



# U.S. Domestic CPDLC Flight and Route Planning Guide

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# Introduction

This document is intended to be a best practices when filing for CPDLC services for both domestic and international carriers who intend to use Data Communications (Data Comm) to obtain their departure clearances. Always refer to FAA regulations, company policies or company SOP's for guidelines. Specifically, the guidance offered in this document will be targeted towards Airline Operations Center (AOC) dispatchers and flight planners. The document details best practices for the use of Data Comm and obtaining a 'Cleared as Filed' (CAF) clearance as opposed to a revised departure clearance on the first filing attempt.

The guidance offered in this document will cover specific areas about flight planning and route planning guidance. They are as follows:

1. Flight Planning Guidance for obtaining a Controller Pilot Data Link Communications (CPDLC) Departure Clearance (CPDLC-DCL)
2. Route Planning Guidance
3. Refiling a flight plan

# Flight Plan Filing Requirements

## ICAO FPL

CPDLC-DCL requires the operator to file the relevant equipage codes in the Equipage Field 10a of the International Civil Aviation Organization (ICAO) Flight Plan (FPL). To specify a preference to receive a CPDLC-DCL, the appropriate delivery preference code is filed in the DAT/ sub-field of Field 18 (Additional information box).

## Field 10a Equipage Codes

### E and Z Codes

E-codes indicate the type of service that can be received over the Aircraft Communications Addressing and Reporting System (ACARS).

The z-code is a generic code for all other equipment or capabilities which are not specified in that item and apply to that flight.

Code	Description	Notes
<b>E-Code</b>		
E1	Flight Management Computer (FMC) WayPoint Reporting (WPR) ACARS	A number of airlines routinely receive ACARS position reports from their aircraft via satellite as part of their AOC flight monitoring. These position reports can be forwarded to an ATS provider and used to replace HF voice position reports. This method of delivery for aircraft position reports is known as FMC WPR.
E2	Data link (D)-Flight Information Services (FIS) ACARS.	The flight information services provided can be weather reports and operational data.
E3	Pre-Departure Clearance (PDC) ACARS.	PDC from ATC can be received in the cockpit via the ACARS.
<b>Z-Code</b>		
Z-Code	Indicates that other equipment or capabilities which are not specified in that Item, apply to that flight.	Additional equipment or capabilities, for the aircraft shall be specified in Item 18 preceded COM/, NAV/, DAT/.

Figure 1

## J Codes

J-Codes are used to indicate what radio communication, navigation, approach aid equipment and capabilities are onboard the aircraft. These are filed in box 10a (equipment box) of the ICAO FPL.

J-Code	Description	Notes
J3	CPDLC FANS 1/A VDL Mode A	Accepted for DCL ONLY
J4	CPDLC FANS 1/A VDL Mode 2	Required media for U.S. Domestic En Route CPDLC
J5	CPDLC FANS 1/A SATCOM (INMARSAT)	
J7	CPDLC FANS 1/A SATCOM (Iridium)	

Figure 2

# Field 18 Codes

## DAT/Codes

The DAT/ codes, which are filed in Field 18 (additional information box) of the ICAO FPL, are the mechanisms which allow Federal Aviation Administration (FAA) automation to generate a CPDLC-DCL, PDC or voice clearance.

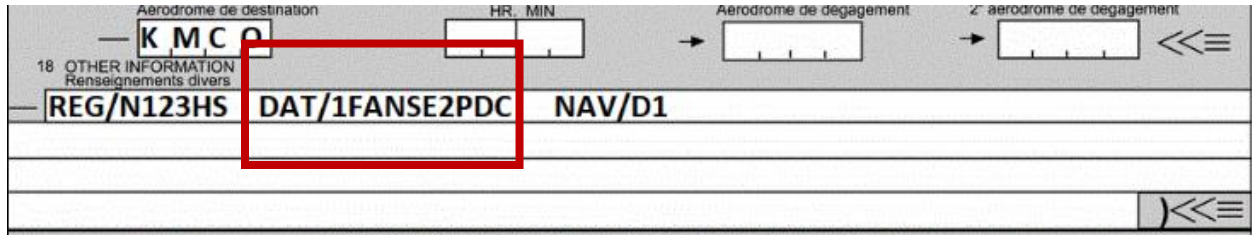


Figure 3

Additionally, the codes will be used for determining an aircraft's eligibility for U.S. domestic En Route CPDLC.

