



Operator Requirements

Global Operational Data Link (GOLD)
Familiarization with Performance Based Communications
and Surveillance (PBCS) Workshop
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FAA



Federal Aviation
Administration

Overview

- Operator Preparation
- Initial Use/Compliance
 - Continued Compliance
- Maintenance
- Failures
- Flight Planning
- Training: Operator and Flight Crews
- Summary

One Slide Summary of ICAO PBCS Provision

State, ANSP **and** Operator **each have responsibility**

In accordance with the ICAO PBCS Provision, State	In accordance with State policies	
	ANSP	Operator
<ul style="list-style-type: none"><input type="checkbox"/> Establishes PBCS policies for ANSP, operator, airworthiness, etc.<input type="checkbox"/> Prescribes RCP/RSP specifications in the applicable airspace for the relevant operations<input type="checkbox"/> Publishes PBCS requirements in aeronautical information publication (AIP)	<ul style="list-style-type: none"><input type="checkbox"/> Provides RCP/RSP-compliant air traffic services*<input type="checkbox"/> Recognizes RCP/RSP capabilities in air traffic control (ATC) automation<input type="checkbox"/> Establishes PBCS monitoring program	<ul style="list-style-type: none"><input type="checkbox"/> Prepares to file RCP/RSP capabilities in flight plan<input type="checkbox"/> Participates in ANSP PBCS monitoring programs

* RCP/RSP specifications include allocated criteria to the communication service provider (CSP). These criteria are applied to the CSP through service agreements with the ANSP and/or operator.

Operator Preparation Overview

- Operator should prepare to use CPDLC and ADS-C in accordance with **policies established by the State of Registry or State of the Operator**
- **GOLD provides a resource** for both the **States** to establish its policy and the **operator** to prepare for using CPDLC and ADS-C
- Other documentation, such as that which is specific to the aircraft type and data link equipment, will also be relevant to operator preparation (e.g. design approval, user manual, flight manual)
- So what's new? Good preparation will ensure a successful program and that CPDLC / ADS-C will be effective for pilots to do their job

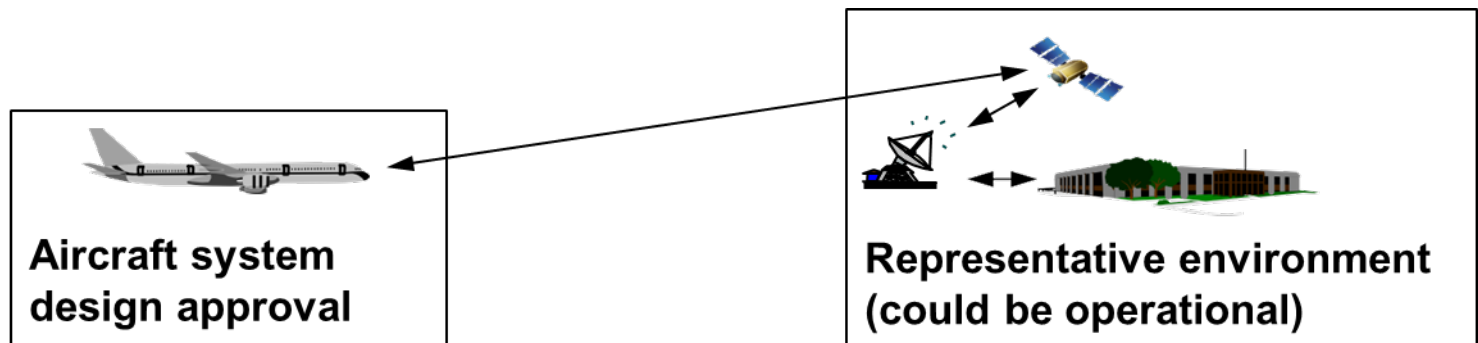
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Initial Compliance – Aircraft/Avionics

➤ **Aircraft/avionics manufacturer obtains design approval in accordance with State policies (State of Design and State of Manufacture); ensures avionics meet allocated interoperability and RCP – RSP criteria**

- Aircraft/avionics manufacturer shows operational performance with a representative ATS system
- Flight manual and master minimum equipment list (MMEL)
- Compliance cannot be practically exhaustive



