



FOURTEENTH AIR NAVIGATION CONFERENCE

Montréal, Canada, 26 August to 6 September 2024

- Agenda Item 4: Hyper-connectivity of air navigation system**
4.1: Connected aircraft concept and associated challenges

ENHANCING THE ADVANTAGES FROM CONTROLLER-PILOT DATA LINK COMMUNICATIONS (CPDLC)

(Presented by Brazil, supported by the United States)

EXECUTIVE SUMMARY

States and air navigation services providers (ANSPs) around the globe have different realities in their capacity to invest in the processes and enabling technologies to support the future air traffic management (ATM) system. In regions where investments must be carefully planned, a lack of comparative clarity can make investment in air navigation services (ANS) technologies more challenging.

In Brazil, the implementation of controller-pilot data link communications (CPDLC) in the continental airspace brought improvements. However, difficulties in comparison with deployments in other countries arose due to the lack of outputs standardization. This paper presents a few outputs from CPDLC implementation in the Brazilian upper continental airspace and proposes action as follows:

Action: The Conference is invited to:

- a) recognize the need to standardize indicators to measure the effectiveness of CPDLC implementations regarding their benefits for aviation; and
- b) encourage international airlines to engage in CPDLC communications to maximize the technology benefits.

1. INTRODUCTION

1.1 Controller-pilot data link communications (CPDLC) employs preformatted, standardized messages corresponding to the standard phraseology used in radiotelephony in the provision of air traffic services (ATS).

1.2 The application is recommended by the International Civil Aviation Organization (ICAO) as one of the enabling technologies of air traffic management concepts of the future, and provides greater automation and management of communications, having as main benefits the reduction of congestion in voice channels, greater availability and coverage for aeronautical communications, reduced misunderstandings in communications during the ATS provision, and reduction in the workload of air

traffic controllers and pilots. It is also an important enabler of the trajectory-based operation (TBO) concept, among others.

1.3 The Department of Airspace Control (DECEA), through its SIRIUS BRAZIL Program, has been working in cooperation with stakeholders and the aeronautical community to operationalize CPDLC in the Brazilian continental airspace.

1.4 Brazil has implemented future air navigation system (FANS) data link services in both domestic and remote operations. The data link service has been provided since 2009 in the oceanic airspace corresponding to the flight information region (FIR)- Atlântico (SBAO): CPDLC, as the primary means of communication, and automatic dependent surveillance — contract (ADS-C) are available.

1.5 In continental airspace, Pre-FANS services departure clearance (DCL) and data link-automatic terminal information service (D-ATIS) have been available for 26 of the main national airports since 2014. Since 2021, CPDLC FANS 1/A became operational in a few FIRs of the Brazilian continental airspace. For detailed information, refer to AN-Conf/14 (IP) CPDLC Implementation in Brazil.

2. DISCUSSION

2.1 The initial operationalization of CPDLC in continental airspace occurred in given sectors, which were selected considering fleet characteristics (CPDLC capabilities already implemented in aircraft on international routes), airspace complexity and traffic flow.

2.2 In Brazil, it is not mandatory for all aircraft to be equipped with CPDLC data link avionics FANS 1/A or FANS 1/A +. There is no airspace segregation as well. Thus, CPDLC has been used in the Brazilian continental airspace in a mixed environment, that is, where ATS will be provided for aircraft with and without CPDLC capability. This mix brings flexibility, but it may also diminish the expected benefits.

2.3 For this implementation to be carried out without the need for a mandate and, at the same time, to have greater user support, awareness campaigns focusing on the benefits must be both broad and informative. In Brazil, there was reduction in radiotelephony time used and increased standardization and clarity in the communications of those crews who opted for data link communication. However, user adherence in general is still below ideal levels.

2.4 Sharing knowledge and improvements achieved with the implementations of enabling technologies foreseen in Global Air Navigation Plan (GANP) is a powerful tool for increasing awareness of the aeronautical community and boosting the equipping of aircraft with specific avionics required.

2.5 For the full recognition of the effectiveness and the benefits of using CPDLC, it is essential to establish basic and comparable indicators. Indicators/parameters, such as time saved on phraseology, reductions in misunderstandings, airspace or airport capacity improvement etc., can support States and airspace users in recognizing advantages that are aligned with what is expected in the GANP, paving the way for the ATM of the future. It would also encourage States or ANSPs in a challenging budget reality to justify the investment needed to comply with this important enabler.

2.6 In addition, the establishment of common indicators would allow to identify trends, patterns and opportunities for system or ATC provision improvement related to CPDLC communication, either locally or between ICAO States and regions.

2.7 Finally, in the timeframe in which ANSPs should accommodate ready and non-ready fleet/crew, a robust comparative scheme would encourage the airlines to boost their adherence to data link communication.

3. CONCLUSION

3.1 The Conference is invited to discuss the need to establish standardized indicators to measure the effectiveness of CPDLC implementations around the world, regarding their benefits for aviation and society, as well as its adherence to the recommended GANP, with a view to supporting the ATM of the future.

3.2 **Action:** The Conference is invited to:

- a) recognize the need to standardize indicators to measure the effectiveness of controller-pilot data link communications (CPDLC) implementations regarding their benefits for aviation; and
- b) encourage international airlines to engage in CPDLC communications to maximize the technology benefits.

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