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South American Regional Office
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**Agenda Item 6: Other business**

# CPDLC IN THE BRAZILIAN CONTINENTAL AIRSPACE

(Prepared by Brazil)

**SUMMARY**

This paper presents Brazil's experience in the implementation and operational use of Continental CPDLC, highlighting initiatives to promote aircraft equipage and operational utilization, recent operational results, lessons learned and their contribution to the future evolution of Air Traffic Management (ATM) within the SAM Region.

**References:**

- International Civil Aviation Organization (ICAO). Global Air Navigation Plan – Doc 9750. 4 th Edition, 2013.
- International Civil Aviation Organization (ICAO). Annex 10 – Aeronautical Telecommunications.
- International Civil Aviation Organization (ICAO). Procedures for Air Navigation Services - Air Traffic Management (PANS-ATM) – Doc 4444, 2016.

## 1. Background

1.1 Controller-Pilot Data Link Communications (CPDLC) is recognized by the International Civil Aviation Organization (ICAO) as one of the key enabling technologies for future Air Traffic Management (ATM). By complementing conventional voice communications, CPDLC improves communication efficiency, reduces VHF frequency congestion, enhances communication reliability and coverage, minimizes communication misunderstandings, and contributes to reducing controller and pilot workload.

## 2. Analysis

2.1 In Brazil, CPDLC services are provided separately for domestic and oceanic airspace. Oceanic CPDLC has been in use for more than 17 years.

2.2 In Brazilian continental airspace above **FL250**, **CPDLC FANS 1/A** is used as a supplementary means to **VHF voice communications** for routine ATS communications where the ATS surveillance service is provided. The application is not used for vectoring.

2.3 Continental CPDLC implementation was completed according to the following schedule:

- Apr 2022 – FIR Recife (SBRE)
- Oct 2022 – FIR Amazonica (SBAZ)
- Jun 2023 – FIR Brasilia (SBBS)
- Dec 2024 – FIR Curitiba (SBCW)

2.4 Communications may be conducted via the **VDL Mode 0/A**, **VDL Mode 2** and **SATCOM** subnetworks.

2.5 It is not mandatory for all aircraft to be equipped with CPDLC data link avionics FANS 1/A or FANS 1/A +.

2.6 CPDLC currently operates in a mixed communication environment, where ATS is simultaneously provided to both CPDLC-equipped and non-equipped aircraft. Therefore, maximizing operational benefits depends not only on infrastructure deployment but also on the progressive increase in aircraft equipage and the effective operational use of data link services.

*Promotion of CPDLC Operational Use*

2.7 Brazil has undertaken several initiatives to promote the adoption of FANS 1/A capabilities, including engagement activities with airlines and aircraft operators to encourage fleet equipage and operational readiness.

2.8 At the international level, Brazil has actively promoted discussions within ICAO aimed at increasing the operational use of CPDLC. During the Fourteenth Air Navigation Conference (AN-Conf/14), Brazil presented proposals emphasizing the need for standardized operational performance indicators to quantify CPDLC benefits and support evidence-based investment decisions. The proposals also highlighted the importance of encouraging airlines to expand fleet equipage and operational use of CPDLC.

2.9 These initiatives were subsequently developed within the ICAO Operational Data Link Working Group (OPDLWG), contributing to the approval of new Job Cards addressing: a) a global framework for assessing the operational benefits of data link communications; and b) the extended use of CPDLC in dense continental en-route airspace, including future operational concepts where CPDLC may become the primary communication medium.

2.10 At the regional level, Brazil also presented the subject to GREPECAS, proposing actions to increase operator awareness of CPDLC operational benefits, encourage harmonized regional messaging to aircraft operators, and promote greater fleet equipage and operational use throughout the CAR/SAM Region.

2.11 Complementing these initiatives, DECEA has maintained continuous engagement with national aircraft operators through workshops, implementation meetings and operational coordination activities, encouraging fleet equipage, pilot qualification and effective use of CPDLC services.

*Operational Results*

2.12 These initiatives have already contributed to the progressive increase in CPDLC-equipped aircraft operating in Brazilian airspace.

COMPARISON JAN–MAY/25 vs OCT–FEB/26

| FIR | CPDLC FANS 1/A DATA LINK FLIGHTS | | | CPDLC LOGON FLIGHTS | | |
|---|---|---|---|---|---|---|
| | JAN–MAY/25 (% OF FLIGHTS IN FIR) | OCT–FEB/26 (% OF FLIGHTS IN FIR) | Δ (p.p.) | JAN–MAY/25 (% OF DATA LINK FLIGHTS) | OCT–FEB/26 (% OF DATA LINK FLIGHTS) | Δ (p.p.) |
| SBBS FIR CURITIBA | 13,26% | 21,23% | ↑ +7,97 | 92,71% | 52,06% | ↓ -40,65 |
| SBCW FIR AMAZÔNICA | 16,03% | 16,00% | – 0,03 | 33,63% | 59,10% | ↑ +25,47 |
| SBRE FIR RECIFE | 11,74% | 12,42% | ↑ +0,68 | 95,84% | 75,73% | ↓ -20,11 |
| SBAZ FIR BRASÍLIA | 11,71% | 17,45% | ↑ +5,74 | 76,12% | 64,16% | ↓ -11,96 |

Figure 1 – CPDLC usage statistics

2.13 When comparing the periods January-May 2025 and October 2025-February 2026, the percentage of CPDLC-equipped flights increased across most Brazilian FIRs, reflecting the progressive entry into service of newly equipped aircraft. The most significant increase was observed in the Brasília FIR (SBBS), where the proportion of CPDLC-equipped flights rose from **13.26%** to **21.23%**, while the Curitiba (SBCW), Recife (SBRE) and Amazônica (SBAZ) FIRs also registered moderate growth.

