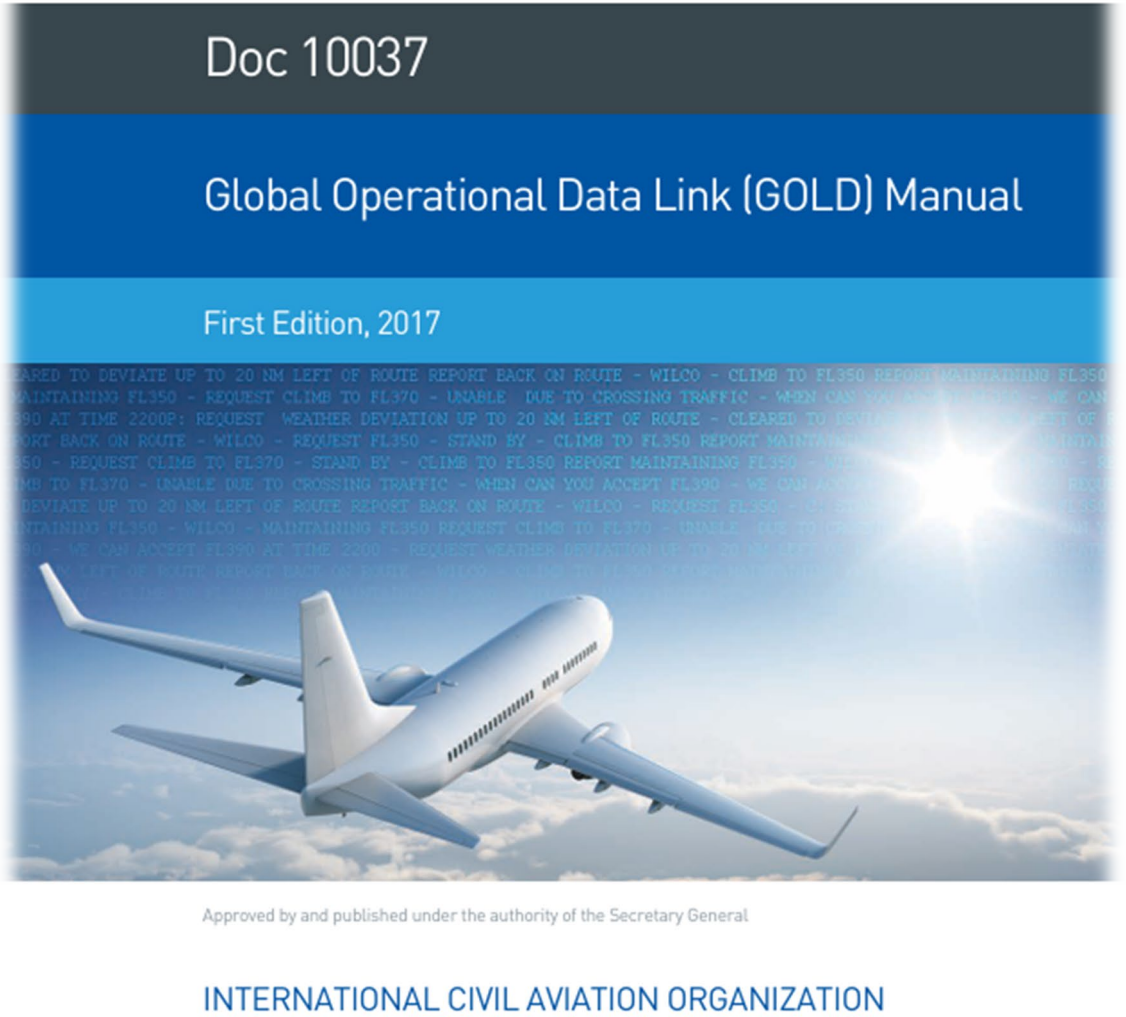
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ICAO DOC 10037

Global Operational Data Link (GOLD) Manual

Data link operations for technical and operational staff: DLIC, CPDLC, ADS-C and performance-based requirements

