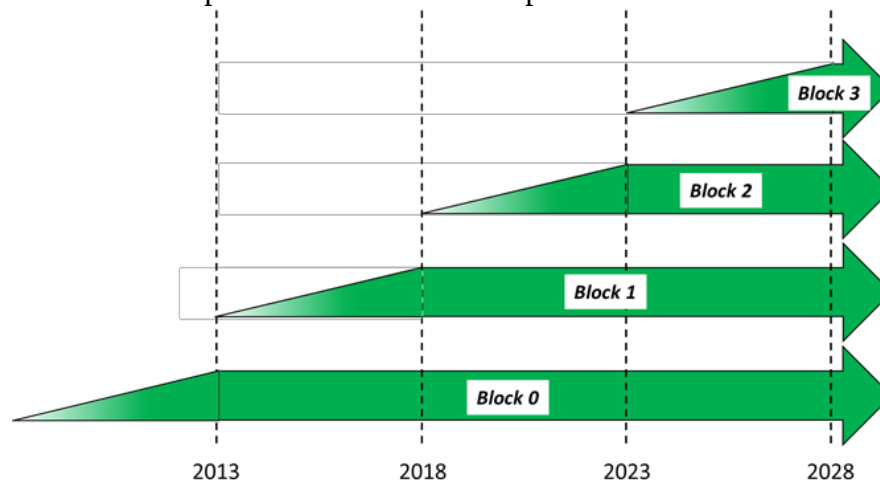


Figure 2. Timing relationship between blocks

2.2 Development of Regional Air Navigation Action Plans

2.2.1 Recommendation 6/1 of the AN-Conf/12 as well as the outcome of PIRG-RASG coordination meeting held in March 2013, called on PIRGs to develop regional action plans for ASBUs by May 2014. The action plan should contain:

- a) priorities and targets for ASBU Block 0 Modules;
- b) identification of implementation challenges; and
- c) determining implementation and benefit indicators/metrics

2.2.2 The regional action plan for ASBUs is a transition document and will need to be approved by the respective PIRGs and thereafter to be suitably reflected in respective regional Air Navigation Plan.

2.2.3 Following this requirement, some ICAO Regions have developed or are in the process of developing their regional action plans. In terms of the AFI region, there is a need to develop this action plan and present it to the Regional ASBU Workshop to be held in Nairobi on 7 to 11 October 2013 and then to APIRG/19 on 14-17 October 2013 for approval.

2.2.4 This working paper proposes a categorization and prioritization of ASBU block 0 Modules for AFI region in the area of Aerodrome Operations and a related set of Air Navigation Reporting Forms (ANRFs)¹ for Block 0 Modules with performance objectives, targets, challenges and implementation as well as benefit metrics.

Categorization of ASBU Modules

2.2.5 Although some modules are suitable for entirely stand-alone deployment, an overall integrated deployment of a number of modules could generate additional benefits. The benefits from an integrated implementation of a number of modules may be greater than the benefits from a series of isolated implementations. Similarly, the benefits from the coordinated deployment of one module simultaneously across a wide area (e.g. a number of proximate airports or a number of contiguous airspace/flight information regions) may exceed the benefits of the implementations conducted on an ad hoc or isolated basis.

2.2.6 An example of a need for global applicability would be performance-based navigation (PBN). Assembly Resolution A37-11 urges all States to implement approach procedures with vertical guidance in accordance with the PBN concept. Therefore, the ASBU modules on PBN approaches should be seen as required for implementation at all airports. In the same way, some modules are well suited for regional or sub-regional deployment and should take this into account when considering which modules to implement regionally and in what circumstances and agreed timeframes.

2.2.7 Based on the above paragraphs, it is important to clarify how each ASBU module fits into the framework of AFI regional air navigation system. To assist in this regard, a module categorization has been developed below with the objective of ranking each module in terms of implementation priority. On the basis of operational requirements and taking into benefits associated, the AFI region can chose all 18 Block 0 Module for implementation. The categories of 18 Block 0 Modules are as follows:

- **Essential (E):** These are the ASBU modules that provide substantial contribution towards global interoperability, safety or regularity. The (3) Modules for all States of AFI region are FICE, DAIM and ACAS
- **Desirable (D):** These are the ASBU modules that, because of their strong business and/or safety case, are recommended for implementation almost everywhere. The (9) Modules for all States of AFI region are APTA, ACDM, NOPS, ASUR, SNET, AMET, TBO, CDO, and CCO
- **Specific (S):** These are the ASBU modules that are recommended for implementation to address a particular operational environment in specific countries of AFI region (for example South Africa). The (3) Modules are OPFL, ASEP and WAKE.
- **Optional (O):** These are the ASBU modules that address particular operational requirements in specific countries of AFI region (for example South Africa) and provide additional benefits that may not be common everywhere. The (3) Modules are SURF, RSEQ and FRTO

¹ Note: See Paragraph 2.2.9 of this working paper.

