



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

**DEVELOPMENT AND PUBLICATION OF PROCEDURES FOR AIR NAVIGATION
(PANS-OPS)**

(Presented by Brazil)

SUMMARY

This working paper presents a summary of actions adopted by Brazil to implement the guidelines to reassure the quality and the operational safety for the development and publication of procedures for air navigation (PANS-OPS).

References:

- DOC 9906-AN/472
- DOC 8168-OPS/611.

1 INTRODUCTION

1.1 Since 2007, Brazil implemented several changes in the process of air navigation procedures development and publication, especially when concerning the competency framework, technical qualification and deployment of new procedures, taking in account the need of:

- a) Implementation of new types of procedures, especially those with barometric vertical guidance (APV BARO/VNAV) as a consequence of the Resolution A36-23 (replaced by Resolution A37-1);
- b) Implementation of DOC 9906 AN/472 (Quality Assurance Manual for Flight Procedure Design); and
- c) Implementation of changes to DOC 8168 OPS/611 (amendment dated 20 NOV 2008);

2 Regulation Structure

2.1 For many years the regulation structure of the process of development and publication of Brazilian air navigation procedures was based on the FAA standards. With the development and the improvement of DOC 8168 PANS-OPS, Brazil began a transition process to a regulation structure based on ICAO standards.

2.2 The following rules and standards were elaborated and revised in order to complete the transition mentioned above:

- a) Instruction 100-23 (Rating Certificate for Procedures Development)
 - Purpose: Establish standards and procedures for obtaining and revalidating the Rating Certificate for Procedures Elaborators ;

- Scope: PANS-OPS service providers;
- b) Instruction 100-24 (Air Navigation Procedures Development)
 - Purpose: Establish standards and guidelines for the development of air navigation procedures and operational safety oversight of the process for development and publication.
 - Scope: PANS-OPS service providers;
- c) Circular 100-30 (Standardized Rules for Development of Air Navigation Procedures)
 - Purpose: Establish standards and guidelines for the development of air navigation procedures;
 - Scope: PANS-OPS service providers;
- d) Manual 53-3 (Aeronautical Chart Manual)
 - Purpose: Establish standards for the development of Brazilian aeronautical charts;
 - Scope: aeronautical charts services providers;
- e) Manual 63-4 (Approval, Activation and Deactivation)
 - Purpose: Establish administrative flow for providers involved with the development and the publication of air navigation procedures;
 - Scope: Service providers;
- f) AIC 07/09 (Air Navigation Procedures)
 - Purpose: Divulge information concerning the air navigation procedures elaborated in Brazil;
 - Scope: Users of air navigation services;
- g) AIC 08/09 (New Standards of Charts)
 - Purpose: Divulge the new layout of instrument approach charts (IAC), standard instrument departure (SID) and standard terminal arrival route (STAR), published in Brazil;
 - Scope: Users of air navigation services.

3 Technical qualification

3.1 To meet the requirements for the reassurance of the quality and operational safety of the PANS-OPS it was necessary to define an efficient mechanism to guarantee the technical training of the procedure designer. Accordingly, the Instruction 100-23 was edited, establishing the Rating Certificate (CHT) as a requisite for the procedure designer.

3.2 Through the CHT, it was possible to control the training of each procedure designer, in order to ensure that the procedures are developed only by qualified professionals and through the updated criteria defined by ICAO.

3.3 Training for the PANS-OPS area is accomplished through the following courses and programmes and the evaluations of each procedure designer are kept for future reference and as a means of follow-up her/his performance:

- a) General Criteria for PANS-OPS
 - Purpose: Provide knowledge about the general criteria applicable to the development of several types of air navigation procedures prescribed by the DOC8168/611 PANS-OPS.
 - Pre-requisites: Qualification recognized by DECEA on the following specific areas:
 - i. Air Traffic Management, according to the Brazilian legislation in force, together with the prescribed by ICAO Annex 11 and ICAO Doc 4444.
 - ii. Aerodromes, according to the Brazilian legislation in force, together with the prescribed by ICAO Annex 14;
 - iii. Basic and Advanced Air Navigation;
 - iv. Aeronautical Information, according to the Brazilian legislation in force, together with the prescribed by ICAO Annex 4;

