



SAM/IG/5  
WP/18  
02/04/10

**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 4: Standards and procedures for the approval of performance-based navigation operations**

**Proposed revision to CA 91-001 – Aircraft and Operators Approval for RNAV 10 (RNP 10) Operations**

(Presented by the DGCA of Chile)

**Summary**

This working paper presents a proposal of revision to AC 91-001 – Aircraft and operators approval for RNAV 10 (designated and authorised as RNP 10) operations, in relation to the FDE availability prediction programme.

**References:**

- AC 91-001 dated 12 October 2009
- Report of the SAM/IG/4 meeting
- Report of the SAM/IG/3 meeting

**1 Background**

1.1 The Fourth Workshop/Meeting of the SAM Implementation Group (SAM/IG/4) (Lima, Peru, 19 - 23 October 2009) took note of the content of AC 91-001 concerning aircraft and operators approval for RNAV 10 (RNP 10) operations.

## 2 Discussion

2.1 Regarding the FDE availability prediction programme required for aircraft equipped with dual GNSS approved as primary means of navigation in oceanic or remote areas, paragraph 8.3.1 b) 1) (d) of **AC 91-001** states the following: The authorised dual GNSS equipment must be installed by virtue of a technical standard order (TSO) and **an approved FDE availability prediction programme must be used**. The maximum allowable time in which it is foreseen that FDE capability will not be available is 34 minutes. The maximum service downtime must be included as a condition for RNP approval.

The note to this paragraph states: *If the maximum FDE service downtime for the foreseen RNP 10 operation is expected to be exceeded, the operation must be re-scheduled for a time when FDE is available or the RNP operation must be conducted based on an alternate means of navigation.*

2.2 Likewise, paragraph 8.3.1 b) 7) (a) of the aforementioned circular, concerning the use of a single INS/IRU and a single GNSS approved as primary means of navigation in oceanic or remote areas, states that the GNSS must be authorised in accordance with TSO-C129 and **must have an approved fault detection and exclusion (FDE) availability prediction programme**. Maximum allowable time in which it is foreseen that FDE capacity will not be available is 34 minutes. The maximum service downtime must be included as a condition for RNP 10 approval.

2.3 Likewise, Volume II, Part B, **Chapter 1 – Implementation of RNAV 10, of ICAO Doc 9613 – Manual on performance-based navigation (PBN)** (third edition - 2008) contains the following paragraphs concerning the FDE prediction programme:

2.3.1 Paragraph 1.3.4.2.1.4: The flight manual must indicate that a given GNSS facility meets the requirements of the appropriate aviation administration. The dual GNSS equipment approved according to the TSO must be installed and **an approved FDE availability programme must be used**. The maximum allowable time for FDE unavailability is 34 minutes on any occasion. The maximum service downtime must be included as a condition for RNP 10 approval.

*Note.- If the maximum FDE service downtime for the foreseen RNP 10 operation is expected to be exceeded, the operation must be re-scheduled for a time when it is available or RNP 10 must be based on an alternate means of navigation.*

2.3.2 Paragraph 1.3.4.2.4: Aircraft equipped with a single INS or IRU or a single GNSS, meet RNP 10 requirements with no time limitations. The INS or IRU must be approved according to 14 CFR, Part 121, Appendix G. The GNSS must be authorised in accordance with TSO-C129a and **must have an approved FDE availability prediction programme**. The maximum allowable time of FDE unavailability is 34 minutes on any occasion. The maximum service downtime must be included as a condition for RNP 10 approval. The flight manual must indicate that the particular INS, IRU or GPS facility meets the requirements of the appropriate aviation administration.

2.4 Taking into account that stated in the advisory circular mentioned in item 2.1 above and the PBN Manual (Doc 9613) in terms of the need to have an approved FDE availability prediction programme, it has been noted that operators and administrations have difficulties having at their disposal a prediction programme that has been approved and is applicable to en-route operations in the SAM Region.

2.5 According to the final report of the SAM/IG/3 meeting, the FAA has made available to the aeronautical community a prediction programme to be used en route, but is only applicable to its territory (<http://www.raimprediction.net/>)

2.6 Likewise, Eurocontrol has developed the “AUGUR” tool, which provides all the necessary information for advising on GPS integrity in air operations in the ECAC region (<http://augur2.ecacnav.com/augur/app/home>).

### **3 Suggested action**

3.1 In view of the above, the Meeting is invited to:

- 3.1.1 Provide guidance to authorities and operators regarding available prediction programmes for en-route operations that meet the requirements for being approved and applicable in the SAM Region.
- 3.1.2 Establish the scope of the term “approved programme” for purposes of this working paper;
- 3.1.3 Determine the technical and regulatory criteria to be taken into account by the authority for accepting and/or approving a prediction programme;
- 3.1.4 Analyse the validity of a dual GNSS facility as single means of navigation for RNP 10 operations in the SAM Region as long as the prediction programme required by AC 91-001 and applicable to the Region is not available.
- 3.1.5 Review the requirement of having a prediction programme in those facilities that have at least an approved inertial navigation system.

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