SAM/IG/1
WP/07
24/03/08

International Civil Aviation Organization
South American Regional Office

FIRST WORKSHOP/MEETING OF THE SAM IMPLEMENTATION GROUP (SAM/IG/1)
REGIONAL PROJECT RLA/06/901

Lima, Peru, 21 to 25 April 2008

Agenda Item 1: **Optimization of the ATS route structure in terminal and en-route airspace and implementation of performance-based navigation (PBN) in the SAM Region**.

REQUIREMENTS FOR THE DEVELOPMENT OF GUIDELINES FOR THE IMPLEMENTATION OF RNAV 5 AND TMAS/APPROACH, THROUGH THE HIRING OF AN EXPERT

(Presented by the Secretariat)

Summary

The objective of this working paper is to submit a proposal for the hiring of an ATM expert to develop the necessary material for PBN implementation, including the guidelines to be used by CAR/SAM States and international organizations.

References:

- Project RLA/06/901
- Report of the AP/ATM meetings

1 Background

1.1 The experience gained at the AP/ATM meetings regarding the implementation of RVSM and RNAV routes as well as the development of the PBN roadmap and other guidelines was a significant success in the CAR/SAM Regions, taking air navigation to a new level of safety and efficiency.

1.2 However, the development of the necessary material for the abovementioned implementations was dependant upon the isolated initiative of some of the participants at the AP/ATM meetings. The complexity of the tasks of project RLA 06/901 will not permit this work model to continue, since the experts attending the meetings are not exclusively committed to an particular project and are normally responsible for other activities in their respective State.

1.3 PBN implementation will require the development of detailed guidance material for the States and International Organizations, mainly covering three aspects:

a) Analysis of experiences in other regions;

b) Data collection on, and analysis of, air traffic movement to identify main flows;

c) Data collection on, and analysis of air navigation infrastructure (communications, navigation, surveillance, meteorology, AIS)

1.4 After analysing and processing the aforementioned information, the consultant shall prepare a document clearly describing the current situation in the States participating in the project and, to the extent possible, in all SAM States, concerning the aforementioned matters.

2 PBN implementation

2.1 PBN implementation is related to two basic objectives set forth in Conclusion AP/ATM/12/02:

a) Optimization of the ATS route structure in terminal and en-route airspace; and

b) Implementation of RNP approach and departure procedures.

2.2 **Appendix A** contains the high-level tasks related to the implementation of the two aforementioned objectives, which depend on the application of PBN.

2.3 High-level tasks must be divided into specific tasks, establishing deliverables that may be performed by experts hired by Project RLA/06/901. These tasks must be analyzed at each SAM/IG meeting for comments, changes, and validation.

3 PBN tasks of Project RLA/06/901

3.1 Under Objective No. 1, item 1.1, Project RLA/06/901 defines the tasks to be performed in the PBN area. For more reference, **Appendix B** contains all the foreseen PBN tasks.

3.2 Bearing in mind that the relevant deliverables should be discussed at the next SAM/IG meeting, project RLA/06/901 should hire an ATM expert to carry out the tasks contained in item 1.1.1.

4 Suggested action

4.2 The meeting is invited to:

a) Review the activities assigned to the ATM expert under item 1.1.1 of **Appendix A** to this working paper, recommending the changes it may deem necessary.

b) Submit the results to the SAM/IG/2 meeting, once the task of the consultant has been completed.