For En Route CPDLC, an option is made available for operators whose aircraft have known issues loading a route clearance with a STAR. An additional filing code has been created (FANSE) that places the STAR in an appended free text message enabling those impacted aircraft to receive a CPDLC route clearance.

## REG/Code

The nationality or common mark and registration mark of the aircraft, if different from the aircraft identification in Field 7 (flight ID).

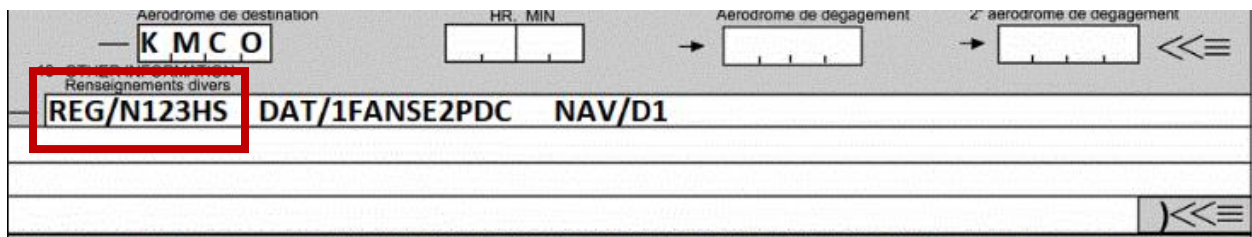


Figure 4

User Preference	Data Comm Capability Description	ICAO 2012 Field 10a	Data Comm Field 18 DAT/ Code	Comments
<b>PDC and CPDLC-DCL</b>				
PDC only*	Not ACARS equipped but gets PDC via manual means.	Z	1PDC	Some aircraft are non-ACARS equipped, and 10a is a physical equipage. Still get PDC via other means (e.g. gate printer). Optional if currently getting PDC.
PDC only*	Equipped only for ACARS/PDC	E3 Z	1PDC	Optional if currently getting PDC
PDC only*	Equipped for ACARS/PDC and FANS but wants PDC only.	E3J4x Z	1PDC	Equipped for ACARS/PDC and FANS 1/A or 1/A +, and possible other capabilities (Jx)
FANS 1/A & FANS 1/A+ CPDLC-DCL/PDC	Equipped for ACARS/PDC and FANS but wants FANS 1/A or FANS 1/A+ only for CPDLC-DCL	J4Jx Z	1FANS	Identifies US domestic preference for FANS 1/A or FANS 1/A+ CPDLC-DCL
FANS 1/A & FANS 1/A+ CPDLC-DCL/PDC	Equipped for ACARS/PDC and FANS, with primary/secondary preferences.	E3J4Jx Z	1FANS2PDC	Code number shows priority preference (e.g. CPDLC-DCL is primary preference; PDC is secondary that will be used if primary is unavailable and feasible.)
<b>PDC only and En Route Data Link Clearances</b>				
FANS 1/A & FANS 1/A+ No En Route UM80 load issues	For flights authorized for en route data link with no UM80 load issues and for PDC services only	E3J4Jx Z	1PDCFANSE	This code is to be used to obtain PDC and CPDLC enroute clearances with aircraft that <b>have no</b> en route UM80 issues.
FANS 1/A & FANS 1/A+ With en route UM80 load issues	For flights authorized for en route data link with UM80 load issues and for PDC service only	E3J4Jx Z	1PDCFANSER	This code is to be used to obtain a PDC and CPDLC en route clearances with aircraft that <b>have</b> en route UM80 load issues.
<b>CPDLC-DCL and En Route Data Link Clearances</b>				
FANS 1/A & FANS 1/A+	For flights authorized for enroute data link with no UM80 load issues.	E3J4Jx Z	1FANSE2PDC	This code is to be used to obtain CPDLC-DCL and en route clearances with aircraft that <b>have no</b> UM80 load issues.
FANS 1/A & FANS 1/A+	For flights authorized for en route Data Comm with UM80 load issues	E3J4Jx Z	1FANSER2PDC	This code is to be used to obtain CPDLC-DCL and en route clearances with aircraft that <b>have</b> UM80 load issues.
<b>En Route Data Link Clearances ONLY</b>				
FANS 1/A & FANS 1/A+ No En Route UM80 load issues	For flights authorized for En Route Data Comm with no UM80 load issues.	J4 Z	FANSE	This code is to be used to obtain CPDLC en route clearances with aircraft that <b>have no</b> UM80 load issues. (No tower DCL or PDC)
FANS 1/A & FANS 1/A+ With en route UM80 load issues	For flights authorized for en route data link with UM80 load issues.	J4 Z	FANSER	This code is to be used to obtain CPDLC en route clearances with aircraft that <b>have</b> UM80 load issues. (No tower DCL or PDC.)

