

## 4.4 CPDLC – DOWNLINK MESSAGES

### 4.4.1 General

4.4.1.1 Downlink messages can only be sent to the ATS unit that holds the active CPDLC connection. To provide situational awareness, procedures should ensure that each flight crew member has read each downlink message before it is sent.

4.4.1.2 When the aircraft has an active CPDLC connection with an ATS unit, the flight crew should downlink a clearance request only if the flight is in that ATS unit's airspace.

4.4.1.3 The flight crew should use standard downlink message elements to compose and send clearance requests, CPDLC position reports and other requested reports. Additional qualifying standard message elements, such as [SUPD-1](#) DUE TO (*specified reason downlink*) or *DUE TO WEATHER*, should also be used as needed.

*Note.— The use of standard message elements is intended to minimize the risk of input errors, misunderstandings, and confusion, and facilitate use by a non-native English speaking flight crew. The use of standard message elements allows the aircraft and ground systems to automatically process the information in the messages that are exchanged. For example, the flight crew can automatically load clearance information into the FMS and review the clearance, the ground system can automatically update flight plan data for route conformance monitoring, and both aircraft and ground systems can associate responses to messages.*

4.4.1.4 To avoid potential ambiguity, the flight crew should avoid sending multiple clearance requests in a single downlink message. For example, the flight crew should send separate downlink messages for [LVLD-2](#) REQUEST CLIMB TO (level) and [RTED-1](#) REQUEST DIRECT TO (position) unless there is an operational need to combine them in a single message (i.e. the flight crew does not want to climb unless they can reroute).

4.4.1.5 When a closure response to an open CPDLC downlink message is not received within a reasonable time period, the flight crew should:

- a) for a FANS 1/A aircraft, send a query using one of the “WHEN CAN WE EXPECT...” messages or a [TXTD-2](#) (free text) message rather than resending the downlink message. Alternatively, the flight crew may use voice communication to clarify the status of the open CPDLC downlink message; or
- b) for an ATN-B1 aircraft, the flight crew should use voice communication to resolve the operational situation resulting from the timed out CPDLC downlink message.

*Note 1.— A closure response is a response that operationally closes the dialogue. A [RSPU-2](#) STANDBY response to an open CPDLC downlink message does not operationally close the dialogue.*

*Note 2.— The use of a CPDLC free text message by a FANS 1/A aircraft avoids multiple open messages involving the same downlink message.*

*Note 3.— ATN-B1 ground systems will reject duplicate requests and return an ERROR message for display to the flight crew TOO MANY (dialogue type) REQUESTS - EXPECT ONLY ONE REPLY.*

**Example**

Flight crew	<a href="#">LVLD-2</a> REQUEST CLIMB TO FL350
	Reasonable period of time has passed
Flight crew	<a href="#">LVLD-7</a> WHEN CAN WE EXPECT HIGHER LEVEL or <a href="#">TXTD-2</a> WHEN CAN WE EXPECT CLIMB TO FL350

4.4.1.6 If the flight crew receives an indication of non delivery of a downlink message, they may elect to re-send an identical message within a reasonable amount of time or as required. Alternatively, they may use voice communication to clarify the status of the downlink message.

**4.4.2 Free text**

*Note.— Provisions concerning the use of free text messages elements are contained in Annex 10, Volume II, 8.2.11 and Doc 4444, 14.3.4.*

4.4.2.1 While the use of free text should generally be avoided, the flight crew may use the free text message element in accordance with the guidelines provided in this section.

*Note 1.— The use of standard message elements is intended to reduce the possibility of misinterpretation and ambiguity.*

*Note 2.— A free text message element (such as [TXTD-2](#) REVISED ETA (position) (time)) does not require a response from the ATS unit.*

4.4.2.2 The flight crew should only use a free text message element when an appropriate standard message element does not exist.

4.4.2.3 When composing a free text message, the flight crew should only use standard ATS phraseology and format and avoid nonessential words and phrases. Abbreviations should only be included in free text messages when they form part of standard ICAO phraseology, for example, ETA.