- v. General Criteria applicable to the Air Navigation Procedures, according to the Brazilian Legislation in force, together with the prescribed in the ICAO Doc 8168, Vol.2.
- b) Conventional Air Navigation Procedures.
 - Purpose: Provide the needed knowledge for the development of the non-precision approach procedures, departure conventional procedures and arrival conventional procedures.
 - Prerequisites: module PANS-OPS General Criteria, or similar training recognized by DECEA.
- c) ILS, LOC and PAR Approach Procedures.
 - Purpose: Provide the needed knowledge for the development of the ILS, LOC and PAR instrument approach procedures.
 - Prerequisites: module PANS-OPS General Criteria and Conventional Air Navigation Procedures or similar training recognized by DECEA.
- d) RNAV/RNP Air Navigation Procedures.
 - Purpose: Provide the needed knowledge for the development of the APCH RNP approach procedures, RNAV/RNP departure procedures and RNAV/RNP arrival procedures.
 - Prerequisites: module PANS-OPS General Criteria, or similar training recognized by DECEA.
- e) Approach Procedure with Barometric Vertical Guidance - APV BARO/VNAV
 - Purpose: Provide the needed knowledge for the development of the approach procedure with barometric vertical guidance (APV BARO/VNAV).
 - Prerequisites: module RNAV/RNP Air Navigation Procedures or similar training recognized by DECEA.
- f) Air Navigation Procedures for Helicopters
 - Purpose: Provide the needed knowledge for the development of the approach, departure and arrival, conventional and RNAV/RNP instrument procedures, applicable to rotary-wing aircraft.
 - Prerequisites: module PANS-OPS General Criteria, Conventional Air Navigation Procedures, ILS, LOC and PAR Approach Procedures and RNAV/RNP Air Navigation Procedures or similar training recognized by DECEA.
- g) RNP AR APCH Approach Procedures.
 - Purpose: Provide the needed knowledge for the development of the RNP AR APCH Approach procedures.
 - Prerequisites: module RNAV/RNP Air Navigation Procedures or similar training recognized by DECEA.
- h) Practice for the PANS-OPS Procedures Development.
 - Purpose: Provide the needed knowledge for the achievement of the Rating Certificate for the Procedure Designer.
 - Prerequisites: Training recognized by DECEA on the following specific areas:
 - i. Air Traffic Management, according to the Brazilian legislation in force, together with the prescribed by ICAO Annex 11 and ICAO Doc 4444.
 - ii. Aerodromes, according to the Brazilian legislation in force, together with the prescribed by ICAO Annex 14;
 - iii. Basic and Advanced Air Navigation;
 - iv. Aeronautical Information, according to the Brazilian legislation in force, together with the prescribed by ICAO Annex 4;
 - v. General Criteria applicable to the Air Navigation Procedures, according to the Brazilian Legislation in force, together with the prescribed in the ICAO Doc 8168, Vol.2.

- i) Recurring Training for the PANS-OPS Procedure Designer.
 - Purpose: Provide the needed knowledge for the revalidation of the Rating Certificate for the Procedure Designer.
 - Prerequisites: They must have a Rating Certificate for Procedure Designer in effect or expired with 1 (one) year at most.
- j) Training to update PANS-OPS.
 - Purpose: Provide the needed knowledge to the procedure designer whenever there are significant changes and inclusions to DOC 8168/611 PANS-OPS, the establishment of the national criteria or, still, whenever DECEA indicates such qualification for the technical qualification of the professionals.
 - Pre-requisites: They must have a Rating Certificate for Procedure Designer in effect or expired with 1 (one) year at most.

4 New Procedures Implementation

4.1 Once defined the regulation structure and requirements for technical qualification, it was necessary to implement new types of procedures, whose importance was justified by safety requirements (as APV procedures), or even by operational gain (such as ILS procedures with RNAV and RNAV SID transition).

4.2 In this way, a strategy was defined to elaborate the new procedures for around 140 public aerodromes that operate by instrument in Brazil, totalizing 640 new charts that are currently in a publication schedule sorted by priority established considering the needs of the users and the goals of the Resolution A36-23 (replaced by Resolution A37-1).

4.3 It is worth noting that until the beginning of the deployment of this schedule, there were about 240 approach and arrival RNAV (GNSS) charts published in Brazil and that currently this number is around 370 charts, including 32 APV Baro-VNAV, 16 RNAV/ILS and 85 SID/RNAV.

4.4 Another important issue related to the deployment of new procedures and the maintenance of existing ones is the analysis of the visual segment surface (VSS), which may impose serious operational restrictions to the airport. According to the requirements of item 5.4.6 of DOC 8168, Part I, Section 4, Chapter 5, the new procedures should be protected from obstacles in the visual segment, defined by the VSS, and the effective procedures where the obstacles are penetrating the VSS must be cancelled no latter than 15 Mar 2012. In Brazil about 1600 approach procedures were analyzed and currently the actions to remove or lower the obstacles are being coordinated among federal, state and local authorities.

5. Conclusion

5.1 The improvement of the mechanism of technical qualification of Procedure Designers, as well the definition of a consistent regulation structure allow the Brazilian Administration to increase the safety level, to meet the goals established by ICAO for implementation of new procedures of air navigation, specially those with barometric vertical guidance, and to introduce the concept of performance based navigation (PBN) within the terminal control areas.

6. Suggested Actions

6.1 The meeting is invited to:

- a) Take note of the information provided in the working paper;
- b) Access mechanisms of interchange between the CAR/SAM States to provide the needed conditions to the implementation of the air navigation procedures, especially those based on PBN, in order to allow the accomplishment of the goals prescribed by the resolution 37/1 of the 37th ICAO Assembly.

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