



Agenda Item 7: Performance Based Implementation Plan for the South American Region (SAM-PBIP) and its alignment to GANP 2015

Analysis of SAM-PBIP AIM chapter and PFF

(Presented by the Secretariat)

SUMMARY	
This working paper presents the objective of SAM-PBIP and the contents of the AIM Chapter and Performance Framework Form (PFF) of this document.	
REFERENCES	
<ul style="list-style-type: none"> • Doc 9750 – Global Air Navigation Plan • Doc 9883 - Manual on Global performance of the Air Navigation Plan • AIS to AIM Transition Roadmap • Report of the Eleventh Air Navigation Conference • Report of the Twelfth Air Navigation Conference • Summary of the ASBU Workshop and revision of the SAM-PBIP 	
ICAO strategic objectives:	<i>A – Safety</i> <i>B – Air navigation capacity and efficiency</i> <i>E – Environmental protection</i>

1. Background

1.1 The current *Performance Based Implementation Plan for the South American Region (SAM-PBIP)* has been drafted taking into consideration ICAO Global Air Navigation Plan (Doc. 9750) and is framed within the of Aviation System Blocks Upgrades (ASBU) methodology, with the aim of achieving a more efficient and interoperable airspace to meet future capacity demand, without compromising air navigation safety.

1.2 This Plan seeks to establish an implementation strategy so that benefits can be obtained for the air navigation community, based on the ATM-related infrastructure and available and foreseen aircraft capabilities. The document contains the Regional vision for the air navigation system AGA/AOP, AIM, ATM, CNS, MET, SAR, Human Resources and Safety, giving high priority to environmental protection, training and safety.

1.3 The scope of this implementation plan covers SAM Flight Information Regions (FIR), and considers the short-and medium-term implementations of the systems in support of the air navigation services, between 2017 and 2023, and the continuation of ASBU Block 0 modules implementation, as well as the beginning of selected ASBU Block 1 modules. The long-term initiatives required for the evolution to a global ATM system, as shown in the Global ATM Operational Concept, will be added to this Plan as they are developed and approved.

2. Analysis

2.1 The Global ATM Operational Concept was approved by the Eleventh Air Navigation Conference (AN-Conf/11) (Montreal, September-October 2003) and published as Doc. 9854-AN/458. In order to align global planning to the ATM Operational Concept, the AN-Conf/11, recommended States and Regional Planning and Implementation Groups (PIRG), through Recommendation 1/1, to consider the Concept as a common global framework to guide in the planning for the implementation of the systems in support of the air navigation services.

2.2 GREPECAS/15 approved Conclusion 15/1 for the development by the Group of a regional performance-based plan, in keeping with the Global Air Navigation Plan (GANP) and the Global ATM Operational Concept.

2.3 The *Air Navigation System Performance-Based Implementation Plan for the SAM Region* was completed in May 2011, and approved by the Twelfth Meeting of Civil Aviation Authorities of the SAM Region (RAAC/12) (Lima, Peru, October 2011).

2.4 The 37 Session of the International Civil Aviation Organization General Assembly (2010) directed the Organization to double its efforts to meet the global needs for airspace interoperability while maintaining its focus on safety. The block upgrades initiative was formalized at the Twelfth Air Navigation Conference (AN-Conf/12) (Montreal, November 2012) and were included in the new GANP, 4th Edition (Doc 9750). The block upgrades describe a way to apply the concepts defined in the GANP with the goal of implementing regional performance improvements. They 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, but it must be achieved at a reasonable cost with commensurate benefits.

2.5 Through Recommendation 6/1 - *Regional performance framework – planning methodologies and tools*, AN-Conf/12 urged States and PIRGs to harmonize the regional and national navigation plans with the ASBU methodology in response to this, and the *Air Navigation System Performance-Based Implementation Plan for the SAM Region* was aligned with the ASBU methodology (version May 2013). After this edition, an amendment was made in November 2013).