2.2.8 The 18 modules considered under ASBU Block 0 and associated to each of the Performance Improvement Areas (PIA) are shown at **Appendix A** to this working paper. An illustration of the improvements brought by Block 0 for the different phases of flight is presented in **Figure 3**. It highlights that the proposed improvements apply to all flight phases, as well as the network as a whole including information management and infrastructure.

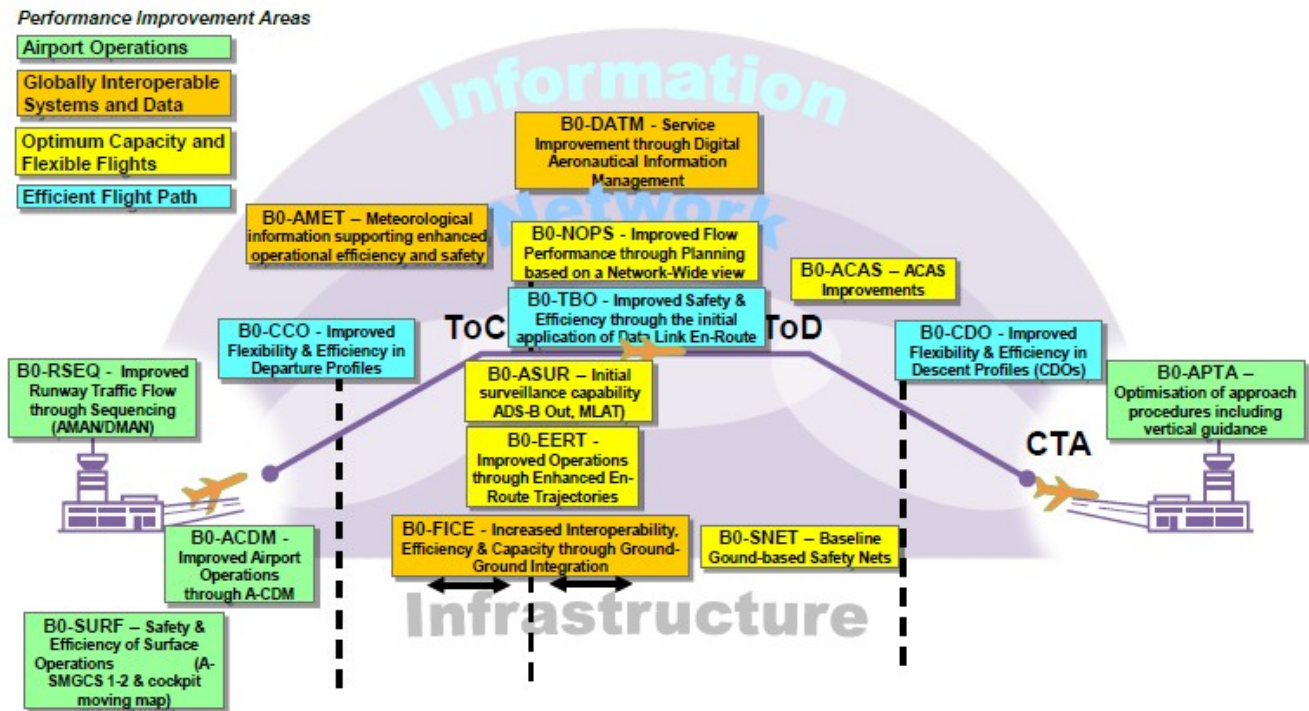


Figure 3. Block 0 Improvements for different phases of flight

Prioritization of ASBU Block 0 Modules for AFI Region

2.2.9 **Appendix B** to this working paper provides the list of Block 0 modules with suggested allocated priority for implementation within the AFI Region. The allocation of priority is based on the following criteria. Priority 1 = immediate implementation; Priority 2 = recommended implementation. Although the AFI region may categorize all 18 Block 0 Modules for its implementation, only 8 Modules will have priority 1 as it covers most of the AFI States. The remaining Modules are priority 2 and apply to only specific State (s) of AFI region.

Air Navigation Reporting Forms (ANRFs)

2.2.10 The ANRF is a customized tool for ASBUs which is recommended for application for setting planning targets, monitoring implementation, identifying challenges, measuring implementation as well as performance and reporting. Also, the PIRGs and States could use this ANRF report format for any other air navigation improvement programmes such as Search and Rescue, not necessarily for ASBU modules only. **Appendix C** to this working paper provides a set of ANRFs related to Aerodrome Operations.

3. CONCLUSION

3.1 The meeting is invited to:

- a) Note the Global Air Navigation Plan (GANP) Aviation System Block Upgrade (ASBU) Concept as summarized in this working paper;
- b) Review categorization and prioritization of ASBU block 0 Modules as proposed in **Appendix B** this working paper and decide what is best for the AFI Region; and
- c) Review the Air Navigation Reporting Forms (ANRFs) provided in **Appendix C** to this working paper and verify that all the information currently in Performance Framework Forms (PFFs) in the ICAO SP AFI RAN/08 Report (Doc 9930) is reflected; and ensure that the target dates are updated and aligned with the ASBU Block 0 modules related to Aerodrome Operations.

— — — — —