



- Agenda Item 2: Optimisation of SAM airspace**
- a) PBN en route
 - b) PBN in terminal areas
 - c) PBN procedures
 - d) Reduction of longitudinal separation

**TEMPLATE TO FOLLOW UP ON PBN GOALS ESTABLISHED IN THE
DECLARATION OF BOGOTA**

(Presented by Peru)

SUMMARY	
<p>This working paper proposes a set of improvements to the follow-up template entitled “<i>Status of implementation of PBN SIDs and STARs at international airports</i>” that currently circulates in Excel format, to allow for a more precise quantification of the progress made in PBN implementation at international airports in the SAM Region.</p>	
References:	
<ul style="list-style-type: none">• RAAC/13 (Bogota, Colombia, 4-6 December 2013) – Declaration of Bogota• Third Meeting of Air Navigation and Safety Directors of the SAM Region (Lima, Peru, 22-24 August 2016)• SAM/IG meetings	
ICAO strategic objectives:	<p><i>A - Safety</i> <i>B - Air navigation capacity and efficiency</i> <i>E - Environmental protection</i></p>

1. Introduction

1.1. The SAM/IG/14 meeting, held in Lima, Peru, on 10-14 November 2014, formulated Conclusion SAM/IG/14-4 – *Follow-up on PBN goals established in the Declaration of Bogota*, requesting the performance of such follow-up by completing the template entitled “*Status of implementation of PBN SIDs and STARs at international airports*”, which is contained in Appendix E to the corresponding part of the final report. Likewise, the conclusion requested SAM States to calculate fuel and CO₂ savings using the IFSET.

1.2. Since 2014 and during the course of SAM/IG meetings, the follow-up template has undergone several modifications. An Excel spreadsheet has been prepared and circulated that allows each State to quantify the progress made in PBN implementation, while facilitating a quick exchange through email. In the spreadsheet, a PBN procedure or standard route that has been implemented receives a value of 1; otherwise, number 2 should be used (meaning not implemented).

1.3. In this sense, this working paper proposes a set of improvements to the aforementioned spreadsheet in order to obtain a more precise quantification of the status of PBN implementation at international airports in the Region.

2. Discussion

2.1. The opportunity for improvement was identified at the last review of the follow-up template of Peru, during which the values contained in the *SID PBN AIRPORT* column were analysed. Note was taken that only 12.5% progress had been made, and that the line corresponding to runway 28 of the Cusco international airport had a value of 2 (not implemented) for PBN standard instrument departures, showing a deficiency in that runway.

2.2. Accordingly, it was felt that the “*not implemented*” status was not the most appropriate for runway 28 of Cusco, since it was not possible to implement a SID route for that threshold due to the existence of very high natural obstacles west of the station.

2.3. In this sense, consideration was given to the possibility of deducting, in the formula of the template, those runways where implementation of the PBN procedure or standard route was completely unfeasible, thus avoiding an incorrect indication of a deficiency that distorts the real percentage of progress in PBN goals.

2.4. Accordingly, it was felt that the Excel spreadsheet should include another option, in addition to status “1 = *implemented*” or “2 = *not implemented*”. To this end, a modification to the formula was tested, deducting those boxes that contained the option “N/A” (*not applicable*), as follows:

- Current formula, showing the results of column D in the template of Peru:

$$=FREQUENCY (D6:D14; D16)/COUNT (D6:D14)$$

- Improved formula (grey-shaded), where boxes with N/A values are deducted, thus increasing the percentage:

$$=(FREQUENCY(D6:D14;D16)-
FREQUENCY(D6:D14;D17))/COUNT(D6:D14)$$

In the example of Peru, for purposes of comparing the frequency, boxes D16 and D17 contain the values “1” and “N/A”, respectively.

2.5. It was noted that the inclusion of the third “*not applicable*” option in the appropriate cases could better reflect the status of PBN implementation at each airport. This clearly shows the progress made in the State with respect to its commitments with the Declaration of Bogota.

2.6. Finally, in the case of Peru, the use of the improved formula would permit an upward adjustment of implementation indices, upon including, *inter alia*, the threshold of runway 10 in Cusco. In this case, the implementation of approach procedures or a PBN STAR route is not feasible because of geographical conditions, but it currently publishes GAXUN 1B SID (RNP 0.3) RWY 10 in the AIP PERU.

3. Suggested action:

3.1. The States are invited to take note of the proposed improvements to the spreadsheet used to follow up the implementation of PBN goals of the Declaration of Bogota. If appropriate, the meeting should encourage a new collection of data in the SAM Region, applying the new Excel formula to obtain more realistic implementation indices.