



**Data Communications Implementation Team
Tower Data Link Services
Controller Pilot Data Link Communication
Departure Clearance Service (CPDLC-DCL)
Flight Deck User Guide**



**Version 1.0
April 30, 2015**

Date Communications Implementation Team (DCIT):
(CPDLC-DCL) Flight Deck User Guide

Change History Page

Version	Date	Description of Change
1.0	April 30, 2015	Initial issue of the Data Communications Implementation Team (DCIT) Tower Data Link System (TDLS) Departure Clearance Service (DCL) Flight Deck User Guide

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Executive Summary

CPDLC Departure Clearance Services (CPDLC-DCL) will be introduced at local Tower Data Link Service (TDLS) equipped facilities to provide the delivery of departure clearances and revised departure clearances through advanced automation and Controller Pilot Data Link Communications (CPDLC) as part of the FAA NexGen introduction of advanced communications services in the NAS. The *Data Communications Implementation Team (DCIT) Tower Data Link System (TDLS) CPDLC Departure Clearance Service (CPDLC-DCL) Flight Deck User Guide* introduces flight crews to the concept of DCL and outlines the roles of the Airline Operations Center, clearance delivery controllers, and flight crews. The document describes the general procedures for logging on, loading the flight plan, requesting DCL, responding to the DCL message and logging off. Examples of different types of revised DCLs are provided along with guidance for reviewing, processing and responding to the clearances.

Purpose

The following guidance material will support airlines participating in the FAA's Departure Clearance Services at participating TDLS airports. Recommended DCL procedures or guidance is supplemental to the Global Operational Data Link GOLD recommended procedures and where appropriate should be included in flight crew operational procedures. While GOLD does not directly address Departure Clearances on the ground, the reference to operational procedures should be thought of as additional guidance material supporting currently approved airline procedures. Airlines should extract information from this CPDLC-DCL Flight Deck User Guide that will support their participation in the DCL services. When CPDLC-DCL guidance deviates from GOLD recommended procedures, this document will identify the differences when appropriate.

Participation in this CPDLC-DCL service is voluntary and at the discretion of the flight crew and/or airline. If the flight crew chooses not to participate, contact Clearance Delivery via voice for your ATC clearance or request a PDC using standard SOP's per the ATC flight plan filing instruction and operators guidance concerning departure clearance retrieval .

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Chapter 1. Introduction

Voice communication frequencies between pilots and air traffic control (ATC) are becoming increasingly congested and will not be able to accommodate the projected increase in air traffic demand. Use of data communications (Data Comm) to supplement some routine voice communications will increase efficiency, capacity, and safety. The FAA Data Communications Program (DCP) initiatives will be incrementally implemented to provide advanced communication capabilities and the transition from analog voice to an International Civil Aviation Organization (ICAO) compliant system in which digital communications become the predominant mode of communication.

Chapter 2. Departure Clearance Service (CPDLC-DCL)

The Departure Clearance Service (DCL) provides automated assistance for requesting and delivering initial and revised departure clearances. CPDLC-DCL provides CPDLC messages for the following: Flight plan route, initial and requested altitude, beacon code assignment and departure frequency. When CPDLC-DCL is provided through the use of CPDLC, this information is exchanged using CPDLC messaging. For DCL, the messages will be selected from those already used in FANS equipped aircraft. The CPDLC-DCL service is designed for use in surface operations and supplements the existing PDC at TDLS sites for participating aircraft. A summary of the roles of the Airlines Operations Center (AOC) or company dispatch, clearance delivery controller, and flight crew are described below:

AOC / System Dispatch. Just as in current operations, the aircraft operator will file an ATC flight plan with the Air Route Traffic Control Center (ARTCC) associated with the departure airport via a ground-to-ground communication system. Also, Dispatch will receive courtesy copies of Departure Clearances sent to the aircraft.

Clearance Delivery Controller. ATC automation creates a proposed DCL and presents it to the controller for review. The controller may modify the DCL with local data such as a Departure Procedure and approves or revises the DCL for flight crew request. Upon delivery of the DCL to the aircraft, the automation system forwards a copy of the DCL to the AOC.

