NATS CPDLC

NATS Controller Pilot Datalink Communications Handout for Flight Crews and Airline Operators.

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NATS CPDLC Flight Crew & Airline Operator Handout

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Glossary:

ACC	Area Control Centre
ATN	Air Traffic Network
ATSU	Air Traffic Service Unit
CDA	Current Data Authority
CM	Context Management
CPDLC	Controller Pilot Datalink Communications
DA	Data Authority
DLIC	Data Link Initiation Capability
FANS	Future Air Navigation System
LOS	Limited Operational Service
FIR	Flight Information Region
FOS	Full Operational Service
HMI	Human Machine Interface
ICAO	International Civil Aviation Organisation
NDA	Next Data Authority
OACC	Oceanic Area Control Centre
R-ATSU	Receiving Air Traffic Service Unit
SID	Standard Instrument Departure
TMA	Terminal Manoeuvring Area

1 Introduction

This is intended for flight crews and operators wishing to conduct CPDLC operations within the London and Scottish FIRs. It contains information relating

to the initial CPDLC message set for ATN and FANS equipped aircraft, ATC procedures, CPDLC log-on and connection information and details relating to UK continental airspace where a CPDLC service is available. Provision of CPDLC services in the UK is based on the requirements of the COMMISSION REGULATION (EC) No. 29/2009. A CPDLC service is provided to ATN VDL 2, FANS1/A and FANS1/A+ equipped aircraft.

This document also contains a small subset of what are expected to be the most common datalink procedures, and new procedures developed to provide a service to ATN and FANS equipped aircraft. Appendix 1 contains details of messages that are supported.

The areas of responsibility for the NATS participating ACCs (London Area Control and Scottish Area Control) are referred to as Data Authorities. A data authority is a defined area where a CPDLC service is provided. The NATS data authorities are defined in figures 1 and 2.

2 CPDLC Airspace

CPDLC services are available in domestic airspace and are distinct from Oceanic CPDLC procedures. Within the London (EGTT) and Scottish (EGPX) Data Authorities a CPDLC service will be provided at FL285 and above, the service may be available **FL195 and above** where possible.

The following CPDLC services are provided in this airspace:

- DLIC (data link initiation capability)
- ACL (ATC clearances and instructions)
- ACM (ATC communications management)
- AMC (ATC microphone check)

This excludes the London and Manchester TMAs, where a CPDLC service will not be provided. Aircraft transiting the Manchester TMA below FL285 will maintain a log-on with EGPX.

Upon entering airspace where a logon is maintained but CPDLC is not available, the flight will receive the following CPDLC message:

"CPDLC NOT IN USE". VOICE ONLY UNTIL NOTIFIED."

If the flight crew initiates a downlink message the following response will be received to indicate that no CPDLC service is available:

"CPDLC NOT AVAILABLE AT THIS TIME – USE VOICE."

Upon entering CPDLC airspace the following CPDLC message will be received:

"CPDLC IN USE."

