



**Agenda Item 2: SAM airspace optimisation**  
**c) PBN procedures**

**PBN INSTRUMENT APPROACH PROCEDURES**

(Presented by the Secretariat)

<b>SUMMARY</b>	
This working paper presents an analysis of PBN information obtained during the second quarter of 2013 in the SAM Region concerning PBN and conventional instrument approach procedures.	
<b>REFERENCES</b>	
<ul style="list-style-type: none"><li>• Reports of the workshops/meetings of the SAM Implementation Group</li></ul>	
<b>ICAO Strategic Objectives:</b>	<i>A - Safety</i> <i>C - Environmental protection and sustainable development of air transport</i>

**1. Background**

1.1 The SAM/IG/11 meeting recognised the importance of following up the status of implementation of ICAO Assembly Resolution A37-11, mainly with respect to the implementation of approach procedures with vertical guidance, which should reach 70% of thresholds with IFR operations in 2014.

1.2 Through letter LT2/3A.39-SA204, the Secretariat sent a survey to SAM States to be responded by 8 May 2013. The Regional Office, using funds from its Regular Programme, hired an expert to analyse the information, complete the missing information, and develop a dynamic template to be used as the baseline for the status of implementation of improvements in regional efficiency.

1.3 Information on standard approach, departure, and arrival procedures was obtained through a survey carried out on the second quarter of 2013. This survey provided information on all instrument approach procedures (IAP) for runways and international airports contained in the CAR/SAM Air Navigation Plan.

1.4 Not all SAM States responded to the survey. Consequently, the information contained in the AIPs available at the Regional Office in electronic or physical format was used as official source. Likewise, and despite having the response from the States, the information was verified with that officially published in the respective AIPs. In other cases, the information was reviewed based on publications of private aeronautical information providers.

2. Discussion

2.1 ICAO intends to post regional efficiency graphs on the public website of each of its Regional Offices, showing the regional status of implementation of the strategic objectives of the Organization for the 2014-2016 period, and showing the efficiency indicators foreseen for the region. The new system will start operating in Africa in August 2013 and, for the other Regions, in March 2014, and will be updated every six months.

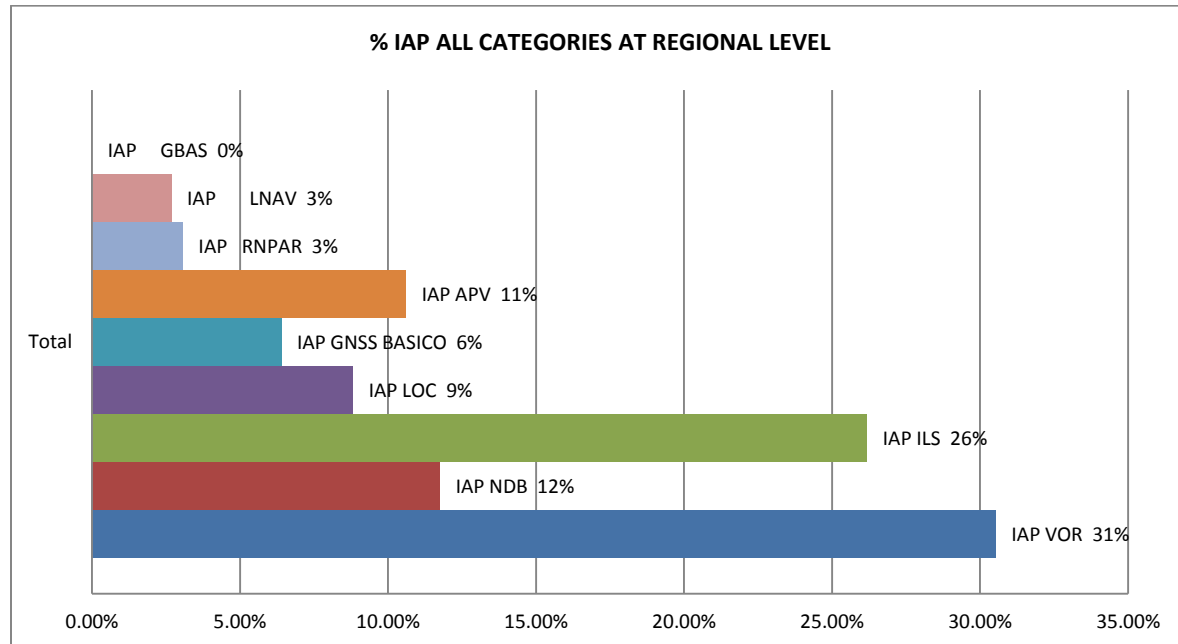
2.2 Regional efficiency data regarding existing instrument procedures, both conventional and PBN, in SAM States is shown in **Appendix A** to this working paper. The analysis comprised the following instrument approach procedures:

(IAP): VOR, NDB, ILS, LOC, APV, RNP AR, LNAV, basic GNSS, and GBAS.