Flight Crew. *The flight crew activates the data link system as they prepare the aircraft for the flight by logging on (using CPDLC) to the ATC system. ATC can accept valid logon data before the controller reviews the DCL for approval. When the controller reviews and approves the Departure clearance, ATC accepts the logon and initiates a CPDLC connection between the aircraft and ATC. After a CPDLC connection is established, the flight crew may request a departure clearance no earlier than 30 minutes prior to departure. ATC transmits a controller approved DCL to the aircraft via the CPDLC connection. If changes in tower or en route conditions occur for weather or*

other reasons, ATC will amend the clearance information and transmit a revised DCL to the flight crew.

Chapter 3. Flight Deck

3.1 Controls and Indicators

The EICAS advisory message “• ATC” or “ATC MSG” (shown in Figure 2) along with an audible tone in the cockpit indicates that a message from ATC is available for viewing. To view the message, select the MCDU ATC or ATC COMM Function key (shown below in Figure 3)



Figure 1. Indication of ATC message (Boeing)

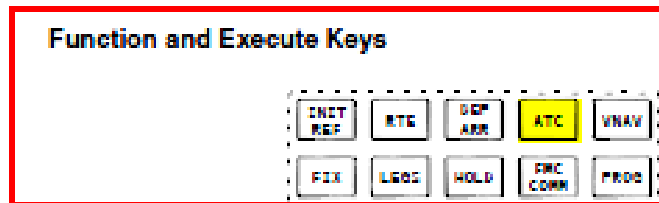


Figure 2. Function Execute Keys (Boeing)

Available responses to ATC to a Departure Clearance are **ACCEPT**, **REJECT**, and **STANDBY** (see Figure 4 below).



Figure 3. Example of Clearance Response Page

3.2 The flight crew should (ACCEPT) the clearance when:

- a. The FMS indicates that the clearance has been successfully loaded and no discontinuities exist, and
- b. No clarification from ATC is required

3.3 The flight crew should (REJECT/UNABLE) the clearance when:

- a. The FMS indicates that it cannot load the clearance (e.g. the clearance was unable to be loaded or only part of the clearance loaded and the flight crew was unable to resolve the clearance); or
- b. The FMS indicates any inconsistencies or discontinuities with the route modification that are not addressed by AIPs or local procedures and the flight crew was unable to resolve the clearance; or
- c. When company policies require the flight crew to obtain a new clearance.

Note: The flight crew should use voice to clarify a clearance due to any loading failures, route discontinuities or inconsistencies. If equipped, the ATC Review Page or displayed full route clearance may be used to resolve the clearance in lieu of voice.

3.4 The Flight Crew should select (STANDBY) when:

A timely response is not practical; the appropriate interim response is **STANDBY**. For example, a **STANDBY** response is appropriate when company procedures require an operational assessment of the reroute by dispatch or the **AOC**.

3.5 (LOAD) – Transferring Route Clearance Information to the FMS

The “LOAD” option is available when FMS Route Information is included in the CPDLC DCL UPLINK. Selecting “LOAD” will transfer route information into the FMS RTE allowing the flight crew to review and accept the departure clearance per company procedures.

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Note: The FMS checks the loadable portion of the clearance to ensure it is correctly formatted and compatible with the FMS navigation database.

3.6 CPDLC Log

The “LOG” function allows previous messages to be viewed by the flight crew when necessary.

