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EXPLORING DATALINK IN LATIN AMERICA AND CARIBBEAN

Wednesday 25 May 2022 16:00 – 18:00 CEST





Mr. Javier Vanegas

Director Latin America and Caribbean Affairs

CANSO





Ms. Lisa Bee

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CANSO DATALINK IMPLEMENTATION TASK FORCE



DLI TF OBJECTIVE

Develop a series of webinars to aid ANSP Members in implementing data link operations (Controller-Pilot Data Link Communications (CPDLC) and Automatic Dependent Surveillance-Contract (ADS-C))

- Develop guidance, such as webinars and quick reference materials, that are available for Members to access at their convenience, to assist air navigation service providers (ANSPs) to implement data link operations (Controller-Pilot Data Link Communications (CPDLC) and Automatic Dependent Surveillance-Contract (ADS-C)) harmonized to ICAO initiatives and the ICAO ASBU framework.
- The series will highlight operational efficiencies and safety enhancements made available by data link, as well as assisting ANSPs to identify methods for reducing or eliminating FANS and ATN transfer failures.



DLI TF INITIATIVES

INITIATIVE 1: Assist ANSPs that have not yet implemented CPDLC, and where applicable, ADS-C:

- plan for implementation,
- ensure harmonization and interoperability with adjacent ANSPs,
- benefit from lessons learned by other ANSPs, and;
- plan for future enhancements.

INITIATIVE 2: Facilitate ANSPs in providing efficiency benefits through the use of data link:

- by implementing PBCS to achieve safe and efficient airspace management;
- by identifying strategies to improve efficiency in complex airspace, as well as improve arrival management/increase the arrival efficiency of long-haul flights

INITIATIVE 3: Determine interest in and topics for Regional webinars

- Assess results from CANSO 2021 Data Link Survey for further action.
- Determine regional interest/focus areas



PROGRESS

Developed initial webinar series and an implementation checklist for Member access

- Primary audience is ANSPs planning to implement or considering data link
 - o Introduce ICAO Global Operational Data Link (GOLD) Manual ed2
 - o Overview of data link operations, capabilities and benefits
 - o CPDLC and data link message handling
 - Automatic Dependent Surveillance Contract (ADS-C)
 - Data Link Planning and Implementation Readiness
 - o CANSO Data Link Implementation Checklist

Data Link Survey

- Low participation: 13 of 86 CANSO Member ANSPs
 - o 11 ANSPs that are operating data link in oceanic and/or domestic airspace
 - o 2 ANSPs that have not and are not planning to implement data link
 - No response from key ANSPs of interest, i.e., ANSPs that are considering or planning to implement data link
- Issues and suggestions are incorporated into webinars



NEXT STEPS AND CHALLENGES

Initial webinars to be scheduled

• Publication of unedited version of GOLD ed2 planned for 2022

Begin development of PBCS webinar

Respond to Regional or Member Need

Tailored workshop/webinar

Members needed

- Team members to plan and develop webinars and guidance materials
- Subject Matter Experts to present webinars

THANK YOU







Mr. Kaio Quinan

Head of Business Development ATC in the Americas

SITA





Exploring Datalink in Latin America and Caribbean

Kaio Quinan

Head of Business Development ATC Americas

Agenda

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- 1. SITA FOR AIRCRAFT
- 2. Some Customers
- 3. ATC Portfolio Summary
- 4. Americas References
- 5. CPDLC Domestic and Oceanic
- 6. Americas' Alignment of Data Link Services and Procedures
- 7. CPDLC Options
- 8. Future View
- 9. Conference in June-2022







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ATC Portfolio Summary

Services:

- Datalink Connectivity & Managed Services:
 - ✓ CPDLC (Oceanic and Domestic/Continental)
 - ✓ ADS-C
 - ✓ D-ATIS, D-VOLMET
- SATVOICE for ATC
- ADS-B/MLAT as-a-service (on demand)

Systems (Hardware + Software):

- CPDLC Standalone
- DCL System (Departure Clearance)
- D-ATIS System
- D-VOLMET System





Datalink Connectivity and Services – Americas References

FAA (USA):

- CPDLC Oceanic & <u>Domestic</u>
- ADS-C
- D-ATIS
- DCL 62 Airports

DECEA (Brazil):