**4.4.3 Unsupported messages and voice responses to CPDLC requests**

4.4.3.1 While ATS units should provide CPDLC service using the complete message set provided in [Appendix A](#), some ATS units provide a CPDLC service using a limited message set. The flight crew should be aware of any unsupported downlink message elements that are described in regional or State documentation.

4.4.3.2 If a downlink message containing a message element that is not supported by the ATS unit is sent, the flight crew will typically receive the uplink message [SYSU-3](#) MESSAGE NOT SUPPORTED BY THIS ATC UNIT. If this message is received, the flight crew should respond to the message with [RSPD-4](#) ROGER and use voice for the communication transaction.

4.4.3.3 In circumstances where a CPDLC downlink message contains a request that can only be responded to verbally, the flight crew will typically receive the CPDLC free text message [TXTU-1](#) REQUEST RECEIVED EXPECT VOICE RESPONSE to indicate that the operational response will be via voice and to close the CPDLC dialogue. If this message is received, the flight crew should respond to the message with [RSPD-4](#) ROGER.

#### Example

Controller	<a href="#">TXTU-1</a> REQUEST RECEIVED EXPECT VOICE RESPONSE
Flight crew	<a href="#">RSPD-4</a> ROGER

### 4.4.4 CPDLC reports and confirmation requests

4.4.4.1 The flight crew should respond to CPDLC reports and confirmation requests, when appropriate.

4.4.4.2 ATS units may send a CPDLC message that combines a REPORT instruction with a clearance. The flight crew may use automation, procedures, and/or a combination to remind them when to send the reports requested in the CPDLC message.

#### Example

Controller	<a href="#">LVLU-6</a> CLIMB TO FL350 <a href="#">LVLU-23</a> REPORT LEAVING FL330 <a href="#">LVLU-24</a> REPORT MAINTAINING FL350
Flight crew	<a href="#">RSPD-1</a> WILCO

4.4.4.3 The controller may send a CPDLC message to request the flight crew to advise intentions when ADS-C indicates the aircraft has deviated from its cleared route, level or assigned speed ([3.3.5.2](#) refers).

### 4.4.5 Weather deviations and offsets

#### 4.4.5.1 General

4.4.5.1.1 The flight crew may use CPDLC to request a weather deviation clearance or an offset clearance. The difference between a weather deviation and an offset is portrayed in [Figure 4-2](#).

- a) a weather deviation clearance authorizes the flight crew to deviate up to the specified distance at their discretion in the specified direction from the route in the flight plan; and
- b) an offset clearance authorizes the flight crew to operate at the specified distance in the specified direction from the route in the flight plan. A clearance is required to deviate from this offset route.

*Note.— CPDLC offers timely coordination of weather deviation clearances. However, the flight crew may deviate due to weather under the provisions of Doc 4444, 15.2.3. The extent to which weather deviations are conducted may be a consideration when applying reduced separations.*

4.4.5.1.2 Flight crews should use the correct message element when requesting an off-route clearance.

*Note.— The difference between a weather deviation and an offset affects how ATC separate aircraft.*

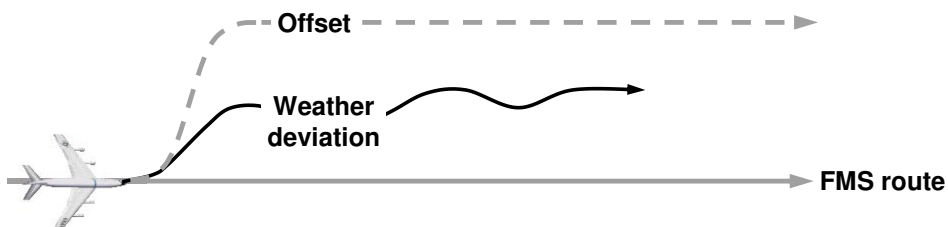


Figure 4-2. Offset and weather deviation

4.4.5.2 Weather deviation requests and offsets

When requesting a weather deviation or offset clearance, the flight crew should specify the distance off route with respect to the cleared route of the aircraft. If the flight crew has received an off-route clearance and then requests and receives a subsequent off-route clearance, the new clearance supersedes the previous clearance (i.e. only the most recent clearance is valid).