2.3 The analysis conducted revealed that 783 conventional and/or PBN instrument approach procedures (IAP) have been designed and published for the 99 airports. The following breakdown identifies the number of procedures and the percentages based on all the procedure categories assessed:

IAP percentages	IAP VOR	IAP NDB	IAP ILS	IAP LOC	IAP GNSS BASICO	IAP APV	IAP RNP AR	IAP LNAV	IAP GBAS
<b>Totals</b>	239	92	205	69	50	83	24	21	0
<b>% of IAP</b>	30.5	11.7	26.2	8.8	6.4	10.6	3.1	2.7	0

2.4 The figure below depicts all IAP categories at regional level:



2.5 Out of the total number of procedures, 77% (605) have been designed based on conventional radio aids (NDB, VOR, DME, LOC, ILS), while 23% (178) have been designed taking into account PBN. In this case, LNAV, RNP AR, APV procedures were considered, and basic GNSS are included. GBAS IAPs for international aerodromes have not been published yet in the SAM Region.

2.6 In the SAM Region, there are 783 approach procedures for the 99 airports, 178 are PBN approach procedures, including GNSS IAPs, out of which 107 are RNP APCH, accounting for 14%, distributed as follows: 83 APV baro-VNAV (APV) procedures (11%) and 24 RNP procedures with authorisation required (RNP AR), accounting for 3%, as reflected in the following table:

Total number of airports	Total IAPs	Total PBN IAPs	Total RNP APCH IAPs	% RNP APCH IAPs out of the total IAPs	OACI indicator: % of aerodromes with APV
99	783	178	83 APV baro-VNAV	11%	14%
			24 RNP AR	3%	

2.7 Furthermore, if we take into account Assembly Resolution A37-11, there are 114 runways in the SAM Region for which instrument procedures have been developed for 175 thresholds out of the existing 228. For those 175 thresholds, 107 APV procedures have been implemented, accounting for 61% of IFR runways.

Total number of runways	Total IFR runways	Total APV IAPs	ICAO indicator A37/11 % APV by IFR runways
114	175	107	61%

**Regional efficiency indicators**

2.8 Regarding regional efficiency indicators for instrument approach procedures (IAPs), States must indicate their status of implementation, updating the information at each SAM/IG meeting. This information will be part of the information that the Regional Office will keep on its website, as coordinated with ICAO Headquarters.

**3. Suggested action:**

3.1 The Meeting is invited to analyse the data and, if deemed appropriate, approve the following draft conclusion:

**DRAFT CONCLUSION SAMIG/12-XX PBN INSTRUMENT APPROACH PROCEDURES**

That SAM States:

- a) complete the implementation of APV procedures for all instrument flight runway ends, whether as primary approach or as support to precision approach, with a view to completing 70% of PBN approaches by 2014 and 100% by 2016; and

- b) advise the Regional Office of any changes in the status of implementation of instrument approach procedures, whether conventional or PBN, at each SAM/IG meeting in order to update regional efficiency indicators.

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## APPENDIX A / APÉNDICE A

ESTADO DE IMPLANTACIÓN DE LOS PROCEDIMIENTOS DE APROXIMACIÓN INSTRUMENTALES (IAP) CONVENCIONALES Y  
PBN POR ESTADO EN LA REGIÓN SAM

## IMPLEMENTATION STATUS OF CONVENTIONAL AND PBN INSTRUMENTAL APPROACH PROCEDURES (IAP) BY STATE IN THE REGION

AEROPUERTOS INTERNACIONALES/ INTERNATIONAL AIRPORTS ANP CAR/SAM	IAP VOR	IAP NDB	IAP ILS	IAP LOC	IAP GNSS BASICO	IAP APV	IAP RNP PAR	IAP LNAV	IAP GBAS	SID CONVEN	SID PBN	CCO	STAR CONVEN	STAR PBN	CDO
ARGENTINA	42	18	53	53	10	0	0	0	0	54	29	0	39	40	0
BOLIVIA	8	4	7	0	2	0	0	0	0	48	0	0	0	0	0
BRAZIL	69	49	82	0	7	55	0	0	0	299	410	0	64	169	0
CHILE	31	2	10	0	0	7	3	4	0	60	5	0	24	17	0
COLOMBIA	17	6	8	0	9	0	0	0	0	108	4	0	32	45	0
ECUADOR	13	4	12	12	0	0	4	0	0	10	26	0	1	8	0
FRENCH GUIANA	4	1	3	0	0	0	0	2	0	3	0	0	9	0	0
GUYANA	4	0	2	0	2	0	0	0	0	0	0	0	0	1	0
PANAMA	7	0	1	1	4	1	4	0	0	2	2	0	2	10	0
PARAGUAY	7	2	3	3	4	2	0	2	0	9	3	0	0	0	0
PERU	17	0	15	0	2	2	13	0	0	34	8	0	36	12	0
SURINAME	4	0	1	0	0	0	0	0	0	0	0	0	0	0	0
URUGUAY	10	5	3	0	10	0	0	0	0	38	0	0	2	0	0
VENEZUELA	6	1	5	0	0	16	0	13	0	12	16	0	1	0	0
<b>Totales</b>	<b>239</b>	<b>92</b>	<b>205</b>	<b>69</b>	<b>50</b>	<b>83</b>	<b>24</b>	<b>21</b>	<b>0</b>	<b>677</b>	<b>503</b>	<b>0</b>	<b>210</b>	<b>302</b>	<b>0</b>

**Source/Fuente:** CAR/SAM ANP, ICAO South American Office Surveys and States' AIP./ANP CAR/SAM, encuestas de la Oficina Regional Sudamericana de la OACI y AIP del Estado.

**Note/Nota:** Information by 31 August 2013 / Información al 31 de agosto de 2013.