FANS 1/A | ATN B1 | CPDLC | ADS-C



OVERVIEW

One global manual for data link operations

Purpose

- Guidance on ATS data link service provision, operator readiness, and controller and flight crew procedures
- Supports uniform application of SARPs in Annexes 2, 10 and 11, PANS-ATM (Doc 4444) and, where applicable, Regional Supplementary Procedures (Doc 7030)
- Promotes seamless, interoperable data link operations worldwide, improving safety and maximizing operational benefits



Technologies

FANS 1/A and ATN B1



Applications

DLIC, CPDLC and ADS-C, plus CPDLC for the ADS-B in-trail procedure (ITP)



Audience

Regulators, airspace planners, aircraft operators, flight crews and controllers

BACKGROUND

From three regional documents to one global manual

APAC

FANS 1/A Operations Manual

Asia-Pacific

NAT

Guidance Material for ATS Data Link Services

North Atlantic airspace

EUR

LINK2000+ Guidance Material

ATN B1 baseline

GOLD, 2nd edition

26 April 2013

Issued by the GOLD ad hoc Working Group for the regional planning groups: APANPIRG, NAT SPG, EANPG, SAM/IG and APIRG

Available through the ICAO regional offices

ICAO Doc 10037

First Edition, 2017

Supersedes Doc 9694 (Manual of ATS Data Link Applications):

- Part II (DLIC)
- Part III (ADS-C)
- Part IV (CPDLC)

Published in English only

STRUCTURE

Six chapters, each aimed at a specific role

1 Overview

Data link operations: operational capabilities, systems and services

All staff

2 Administrative provisions

Service provision, operator considerations for usage, and flight planning

Regulators, providers, operators

3 Controller and radio operator procedures

CPDLC and ADS-C procedures for the ground side

Controllers, radio operators

4 Flight crew procedures

CPDLC and ADS-C procedures for the flight deck

Flight crews, operators

5 Advanced ATS

Re-route procedures, tailored arrivals and the in-trail procedure (ITP)

Controllers, flight crews

6 State aircraft

Data link operations for State aircraft

State operators, ATS

Three applications on two technology baselines

DLIC

Data Link Initiation Capability

The logon that exchanges aircraft and ATSU information so data link applications can start

CPDLC

Controller-Pilot Data Link Communications

Text-message dialogue for clearances, requests and reports between controller and pilot

ADS-C

Automatic Dependent Surveillance - Contract

The aircraft automatically reports position and related data under contracts set by the ATS unit

	FANS 1/A	ATN B1
Heritage	APAC FANS 1/A Operations Manual and NAT guidance	EUR LINK2000+ guidance
Typical use	Oceanic and remote airspace	Continental airspace
Data path	ACARS-based messaging over VHF, SATCOM and HF	ATN over VDL Mode 2
Applications	DLIC, CPDLC and ADS-C	DLIC and CPDLC

SYSTEM VIEW

How a data link message travels

Aircraft

- Avionics and data link applications
- CPDLC and ADS-C functions
- Crew displays, alerts and message log

Communication network

- Subnetworks: VHF, SATCOM, HF (FANS 1/A) and VDL Mode 2 (ATN B1)
- Message routing between aircraft and ATSU
- Availability and message delay

ATS unit

- Ground ATS system and flight data processing
- Controller working position
- Transfer of data link to the next ATSU

Every link in this chain contributes to the end-to-end performance that RCP and RSP specifications measure.

Logon and connection: from flight plan to transfer

1

File

Flight plan shows data link capability and aircraft identification

2

Log on

Crew sends logon to the ATSU using its ICAO facility designator

3

Correlate

ATSU matches logon data with the flight plan and accepts or rejects it

4

Connect

CPDLC connection is established and ADS-C contracts are set up

5

Transfer

Next data authority is designated and the connection moves to the next ATSU

Typical causes of a failed logon

Flight ID or registration differs from the flight plan

Wrong or outdated ATSU facility designator

Logon sent outside the expected time window

A closed-loop dialogue between controller and pilot

Example exchange

UPLINK | controller to pilot

CLIMB TO FL360

DOWNLINK | pilot to controller

WILCO

- The dialogue closes when the final response is received
- Standard message elements first; free text only when none fits