2.6 On 1st December 2015, ICAO through State Letter AN 13/54-15/77 informed on proposal for amendment to the GANP (Fifth Edition) reflecting the changes made in accordance with the recommendations formulated in the Twelfth Air Navigation Conference (AN-Conf/12), as well as on some updates required. The Fifth Edition of GANP was endorsed by the Thirteenth period of ICAO Assembly.

2.7 Taking into account the progress in the implementation of air navigation systems in the SAM Region in the period 2012-2016, and the fifth edition of the GANP, the Air Navigation System Performance-Based Implementation Plan for the SAM Region was updated and the SAM-PBIP was reviewed during the ASBU Workshop carried out in Lima, from 14 to 18 August 2017.

2.8 During the Workshop, the review of the documents by the States was recommended in order to gather information regarding the contents and on the indicators for the assessment of the progress reached in the implementations programmed.

2.9 **Appendix A** to this working paper presents the AIM Chapter, as well as the BO-DATM Performance Framework Forms (PFF) and Air Navigation Report Form (ANRF). The Meeting could

consider the creation of an Ad-hoc Commission for the analysis of the corresponding document and present its comments and proposals for amendment to the plenary for consideration. The document was prepared with a previous analysis as indicated in ICAO Doc 9883.

2.10 The final objective of this revision was to align the SAM-PBIP to the GANP in its fifth edition. The Meeting could as well consider to review the document from this approach.

3. **Conclusion**

3.1 The SAM-PBIP is a Plan based specifically in performance. It is necessary to take into account that for its elaboration an analysis of the initial conditions and projected implementations covering the period was made.

3.2 The alignment of the fifth edition of the GANP is very important so that the planning in the State is aligned with this document at a regional level.

4. **Suggested action**

4.1 The Meeting is invited to:

- a) analyze the information provided in this working paper;
- b) consider the creation of the Ad-hoc Commission for the review of the AIM part contained in Appendix A; and
- c) take any other actions it may deem appropriate.

APPENDIX A

STATES' CORRECTIVE ACTION PLANS

8. **Chapter 8: Aeronautical Information Services / Aeronautical Information Management**

8.1 **Introduction**

8.1.1 SAM States must consider the operational requirements of this Plan when implementing aeronautical information services.

8.1.2 In view of the requirements derived from the implementation of the ATM Operational Concept and the AIS-AIM Transition Roadmap, SAM States shall consider planning for improvements to, and the strengthening of, Aeronautical Information Services, taking into account the initiatives of the Global Air Navigation Plan, as well as new provisions and requirements for short and medium-term implementation, and the related components of the aforementioned concept.

8.2 **Analysis of the current situation (2017)**

8.2.1 The AIS system, currently available in the SAM Region presents improvement opportunities in some States on issues that involve aeronautical information management, *inter alia*:

- a) information with assurance of quality, integrity, and timely distribution of AIS products;
- b) data-oriented activities, and in the provision of electronic information with quality assurance, in real time and with the capability of combining statistical and dynamic information in the same presentation;
- c) use of standard models for the creation of integrated aeronautical, terrain and obstacle information data bases;
- d) use of English language in AIS publications;
- e) topographic and land relief information in instrument approach charts;
- f) implementation of quality control systems;
- g) implementation of automated systems;
- h) provision of pre-flight information bulletin (PIB);
- i) inclusion of area minimum altitudes (AMA) in route navigation charts;
- j) use of English in plain-language in NOTAMs;
- k) provision of post-flight information services;
- l) training for AIS personnel in the new requirements of the Annexes and Documents related to AIM and ATM operational concept;
- m) provision of aerodrome obstacle charts;
- n) provision of 1:500,000 aeronautical charts and 1:1,000,000 global chart;
- o) minor difficulties in the use of the AIRAC system; and
- p) coordination between AIS/MET units for consistency between the NOTAM/ASHTAM and the volcanic ash SIGMET and for updating MET information in the AIP.

8.3 **Strategy for the implementation of performance objectives**

8.3.1 Planning has been based on two main axes, which are shown in Attachment C, and listed below:

- a) Improving the quality, integrity and availability of aeronautical information (SAM AIM/01 PFF); and
- b) Transition to the provision of electronic aeronautical information (SAM AIM/02 PFF).