Chapter 4. Flight Crew Procedures and Guidance

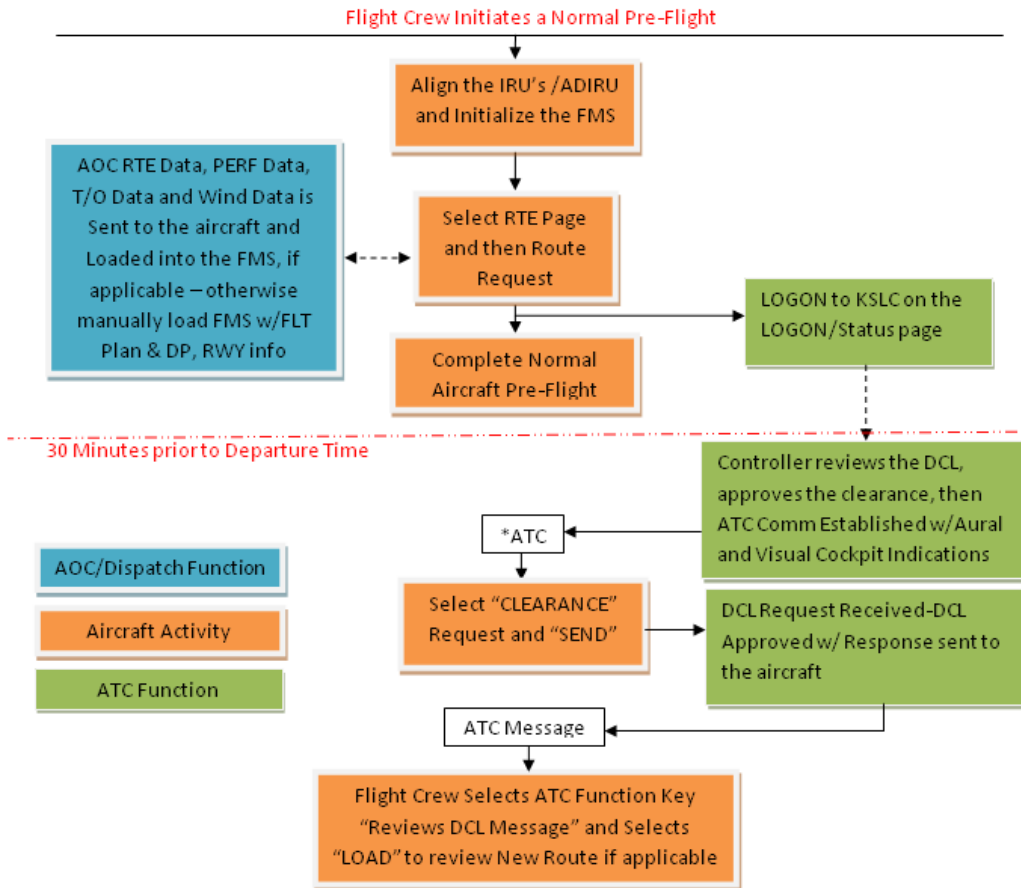


Figure 4. Overview of Flight Crew Departure Clearance Activities

4.1 Loading the Original Filed Flight Plan

Flight Crews will have a flight plan on board to initially load the FMS with the filed route of flight. Crews should load the flight plan that was filed with ATC into the FMS via either;

- a. Company FMS Uplink with Route, Wind, Performance and T/O company uplink, or

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- b. Manually-entered Route, Wind, Performance and T/O information from the onboard flight plan per company procedures.

4.2 CPDLC LOGON

Logon may be completed anytime during pre-flight operations - (e.g., KSLC). Within P-30 minutes of your proposed departure time an “ATC Connection Established” message will be received by the aircraft if the Logon Information was correctly formatted, there is an ATC Filed Flight Plan on File, Company Dispatch has indicated to the FAA that the aircraft is DCL capable via the flight plan and the ATC Controller has approved the DCL. **Note: Logon Rejection:** If the initial attempt to logon fails, flight crews should ensure that a flight plan is on file, verify the Logon information is correct, then **one** additional logon should be made. If the second logon attempt fails, the crew should revert to voice and contact clearance delivery for the Departure Clearance or revert to PDC if your company has indicated this is your airlines preferred method of data communication with the FAA.

Note: Reverting to PDC is only available if entire CPDLC service is unavailable at the TDLS facility.

4.3 Requesting the DCL:

Once a successful ATC Connection has been established and your Departure Clearance has been approved by the controller, it will be available for your request.

To request the DCL, on the ATC page, select the “CLEARANCE”, followed by request “SEND”.



Figure 5. Boeing ATC Index page w/Clearance Request (L), and Verification/Send page (R)

When making a Departure Clearance request, DO NOT add any Free Text to the downlink page. If any free text information is added, the ground system will send an auto reply message indicating “MESSAGE NOT SUPPORTED BY THIS ATS UNIT”.