Initial Compliance – Operator

Doc 9869 PBCS Manual Paragraph 4.3.4

- Operator determines eligibility in accordance with State policies (State of the Operator or State of Registry); ensures operations and maintenance meet allocated interoperability and RCP – RSP criteria
 - Aircraft system approval for the intended use
 - Flight crew training and qualification
 - Minimum equipment list (MEL)
 - Maintenance, such as user modifiable software used to establish airline policies for the management of communication media
 - Service agreements with the CSP(s)/SSP(s)
 - Procedures for submitting problem reports and data to the PBCS monitoring programme

Operator Considerations: Initial Use of CPDLC

GOLD Doc 10037 Paragraph 2.2.1

- An operator intending to use CPDLC or ADS-C should ensure necessary **approvals** have been obtained from **State of Registry or State of Operator**, if applicable.
- The operator should also ensure that **aircraft equipment** has been **approved** for the intended use per interoperability standards and **in accordance** with **airworthiness requirements** and related means of compliance.
- The operator should **establish policy and procedures** for flight crews and flight operations officers/dispatchers involved in data link operations, taking into account the flight manual and the MEL, and **incorporate them in appropriate operations manuals**.

Continued Compliance

- Aircraft types/systems in an operator's fleet normally perform acceptably in accordance with maintenance and operations specifications (e.g. configured avionics, CSP/SSP, area(s) of operation), BUT...
- If non-compliant, the State of the Operator or State of Registry
 - Provides operator with a notice to improve performance
 - If non-compliance is not corrected, removes the RCP [X] and/or RSP [Y] eligibility status
 - The operator may still use CPDLC and ADS-C, but specified aircraft types within its fleet or individual airframe would not be eligible for any ATM operation predicated on RCP [X] and/or RSP [Y]

RCP240/RSP180 Specifications

Aircraft Operator

1. Transaction time/data delivery time and continuity
 - Responsible for aircraft system allocation and CSP allocation via contract/agreement/charter
2. Availability:
 - Responsible for aircraft system and CSP via contract/agreement/charter
3. Integrity: Malfunction = 10^{-5} per flight hour
4. Monitoring and alerting criteria:

RCP monitoring and alerting criteria		
Specification: RCP 240/D	Application: CPDLC	Component: Aircraft operator
Ref:	Criteria	Compliance means
MA-2	When the flight crew determines that the aircraft communication capability no longer meets the requirements for the intended function, the flight crew shall advise the ATS unit concerned.	Procedures, flight crew training and qualification.

RCP240/RSP180 Specifications Aircraft Operator (2)

RCP related safety requirements

Specification: RCP 240/D, RSP180/D			Application: CPDLC, ADS-C			Component: Aircraft operator		
Ref:	Related RCP parameter	Safety requirement						
SR-22 (Operator)	C, I	The flight crew shall perform the initiation data link procedure again with any change of the flight identifier.						
SR-24 (Operator)	C, I	The flight crew shall respond to a message in its entirety, when not responded by the aircraft system.						
SR-27 (Operator)	C, I	The aircraft and/or flight crew shall ensure the correct transfer into or out of the aircraft's FMS of route data received/sent via data link to be used to define the active flight plan.						

Operator Considerations: Maintenance

GOLD Doc 10037 Paragraph 2.2.1.5-6

- From time to time aircraft manufacturers release new software which will often **rectify in service issues** and may add increased functionality.
 - The operator should **update their software** as new releases become available to ensure best possible performance.
- The **operator should ensure that their CSP(s) meets** the performance criteria for communication services, in accordance with ICAO Doc 9869 and notifies them and appropriate ANSPs when data communication services as prescribed for the intended operations cannot be provided
 - More discussion concerning the “Charter”

Operator Considerations: Failures and Outages

GOLD Doc 10037 Paragraph 2.2.1.7-8

- The operator should ensure that **flight operations**, the **flight crews** and the **appropriate ANSPs are notified of failures** with the aircraft equipment or the operator's AOC system related to data link operations.
- The **operator should provide** flight operations officer/dispatcher and the flight crew with **procedures**, as appropriate, **when** the following occurs:
 - The **operator is notified of data link system failures** per paragraph 2.2.1.7; or
 - The AOC system or **aircraft equipment fails** such that the aircraft capability can no longer meet the performance specifications (prescribed in ICAO Doc 9869 for the intended operation.)