Improving the quality, integrity and availability of aeronautical information

8.3.2 Full compliance with SARPs on quality assurance, integrity and timely availability of aeronautical information is a prerequisite for the transition to AIM.

8.3.3 In this sense, an action plan must be drafted and carried out to resolve current deficiencies as a prerequisite for the migration to AIM.

Aeronautical information regulation and control (AIRAC)

8.3.4 According to the AIS-AIM Transition Roadmap, the States must comply with the aeronautical information regulation and control (AIRAC) process, since the quality of Aeronautical Information Services depends on the efficacy of the mechanisms for distribution, synchronisation and timing of said information.

Quality management system (QMS)

8.3.5 Quality management systems covering all the functions of aeronautical information services will be implemented and maintained.

8.3.6 The use of data sets on airborne equipment (FMS), automated systems for ATC, ground proximity warning systems (GPWS) and other systems related to an improved situational awareness make it absolutely necessary to implement processes to ensure the quality and integrity of the aforementioned data. These processes should be organised in a quality management system (QMS) applicable to all activities performed by the AIS.

8.3.7 The quality management system should be consistent with the ISO 9000 series and be certified by an accredited certification body. This certification is sufficient measure of compliance.

Monitoring of integrity in the data supply chain

8.3.8 Quality management systems should evolve until they are applied to all the data supply chain, starting at their origin.

8.3.9 In order to guarantee raw data integrity, service level agreements (SLA) must be established with the originators.

8.3.10 These SLAs will serve as a regulatory framework for the provision of data by the originators, and will contain details, *inter alia*, on: services to be provided, related indicators, acceptable and unacceptable levels of service, commitments and responsibilities of the parties, action to be taken in face of given events or circumstances, agreed data transmission formats, etc.

8.3.11 The SLAs are also a tool for measuring service performance, through the use of key performance indicators (KPIs).

Use of WGS-84

8.3.12 GNSS implementation requires the use of a common geodetic reference system. The SARPs determine that this common reference system must be WGS-84.

8.3.13 Consequently, the objective should be to express all coordinates in the WGS-84 reference system in an effective and verifiable manner. This requirement will also apply to future data products.

8.3.14 SAM States have completely implemented WGS-84.

Transition to the provision of electronic aeronautical information

8.3.15 The transition to aeronautical information management (AIM) implies--as already stated--a data-oriented product. This transition to a digital format must be based on standard models and products that permit the exchange at a global level.

8.3.16 Based on this standardisation, the implementation of products and models will be done in a coordinated manner, at a global level, and in keeping with SARP updates resulting from new specifications.

Integrated aeronautical information database

8.3.17 For the design of the aeronautical information database, it is necessary to establish a conceptual model that defines the semantics of aeronautical information in terms of common data structures and takes into consideration the new requirements derived from the ATM Operational Concept.

8.3.18 The implementation of a conceptual model fosters interoperability and should serve as a reference in the design of the specified database.

8.3.19 Use will be made of an integrated aeronautical information database that integrates the digital aeronautical data of a State or Region and will serve to generate AIM products or services.

8.3.20 Use of database engines with spatial characteristics (geo-database) is highly advisable, since it enables data processing in geographical information systems (GIS).

8.3.21 Although it is not necessary for the design of these databases to be identical in all States or Regions, their modelling according to a common conceptual model would facilitate the subsequent exchange of data.

8.3.22 Database management may be carried out by a State or through regional initiatives.

Aeronautical Information Exchange Model (AIXM)

8.3.23 An exchange model is essential for interoperability, since it establishes aeronautical data syntax for names and characteristics.

8.3.24 They have been established based on open standards (XML, GML), facilitating their incorporation into pre-existing or future systems.

8.3.25 It shall contemplate, for a medium term, the exchange of dynamic information (NOTAM), enabling the extension of the traditional NOTAM format to give way to the digital NOTAM digital.

Terrain and obstacle database (e-TOD)

8.3.26 Ground proximity warning systems (GPWS), like the GIS-based procedure design and optimisation tools, require the electronic availability of high-quality terrain and obstacle data products.