4.4 Flight Crew Processing of DCL

Flight crews should treat any CPDLC-DCL sent to the aircraft just like they would any voice or PDC clearance per company procedures when reviewing and accepting route clearances. One additional feature of the CPDLC-DCL Service is the ability to introduce revisions to a previously cleared flight plan which can be received at any time until the aircraft is handed off to the tower for takeoff. Amendments can be a simple altitude change or a more complex full reroute. When notified of a revised clearance, flight crews should use good judgment and follow company procedures.

4.4.1 At the Gate

When an initial/revised CPDLC-DCL is received, flight crews should act in accordance with company policy or best operational judgment in a timely manner, to review the initial or revised clearance and either accept / reject / standby, as appropriate.

4.4.2 Off the Gate

Flight crew should act in accordance with company policy or best operational judgment in a timely manner, to review the revised clearance and either accept / reject / standby, as appropriate.

A revised clearance may contain simple changes (e.g., a revised transponder code) or complex changes (such as a full re-route). Complex revisions may require substantial 'heads-down' time for FMS route loading and verification. Whether or not these activities will be able to be conducted without requesting additional time from ATC will depend on a variety of factors and is at the discretion of the flight crew. In some cases, it may not be prudent to conduct these activities when the aircraft is in motion (such as approaching a runway). It is advisable to notify the appropriate ATC controller (ground or tower control) and pull out of the ground traffic flow when:

- Required by company procedures
- In areas of high traffic density or high-tempo operations
- In low-visibility or nighttime operations
- When safety dictates

4.5 Termination of CPDLC DCL Services

4.5.1 ATC Initiated Termination while airborne

- a. After Takeoff, flight crews can expect an automated ATC initiated disconnect 5-10 Minutes after Takeoff. The disconnect time may be modified by local agreement as determined by the DCIT.
- b. Flight crews are reminded to Logon to the next FIR/Data Authority when transitioning to the OCEAN environment. The TDLS system does not have controller to controller handoff capability. If the flight is still connected to the TDLS system, the flight crew will have to disconnect / terminate the session before the OCEAN controller can accept the Logon.

4.5.2 Flight Crew initiated CPDLC logoff

If the flight crew elects to disconnect their ATC CPDLC connection, or the CPDLC session is terminated by the controller while on the ground, all subsequent Departure Clearance services with ATC clearance delivery will be handled via voice. Accepted CPDLC Clearances will remain in effect for that flight unless amended by Clearance Delivery via voice.

- a. For the DCL Service, the automated ATC disconnect after takeoff may be adjusted for local airspace requirements for flight crew sterile periods e.g., eliminate nuisance alerts.
- b. Flight crews are reminded to Logon to the next FIR/Data Authority when transitioning to the OCEAN environment. The TDLS system does not have controller to controller handoff capability. If the flight is still connected to the TDLS system the flight crew will need to disconnect / terminate the session before logging on to the next ATS Unit.

NOTE: The flight crew should contact Clearance Delivery by voice:

- To clarify the delivered clearance,
- To request an amendment,
- When requested by Ground Control,
- Whenever safety dictates, or
- Anytime when confusion exists or clarification is needed.

5.0 Departure Clearances (DCL)

5.1 “Then As Filed”

When no changes have been made to the filed flight plan, ATC will send a “Then As Filed” Departure Clearance that *does not* contain a loadable route clearance:

- Flight Crews will obtain the FMS route information from the onboard flight plan or from company dispatch and **manually insert the Departure Procedure/Transition and Runway (if applicable)** into the FMS obtained from the DCL.

5.2 Change from Filed Flight Plan – Initial Clearance

If ATC has modified the filed flight plan, a FMS loadable route clearance will be sent to the aircraft with either a “CLEARED ROUTE CLEARANCE” or “CLEARED TO POSITION VIA ROUTE CLEARANCE” message.