*Note.— When an off-route clearance has been received, the flight crew will need to ensure that waypoints are sequenced correctly as per 4.5.1.6.*

**Example 1**

As shown in Figure 4-3, the flight crew requests a weather deviation clearance to operate up to 20 NM (37 km) left of route. The controller issues the appropriate clearance.

Flight crew	LATD-2 REQUEST WEATHER DEVIATION UP TO 20 NM LEFT OF ROUTE
Controller	LATU-10 CLEARED TO DEVIATE UP TO 20 NM LEFT OF ROUTE LATU-18 REPORT BACK ON ROUTE
Flight crew	RSPD-1 WILCO

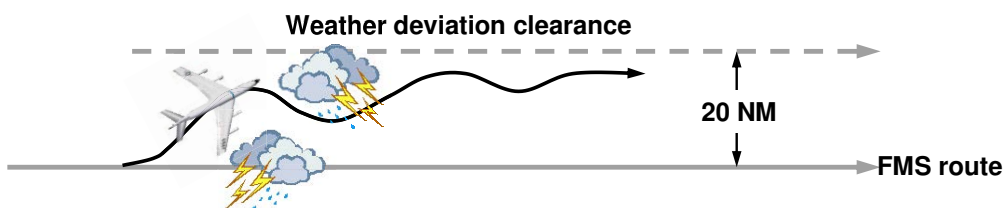


Figure 4-3. Weather deviation clearance up to 20 NM (37 km) left of route

**Example 2**

As shown in [Figure 4-4](#), the flight crew is operating on a weather deviation clearance up to 20 NM (37 km) left of route and then requests another weather deviation clearance to operate up to a further 30 NM (55.5 km) left of route. In the clearance request, the flight crew specifies a deviation distance from the cleared route rather than from the current weather deviation clearance. The controller issues the appropriate clearance.

Flight crew	<a href="#">LATD-2</a> REQUEST WEATHER DEVIATION UP TO 50 NM LEFT OF ROUTE
Controller	<a href="#">LATU-10</a> CLEARED TO DEVIATE UP TO 50 NM LEFT OF ROUTE <a href="#">LATU-18</a> REPORT BACK ON ROUTE
Flight crew	<a href="#">RSPD-1</a> WILCO