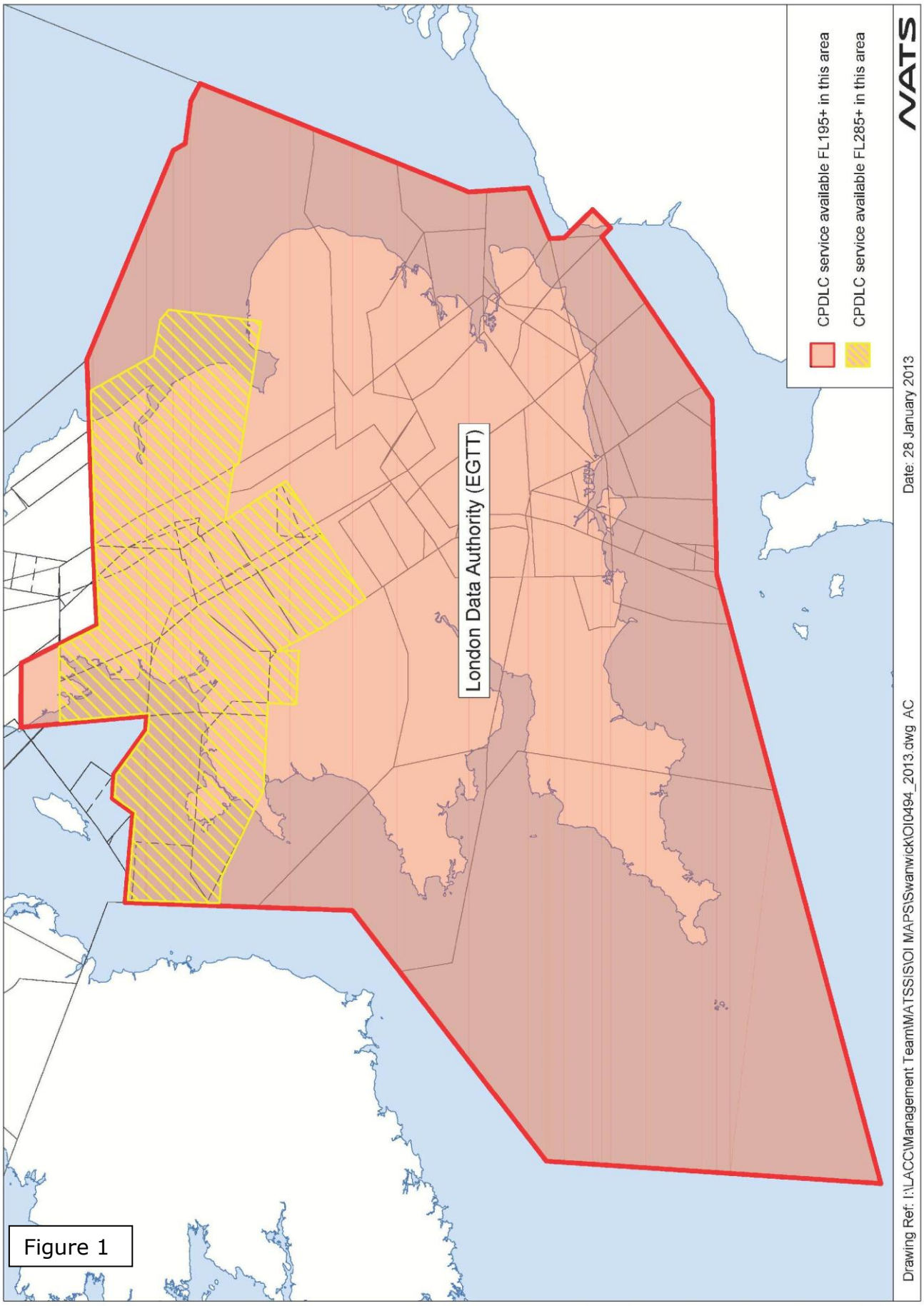
London Data Authority (EGTT)
CPDLC service available FL195+ in this area
CPDLC service available FL285+ in this area
NATS
Date: 28 January 2013
Drawing Ref: I:\LACC\Management Team\MATSSIS\OI MAPS\Swanwick\OI0494_2013.dwg AC

