



ICAO

**INTERNATIONAL CIVIL AVIATION ORGANIZATION**

**WESTERN AND CENTRAL AFRICA OFFICE**

**Fourteenth Meeting of the FANS I/A Interoperability Team (SAT/FIT/14)**

**Luanda, Angola, 3-4 June 2019**

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**Agenda Item 4: System performance monitoring and maintenance**

**4.2 CPDLC FREE TEXT MESSAGES**

*(Presented by ATNS)*

<b>SUMMARY</b>
This paper promotes the use of CPDLC messages and provides reasons why the use of pre-formatted CPDLC messages are preferred.
<b>REFERENCE(S):</b> ICAO GOLD doc10037, DOC 4444, Annex 10, Volume II, Chapter 8.
<b>Related ICAO Strategic Objective(s):</b>

**1. INTRODUCTION:**

This paper gives an overview of Controller Pilot Data Link Communications (CPDLC). It describes the main principles, the benefits different data link services and the basics of CPDLC operations, including related phraseology.

The goal is to provide background information for understanding the safety issues related to this technology.

**2. DISCUSSION:**

What is CPDLC? Controller Pilot Data Link Communications is a means of communication between controller and pilot, using data link for ATC communications. (ICAO Doc 4444: PANS-ATM) It is a two-way data-link system by which controllers can transmit messages to an aircraft as an alternative to voice communications.

These messages are displayed on a flight deck visual display.



CPDLC provides air-ground data communication for the ATC services.

The controllers are provided with the capability to issue ATC clearances, radio frequency assignments, and various requests for information.

The pilots are provided with the capability to respond to messages, to request/receive clearances and information, and to report information.

The pilot and the ATC are capable of exchanging messages which do not conform to defined formats (i.e. free text messages)

### **Main Principles of CPDLC Exchange**

The following underlying principles are applicable to the use of CPDLC:

- Voice and data link shall co-exist as a means of ATS communication. CPDLC is intended to be a

- supplementary means of communication to the use of voice communication.
- CPDLC shall only be used in the context of non-time-critical communications. This is for safety reasons. Users should be aware that while a voice response is generally expected in a few seconds the latency of CPDLC is usually much longer (up to several minutes).
- The provisions regarding the use of CPDLC shall respect the following standard as provided in ICAO Annex 11, Chapter 3, par. 3.5.1: “*A controlled flight shall be under the control of only one air traffic control unit at any given time*”.

### **Benefits of CPDLC**

The goal of Data Communications (CPDLC) is to improve safety and performance related to Communication, Navigation and Surveillance (CNS) / Air Traffic Management (ATM) activities. HF traffic is reduced and the poor quality of HF is no longer an issue. Standardized message set removes language barrier. No impact from solar flares like HF

- Less communication on the ATC frequency;
- Increased sector capacities;
- More pilot requests can be dealt with simultaneously;
- Reduced probability of miscommunication (e.g. due call sign confusion);
- Safer frequency changes, hence fewer loss of communication events.

The overall conclusion that can be drawn is reduced controller workload and task related stress, as well as an increase in the margin of safety as communications errors and losses are prevented.

Where ATC performance is limited by the voice radio system, CPDLC will expand the communications channel.

In addition, CPDLC will permit sharing of communications tasks and allow more productive use of seamless handoffs.

The **indirect benefits** that that can be realized using CPDLC are:

- Elimination of the requirement to employ inefficient control strategies and holding due to airspace saturation.
- Decreased aircraft delays and operating costs caused by excessive vectoring and speed control.
- An ability to effectively control an increased level of traffic within the sector.
- Increased ATC productivity.
- Increased margin of safety.
- Reduced task-induced stress for controllers.

### **CPDLC Messages**

CPDLC has two effective forms, a **predefined message set** and **free text**.

The CPDLC message set provides a fixed set of responses to clearances, information, or request message elements which correspond to standard ATC voice phraseology (such as “climb and maintain FL350”).

The controller is provided with the ability to issue **standard instructions** or requests for information.

The pilot is provided with a **standard set of responses** to these instructions or requests.

“Free Text” messages are used when information needs to be exchanged that is not conforming to these pre-defined formats.

A comprehensive CPDLC message set is contained in ICAO Doc 4444: PANS-ATM, Annex 5 and this is

supplemented by the same in the GOLD (doc 10037).

**The use of free text message elements by controllers or pilots should be avoided.**

This is intended to reduce the possibility of misinterpretation and ambiguity.

If no pre-formatted message set exists then free text can be used but has to be kept to a minimum.

Provisions concerning the use of free text message elements are contained in Annex 10, Volume II, Chapter 8.

The global communication procedures are detailed in the ICAO Provisions: Annex 10 Volume III Part 1 Chapter 3.

Let us not be left behind.....as CPDLC Is being globally implemented.

Here in ATNS, we have transitioned onto a new ATM system which benefits us in that the CPDLC message set (the pre-formatted message list is greater than our outgoing ATM system, and this will allow the ATC to use the pre-formatted messages more than free text.

The following are examples of the CPDLC system used in ATNS. These depict pre-formatted messages and well as free text messages.















**3. ACTION BY THE MEETING:**

3.1. The meeting is invited to:

- a) Take note of the contents especially the benefits that CPDLC bring.
- b) Start using pre-formatted messages and less of the free text messages (kept to a minimum).
- b) ANSPs to expedite the implementation of CPDLC, most especially the ANSPs controlling Oceanic sectors, to be in line with our Northern counterparts who employ this technology

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