8.3.27 To respond to this need, terrain and obstacle databases will be established according to common definitions that will be incorporated into the SARPs.

Electronic aeronautical information publication (e-AIP)

8.3.28 The eAIP must be considered as the evolution from the traditional paper-based AIP to the digital medium. States shall ensure to present the AIP, in the electronic environment, in two formats: one digital format, suited for printing and the other will be accessible only through web browsers.

8.3.29 The eAIP must maintain a standard format, just like its predecessor, facilitating the exchange and preventing the proliferation of different presentations.

Electronic mapping and aerodrome mapping

8.3.30 Taking into account the technology available on board and in order to improve situational awareness, new digital mapping products suited to these devices will be established.

8.3.31 The use of the exchange model will allow these products to incorporate dynamic information in real time.

AIS-MET interoperability

8.3.32 The Aeronautical Information Services and Aeronautical Meteorology should implement the information exchange standard models. Once an information exchange model has been implemented, it will be necessary to implement processes that promote AIM-MET interoperability and thus permit information integration.

8.4 Alignment with ASBU

8.4.1 Of the ASBU Block 0 modules taken under consideration of the SAM Region, the AIM area contributes to PIA 2 module B0-DATM and module B0-AMET. From ASBU Block 1 modules, modules B1-DATM, B1-AMET and B1-SWIM are considered.

8.4.2 Following are the AIM PFF indicated in paragraph 8.3.1 that are reflected with the following ASBU Block 0 modules indicated in paragraph 8.4.1:

- a) SAM AIM/01 PFF - *Improving the quality, integrity and availability of aeronautical information*) with modules B0-DATM and B1-DATM; and
- b) SAM AIM/02 PFF - *Transition to the provision of electronic aeronautical information*) with modules B0-DATM, B1-DATM, B0-AMET, B1-AMET and B1-SWIM.

REGIONAL PERFORMANCE OBJECTIVE: SAM AIM/01 IMPROVEMENT OF QUALITY, INTEGRITY AND AVAILABILITY OF AERONAUTICAL INFORMATION				
Benefits				
Safety	<ul style="list-style-type: none"> • Assures data integrity and resolution • Favours information traceability 			
Environmental protection and development of air transport	<ul style="list-style-type: none"> • Assures timely awareness of significant changes in information 			
Metrics				
<ul style="list-style-type: none"> • Number of States that meet the AIRAC calendar • Number of States that have implemented and certified QMS • Number of corrected deficiencies • Number of States establish SLA agreements 				
2012 - 2018 Strategy				
ATM OC COMPONENTS	TASKS	PERIOD	RESPONSIBILITY	STATUS
AOM AO DCB AUO	a) Action plan to resolve AIS/AIM deficiencies.	(*) 2019	States	Valid
	b) Assess the status of implementation and update of the AIM Action Plan	2018 - 2020	ICAO - States	Valid
	c) Establish and certify an AIM Quality Management System (QMS)	(*) 2018	States	Valid
	d) Follow up to the application of guidelines on service level agreements (SLAs) between data originators and AIM	*2018-2021	GREPECAS	Valid
	e) Establish agreements with data originators (SLAs)	2017 - 2019	States	Valid
	f) Monitor the implementation of the AIM Action Plan	2016 - 2021	GREPECAS	Valid
Relation-ship with GPIs	GPI/9: Situational awareness, GPI/16: Decision support and alerting systems, GPI/18: Aeronautical information, GPI/20: WGS-84, GPI/21: Navigation systems.			

(*) Indicates that the task has been started before the date contemplated in this planning.