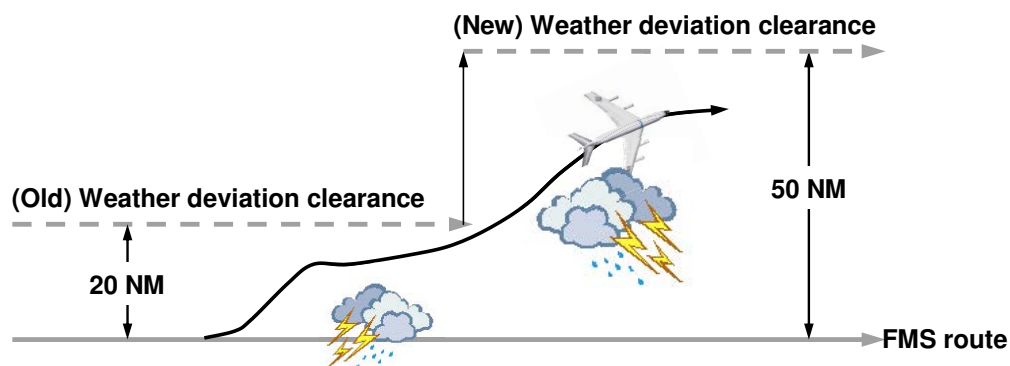


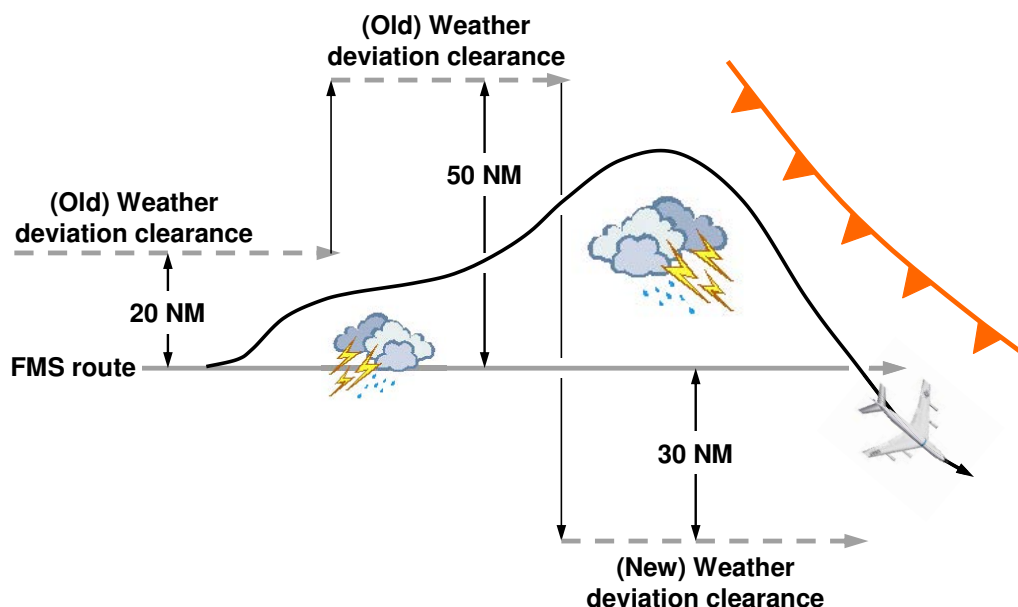
Figure 4-4. Subsequent weather deviation clearance up to 50 NM (93 km) left of route

**Example 3**

As shown in [Figure 4-5](#), the aircraft then requests a weather deviation clearance to operate 30 NM (55.5 km) right of route. The controller issues the appropriate clearance. The flight crew expeditiously navigates from one side of route to the other in accordance with the above clearance.

*Note.— The ATS unit applies the appropriate separation standards during the manoeuvres.*

Flight crew	<a href="#">LATD-2</a> REQUEST WEATHER DEVIATION UP TO 30 NM RIGHT OF ROUTE
Controller	<a href="#">LATU-10</a> CLEARED TO DEVIATE UP TO 30 NM RIGHT OF ROUTE <a href="#">LATU-18</a> REPORT BACK ON ROUTE
Flight crew	<a href="#">RSPD-1</a> WILCO



**Figure 4-5. Subsequent weather deviation clearance up to 30 NM (55.5 km) right of route**

#### 4.4.5.3 Deviations either side of route

When requesting a deviation on either side of route, the flight crew should request a weather deviation left and right of route using [LATD-2](#) REQUEST WEATHER DEVIATION UP TO (*lateral deviation*) OF ROUTE.

#### Example

The flight crew requests a deviation left and right of route. The controller issues the appropriate clearance.

Flight crew	<a href="#">LATD-2</a> REQUEST WEATHER DEVIATION UP TO 20 NM EITHER SIDE OF ROUTE
Controller	<a href="#">LATU-10</a> CLEARED TO DEVIATE UP TO 20 NM EITHER SIDE OF ROUTE <a href="#">LATU-18</a> REPORT BACK ON ROUTE
Flight crew	<a href="#">RSPD-1</a> WILCO

#### 4.4.5.4 Reporting back on route

When the flight crew no longer needs the deviation clearance and is back on the cleared route, the flight crew should send a [LATD-4](#) BACK ON ROUTE report.

- a) if during the weather deviation, the flight crew receives a clearance to proceed direct to a waypoint — and the flight crew responds to the clearance with [RSPD-1](#) WILCO — the aircraft is considered to be on the cleared route. Therefore, the flight crew should send a [LATD-4](#) BACK ON ROUTE report after they execute the “direct to” clearance; and

- b) if the aircraft is off route during a weather deviation clearance and proceeding direct to a waypoint on the cleared route, the flight crew should send a [LATD-4](#) BACK ON ROUTE report after the aircraft has sequenced the waypoint on the cleared route.