Response	Meaning
WILCO	Instruction understood and will be complied with
UNABLE	Instruction cannot be complied with
STANDBY	Request received and being assessed; dialogue stays open until a further response
ROGER	Message received and understood; not a response to a clearance
AFFIRM / NEGATIVE	Yes or no answer to a question

Position and intent reports under contract

Periodic contract

Reports sent at an interval set by the ATS unit

Demand contract

A single report sent when the ATS unit asks for it

Event contract

Reports triggered by events such as a waypoint change, lateral deviation or vertical range change

Emergency mode

Reports flagged as emergency when activated, so the ATS unit sees the situation at once

Data groups a report can carry

- Basic
- Flight identification
- Earth reference
- Air reference
- Meteorological
- Predicted route

The contract defines which groups and how often. Technical staff should know what each ATS unit requests.

Performance-based requirements: RCP and RSP

240

RCP 240

Communication

400

RCP 400

Communication

180

RSP 180

Surveillance

400

RSP 400

Surveillance

What this means for staff

- The number is the performance limit, in seconds
- RCP covers the time to complete a CPDLC transaction; RSP covers delivery of surveillance data
- Operators need authorization for PBCS-based operations
- ATS providers monitor actual performance against the specification
- Specified in the PBCS Manual (Doc 9869); GOLD gives the operational guidance

Controller and radio operator procedures

Before	Confirm the data link connection and that aircraft identification matches the flight plan
Issue	Use standard message elements and keep clearances concise and unambiguous
Monitor	Track open dialogues until closed; follow up late or missing responses, by voice if needed
ADS-C	Set contracts suited to the service and check reports against the flight plan and clearances
Transfer	Designate the next data authority and make sure the connection moves at the boundary

Flight crew procedures: do and avoid

Do

- Log on to the correct ATSU and confirm the connection before it is needed
- Read the whole uplink message before responding
- Respond WILCO only if you will comply; otherwise UNABLE
- Check clearances against the flight plan; use voice when time is critical
- Keep ADS-C armed unless instructed otherwise

Avoid

- Replying ROGER to a clearance
- Acting as if a clearance is accepted before the dialogue is closed
- Leaving a STANDBY without a final response
- Using free text for routine requests

When data link does not work as expected



Data link failure

- Revert to voice communications
- Tell the other party the data link is unavailable
- Re-establish the connection when practicable



Doubt about a message

- Confirm the content by voice
- Do not act on an uplink you cannot verify
- Close the dialogue once clarified



Reporting problems

- Record flight ID, registration, ATSU and times
- Keep the message text and any error
- Send it to the ATS provider or monitoring agency

Voice remains the backup for every data link service. Reported problems help find systemic faults.

Advanced ATS supported by data link

Re-route procedures

Route changes delivered by CPDLC for the crew to review, load and accept

Tailored arrivals

Pre-planned arrival profiles delivered by data link to support efficient descents

In-trail procedure (ITP)

CPDLC used with ADS-B information to request and approve a level change relative to other traffic

State aircraft

Data link operations for State aircraft, covered in Chapter 6

These services build on the basics: a working logon, CPDLC dialogue and ADS-C reporting.

Two perspectives on ADS-C/CPDLC implementation

TECHNICAL | CNS

Technical Summary – CNS Perspective

ADS-C/CPDLC System Architecture, Interoperability and Technical Implementation Requirements

Aircraft, CSPs and ANSPs: network infrastructure, interoperability and technical requirements

GOLD: Ch. 1 §1.1–1.2 | Ch. 2 §2.1 | Appendix A

OPERATIONAL | ATM

Operational Summary – ATM Perspective

ADS-C/CPDLC Operational Procedures, Air Traffic Management and Regional Harmonization

Controllers and pilots: operational procedures, ATM and regional harmonization

GOLD: Ch. 2 §2.1–2.3 | Ch. 3 §3.1–3.10 | Ch. 4 | Ch. 5

Based on ICAO Doc 10037, First Edition (2017). Introductory material for the CAR Regional ADS-C/CPDLC Implementation Workshop, 9–11 November 2026.