REGIONAL PERFORMANCE OBJECTIVE: <u>SAM AIM/02</u> TRANSITION TO THE PROVISION OF ELECTRONIC AERONAUTICAL INFORMATION				
Benefits				
Safety	<ul style="list-style-type: none"> • Support to ground proximity warning systems (GPWS) and procedure design and optimisation tools. 			
Environmental protection and development of air transport	<ul style="list-style-type: none"> • Integration of dynamic and static information into a single display to facilitate situational awareness. • Access to information during all flight phases. 			
Metrics				
<ul style="list-style-type: none"> • Number of States that have implemented the transition plan to the provision of electronic information • Number of States that have implemented the GIS action plan • Number of States that have implemented the e-TOD action plan 				
2017 - 2021 Strategy				
ATM OC COMPONENTS	TASKS	PERIOD	RESPONSIBILITY	STATUS
AOM AO CM DCB TS AUO ATM-SDM	a) Implement the transition plan for the provision of electronic aeronautical information	2017 - 2021	States	Valid
	b) Prepare a training programme for AIM personnel with the new profiles for the performance of the aeronautical information management in the digital environment	2017 - 2021	States - ICAO	Valid
	c) Develop and establish a programme to facilitate AIS - MET interoperability	2017 - 2019	ICAO	Valid
	d) Follow up the Action Plan for implementation of a GIS	2017 - 2019	ICAO	Valid
	e) Follow up the Action Plan for e-TOD implementation	2017 - 2019	ICAO	Valid
	f) Monitor the implementation of the transition plan for the provision of electronic aeronautical information	2017 - 2019	GREPECAS	Valid
Relationship with GPIs	GPI/9: Situational awareness, GPI/16: Decision support and alerting systems, GPI/18: Aeronautical information, GPI/19: Meteorological systems, GPI/20: WGS-84.			

AIR NAVIGATION REPORT FORM (ANRF)

SAM Regional Planning for ASBU Modules

REGIONAL PERFORMANCE OBJECTIVE – B0-DATM: Service Improvement through Digital Aeronautical Information Management					
Performance Improvement Area 2: Globally Interoperable Systems and Data – Through Globally Interoperable System Wide Information Management					
ASBU B0-30: Impact on Main Key Performance Areas					
	Access & Equity	Capacity	Efficiency	Environment	Safety
Applicable	N	N	N	Y	Y

ASBU B0-30: Implementation Progress	
Elements	Implementation Status (Ground and Air)
1. QMS for AIM	Dec.2015
2. e.TOD implementation	Dec.2019
3. WGS-84 implementation	Implemented
4. AIXM implementation	Dec.2019
5. E-AIP implementation	Dec.2019
6. Digital NOTAM	Dec. 2021

ASBU B0-DATM: Implementation Roadblocks/Issues				
Elements	Implementation Area			
	Ground System Implementation	Avionics Implementation	Procedures Availability	Operational Approvals
1. QMS for AIM	Lack of electronic Database. Lack of electronic access based on Internet protocol services.	NIL	Lack of procedures to allow airlines provide digital AIS data to on-board devices, in particular electronic flight bags (EFBs). Lack of training for AIS/AIM personnel.	NIL
2. e-TOD implementation				
3. WGS-84 implementation				
4. AIXM implementation				
5. e-AIP implementation				
6. Digital NOTAM				

ASBU B0-DATM: Performance Monitoring and Measurement (Implementation)	
Elements	Performance Indicators/Supporting Metrics
1. QMS for AIM	Indicator: % of States QMS Certified Supporting Metric: number of States QMS Certification
2. e-TOD implementation	Indicator: % of States e-TOD Implemented Supporting Metric: number of States with e-TOD Implemented
3. WGS-84 implementation	Indicator: % of States WGS-84 Implemented Supporting Metric: number of States with WGS-84 Implemented
4. AIXM implementation	Indicator: % of States with AIXM implemented Supporting Metric: number of States with AIXM implemented

ASBU B0-DATM: Performance Monitoring and Measurement (Implementation)	
Elements	Performance Indicators/Supporting Metrics
5. e-AIP implementation	Indicator: % of States with e-AIP Implemented Supporting Metric: number of States with e-AIP Implemented
6. Digital NOTAM	Indicator: % of States with Digital NOTAM Implemented Supporting Metric: number of States with Digital NOTAM Implemented

ASBU B0-DATM: Performance Monitoring and Measurement (Benefits)	
Key Performance Areas	Benefits
Access & Equity	NA
Capacity	NA
Efficiency	NA
Environment	Reduced amount of paper for promulgation of information
Safety	Reduction in the number of possible inconsistencies

- END -