



WORKING PAPER

THIRTEENTH AIR NAVIGATION CONFERENCE

Montréal, Canada, 9 to 19 October 2018

COMMITTEE A

**Agenda Item 3: Enhancing the global air navigation system
3.5: Other ATM issues**

AIRSPACE CONCEPT AND ITS CORRELATIONS WITH ICAO DOCUMENTS

(Presented by Brazil)

EXECUTIVE SUMMARY

This working paper aims to endorse that the formulation of an Airspace Concept associated with a performance-based approach and collaborative decision making (CDM) sets up as a powerful strategic planning tool, especially when it directs complex and congested airspaces. In addition, it suggests the intensification of the connection between airspace design documents and the CDM process. References: *Manual on Global Performance of the Air Navigation System* (Doc 9883); *Manual on Collaborative Air Traffic Flow Management* (Doc 9971); *Manual on the Use of Performance-based Navigation (PBN) in Airspace Design* (Doc 9992).

Action: The Conference is invited to:

- a) support and practice the combined use of ICAO documentation for airspace concepts;
- b) support and improve the ICAO normative framework, understanding that it can be used as a development engine; and
- c) request ICAO to reinforce, in the airspace design documentation, the need to define strategic objectives already comprising an active CDM process.

1. INTRODUCTION

1.1 In early 2017, the Department of Airspace Control (DECEA) determined that it was time to start building a new airspace concept for the terminal control area (TMA) São Paulo. The project began in December 2017 and is estimated to last three years.

1.2 The concepts of continuous improvement, performance-based approach (PBA), airspace concept and collaborative decision making (CDM) are being used and, along the way, some analyses were considered relevant to endorse the ICAO documentation as a strategic planning tool.

2. THE TMA-SP NEO

2.1 Terminal area São Paulo comprises three major airports in Brazil, among which Guarulhos-SBGR, Congonhas-SBSP and Campinas-SBKP are respectively the first, second and the sixth busiest in the country¹, and Guarulhos is also the busiest in South America².

2.2 Concomitantly with this important air movement, there is an unfavourable airport configuration, with the final approaches of the main runways at Guarulhos and Congonhas competing at an angle of almost 90 degrees, and only 15 NM apart from the midpoints at those airports. TMA-Sao Paulo also has several airports for general aviation and a complex network of visual routes connecting them. This scenario is further boosted by the largest city fleet of helicopters in the world³, confirming that air transportation in Brazil is not just a solution between cities but also within the cities.

2.3 Then, in 2017, following the continuous improvement concept, DECEA identified that it was time to start building a new airspace concept for TMA-São Paulo, five years after the PBN implementation took place. This decision resulted from an analysis of capacity indicators compared to the demand growth forecast. Requests from users, both pilots and air traffic control officers (ATCOs), to implement improvements in circulation contributed as well.

2.4 In a new initiative, inspired by an established CDM process, DECEA conducted a two-week workshop on airspace concept, attended by more than 130 participants of the Brazilian aviation community (safety, airworthiness, industry, general aviation, ministry of transport, airlines and air navigation services provider (ANSPs)). This event had two main objectives: i) informing the community about the complexity and the length of work; and ii) collecting experience reports to set goals and expectations.

2.5 After that, the TMA-SP Neo Project was initiated, with the aim of delivering a new airspace concept in late 2020s, to be finalized in at most three years.

3. ANALYSIS FROM THE PROJECT

3.1 The complicated characteristics of airspace over the city of São Paulo are not a matter of coincidence. Like any other asset, airspace is a finite resource and reflects with great fidelity the urban organization of a given society.

3.2 In the case of a developing country, issues such as disorderly occupation of cities and poor urban planning culture stress this complexity, for example, preventing the expansion of an airport or its land accessibility. As anywhere in the developing world, aviation segments have to learn how to deal with and overcome those challenges on ensuring global security and efficiency from its high regulatory standards.

3.3 Along with this scenario, the Brazilian aviation community is a benchmark of excellence within the country. With a reference industry, exporting both aircraft and air traffic control (ATC) technology, and an ANSP listed in the ICAO⁴ Top-10 rank of Effective Implementation (EI), the positions signed by the players of this market are embodied by its excellent reputation at the national and global levels.