An integrated infrastructure links aircraft, CSPs and ANSPs

Aircraft

- Data link capability: FANS 1/A or ATN B1
- ADS-C and CPDLC applications
- Aircraft capabilities assessed during implementation

Communication Service Providers

- Communication networks linking aircraft and ground
- Network availability
- Coordination with CSPs is a regional priority

Air Navigation Service Providers

- ATS automation integration
- Message processing, monitoring and recording
- Interfaces with adjacent FIRs

Doc 10037 covers FANS 1/A and ATN B1, interoperability, communication networks, data link initiation, connection management and the exchange of operational information.

What technical implementation requires

Evaluate

- Aircraft and ground-system capabilities
- ATS automation integration
- Communication network availability
- Message processing
- System redundancy
- Interfaces between adjacent FIRs for seamless data exchange

Configure and assure

- ADS-C contracts
- CPDLC connections
- Technical performance requirements
- Monitoring and recording
- System testing
- Contingency arrangements

Technical priorities for the CAR Region

Assess	Review existing CNS infrastructure and ground-system capabilities
Identify	Find interoperability gaps between systems and adjacent FIRs
Coordinate	Work with Communication Service Providers (CSPs)
Validate	Check ground-system interfaces before deployment
Establish	Define technical requirements for reliable regional deployment

Relevant GOLD Manual references: Chapter 1, Sections 1.1–1.2; Chapter 2, Section 2.1; Appendix A

Safer, more efficient ATM through ADS-C and CPDLC

ADS-C

Automated aircraft surveillance reporting

The aircraft reports automatically under contracts set by the ATS unit.

CPDLC

Structured digital communications

Controllers and pilots exchange structured messages; voice remains an alternative or complement.

Oceanic and remote airspace

Where conventional surveillance and voice communications may be limited, ADS-C and CPDLC are particularly valuable.

Goal: safer and more efficient air traffic management

What Doc 10037 covers on the operational side

- CPDLC logon and connection management
- Standard message exchanges
- ATC clearances
- Transfer of communications between ATS units
- ADS-C periodic, event and demand contracts
- Controller and flight crew responsibilities
- Separation applications
- Emergency procedures and abnormal situations
- Voice as an alternative or complement to data link

Operational priorities for the CAR Region

1. Harmonized ATC procedures
2. Coordination between adjacent FIRs
3. Identification of operational scenarios
4. Controller and pilot training
5. Safety assessments
6. Regional operational requirements

Operational needs of

Incorporating FAA experience and lessons learned to support a coordinated regional implementation roadmap.

- Mexico
- COCESNA
- Curaçao
- Trinidad and Tobago

GOLD Manual references by perspective

Perspective	GOLD Manual reference	Focus
Technical (CNS)	**Chapter 1, Sections 1.1–1.2**	Overview of data link operations, systems and services
Technical (CNS)	**Chapter 2, Section 2.1**	Administrative provisions: service provision
Technical (CNS)	**Appendix A**	Supplementary technical material
Operational (ATM)	**Chapter 2, Sections 2.1–2.3**	Administrative provisions: service provision, operator usage, flight planning
Operational (ATM)	**Chapter 3, Sections 3.1–3.10**	Controller and radio operator procedures for CPDLC and ADS-C
Operational (ATM)	**Chapter 4**	Flight crew procedures for CPDLC and ADS-C
Operational (ATM)	**Chapter 5**	Advanced ATS: re-route procedures, tailored arrivals and ITP

1. **One global reference**
   Doc 10037 covers DLIC, CPDLC and ADS-C for FANS 1/A and ATN B1

2. **Know your chapter**
   Ground staff: Chapter 3. Flight crews: Chapter 4. Planners and operators: Chapter 2

