



Agenda Item 2: Optimization of SAM airspace

a) Progress in the PBN Regional Implementation

PBN BRASIL

(Presented by Brazil)

SUMMARY

This working paper presents the progress of projects and action plans for PBN implementation in Brazil, the situation and progress of the TMA-SP Neo Project and other actions adopted by DECEA for the optimization of Brazilian airspace (progress of the PBN designs of the TMA).

REFERENCES

- SAM/IG/22 report
- GREPECAS/18 meeting
- Doc 9750 – Global Air Navigation Plan

1. BACKGROUND

1.1 The conclusions obtained during GREPECAS/18 indicate the need for States to increase efforts for the publication and implementation of IFR routes and procedures for Terminal Control Area (TMA), based on the PBN concept, to increase or maintain operational safety and efficiency of air navigation in the SAM Region.

1.2 This commitment assumed by the States is also an issue frequently addressed during the meetings of the SAM/IG, where it is also highlighted that such initiatives should be implemented in close coordination among the States, the ANSPs, the airlines and other airspace users.

1.3 In this sense, this working paper presents the progress of projects and action plans for PBN implementation in Brazil, the situation and progress of the TMA-SP Neo Project and other actions adopted by DECEA for the optimization of Brazilian airspace (progress of the PBN designs of the TMA).

2. PBN PROJECTS AND PROCEDURES FOR BRAZILIAN TMA

2.1 The PBN projects and their respective dates for implementation in the Brazilian TMAs are the following:

Brazil	Brasília		12 NOV 2015 (implemented)
	Belo Horizonte		12 NOV 2015 (implemented)
	São Paulo (partial improvement)		12 NOV 2015 (implemented)
	Salvador		27 APR 2017 (implemented)
	Manaus		17 AUG 2017 (implemented)
	(PBN SUL)	Curitiba	12 OCT 2017 (implemented)
		Florianópolis	
		Joinville	
		Navegantes	
		Porto Alegre	
		São Paulo (cambios parciales) Rede de rota FIR CW	
	São Paulo (TMA-SP Neo)		SEP 2020
Fortaleza, Natal, João Pessoa and Recife		NOV 2021	
Belém, Campo Grande and São Luís		OCT 2022	
Cuiabá, Boa Vista, Porto Velho and Rio Branco		OCT 2023	

2.2 The dates of PBN projects have been updated in SAM/IG/22. The main reason for the changes in the dates were:

- a) Increase in the number of IFR procedures required for the PBN TMA-SP Neo Project (there will be changes in the procedures of the TMA Curitiba, Florianópolis, Porto Alegre);
- b) Implementation Plan of Circular 353 (316 charts);
- c) Procedure review working plan.

2.3 Another important information: Brazil has 1.524 IFR procedures (IAC, SID, STAR) published for 135 airports with IFR operations:

IAC		SID		STAR	
CONV	PBN	CONV	PBN	CONV	PBN
447	266	294	345	43	129
713		639		172	

2.4 Taking these procedures into account, it is possible to carry out a relevant analyzes of PBN and CDO/CCO techniques implementation in Brazilian airports:

APV / LNAV			STAR	SID	CDO TMA	CCO TMA
IAP APV	LNAV	IAP RNP AR	STAR PBN	SID PBN		
100,00%	100,00%	9,23%	77,27%	95,38%	75,86%	75,86%

3. **TMA-SP NEO PBN PROJECT**

3.1 As presented in SAM/IG/22¹, the Department of Airspace Control (DECEA) decided to establish a project to implementing a new Airspace Concept for the Terminal Control Area (TMA) of São Paulo. The project started in December 2017 and is expected to last three years.

3.2 The decision to implement a new PBN project was made based on the results of the analysis of the capacity indicators with respect to the increase in forecasted demand. It also obeyed the request of the users, in particular pilots and air traffic controllers (ATCO), to introduce improvements in the current airspace concept.

3.3 In the PBN TMA-SP Neo project, the concepts of continuous improvement, performance-based approach (PBA) and collaborative decision-making (CDM), are applied and relevant analyzes are taken into account to endorse ICAO documentation as a strategic planning tool.

3.4 The most important strategic objectives to be achieved with the project are the following:

- a) Guarantee capacity at least 10% higher than the expected demand in the next 10 years;
- b) Reduce the ATCO workload by at least 10%;
- c) Reduce holdings due to airspace capacity;
- d) Reduce delays related to airspace capacity;
- e) Reduce distances, flight time and fuel consumption;
- f) Reduce or maintain safety indicators:
 - Air Safety Reports;
 - Air traffic incidents;
 - TCAS/RA.

¹ SAM/IG/22-NE/05 – Plan de Medición de Performance del Proyecto TMA-SP Neo

3.5 The challenge is significant, since the TMA São Paulo comprises three of the most important airports in Brazil, which are Guarulhos-SBGR, Congonhas-SBSP and Campinas-SBKP, which occupy respectively the first, second and sixth positions of air traffic volume in Brazil².

3.6 In addition, the TMA São Paulo comprises several airports for general aviation, a complex network of visual routes that allows flight between them and an operations flow generated by the largest urban helicopter fleet in the world³.

3.7 Another important aspect is the airport configuration, which does not favor the implementation of a simple Airspace Concept, taking into account, for example, that it is necessary a final approach with an angle of almost 90 degrees to the main runways of Guarulhos and Congonhas, considering that the average distance between these airports is 15 NM.

3.8 After 1 year and a half, many activities were already developed during the implementation of the project:

- a) Implementation process based on the CDM concept: conduct a practical seminar (two weeks) to address the Airspace Concept, with the participation of more than 130 participants from the Brazilian aeronautical community (operational safety, civil aviation authority, general aviation, airlines and air Navigation Service Providers (ANSP)). The seminar had two main objectives:
 - ✓ Inform the aeronautical community about the complexity and general schedule of the project; and
 - ✓ Compile experiences and expectations of the aeronautical community, with a view to establishing the objectives and expected results.
- b) Establishment of ATM indicators to verify if the operational gains in the areas of Operational Safety, Capacity and Efficiency, in accordance with the strategic objectives of the project, will be effectively achieved. The aeronautical community will participate in the process of data collection and calculations of key performance indicators;

Note: Draft of the Performance Measurement Plan presented in the SAM/IG/22⁴.
- c) Development of the project structure, plan of action and the team of project specialists;
- d) Design of 2 (two) scenarios for the Airspace Concept, developed in close coordination with the stakeholders (ATCO, airlines, ATFM, ANSP, AOM, etc);
- e) Validation of the scenarios in Fast Time Simulation (FTS) sections for the decision making of the best Airspace Concept.

2 Source: CGNA/DECEA

3 Source: <https://lab.org.uk/sao-paulo-the-worlds-biggest-helicopter-fleet/>

4 SAM/IG/22-NE/05 – Plan de Medición de Performance del Proyecto TMA-SP Neo

3.9 The next step for the development of the project will be to perform of Real Time Simulation (RTS) sections, whose forecast is JUN 2019. In this activity will participate ATCO of the São Paulo Approach Control (APP) and the Curitiba Area Control Center (ACC), as well as ATFM and Operational Security specialists.

3.10 After this task, a report will be prepared with the results of the real time simulation and a presentation will be made to the competent aeronautical authority, the head of the DECEA Operations Department, for the decision to continue, or not, for the implementation of the new Airspace Concept for the TMA São Paulo: Meeting GO/NO GO.

4. **Suggested actions**

4.1 The Meeting is invited to:

- a) take note and review the information provided in this working paper;
- b) Make comments and suggestions that can help in the development of the PBN project TMA-SP Neo.

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