APPENDIX A

ATM PERFORMANCE OBJECTIVES FOR CAR AND SAM REGIONS

<table>
<tr><th colspan="4">OPTIMIZE THE ATS ROUTE STRUCTURE IN BOTH
TERMINAL AND EN-ROUTE AIRSPACE</th></tr>
<tr><th colspan="4">Benefits</th></tr>
<tr><td>Environment
Efficiency</td><td colspan="3">• reductions in fuel consumption;
• ability of aircraft to conduct flight more closely to preferred trajectories;
• increase in airspace capacity;
• facilitate utilization of advanced technologies (e.g., FMS based arrivals) and ATC decision support tools (e.g., metering and sequencing), thereby increasing efficiency.</td></tr>
<tr><th colspan="4">Strategy
Short term (2010)
Medium term (2011 - 20015)</th></tr>
<tr><th>TASK</th><th>DESCRIPTION</th><th>START</th><th>END</th></tr>
<tr><td>AOM</td><td>En-route airspace
• analyze the en-route ATS route structure and implement all identifiable improvements;
• implement all remaining regional requirements (e.g. RNP 10 routes); and
• Finalize implementation of WGS-84
• monitorear progress in implementation
• develop a strategy and work programme to design and implement a trunk route network, connecting major city pairs in the upper airspace and for transit to/from aerodromes, on the basis of PBN and, in particular, RNAV/5, taking into account interregional harmonization;

In terminal airspace
• develop a regional strategy and work programme for implementation of optimized standard instrument departures (SIDs), standard instrument arrivals (STARs), instrument flight procedures, holding, approach and associated procedures, on the basis of PBN and, in particular RNAV/1 and 2; and
• monitor implementation progress</td><td>2005

2008

2008</td><td>2010

2011

2011</td></tr>
<tr><td>References</td><td colspan="3">GPI/5: performance-based navigation, GPI/7: dynamic and flexible ATS route management, GPI/8: collaborative airspace design and management, GPI/10: terminal area design and management, GPI/11: RNP and RNAV SIDs and STARs and GPI/12: FMS-based arrival procedures.</td></tr>
</table>

IMPLEMENT RNP APPROACHES			
Benefits			
Efficiency **Safety**	• **Improvements in capacity and efficiency at aerodromes.** • **Improvements in safety at aerodromes.**		
Strategy (2008-2015)			
TASK	**DESCRIPTION**	**START-END**	**STATUS**
AOM	• development of a regional strategy and work programme for implementation of RNP approaches at aerodromes where aircraft weighing 5700 kg or more are operated, on the basis of the transition plan as follows: **Stage 1** – Evaluate existing procedures, determine compatibility of use with RNAV overlay routes **Stage 2** – Carry out cost benefit analysis and safety assessments of RNAV procedures **Stage 3** – Use existing radar vectoring patterns as the basis for RNAV departure and arrival tracks **Stage 4** – Evaluating and simulation of procedures **Stage 5** – Design stand-alone RNAV procedures **Stage 6** – Training phase **Stage 7** – Publish new procedures and introduce into new service, meet AIRAC dates **Stage 8** – Operational review **Stage 9** – Removal of conventional procedures • monitor implementation progress	2005 2008 2008	2010 2011 2011
References	GPI/5: performance-based navigation, GPI/7: dynamic and flexible ATS route management, GPI/8: collaborative airspace design and management, GPI/10: terminal area design and management, GPI/11: RNP and RNAV SIDs and STARs and GPI/12: FMS-based arrival procedures.		

APPENDIX B

ACTIVITIES OF THE EXPERT TO BE CARRIED OUT IN PROJECT RLA/06/901 WITH REGARD TO PBN

Results	Activities	Party responsible for each activity
1.1 Implementation of performance-based navigation (PBN) – (GPIs 5, 7, 10, 11, 12, and 21).	1.1.1. Obtain and complete the information, learning about the current status in the participating States and organisations with respect to: a) Available CNS infrastructure, with the corresponding coverage and plans for future facilities; b) Characteristics of available ATM automated systems and future automation plans; c) Aircraft fleet operating in the CAR/SAM ATS route network and its RNAV and RNP capabilities, including capacity for arrival procedures based on the flight management system (FMS) and future plans of the users; d) Airworthiness and operational approval capabilities; e) Airports that might derive operational benefits from the use of RNAV and/or RNP; f) Status of implementation of WGS 84; g) Existing SIDs and STARs connecting international airports to ATS routes; h) Real-time and accelerated simulation of operations; i) Cost-benefit analysis of facilities; j) Safety assessment models; k) Regulation of GNSS use (secondary, primary means) l) Documentation concerning the training of air traffic controllers; m) Terminal control area design and control. Start up date: week 1 Estimated duration: 2 weeks	ATM, RO