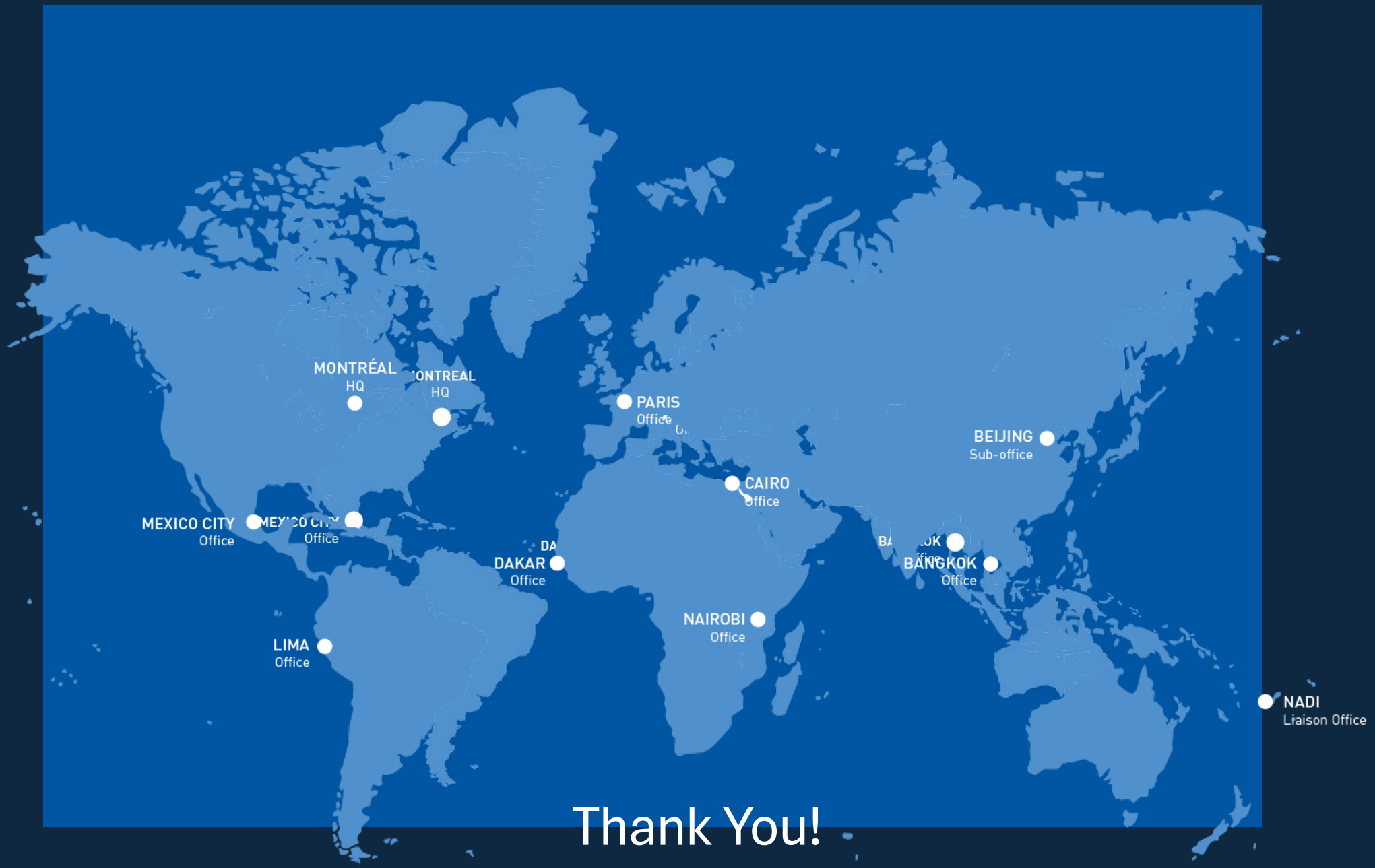
3. **Performance counts**
   RCP and RSP limits define how fast the whole chain must perform

4. **Voice is the backup**
   Revert when data link fails, and report the problem

Next steps

- Obtain the current edition of Doc 10037 from ICAO
- Check State and regional supplements, such as Doc 7030 and the AIP
- Review local procedures against Chapters 3 and 4
- Set up a route for reporting data link problems

Technical – CNS	Operational – ATM
Communications infrastructure and connectivity	ATC procedures and operational applications
FANS 1/A and ATN B1 interoperability	CPDLC messages and clearances
Aircraft–CSP–ANSP architecture	Controller–pilot interaction
ADS-C contract configuration and system interfaces	ADS-C reporting and surveillance use
Network performance, monitoring and redundancy	Separation, safety and contingency procedures
Integration, validation and technical testing	FIR coordination and operational training


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Liaison Office

Thank You!