- CPDLC Oceanic & Domestic (Continental)
- DCL 28 Airports
- D-ATIS/D-VOLMET 4 Airports + 1 Central System

NAV CANADA

- CPDLC Oceanic & Domestic
- ADS-C

COCESNA:

- CPDLC Oceanic
- ADS-C

EANA (Argentina):

- CPDLC Oceanic
- DCL 2 Airports

DGAC (Chile):

CPDLC Oceanic

DINACIA (Uruguay):

CPDLC Oceanic

AEROCIVIL (Colombia):

- D-ATIS/D-VOLMET
- DCL









NAV CANADA

AERONÁUTICA CIVIL









CPDLC Oceanic and Domestic





CPDLC Oceanic and Domestic – Focus Today





Datalink Connectivity and Services - Challenges

- Excessive controller and pilot workload
- Controller-pilot misunderstandings
- Transcription errors
- Non-standard phraseology
- Frequency congestion





CPDLC Oceanic and Domestic - Overview

- Controller-pilot data link communications (CPDLC) is a method by which air traffic controllers can communicate with pilots over a datalink system:
 - ✓ Using a standard message set
- Two-way data-link system
- An alternative to voice communications (VHF and HF)
- Transmit messages such as clearance/information/request messages Note : "free text" capability is also provided







CPDLC - Operational Benefits

- Helps to maintain and increase air navigation services safety and efficiency during all flight phases.
- Reduce controller-pilot misunderstandings, independent and secure channel, transmitting clear messages
- $\checkmark\,$ Overcomes issues with VHF and HF voice operations
 - Frequency Congestions
 - Backup for Voice
- Facilitates standard phraseology through use a standard message set
- ✓ Could potentially reduce flight delays





Americas' Alignment of Data Link Services and Procedures





Americas' Alignment of Data Link Services and Procedures



Operational or under implementation



Americas' Alignment of Data Link Services and Procedures



CPDLC Options



FOR AIRCRAFT



Exploring Datalink in Latin America and Caribbean













21 – 23 JUNE 2022 | RECINTO FERIAL IFEMA MADRID MADRID, SPAIN



STAND Nº 337



Thank you!

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Capt. Marcelo Fagundes

CNS Planning Sector Deputy Chief, Department of Airspace Control DECEA





CPDLC IMPLEMENTATION IN THE BRAZILIAN CONTINENTAL AIRSPACE

E PROGRE

DEM

Best Practices



SUMMARY

- LANDELL Project Implementation Schedule
- Continental CPDLC Expansion Schedule
- Best Practices



LANDELL PROJECT

"The New Age of Aeronautical Communications in Brazil"

Scope

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- FIR RE: Sectors 1-6, 9 and 10
- FIR AZ: Sectors 1-5 (Belem Region)



- VDLM0/A, VDLm2, SATCOM
- FL 250 ↑
- Mixed Communication Environment





CPDLC EXPANSION PROJECT IN BRAZIL

<u>Next Moves</u>









What to do

 Search for international best practice references for the implementation of CPDLC in domestic airspace

Why

• Increase work efficiency




- A phased operationalization (I):
- Define a CPDLC operationalization prototype scenario, before full operationalization in all continental airspace
- Consider airspace characteristics and complexities, air traffic volume, number of aircraft already equipped with CPDLC...

Why

 The phasing considering less complex sectors and sectors with full ATS surveillance availability allows operators and ATCOs to gradually adapt to the new operational standard







- A phased operationalization (II):
- Phase the CPDLC implementation by operating hours, starting with the time of lower traffic volume.
- Use at least one month for transition between phases (this can change according to ATCO feedback and results obtained)



Why

- Advantages of reducing the workload, diverting attention and disorientation during the provision of the ATC service
- Gradually integrate the datalink application into the operating environment while performing additional technical tests and evaluations
- Facilitate ATCO assimilation





• Introduce the CPDLC Simulation tools ASAP in the Project



ATC

Piloting

Why

- ATC Data Treatment and Visualization Systems evaluation (HMI and features)
- ATCO basic and advanced training
- Validation of system adjustments and regulatory framework





 Involve technical personnel and ATCO system developers since the very beginning of the project

Why

• They can gather knowledge as it is developed.