Caution: After loading the uplinked CPDLC DCL Clearance, it is important to use the individual FMS pages to request AOC/Company Wind, Performance, and/or Takeoff data, or manually enter the data per company procedures. Do not use the FMS RTE page “ROUTE REQUEST” function for these requests. **Using the AOC/Company FMS “ROUTE REQUEST” function will delete the cleared ATC assigned route from the FMS.**

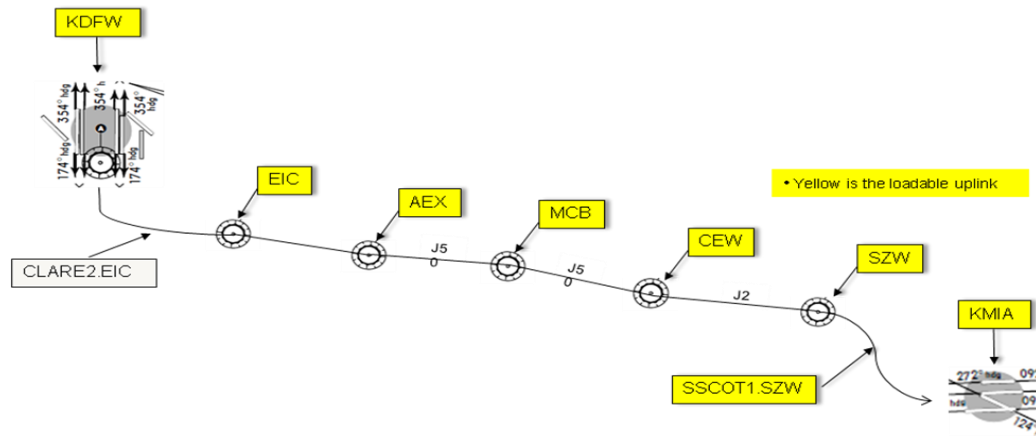


Figure 6. Depiction of a Loadable DCL Information

5.3 Types of Revised DCLs

If the cleared route is modified *after* the original DCL has been ACCEPTED, ATC will send a *revised* DCL to the aircraft. The route modification will have one of three (3) types of loadable enroute waypoints clearances. **(Recall that Departure Procedures/Transitions and the Runway are always manually entered by the flight crew.):**

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c. “THEN AS FILED”, will be appended after the Departure Procedure/Transition Fix. Crew should use their flight plan to ensure the filed ATC route is inserted / loaded into the FMS and then verify the cleared route per company procedures.

2. “MAINTAIN 10000FT.”

a. This will be the “Initial” cleared altitude if included, otherwise crews can expect in this field “CLIMB VIA SID or CLIMB VIA SID EXCEPT MAINT 8000 FT.

NOTE: If a CLIMB VIA SID is included in the clearance then there is a vertical profile associated with the Departure Procedure, Altitude and/or Speed Restrictions remain in force unless ATC amends the Departure Profile.

3. “EXPECT FL340 10 MIN AFT DP. DPFREQ 126.250 ”

a. EXPECT altitudes are provided and should be verified against the filed flight plan. No revision notice will be provided if it is different from the filed flight plan.

- If different from Filed – use standard company procedures to determine if acceptable

b. Departure frequency will be provide and should be verified against the Departure Page if available.

```
2105z ATC UPLINK 1/2
                                STATUS
                                OPEN
CLEARED TO DNJ VIA ROUTE
CLEARANCE . } 4
TWF1 .
AFTER DNJ CLEARED TO
PANC ARPT AS FILED, CLB } 5
VIA SID EXC MAINT
10000FT .
- - - - CONTINUED - - - -
                                LOG >
ATC MESSAGE
```

Figure 10b. Depiction of DCL including CLEARED TO “POSITION”AS FILED

4. In the above example, the controller has received an amendment to the FILED ATC Clearance request which connects at the downstream waypoint DNJ. VIA ROUTE CLEARANCE is the “Loadable” portion of the clearance which contains the modified route to the Cleared TO Position point – “DNJ.
5. AFTER DNJ CLEARED TO PANC ARPT AS FILED indicates to the flight crew that they are cleared after DNJ to destination via their original FILED ATC route.
6. **Not Shown:** Squawk and Local INFO which in this case would be on page 2/2. See figure 11 for this example.

6.2 DCL – Full Route Clearance – FMS Loadable

When the AOC Dispatch “Filed” ATC flight plan “does not exactly match the ATC provided clearance, the controller will provide the flight crew with a FMS loadable full route clearance.