2.14 Despite the increase in aircraft equipage, the percentage of CPDLC logons decreased. This behaviour is primarily associated with the progressive entry into service of newly equipped aircraft.

2.15 Although the required avionics have already been certified, routine operational use of CPDLC depends on the completion of the corresponding flight crew training. Consequently, pending crew qualification, a significant proportion of equipped aircraft has not yet begun routine use of CPDLC, resulting in a temporary reduction in CPDLC logon rates.

2.16 As pilot qualification progresses, CPDLC utilization is expected to increase, allowing the operational benefits associated with the expanded fleet equipage to be progressively realized.

*User Engagement and Continuous Improvement*

2.17 In November 2025, DECEA, in cooperation with the International Air Transport Association (IATA), organized a joint operational workshop to identify opportunities for improving the operational use of Continental CPDLC in Brazil and to promote broader utilization of data link services. The event brought together more than 30 representatives from international airlines.

2.18 The meeting provided an important forum for exchanging operational experience and best practices. Airline representatives highlighted the operational benefits of data link communications, discussed international operational practices, identified opportunities to improve controller-pilot interaction and presented proposals aimed at increasing the consistency, predictability and operational use of CPDLC in Brazilian continental airspace.

2.19 The discussions confirmed that the Brazilian CPDLC infrastructure supports the vast majority of ICAO-standard message sets and operational services. At the same time, participants identified opportunities for improvements in operational procedures, controller standardization and system functionalities that could further enhance the effective use of CPDLC by aircraft operators.

2.20 Airline representatives particularly highlighted the provision of traffic information via CPDLC as a distinctive operational capability, reporting that they were not aware of a comparable implementation elsewhere.

2.21 Based on the workshop outcomes, DECEA initiated several operational and technical improvements, including revisions to operational procedures, enhancements to controller guidance and training, and improvements to the ATC system aimed at increasing operational efficiency and expanding the effective use of CPDLC.

*Operational Benefits*

2.22 The operational use of Continental CPDLC has demonstrated significant safety and operational benefits. By complementing conventional VHF voice communications, CPDLC expands communication availability through multiple subnetworks (VDL Mode 0/A, VDL Mode 2 and SATCOM), increasing communication resilience.

2.23 Digital messaging eliminates the effects of voice interference, background noise and frequency congestion, reducing the risk of communication misunderstandings. It also transfers routine ATS communications from voice to data link, reducing VHF frequency occupancy and preserving voice channels for time-critical communications.

2.24 For flight crews, several CPDLC clearances can be transferred directly to the Flight Management System (FMS), reducing manual data entry and minimizing the potential for input errors.

2.25 For air traffic controllers, CPDLC provides automated functions that reduce routine workload and improve operational efficiency, including standardized message sets for lengthy or repetitive instructions, automated message management, and enhanced communication traceability.

*Future Outlook*

2.26 The implementation of CPDLC in Brazil demonstrates that successful data link operations depend not only on technological infrastructure but also on close collaboration among ANSPs, aircraft operators, industry and regulators.

2.27 As the SAM Region progresses towards future ICAO operational concepts - including Trajectory-Based Operations (TBO), Flight and Flow Information for a Collaborative Environment (FF-ICE) and increasingly automated ATM environments - the continued expansion of aircraft equipage, operational use of CPDLC and regional cooperation will become increasingly important.

2.28 The operational experience accumulated by Brazil provides a valuable reference for other SAM Region States in developing their CPDLC implementation strategies. However, its application should take into account the operational characteristics and the level of maturity of each State's CNS/ATM infrastructure, thereby contributing to the harmonized evolution of digital ATM communications across the Region.

2.29 The continued evolution of CPDLC within the SAM Region should therefore be regarded not only as a communication enhancement, but as a strategic investment in the digital transformation of ATM and in the future implementation of ICAO operational concepts.

## 3. Conclusion

3.1 The implementation of CPDLC in continental Brazilian airspace has successfully achieved its primary objectives, establishing a stable, interoperable and operationally mature data link environment that effectively complements conventional VHF voice communications.

3.2 Operational experience confirms that CPDLC has enhanced the safety, resilience and efficiency of ATS communications while improving support for both flight crews and air traffic controllers.

3.3 Continued improvements in operational procedures, controller training and ATC system functionalities, supported by close cooperation among ANSPs, aircraft operators, industry and ICAO, will further enhance CPDLC effectiveness.

3.4 However, the full operational and ATM performance benefits will ultimately depend on the continued expansion of FANS 1/A-equipped fleets and the consistent operational use of CPDLC by qualified flight crews, supporting the transition toward future ICAO operational concepts.

## 4. Suggested actions

4.1 The meeting is invited to:

a) note the information presented in this paper;
b) recognize the importance of promoting aircraft equipage and the operational use of CPDLC; and
c) encourage the exchange of implementation experience and operational best practices among SAM States to support the harmonized evolution of data link communications within the Region.

END