Figure 1

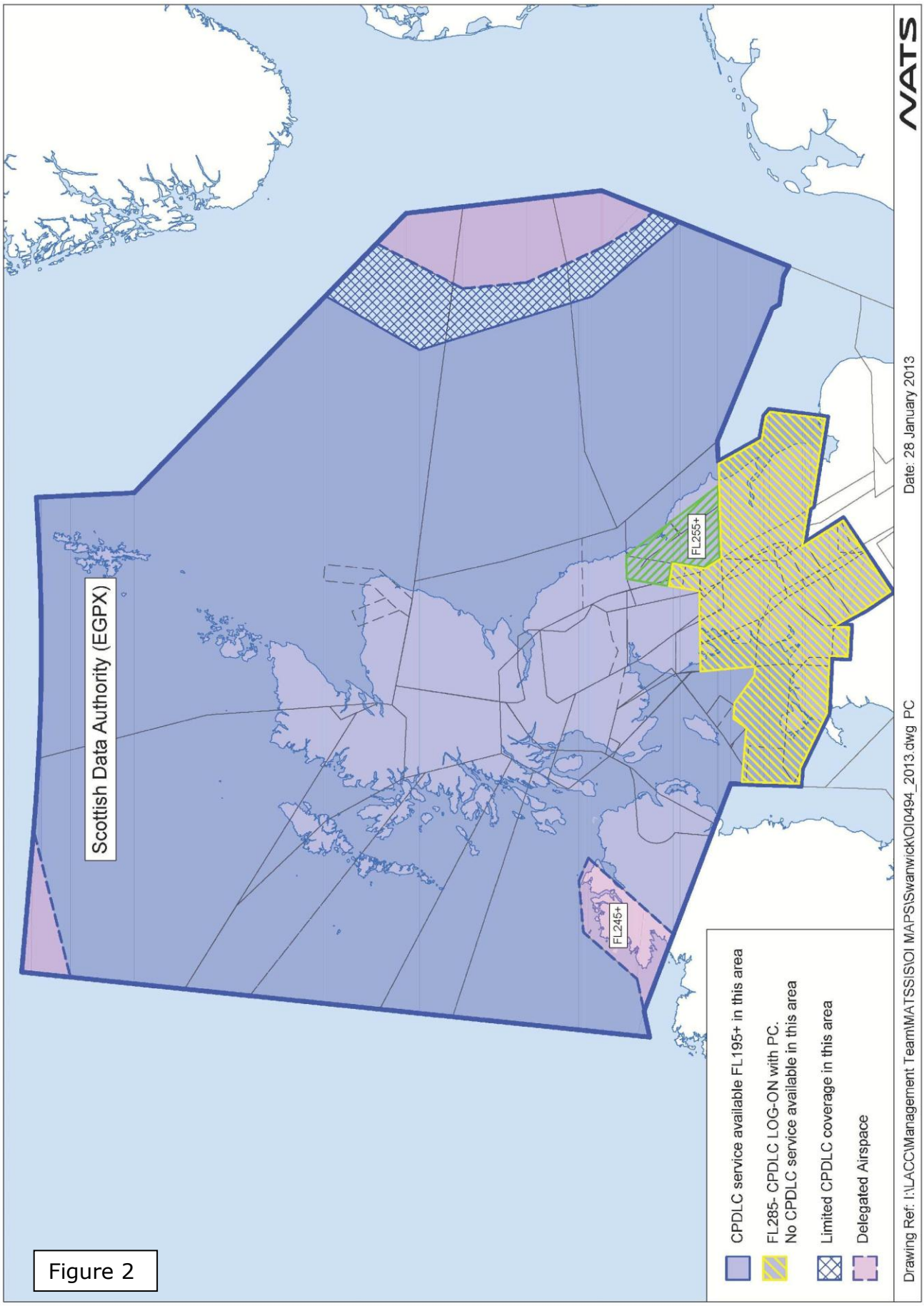
Scottish Data Authority (EGPX)
FL255+
FL245+
CPDLC service available FL195+ in this area
FL285- CPDLC LOG-ON with PC.
No CPDLC service available in this area
Limited CPDLC coverage in this area
Delegated Airspace
Drawing Ref: I:\LACC\Management Team\MATSS\SI\OI MAPS\Swanwick\OI0494_2013.dwg PC
Date: 28 January 2013
NATS

Figure 2

3 NATS CPDLC Service

A LOG-ON address refers to the ICAO designator for a given Data Authority. In the case of the United Kingdom the areas of responsibility are defined within the London and the Scottish FIRs.

The CPDLC LOG-ON address for London Data Authority is **EGTT**

The CPDLC LOG-ON address for Scottish Data Authority is **EGPX**

An aircraft may only receive a CPDLC service from a single Data Authority e.g. EGTT or EGPX.

In all CPDLC communications, the highest standard of discipline shall be observed at all times (Ref. ICAO Annex 10, Vol. II).

The use of CPDLC is not mandatory and is conducted at the discretion of ATC and the pilots concerned. Where urgent or time critical communications are required voice shall be used. Voice read-back is not required for any CPDLC instruction. In cases were uncertainty arises as a result of a data link message, communication shall revert to voice.

3.1 Aircraft LOG-ON

LOG-ON can be established at any time prior to the entry time for the relevant FIR boundary (EGTT or EGPX). For flights departing aerodromes in the United Kingdom LOG-ON may also be conducted by aircraft on the ground where coverage exists.