¹ Source: CGNA/DECEA

² Source: CGNA/DECEA x IATA

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

⁴ Source: ICAO, <https://www.icao.int/safety/iStars/Pages/API-Data-Service.aspx>

3.4 With the outcome of the CDM event described in item 2.4 and based on the reputation mentioned above, challenging goals and statements were defined, such as:

- a) building an airspace concept (AC) to keep capacity level always 10 per cent higher than the demand forecast for the next ten years, when the AC expires; and
- b) ranking and prioritizing the busiest instrument flight rules (IFR) airports with the best routes.

3.5 As an immediate outcome, owing to the collaborative environment (built by CDM awareness, see item 2.4), transparent and strong objectivity in the goals, many major players officially expressed their strategic interests and expectations to DECEA, such as:

- a) intention of existing airports to build new runways;
- b) intention to establish new airports;
- c) intention to convert visual flight rules (VFR) airports into IFR airports; and
- d) growth forecasts for various segments.

3.6 At the end, it seems that it was very positive to set strategic goals with the CDM approach already established, despite the suggestion stated in the Manual on the Use of Performance-based Navigation (PBN) in Airspace Design (Doc 9992) , items 2.1 and 2.2, to create a multidisciplinary team only after identifying the operational requirements or the strategic objectives.

4. **DISCUSSION**

Endorsing the Manual on Global Performance of the Air Navigation System (Doc 9883) methodologies

4.1 As a result of the above mentioned initial actions, the community realized that an airspace as TMA-SP cannot be changed overnight since high costs and extensive work have to be considered.

4.2 With the support provided by consistent international rules for the development of the Airspace Concept, as described in Doc 9992 and reinforced by the methodology of “strong focus on desired/required results” for the performance-based approach prescribed by Doc 9883, good initial results were achieved, as expected.

4.3 There are reasons to believe that, with the large publicity of the project objectives, the partners were strongly encouraged to disclose more clear expectations of medium and long-term planning. Thus, the air traffic management (ATM) planning process worked as a trigger, leading the aviation community as a whole towards a common place.

4.4 The powerful combination of methodologies from Doc 9883, CDM and airspace concept is surely at the core of this working engine.

Airspace Concept with CDM

4.5 The combination mentioned above proved to be a powerful approach. However, the use of the CDM process (*Manual on Collaborative Air Traffic Flow Management (Doc 9971)*), long before the creation of the project itself, was also central to the great adherence and commitment of the players thus far.

4.6 It is marked that the information provided by stakeholders was crucial in the early phases of the work, as evidenced in the Project São Paulo Neo (Item 3.5). Any lack or even delay in the CDM establishment to the airspace design process could decisively affect the outcome of the product.

4.7 It is noteworthy that the Doc 9971 is complete and comprehensive in trying to engage the process of CDM at the airspace design stage, faithfully reflecting the ATM system requirements from Doc 9882, among other references.

4.8 But in some situations Doc 9971 may not be the first source of information for personnel involved in airspace design, especially in places where air traffic flow management (ATFM) has not been fully implemented. If this happens, valuable information will be lost or delayed, which may have a decisive impact on the outcome.

4.9 Thus, we consider relevant to foresee the explicit use of CDM in the planning or pre-planning phase described in Doc 9992 (see item 3.6) and other related publications. Although Doc 9992 suggests the participation of a multidisciplinary team in the planning phase, the CDM process comprises many more features and details to identify needs and help setting better strategic goals.

5. CONCLUSION

5.1 Brazil applies and endorses the ICAO normative framework. More than that, as this documentation has a high standard of quality and precision, it supports DECEA to foster strategic planning actions at the national level.

5.2 In places where long-term planning is still a major challenge, a proposed 10-year Airspace Concept may scare or cause mistrust for several audiences.

5.3 However, owing to the normative consistence and strong professionalism, such initiatives have been configured as the core of the planning and development processes in the aviation system.