System Developers



CSP Representatives





 Involve operational personnel (ATCO) from development to validation of new CPDLC requirements for the ATC system



The ATCOs and the System Developers

Why

- Develop a robust ATC system, coherent with the reality experienced within the ACC
- ATCOs will use the system and should help decide how that system should work
- Ensure that the product is developed as requested and that the performance of the datalink system is as required





• Evaluate the advantage of develop a specific training course for the initial implementation



Theory



Practice

Why

- To create critical mass and use doctrine
- Train the trainer
- Greater efficiency in the assimilation of the new concept of communications
- Reduces ATCO resistance





- Training Strategy:
- Specific initial training course +
- Real-time simulation training +
- Pre-operational theoretical reviews

Why

- To ensure the ATCOs to be fully adapted to the use of the new datalink application operation
- Obtain valuable contributions (suggestions, identification of regulatory gaps, etc.) from ATCOs



There is still time for adjustments!





Why

- Evaluate the need to maintain the CPDLC training course AFTER the initial implementation
- Evaluate the advantage of introducing CPDLC information in the ATCO graduation course.
- After the initial implementation, the number of ATCO needing the course will be reduced dramatically
- Training may be conducted locally (in the ATC unit)
- To allow new ATCO to get to the ATC units already knowing the CPDLC





- Proof of Concept
- Scaled-down controlled environment
- Adoption of all operational procedures prescribed in the rules published by the ANSP



Technical-operational Proof of Concept

Why

- Evaluation of technical and operational indicators: demonstrate in practice the operational concepts and technical provisions developed in the Project
- Identify unforeseen issues in order to mitigate and/or correct them before the start of the operation



There is still time for adjustments!





Why

- Implement CPDLC monitoring systems
- Implement transaction time alerts (based on the operational time limit established)
- Train the ATCO to know what to do when a transaction time alert is issued
- Train the ATCO to recognize situations when it is not possible to wait for the transaction time alert (after a clearance or instruction message is sent)

• ATCO must be aware when a message takes too long to be answered

• Longer transaction time can impact safety

- ATCO must know the system response to an alert and what to do after it is issued.
- ATCO must know when to change to voice and when not to wait for the transaction time alert





- Include the aeronautical community and users from the beginning of the project
- Disseminate the technology and project planning
- Workshops
- o Seminars
- Reports
- Webinars and Institutional Videos

Why

- Collaborative Decision Making
- Keep all stakeholders informed about the project evolution





SUMMARY

- LANDELL Project Implementation Schedule
- Continental CPDLC Expansion Schedule
- Best Practices



CPDLC IMPLEMENTATION IN THE BRAZILIAN CONTINENTAL AIRSPACE

Best Practices

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Department of Airspace Control

THANK YOU







Mr. John Roman

Program Operations Field Manager

FAA

FAA Data Link Implementation

Presented to: CANSO: Exploring Datalink in Latin America and Caribbean

By: John Roman

Date: May 25, 2022



Federal Aviation Administration

CPDLC In Oceanic Airspace

- FAA began implementing Controller Pilot Data Link Communications (CPDLC) for oceanic airspace in 1996.
- CPDLC provided the immediate benefit of reduced end-to-end communication transactions.
 - HF communications: Measured in minutes
 - CPDLC communications: Measured in seconds



CPDLC In Oceanic Airspace

- Advanced Technologies and Oceanic Procedures (ATOP) System (2005):
 - Automated Conflict Prediction and Reporting (CPAR)
 - ADS-C Position Reporting
 - Frequency of position reports
 - Position accuracy and intent data
 - Supports Global Tracking Initiatives
 - AF447
 - MH370



Data Link Efficiency Improvement

Reduced Separation Minima:

- 10 minutes
- 50 nautical miles
- 30 nautical miles
- 23 nautical miles
- 20 nautical miles

Advanced Procedures:

- ADS-C Climb/Descent Procedure (CDP)
- ADS-B In-Trail Procedure (ITP)



Data Link Efficiency Improvement

Route Efficiencies:

- Optimization of route structures
- Elimination of mandatory route filing
 - Pacific Organized Track System (PACOTS)
- User Preferred Routes (UPR)
- Dynamic Airborne Reroute Procedure (DARP)
- Altitude Efficiencies:
 - Ability to approve altitude clearance requests
 - More aircraft flying at optimum altitudes



Aircraft Equipage – Datalink / RNP





Federal Aviation Administration

Outage Example – 2/20/2020





Federal Aviation Administration

United States Domestic CPDLC

- The United States Data Link Communications Program completed its "Departure Clearance" rollout at 62 airports in 2016-2019.
- FANS 1/A Controller-Pilot Datalink
 Communications (CPDLC) is used to deliver
 ATC clearances to aircraft prior to departure.