NOTE: Full Route Clearance is also used when a revised DCL is not able to append to an originally cleared route of flight. In this case, the uplinked message format in Figure 11 would be used for re-routes.

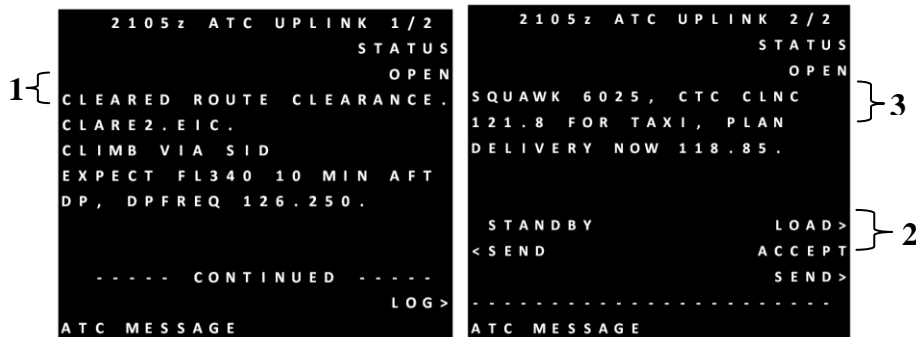


Figure 11. Depiction of DCL including a full route clearance

1. “CLEARED ROUTE CLEARANCE”, indicates that there has been an amendment to the “Filed ATC Filed Flight Plan” or a THEN AS FILED clearance from the controller is not available and a fully loadable FMS clearance is available for review.

NOTE: “Then As Filed” is not included in *this* Departure Clearance and the onboard flight plan will not exactly match the FMS loaded clearance. Use company procedures when changes to the filed flight plan occur.

2. Load Prompt allows the flight crew to load the ATC clearance into the FMS. Flight Crews must load the ATC provided Cleared Route into the FMS using standard operating procedures and review the clearance prior to accepting it.
3. “Squawk” should be selected in the transponder panel.

6.3 Change in Departure Procedure – Connect Downstream

A revised clearance that contains a change to only the initial portion of the flight plan and is intended to connect to a position or point on the previously accepted ATC clearance will have a “Revised RTE” header with a loadable clearance and will be followed by “REST OF ROUTE IS UNCHANGED”. Flight crews should load this amended clearance into the FMS, review the amendment before performing a FMS execute function, and then either ACCEPT or REJECT the revised clearance based on company procedures for route modifications.

```
2105z ATC UPLINK 1/2
                                     STATUS
                                     OPEN
1 { REVISED RTE. DPP. ALT.
2 { CLEARED TO DORET VIA
   ROUTE CLEARANCE
3 { LEETZ2. OCS. AFT DORET
   REST OF ROUTE UNCHGED.
   CLIMB VIA SID

   - - - - CONTINUED - - - -
                                     LOG >
ATC MESSAGE
```

Figure 12. Depiction of Revised DCL including “REST OF ROUTE UNCHANGED”

1. REVISED RTE

- a. REVISED RTE is a “Free Text” message indicating to the crew a revised route is the reason for the uplinked message. The revised header is intended to indicate to the crew what has actually been revised. Possible Revised Header TAGS that may be attached to a revised DCL may be:
 - i. RTE, DP, ALT, EXP ALT, DEP FREQ, EDCT, SQUAWK may or may not be added.

2. CLEARED TO DORET VIA ROUTE CLEARANCE

- a. In this example, the controller has received an amendment to the previously cleared ATC Clearance which connects up to the downstream waypoint DORET. VIA ROUTE CLEARANCE is the “Loadable” portion of the clearance.

3. LEETZ2.OCS, AFTER DORET REST OF ROUTE UNCHANGED

- a. LEETZ2.OCS is a departure procedure manually inserted in to the FMS.
- b. AFTER DORET REST OF ROUTE UNCHANGED indicates to the flight crew that they are cleared via their original/previously cleared DCL after DORET to destination.