Standard Instrument Departure plates advise flight crews of the appropriate CPDLC Data Authority to select prior to departure.

CPDLC log on shall be established in sufficient time to ensure that the aircraft is communicating with the appropriate Data Authority. The following guidance criteria provided by GOLD is applicable to UK airspace.

Logon Timing Condition(s)	**When**	**Logon Address of Data Authority**
15 minutes or more prior to boundary estimate	When operating above FL 100	Current Data Authority for the airspace in which the aircraft is operating
Less than 15 minutes prior to boundary estimate	When operating above FL 100	Next Data Authority that provides CPDLC and/or ADS C services on that flight
Following an unsuccessful data link transfer to another ATSU	When detected by the flight crew or upon receipt of instruction from ATC	As instructed or per above

Flight crews are requested to check the UK AIP regarding logging on to the correct CPDLC Data Authority prior to departure. Additional information is contained within the Eurocontrol Flight Crew Guidance document. http://www.eurocontrol.int/services/link-2000-programme

3.2 CPLDC Flight Planning Requirements

A CPDLC service is only established when **all** the required LOG-ON parameters match those contained in the ICAO flight plan:

For an ATN LOG-ON
Mode-S Aircraft-ID i.e. ICAO [Flight plan item 7] callsign
Aircraft ID – 24bit address
ICAO Flight plan departure and destination airfields (not IATA codes)

For a FANS LOG-ON
Mode-S Aircraft-ID i.e. ICAO [Flight plan item 7] callsign
Aircraft registration

Equipage code
In order to use the CPDLC services, aircraft operators **must** file the respective equipage (J1 for ATN VDL 2 and J3 for FANS) in their flight plan in accordance with Flight Plan 2012 J codes:

J1: CPDLC ATN VDL Mode 2
or
J3: CPDLC FANS 1/A VDL Mode A
or
J4: CPDLC FANS 1/A VDL Mode 2

For flights granted a CPDLC exemption, the indicator DAT/CPDLCX shall be included in Item 18 of the flight plan.

3.3 Reasons for failed LOG-ON

- Incorrectly filed flight plans or late change of aircraft frame may result in a failed LOG-ON unless the flight plan is updated.
- If possible for FANS connections **do not include the 24 bit aircraft ID in the filed flight plan**. Inclusion of this information in B757, B767, B744 and some A340s will result in rejection of connection by the ground system. Should connection not be possible in other types of aircraft please follow the same instruction.
- Aircraft must be set to LOG-ON to the correct Data Authority.
- Using IATA flight ID, inserting additional leading zeros or spaces will result in a failed LOG-ON.
- At time of publication dual stacked B777s may have issues connecting due interaction with ground systems

3.4 Transfer between UK and adjacent units

The following section applies to both ATN and FANS aircraft unless otherwise stated:

Current Data Authority	**Next Data Authority**	
Scottish (EGPX)	to London (EGTT)	EGPX will automatically nominate EGTT as NDA.
	to Shannon (EISN)	EGPX will automatically nominate EISN as NDA.
	to Shanwick (EGGX) Note EGGX supports FANS only.	EGPX will automatically nominate EGGX as NDA.
	to Reykjavik (BIRD) Note BIRD supports FANS only.	EGPX will automatically nominate BIRD as NDA.
	to Maastricht (EDYY)	EGPX will automatically nominate EDYY as NDA.
London (EGTT)	to Scottish (EGPX)	EGTT will automatically nominate EGPX as NDA.
	to Shannon (EISN)	EGTT will automatically nominate EISN as NDA.
	to Maastricht (EDYY)	EGTT will automatically nominate EDYY as NDA.
Shanwick (EGGX)	to Scottish (EGPX)	EGGX will automatically nominate EGPX as NDA.
Shannon (EISN)	to Scottish (EGPX)	Manual logon to EGPX required.
	to London (EGTT)	Manual logon to EGTT required.
Maastricht (EDYY)	to Scottish (EGPX)	EDYY will automatically nominate EGPX as NDA.
	to London (EGTT)	EDYY will automatically nominate EGTT as NDA.
Reykjavik (BIRD)	to Scottish (EGPX):	BIRD will automatically nominate EGPX as NDA.