*Note.— If a [LATD-4](#) BACK ON ROUTE report is received while the aircraft is still off route, the incorrect information provided to ATC may affect the separation standards in use. Alternatively, the flight crew may consider requesting a clearance direct to the waypoint – on receipt of the uplink clearance, the procedure specified in item a) above applies.*

#### 4.4.6 CPDLC position reporting

##### 4.4.6.1 General

When using CPDLC to provide position information, the flight crew should report unnamed waypoints (latitudes/longitudes) using the ICAO format of nn[N/S]nnn[E/W] or, if both degrees and minutes are required, nnnn[N/S]nnnnn[E/W].

*Note.— The flight crew and flight operations officers/dispatchers should not use the ARINC 424 format. ARINC 424 describes a five-character latitude/longitude format for aircraft navigation databases (e.g. 10N40 describes a lat/long of 10N140W). The ATS unit may reject or be unable to process any downlink message containing waypoint names in the ARINC 424 format.*

##### 4.4.6.2 Position reporting in a non-ADS-C environment

4.4.6.2.1 When ADS-C is not available, the flight crew should conduct position reporting by voice or CPDLC. When using CPDLC, the flight crew should send [RTED-5](#) POSITION REPORT (position report) whenever an ATC waypoint is sequenced (or passed abeam when offset flight is in progress).

4.4.6.2.2 When using CPDLC for position reporting, the flight crew should send position reports only at compulsory reporting points and ensure that the position and next position information applies to compulsory reporting points, unless requested otherwise by ATC. The ensuing significant point after the next position may be either a compulsory or non-compulsory reporting point (refer to the air-report (AIREP) form found in Doc 4444, Appendix 1).

##### 4.4.6.3 Position reporting in an ADS-C environment

*Note.— In an ADS-C environment, the flight crew should not provide position reports or revised waypoint estimates by CPDLC or voice, unless otherwise instructed or under conditions in certain airspace as stipulated in the AIP (or other appropriate publication) (see also [Appendix B](#)).*

4.4.6.3.1 If required by regional SUPPS or the AIP (or other appropriate publication), the flight crew should provide a CPDLC position report when either of the following events occurs:

- a) an initial CPDLC connection is established; or
- b) the CPDLC connection transfer has been completed (i.e. at the associated boundary entry position).

*Note.— Some ANSPs require a single CPDLC position report, even when in an ADS-C environment, to provide the controlling ATS unit confirmation that it is the CDA and the only ATS unit able to communicate with the aircraft via CPDLC (refer to [Appendix B](#)).*

4.4.6.3.2 The flight crew should include only ATC waypoints in cleared segments of the aircraft active flight plan. However, when an ATC clearance eliminates a waypoint, it is permissible to retain and report the point abeam of that waypoint since this ensures retention of meteorological data associated with the eliminated waypoint.

*Note.— If the flight crew inserts non-ATC waypoints (e.g. mid-points) into the aircraft active flight plan and activates the change, the aircraft system may trigger an ADS-C waypoint change event report at the non-ATC waypoint, or include information about the non-ATC waypoint in the predicted route group, as well as the intermediate and fixed projected intent groups. As a result, the ADS-C report will include information about the non-ATC waypoint, which is not expected by the ATC ground system.*

4.4.6.3.3 The flight crew should maintain the active route in the aircraft system to be the same as the ATC cleared route of flight.

*Note.— If the flight crew activates a non-ATC cleared route into the aircraft system, the ADS-C reports will include information that will indicate the aircraft is flying a route that is deviating from the cleared route.*

4.4.6.3.4 When reporting by ADS-C only, the flight crew should include ATC waypoints in the aircraft active flight plan even if they are not compulsory reporting points.

## 4.5 AUTOMATIC DEPENDANT SURVEILLANCE – CONTRACT (ADS-C)

### 4.5.1 General

4.5.1.1 ADS-C allows the ATS unit to obtain position reports from the aircraft without flight crew action to update the current flight plan, to check conformance and to provide emergency alerting.

