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**International Civil Aviation Organization
South American Regional Office**

**FIFTH WORKSHOP/MEETING OF THE SAM IMPLEMENTATION GROUP (SAM/IG/5)
REGIONAL PROJECT RLA/06/901**

Lima, Peru, 10 - 14 May 2010

Agenda Item 3: Implementation of performance-based navigation (PBN) in the SAM Region

Basic Training Programme on Performance-Based Navigation (PBN) for Air Traffic Controllers

(Presented by the Secretariat)

Summary	
This working paper contains information on the basic training programme on performance-based navigation (PBN) for air traffic controllers, which is submitted to the consideration of the Meeting for its application at regional level.	
References:	
• Performance-based navigation (PBN) Doc. 9613	
ICAO Strategic Objectives:	<i>A – Safety</i> <i>D - Efficiency</i>

1 Background

1.1 The RNAV 5 Implementation Action Plan foresees, under section 7 Training, task 7.2 – *Develop a training and documentation programme for air traffic controllers and AIS operators*. The task should be submitted to the SAMIG/5 Meeting with the expectation that Regional RLA/06/901 could develop it.

2 Analysis

2.1 Document 9613, *Manual on Performance-Based Navigation*, states that PBN introduction may entail a considerable investment in terms of training, education and material for pilots and air traffic controllers. Some States have effectively used computer-based training packages. ICAO has also provided training and conducted seminars on PBN. Likewise, Doc. 9613, in each navigation specification, lists the most relevant aspects that must be provided to pilots and controllers.

2.2 The objective of the PBN course shown in **Appendix A** to this working paper is to provide air traffic controllers with sufficient knowledge on the PBN concept to permit a safe implementation of performance-based navigation. It is expected that the ATSPs and the States concerned will define the modules that will be presented to air traffic controllers (ATCOs), taking into account that training should not last more than 2 days.

3. **Suggested action**

3.1 The Meeting is invited to:

- a) take note of the information provided in this working paper;
- b) review the Appendix containing the basic performance-based navigation (PBN) training programme for air traffic controllers; and
- c) approve, if applicable, the contents of **Appendix A** for its application at regional level.

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APPENDIX A

Basic Performance-Based Navigation (PBN) Training Programme for Air Traffic Controllers

Introduction

Document 9613, Manual on Performance-Based Navigation, states that PBN introduction can entail a significant investment in terms of training, education, and material for pilots and air traffic controllers. Some States have effectively used computer-based training packages. ICAO has also provided training and conducted seminars on PBN. Likewise, Doc. 9613, in each navigation specification, lists the most relevant aspects that must be provided to pilots and controllers.

Objective of the course

The objective of the PBN course is to provide air traffic controllers with sufficient knowledge on the PBN concept to permit a safe implementation of performance-based navigation.

Tentative programme

Initially, the training programme for air traffic controllers (ATCOs) must not be too extensive, preferably focusing on the application of PBN knowledge, and should not last more than two days. The ATSP and the States concerned shall define the modules to be presented to the ATCOs.

The basic PBN course for ATCOs should contain at least the following:

Contents of the basic performance-based performance (PBN) course		
Topics	Reference	Comments
Performance-based navigation (PBN) concepts	Doc 9613 Vol. I, Part A, Ch 1, Ch 2	Define performance-based navigation and its main components (RNAV and RNP). Explain the differences between navigation specifications.
PBN-related definitions	Doc 9613	
Benefits derived from the use of PBN	Doc. 9613, Part A, Ch 3	
SAM PBN Roadmap and Action Plan	SAMIG/1 report	ICAO SAM website
National PBN plan and action plan	Plan for PBN implementation in TMAs in the short term in the SAM Region (SAMIG/2)	According to the plan developed by each State
Safety considerations	Doc. 9613, Vol. II, Part A, Ch 3	

Contents of the basic performance-based performance (PBN) course		
Topics	Reference	Comments
GPS receivers and RAIM integrity concept, RAIM alerts, FDE precision, integrity, availability, and continuity	SAMIG/4	Explain its functions. See advisory circulars for the approval of aircraft and operators and the respective courses in the SAM Regions
Requirements for airworthiness and RNAV/RNP approval	SAMIG/4 report	Courses on approval conducted in the SAM Region
Implementation of RNAV 5	Doc. 9613, Vol. II, Part B, Ch 2 Project for PBN implementation en-route in the short term in the SAM Region	
Considerations on communications, navigation aids and surveillance vs RNAV5	SAMIG/4	Advisory circulars for the approval of aircraft and operators and the respective courses in the SAM Region
Functional capabilities and limitations of the RNAV5 navigation specification	SAMIG/4	Advisory circulars for the approval of aircraft and operators and the respective courses in the SAM Region
Flight plan requirements	Amendment 1 Doc. 4444 FPL	SAMIG/4 and CNS/ATM/SG/1 regional strategy
ATC procedures	Doc 4444	
Route spacing	Annex 11	
Separation minima	Annex 11 Doc 4444	
ATC contingency procedures		
Mixed airspaces (exemptions for State aviation)	PBN Roadmap	
Use of GNSS and NOTAM	SAMIG/3	
STAR and SID RNAV procedures in terminal area	Doc 8168	Explanation of procedure leg types, like, for instance, entry to holding patterns for RNAV procedures, etc., necessary for a good understanding by the operator.
Criteria on waypoints and ARINC 424 path terminators		
Criteria for the design of APV Baro/VNAV approach procedures	Doc 8168	SAM procedure design course
Criteria for the design of RNAV/RNP approach	Doc 8168	SAM procedure design course

Contents of the basic performance-based performance (PBN) course		
Topics	Reference	Comments
procedures		
Criteria for the design of RNP AR APCH approach procedures	Required navigation performance. Authorisation required (RNP AR) procedure design Manual (Doc 9905).	SAM procedure design course

Controllers shall practice (xx times) in a simulator containing exercises for en-route, terminal, and approach operations using RNAV/RNP, including emergency management and contingency procedures.