3.5 Establishing CPDLC Connection

Flight crew of aircraft equipped with FANS must respond "ROGER" to a CPDLC message for CDA to be confirmed as established.

Message example:
UPLINK: "CURRENT ATC UNIT EGTT, LONDON CENTER"
REQUIRED DOWNLINK: "ROGER"

When entering the next ATSU's airspace, the flight crew should confirm the successful transfer from the Current Data Authority to the Next Data Authority by observing the change in the active centre indication provided by the aircraft system. Crews should be aware that they need to keep the CDA and the frequency aligned. THEY MUST NOT RESPOND TO UPLINK MESSAGES FROM A UNIT THAT THEY ARE NOT IN VOICE COMMUNICATION WITH.
For more information on this process, refer to PANS ATM section 14, PANS OPS, the ICAO GOLD version 2.0, ED154 or Eurocontrol guidance material for ATC and Flight Crews V6.0.4 CPDLC MESSAGE SET (Valid from 2013)

4 UK Domestic CPDLC Message Set

Currently there are two sets of messages being used:

- To support FANS 1/A equipped aircraft; Safety and Performance Standard for Air Traffic Data Link Services in Oceanic and Remote Airspace (Oceanic SPR Standard, RTCA DO-306/EUROCAE ED-122).

- To support ATN VDL 2 equipped aircraft; Safety and Performance Standard for Air Traffic Data Link Services in Continental Airspace (Continental SPR Standard, RTCA DO-290/EUROCAE ED-12).

4.1 Downlink Messages (London and Scottish)

Message Number	Message
DM0	WILCO
DM1	UNABLE
DM2	STANDBY
DM3	ROGER (FANS ONLY)
DM4	AFFIRM (FANS ONLY)
DM5	NEGATIVE (FANS ONLY)
DM6	REQUEST [LEVEL]
DM9	REQUEST CLIMB TO [LEVEL]
DM10	REQUEST DESCENT TO [LEVEL]
DM22	REQUEST DIRECT TO [POSITION]
DM62	ERROR [ERROR INFORMATION]
DM63	NOT CURRENT DATA AUTHORITY
DM64	[FACILITY DESIGNATION] (FANS ONLY)
DM65*	DUE TO WEATHER*
DM66*	DUE TO AIRCRAFT PERFORMANCE*
DM67	[FREETEXT] (FANS ONLY)
DM98	FREETEXT [FOR ADDITIONAL ERROR INFO]
DM99	CURRENT DATA AUTHORITY
DM100	LOGICAL ACKNOWLEDGMENT
DM106	PREFERRED LEVEL [LEVEL]

DM107	NOT AUTHORISED NEXT DATA AUTHORITY

* DM65 and DM66 can be combined with other Downlinked messages. See ICAO documentation for a complete list of messages that may be concatenated.

4.2 Uplink Messages

Message Number	Message
UM0	UNABLE
UM1	STANDBY
UM20	CLIMB TO [LEVEL]
UM23	DESCEND TO [LEVEL]
UM27	CLIMB TO REACH [LEVEL] BY [POSITON]
UM29	DESCEND TO REACH [LEVEL] BY [POSITION]
UM53	CROSS [POSITION] AT OR AFTER [TIME]
UM74	PROCEED DIRECT TO [POSITION]
UM79**	CLEARED TO [POSITION] VIA [ROUTE CLEARANCE]
UM096	CONTINUE PRESENT HEADING
UM106	MAINTAIN [SPEED]
UM108	MAINTAIN [SPEED] OR GREATER
UM109	MAINTAIN [SPEED] OR LESS
UM116	RESUME NORMAL SPEED
UM117	CONTACT [UNIT NAME] [FREQUENCY]
UM157	CHECK STUCK MICROPHONE [FREQUENCY]
UM159	ERROR [ERROR INFORMATION]
UM160	NEXT DATA AUTHORITY
UM162	SERVICE UNAVAILABLE
UM169	[FREETEXT]
UM183	[FREETEXT] for additional error information
UM190	FLY HEADING [DEGREES]
UM196	[FREETEXT]
UM203	[FREETEXT]
UM227	LOGICAL ACKNOWLEDGMENT
UM231	STATE PREFERRED LEVEL
UM237	REQUEST AGAIN WITH NEXT UNIT

** For important information relating to UM79 please see section 7 below.

5 CPDLC Errors

If a flight crew receives an ‘ERROR’ response to a downlink message it should not be re-sent as this may generate another ‘ERROR’, and a possible time-out.