*Note.— In airspace where ADS-C is available, the flight crew need not send position reports via voice or CPDLC, except as described in [4.4.6.3](#) or when required by regional SUPPS or the AIP (or other appropriate publication).*

4.5.1.2 When using ADS-C, the flight crew should check to ensure ADS-C is armed prior to initiating a logon with an ATS unit.

*Note.— The flight crew can switch ADS-C off, which will cancel any ADS-C connections with the aircraft. While ADS-C is disabled, the ground system will not be able to establish an ADS-C connection.*

4.5.1.3 Normally, the flight crew should leave ADS-C armed for the entire flight. However, in airspace where ADS-C is available, if the flight crew switches ADS-C off for any reason, or if they receive indication of avionics failure leading to loss of ADS-C, the flight crew should advise ATC and follow alternative procedures for position reporting as per [4.4.6](#) and [4.7.4.5](#).

4.5.1.4 In airspace where ADS-C is not available, the flight crew may switch ADS-C off to cancel inadvertent ADS-C connections. In such cases, the flight crew should ensure that ADS-C is armed when re-entering airspace where ADS-C is again available.



4.5.1.5 If ADS-C is disabled in an ADS-C environment, the ATS unit may send the flight crew an inquiry as per [4.7.4.7](#).

4.5.1.6 The flight crew should ensure that waypoints are sequenced correctly. If an aircraft passes abeam a waypoint by more than the aircraft FMS waypoint sequencing parameter, the flight crew should sequence the waypoints in the FMS, as appropriate.

*Note.— As shown in [Figure 4-2](#), when an aircraft passes abeam a waypoint in excess of the defined sequencing parameter (refer to [Appendix C, C.7](#) for specific aircraft types), the FMS will not sequence the active waypoint. If the flight crew does not sequence the waypoint, incorrect information will be contained in ADS-C reports and CPDLC position reports – the next waypoint in these reports will actually be the waypoint that the aircraft has already passed.*

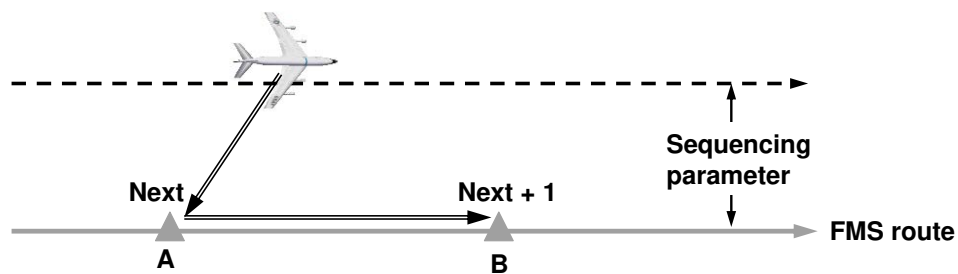


Figure 4-6. Waypoint sequencing anomaly

## 4.6 EMERGENCY PROCEDURES

### 4.6.1 General

4.6.1.1 In accordance with established emergency procedures, the ATS unit within whose airspace the aircraft is operating remains in control of the flight. If the flight crew takes action contrary to a clearance that the controller has already coordinated with another sector or ATS unit and further coordination is not possible in the time available, then the flight crew performs this action under their emergency command authority.

4.6.1.2 The flight crew will use whatever means are appropriate (i.e. CPDLC and/or voice) to communicate during an emergency.

4.6.1.3 During an emergency, the flight crew would normally revert to voice communications. However, the flight crew may use CPDLC for emergency communications if it is either more expedient or if voice contact cannot be established.

*Note.— For ATN B1 aircraft, emergency message elements are not supported. See [Appendix A, A 4.9](#), for a list of emergency message elements.*

## 4.6.2 CPDLC and ADS-C emergency

4.6.2.1 When using CPDLC to indicate an emergency situation or degraded operations to an ATS unit, the flight crew should use the CPDLC emergency downlink message, either [EMGD-2](#) MAYDAY MAYDAY MAYDAY or [EMGD-1](#) PAN PAN PAN.