United States Domestic CPDLC

- The FAA will continue the rollout of its domestic En-Route data link communications capability to the 20 Air Route Traffic Control Centres serving the contiguous United States.
- A rollout schedule is being planned.



En-Route Initial Services Waterfall



Limited Site Testing





Federal Aviation Administration

En-Route Initial Services

- Transfer of Communications
- Altitude Clearances
- Altimeters
- Route Clearances
- Pilot Initiated Downlinks
- Emergency Messages



Questions?





Federal Aviation Administration

THANK YOU







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Controller Pilot Data Link Communications

(CPDLC)



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<u>Controller Pilot Data Link Communications</u> (CPDLC)

- CPDLC application allows data link communications between controllers and pilots.
- ❑ CPDLC application provides the capability to establish, manage, and terminate CPDLC dialogues between ATS ground and aircraft system peers. Once a dialogue is established, CPDLC provides for controller/pilot message exchange. The CPDLC application supports a variety of operational data link services, depending upon the CPDLC message and operational procedures applied.



Main Purpose

Reduction of voice channel congestion and increase of capacity in domestic airspace,

Improvement of communication and surveillance in airspace where procedural separation is being applied.



Depending on the specific implementations, other advantages associated with CPDLC include

- □ in certain airspace, direct controller-pilot communications (DCPC) where it was not previously available;
- □ allowing the flight crew to print messages;
- □ allowing messages to be stored and reviewed as needed;
- reducing flight crew-input errors by allowing the loading of information from specific uplink messages, such as route clearances or frequency change instructions, into other aircraft systems, such as the FMS or radios;
- allowing the flight crew to request complex route clearances, which the controller can respond to without having to manually enter a long string of coordinates;
- reducing flight crew workload by supporting automatically transmitted reports when a specific event occurs, such as crossing a waypoint and the loading of clearance information directly into the flight management system; and
- reducing controller workload by providing automatic flight plan updates when specific downlink messages (and responses to some uplink messages) are received.









	Communication service
Enabler Type	
Enabler Name	CPDLC procedures and monitoring
Description / References	 Requirements and guidance to support deployment of CPDLC operations, such as : Annex 10 Vol II ICAO Doc 4444, Procedures for Air Navigation Services Air Traffic Management ICAO Doc 10037 Edition 1 Global Operational Datalink Manual (GOLD)
Stakeholders	ANSP, Aircraft manufacturer, Aircraft operator



O CAPACITY & EFFICIENCY Airborne system capability

Enabler Type	Communication service
Enabler Name	FANS 1/A CPDLC aircraft system
Description / References	Technical standards to ensure operational and technical interoperability, such as : Annex 10 Vol II ED100/D0258 FANS 1/A Interoperability Requirements
Stakeholders	Aircraft manufacturer, Aircraft operator

For procedural airspaces, **FANS 1/A CPDLC services** provide management of the ATC data link and voice communications, exchange of an extensive set of ATC clearance and requests, reporting of aircraft derived information (including Position Reporting). The vast majority of FANS 1/A aircraft support automatic integration of CPDLC instructions into the aircraft Flight Management System (even though implementations are not harmonized across the fleet due to lack of standardization).


CAPACITY & EFFICIENCY Airborne system capability

Enabler Type	Communication service
Enabler Name	ATN B1 CPDLC aircraft system
Description / References	Technical standards to ensure operational and technical interoperability, such as : Annex 10 Vol II ED100/DO258 FANS 1/A Interoperability Requirements
Stakeholders	Aircraft manufacturer, Aircraft operator

For domestic airspaces, **ATN B1 CPDLC services** provide management of the ATC data link and voice communications, check of ATC microphone stuck and exchange of a limited set of ATC clearances and requests. The vast majority of ATN B1 aircraft do not support any automatic integration of CPDLC instructions into the aircraft Flight Management System.