Operator Considerations: Flight Planning

GOLD Doc 10037 Paragraph 2.3

- When filing data link capability, the operator should ensure that the planned **use of data link** for the flight will be in accordance with regulations, policies and procedures applicable in individual States and/or **FIRs for the flight, as published** in documents such as regional supplementary (SUPPs) procedures and AIPs (or other appropriate publications).

Note.— Refer to paragraph 2.2 for guidance on operator eligibility to participate CPDLC and ADSC operations.

- The operator should ensure that the **proper information** is included in the **ICAO flight plan**.

Note.— Refer to ICAO Doc 4444, Appendix 2, for flight plan requirements.

Operator Considerations: Flight Planning

GOLD Doc 10037 Table 2-2

Item 10a - CPDLC equipment and capabilities	Descriptor
CPDLC ATN VDL Mode 2 (ATN B1)	J1
CPDLC FANS 1/A HF DL	J2
CPDLC FANS 1/A VDL Mode 0/A	J3
CPDLC FANS 1/A VDL Mode 2	J4
CPDLC FANS 1/A SATCOM (INMARSAT)	J5
CPDLC FANS 1/A SATCOM (MTSAT)	J6
CPDLC FANS 1/A SATCOM (Iridium)	J7

Item 10b – ADS-C equipment and capabilities	Descriptor
ADS-C with FANS 1/A capabilities	D1
ADS-C with ATN capabilities	G1

In Item 10 of the flight plan, the operator should insert one or more of the descriptors, as appropriate, listed in Table 2-2, to identify an aircraft's data link equipment and capabilities:

Operator Considerations: CPDLC FP Information

GOLD Doc 10037 Paragraph 2.3.2.2

- In Item 18 of the flight plan, the operator should insert the following other information relevant to CPDLC and ADS-C equipment and capabilities:
 - the indicator REG/ followed by the aircraft registration;
 - the indicator CODE/ followed by the aircraft address expressed in the form of an alphanumeric code of six hexadecimal characters

Benefits/Use of RCP/RSP Flight Plan Codes

- Ensure SAFE application of performance-based separation minima
- Allow ATS system to automatically determine eligibility of aircraft, similar to PBN codes (e.g. L1 for RNP4)
 - eliminate need for manual procedures
- Signify initial approval
 - eliminate the need for ANSPs to “police” for “noncompliant” operators/aircraft types
- Allow non-compliant operators to continue to use capabilities, such as CPDLC and ADS-C, for operations that do not require compliance to certain RCP–RSP specifications
- Allow transition to more stringent RCP–RSP specifications to accommodate advances in technology to further efficiency gains in ATM operations

Operator Considerations: Training

GOLD Doc 10037 Paragraph 2.2.1.4

- The operator should ensure the **flight operations officers/dispatchers** are trained in data link operations. This training should include:
 - description of the data link system, including applications, network and subnetworks;
 - flight planning requirements for data link flights;
 - implications of flights departing under minimum equipment list (MEL) relief; and
 - implications of planned and unplanned outages on data link operations.

Flight Crew Procedures and Training

GOLD Doc 10037 Chapter 4.1.3

- When to use CPDLC – when to use voice
 - Outside VHF, CPDLC is normally used, but pilot and controller will choose at their discretion at any given time
- Logon, automatic transfers and end service
- Initiating and responding to CPDLC messages
 - Individual review of messages before executed or sent

Flight Crew Procedures and Training

GOLD Doc 10037 Chapter 4.3.4

- Responding to CPDLC messages – special emphasis
 - “Expect” instructions
 - Conditional clearances, i.e. AT (time) CLIMB or CLIMB TO REACH BY (position)
 - “Loadable” route clearances and responses

- Initiating CPDLC messages – special emphasis
 - Use of free text – should be avoided and special assessment when used
 - Use of multi-element messages
 - Weather deviations
 - CPDLC position reporting

Flight Crew Procedures and Training

GOLD Doc 10037 Chapter 4.8.2

➤ Emergency procedures

- Preflight preparation guidance
- Use of CPDLC MAYDAY and PAN message elements
- Inadvertent activation of ADS-C emergency

➤ Non-routine procedures

- Voice communications related to CPDLC failures
- Data link initiation failure
- Data link system failures
- Using CPDLC to relay messages

Summary and Questions

- Reviewed paragraphs from Doc 10037 and Doc 9869 contain guidance on initial compliance and use of PBCS
- Continued compliance and maintenance were addressed
- Flight Planning and flight codes were identified
- Selected training considerations were reviewed

- Questions?