*Note 1.— The flight crew may enter PERSONS on BOARD during pre-flight preparation, prior to initiating a logon, or prior to sending the emergency message.*

*Note 2.— The CPDLC emergency downlink message will automatically select the ADS-C function to emergency mode. When a situation prohibits sending a CPDLC emergency message (e.g. in an ADS-C only environment), the flight crew may activate ADS-C emergency mode directly via ADS-C control functions.*

4.6.2.2 If a CPDLC emergency downlink message is inadvertently sent or the emergency situation is resolved, the flight crew should send [EMGD-4](#) CANCEL EMERGENCY as soon as possible to advise the controller and automatically set the ADS-C emergency mode to off. After sending [EMGD-4](#) CANCEL EMERGENCY, the flight crew should confirm the status of the flight and their intentions via either voice or CPDLC.

4.6.2.3 To check for inadvertent activation of the ADS-C emergency mode using CPDLC, the controller may send the following CPDLC free text uplink or use equivalent voice phraseology. The flight crew should then check the status of the aircraft's ADS-C emergency mode and if the emergency mode has been activated inadvertently, the flight crew should select ADS-C emergency mode to off and advise the controller either by voice or by the following CPDLC messages.

Controller	<a href="#">EMGU-3</a> CONFIRM ADS-C EMERGENCY
Flight crew	<a href="#">RSPD-4</a> ROGER, then (free text) <a href="#">TXTD-2</a> ADS-C RESET

## 4.7 NON-ROUTINE PROCEDURES

### 4.7.1 General

*Note.— Provisions concerning complete communications failure (CPDLC and voice) are contained in Annex 2, 3.6.5.2, Annex 10, Volume II, 5.2.2.7 and Doc 4444, 15.3.*

### 4.7.2 Voice communications related to data link

4.7.2.1 When CPDLC fails and open messages existed at the time of failure, the flight crew should recommence any dialogues involving those messages by voice.

4.7.2.2 The flight crew should use the standard voice phraseology under certain conditions as indicated in [Table 4-3](#).

*Note.— See [3.10.2.2](#) for standard voice phraseology used by the controller or radio operator.*

4.7.2.3 Except as provided in [Table 4-3](#) and [3.10.2.2](#), voice communication procedures related to data link operations are not standardized among the regions. Refer to [Appendix B](#) for any additional voice communication procedures for a specific region.

**Table 4–3. Voice phraseology related to CPDLC**

<i>Condition</i>	<i>Voice phraseology</i>
To notify ATC of a correction to a CPDLC message (Doc 4444).	DISREGARD CPDLC ( <i>message type</i> ) MESSAGE, BREAK ( <i>correct information or request</i> )
To notify ATC of a single CPDLC message failure (Doc 4444).	CPDLC MESSAGE FAILURE ( <i>appropriate information or request</i> )
To notify ATC of an aircraft data link system or CPDLC connection failure (Doc 4444).	CPDLC FAILURE ( <i>requests/notifications</i> ) <i>Note.— This voice phraseology is included only with the first transmission made for this reason.</i>  Example: CPDLC FAILURE. CONTINUING ON VOICE
To advise ATC that the CPDLC connection is being terminated manually and logon procedure is being initiated with the next ATSU.	DISCONNECTING CPDLC WITH ( <i>facility designation</i> ). LOGGING ON TO ( <i>facility designation</i> ) <i>Note.— The facility designation is the ICAO four-character facility code or facility name.</i>
To advise ATC that a logon procedure is being initiated following restoration of data link service.	LOGGING ON TO ( <i>facility designation</i> )
To advise ATC that a delayed CPDLC uplink has been received and to request clarification of the intent of the CPDLC message.	DELAYED CPDLC MESSAGE RECEIVED ( <i>requests</i> ) <i>Note.— See <a href="#">4.2.1.9</a> and <a href="#">Appendix C, C.11</a> for associated procedures.</i>

### 4.7.3 Data link initiation failure

*Note — Provisions concerning the data link initiation failure are contained in Annex 10, Volume II, 8.1.1.4 and Doc 4444, 4.15.4.*

4.7.3.1 In the event of a logon failure, the flight crew should verify the correct ATS unit address and confirm the aircraft identification matches the information provided in the flight plan and, as appropriate:

- a) make the necessary corrections; and then
- b) re-initiate the logon.