Crews should refrain from making technical enquiries on frequency as controllers will not have any further information available.

6 Data link failure

When the CDA detects a CPDLC failure, the controller will contact the aircraft using voice, inform the crew 'Disregard CPDLC [message type] message, break, [correct clearance or instruction]'. CREWS ARE REQUESTED TO RESPOND UNABLE IF THE MESSAGE REMAINS UNANSWERED. This closes the message dialogue and ensures that messages do not trigger time out alerts.

When a CPDLC failure is detected in the air, the crew should contact ATC by voice.

Due to safety concerns, there is a requirement for all FANS aircraft, following an uplink message timeout alert to disconnect from the CPDLC ground system. Controllers will instruct crews to disconnect using the following phraseology:

'Disconnect CPDLC and revert to voice'

7 Important Notes

IF A FLIGHT CREW HAS ANY DOUBT REGARDING THE CONTENT, VALIDITY OR EXECUTION OF A CPDLC MESSAGE THEY MUST REVERT TO VOICE IMMEDIATELY TO CLARIFY THE SITUATION.

- Within UK continental airspace CPDLC is a supplementary means of communication. Voice over R/T remains the primary means of communication.

- Flight crews are reminded that following a change of frequency, there is a requirement to check in by voice prior to the use of CPDLC.

- Flight crews must ensure that upon receiving an uplink message, the CPDLC address corresponds to the unit name to which the flight is in voice communications. (ICAO Annex 11, Chapter 3, Para 3.5.1: *"A controlled flight shall be under the control of only one air traffic control unit at any given time"*.)

- Flight crews should ensure upon receiving an UM79 CLEARED TO [position] VIA [route clearance] that the position element is part of the original flight plan to ensure that the onward route is not deleted from the FMS. The full UM79 message must be **loaded and checked** before the clearance executed, and a response sent.

- If a CPDLC instruction is **superseded by a voice instruction**, in order to avoid a time-out the flight crew are requested to respond 'UNABLE' to close the original CPDLC dialog and follow the voice instruction.

- Flight crew of FANS equipped aircraft are requested to respond promptly to uplinked CPDLC messages due to known network latency issues.

- Due to the potential for FANS message duplication flight crew are requested to report any suspected instances of duplicated CPDLC messages by filing a safety occurrence report.

- Any queries relating to NATS CPDLC operations should be sent to: CPDLCqueries@nats.co.uk

8 CPDLC and Voice Phraseology

Operational Circumstance	Phraseology	Flight Crew Action
Controller uses a voice instruction to correct a CPDLC message	"[*Aircraft Callsign*] **DISREGARD CPDLC** [*message type*] **MESSAGE, BREAK** [*followed by the correct clearance, instruction information or request*]"	Crew to disregard a CPDLC message (of that type) that has arrived on the flight deck within the preceding 120 secs or one that arrives within the next 120 secs. If not already responded, crew to respond **UNABLE** to avoid message time out and unnecessary disconnects.
Delayed message or flight crew has not responded within 120 seconds.	"[*Aircraft Callsign*] **DISREGARD CPDLC** [*climb/route/clearance, followed by executive instruction to clarify clearance*] **DISCONNECT CPDLC AND REVERT TO VOICE"**	Crew to disregard a CPDLC message that has arrived on the flight deck within the previous 120 seconds and disconnect the CPDLC connection with the Current Data Authority. A 'commanded termination' message is sent to the aircraft. Crew will be required to LOG-ON manually with the next Data Authority
CPDLC Failure	"**CALLSIGN/ALL STATIONS CPDLC FAILURE AT** [*Unit*] [*followed by the appropriate clearance, instruction information or request*]"	Crew shall revert to voice. ATC may require flight crews to clarify clearances.
Discontinuation of the use of CPDLC	**"ALL STATIONS STOP SENDING CPDLC REQUESTS UNTIL ADVISED** [*reason*]"	
Resumption of the normal use of CPDLC	"**ALL STATIONS RESUME NORMAL CPDLC OPERATIONS**"	