ICAO CAPACITY & EFFICIENCY Ground system infrastructure

Enabler Type	Communication service
Enabler Name	FANS 1/A CPDLC aircraft system
Description / References	Technical standards to ensure operational and technical interoperability, such as : Annex 10 Vol II ED100/D0258 FANS 1/A Interoperability Requirements
Stakeholders	ANSP, Ground systems supplier



ICAO CAPACITY & EFFICIENCY Airborne system capability

Enabler Type	Communication service
Enabler Name	ATN B1 CPDLC aircraft system
Description / References	Technical standards to ensure operational and technical interoperability, such as : Annex 10 Vol II ED100/DO258 FANS 1/A Interoperability Requirements
Stakeholders	ANSP, Ground systems supplier





Enabler Type	Communication service
Enabler Name	Training requirements for CPDLC (FANS 1/A & ATN B1) for domestic and procedural airspace.
Description / References	 Flight Crew Training Maintenance and Flight Operations Training Controllers training ICAO Doc 10037 Global Operational Data link Manual (GOLD)
Stakeholders	ANSP Aircraft manufacturer Aircraft operator



Regulatory Provisions

Enabler Type	Equipage requirements or/and mandates
Enabler Name	CPDLC Requirements and/or mandates
Description / References	Airspace requirements and separation standards, with associated means of compliance. References: Amendment of Regional Supplementary Procedures – Doc 7030.
Stakeholders	ANSP CAA Aircraft operator



Regulatory Provisions

Enabler Type	SMS
Enabler Name	CPDLC Safety Management System
Description / References	Requirements to support local safety cases. References: Annex 19 Annex 11 PANS ATM 4444
Stakeholders	ANSP



ICAO CAPACITY & EFFICIENCY

International Standards and Recommended Practices and Procedures for Air Navigation Services

Annex 10 to the Convention on International Civil Aviation

Aeronautical Telecommunications

Volume II

Communication Procedures including those with PANS status Seventh Edition, July 2016



This edition supervisides, on 12 November 2016, all previous editions of Annes 10, Volume II.

For information regarding the applicability of the Standards and Recommended. Practices and the Procedures for Air Navigation Services, see Foreword.

INTERNATIONAL CIVIL AVIATION ORGANIZATION

Aeronautical Mobile Service — Data Link Communications



DAPPENDIX 2 ITEM 10: EQUIPMENT AND CAPABILITIES DAPPENDIX 5 Controller-pilot data link communications (CPDLC) message set.



Doc 4444 PROCEDURES FOR AIR NAVIGATION SERVICES Air Traffic Management Sixteenth Edition, 2016

This edition supersedes, on 10 November 2016, all previous editions of Doc 4444.

INTERNATIONAL CIVIL AVIATION ORGANIZATION



ICAO CAPACITY & EFFICIENCY



This manual provides guidance and information concerning data link operations and is intended to facilitate the uniform application of Standards and Recommended Practices (SARPs) contained in:

Annex 2 — Rules of the Air

Annex 10 — Aeronautical telecommunications

Annex 11 — Air Traffic Services

the provisions in the Procedures for Air Navigation Services — Air Traffic Management (PANS-ATM) (Doc 4444) and;

when applicable, the Regional Supplementary Procedures (Doc 7030).



Doc 10037

Global Operational Data Link (GOLD) Manual

First Edition, 2017



Approved by and published under the authority of the Secretary General

INTERNATIONAL CIVIL AVIATION ORGANIZATION





□ Main industry standards describing the operation of FANS-1/A products are <u>ARINC</u> 622 and <u>EUROCAE</u> ED-100/<u>RTCA</u> DO-258.



FANS 1/A Interoperability Requirements

Data Link Communication Data link over a satellite system significantly improves communication clarity between the pilot and ATC.









INTERNATIONAL CIVIL AVIATION ORGANIZATION

A UN SPECIALIZED AGENCY

THANK YOU







Mr. Bill Middleswart

Safety Programme Manager

CANSO





QUESTIONS AND ANSWERS





Mr. Bill Middleswart

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THANK YOU