6.4 REVISED DCL – Downstream Route Modification to Destination

When an Uplinked Revised Clearance is received with a route modification after the Departure Procedure transition fix, a loadable route clearance to destination will be included from a “Fix” in the previously cleared route. This type of amendment can modify any portion of the previously cleared route from the Departure Procedure Transition fix up to any point to include the arrival procedure transition fix to destination.

```
1505z ATC UPLINK 1 / 1
STATUS
OPEN
REVIS ED RTE
1 { AT ROD CLEARED ROUTE
  CLEARANCE
STANDBY
<SEND
LOAD > } 2
ACCEPT >
<REJECT
SEND >
-----
LOG >
ATC MESSAGE
```

Figure 13. Depiction of a Route Modification downstream of the DP Transition Fix to Destination

1. The controller has received an amendment to the previously cleared route of flight at waypoint “ROD”. The loadable FMS clearance will start at “ROD” and will include the amended route with an arrival procedure (if applicable) to the destination.
2. Load Prompt allows the flight crew to load the ATC amended route from “ROD” to the destination into the FMS. Use standard operating procedures to review and verify loaded route and then reply with “Accept”, “Reject” or “Standby” as appropriate.

7.0 FAQ Section (Harris Provided – TBD)

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Appendix A –B777 DCL Service Procedures

Flight Crew Procedures for DCL – B777

Audible Chime with EICAS • ATC	Responding to an Uplinked Clearance
<p>ATC Function Key.....Select</p> <p>View the message and act appropriately on the message.</p> <p><u>Verify the Altitude and Squawk as part of the uplinked Clearance.</u></p>	<p><input type="checkbox"/> ATC MCDU Key.....Select Return to the ATC Communication message and after the flight crew agrees with the ATC Departure Clearance and have verified route upload to the FMC</p> <p><input type="checkbox"/> ACCEPTSelect Standby, Reject are also available response as needed by the flight crew</p>
Request a Departure Clearance (DCL)	Manual Entry of DP and Runway
<p><input type="checkbox"/> ATC MCDU Key.....Select</p> <p><input type="checkbox"/> Clearance 4R.....Select</p> <p><input type="checkbox"/> REQUEST CLEARANCE.....Select</p> <p><input type="checkbox"/> SEND.....Select</p>	<p><input type="checkbox"/> Dept/ARR.....Select</p> <p><input type="checkbox"/> RWY.....Select</p> <p><input type="checkbox"/> Procedure.....Select</p> <p><input type="checkbox"/> Transition.....Select</p> <p><input type="checkbox"/> RTE.....Select Verify the appropriate Departure Procedure, Runway and Transition are correct against the DCL with no Route Discontinuities</p> <p><input type="checkbox"/> Execute.....Select</p>
Loading and Verifying an FMS uplinked DCL	LEGS Page / Distance check for Uplinked DCL
<p><input type="checkbox"/> Load.....Select LOAD prompt automatically updates FMC RTE page with route clearance information.</p> <p><input type="checkbox"/> FMC RTESelect</p> <p><input type="checkbox"/> VerifyDEPT Airport</p> <p><input type="checkbox"/> VerifyDEST Airport</p> <p><input type="checkbox"/> VerifyRunway If part of the Uplinked Clearance, otherwise this is a manual entry</p> <p><input type="checkbox"/> VerifyFLT NO: For Example: CAL123</p> <p><input type="checkbox"/> Verify.....Cleared Route The Departure Procedure and Runway will require manual entry if provided</p> <p><input type="checkbox"/> Activate.....Select</p> <p><input type="checkbox"/> EXECSelect to complete the RTE page upload</p>	<p><input type="checkbox"/> LEGSSelect</p> <p><input type="checkbox"/> Map Mode.....Select Step through the legs page using “Step” at 6R and observe on the Navigation Display:</p> <ul style="list-style-type: none"> ○ Waypoints and Altitude constraints agree with those on the filed flight plan and navigation charts, and ○ No discontinuities exist between waypoints <p><input type="checkbox"/> Verify that an active waypoint is depicted in 1L on LEGS page 1</p> <p><input type="checkbox"/> Verify the total route distance is proper for route of flight versus the filed flight plan</p>

Appendix B – ERROR Messaging (TBD)

Appendix C – DCL Message Format structure definition (TBD)