Figure 5

Note: It makes no difference whether “FANS or FANSP” is filed in a flight plan. Either entry will result in a Data Comm clearance.

### Example Flight Plan

The image shows an ICAO flight plan form with several fields highlighted by red boxes and numbered callouts:

- Callout 1:** Points to Field 7 (Aircraft Identification) containing "H J R R S 1 2 3".
- Callout 2:** Points to Field 10 (Equipment) containing "SDGE3J3J4".
- Callout 3:** Points to Field 18 (Other Information) containing "REG/N123HS DAT/1FANS2PDC NAV/D1".

Other visible fields include:
 

- Priority: FF
- Message Type: FPL
- Departure Aerodrome: K J F K
- Destination: K M C
- Endurance: E /
- Survival Equipment: S / P
- Persons on Board: P /
- Emergency Radio: R / U, V, E
- Lighting: J / L
- Fluores: F
- UHF: U
- VHF: V
- Remarks: A / N
- Pilot-in-Command: C /

1. If you have an approved flight ID it goes in Field 7 (aircraft ID). For En Route CPDLC you must file a flight ID. If you don't have a flight ID enter the aircraft tail number.
2. All acceptable J codes for DCL include; J3, J4, J5, J7.  
  
(J4 is preferred)
3. 1FANS2PDC indicates the hierarchy on how you will receive a DCL clearance.  
  
FANS E is acceptable for DCL and En Route use.

Figure 6

Note: This example is not a one size fits all for equipment codes. This is to highlight an example of what a properly filed ICAO flight plan would look like for a CPDLC-DCL eligible flight.

Note: Since the aircraft is equipped for FANS (J3, J4) and PDC (E3) a receive clearance hierarchy must be established in Field 18 DAT/1FANS2PDC.



# Route Planning Guidance

This section contains route construction rules for PDC or CPDLC clearances. If the user files a flight plan that does not adhere to these rules, the ground system will not create a PDC or CPDLC clearance for the flight; clearances will then be handled via voice. These rules are in place to ensure that the clearance can be correctly loaded into an aircraft's flight navigation computer. The following definitions apply:

**Fix** - As used below, the term 'fix' means published intersections, waypoints or navaid. A fix may also be a fix-radial-distance (FRD), also known as Place Bearing Distance (PBD), or a latitude/longitude (L/L). For the purposes of this document an airport is not considered a 'fix'.

**Route Element** - Airways and fixes defining a route of flight. Departure/Arrival airports are NOT considered route elements.

## General Rules

1. Use of an airway as a route element requires a published entry and exit point for the airway (i.e..... SJN. J108. GINGR).
2. An implied airway/airway junction (i.e. no fix between airways) is NOT loadable, (i.e. J4. J65.).
3. If a named fix is published at the implied junction, it may be added to make the route loadable (e.g. J4. ABI. J65.). *Note- This is the preferred option.*
4. A navaid radial is NOT a loadable route element in a Data Comm clearance (i.e. AIR111 or ABQ092R).
5. A fix-radial-distance (FRD) may be used in place of a navaid radial or unnamed airway junction (i.e. ...TCH..TCH094074..MTU..).
6. Unpublished, named (Ghost) fixes are not loadable (i.e. KMSY...IKDP..).
  - a. A Ghost fix are waypoints typically created by pilots for use in their own random RNAV direct navigation.

## Departure Phase

1. The first route element after departure must NOT be an airway, (i.e. KPHX..J65...).
2. The first route element may be a fix, or a standard instrument departure (SID)/DP followed by the last fix on the common route, or a published transition fix. Other exit fixes are NOT loadable (i.e. KPHX..PXR..J65).

## Arrival Phase

1. The last route element prior to destination must NOT be an airway, (i.e....J78. KAMA)

2. The last route element must be a fix, or a standard terminal arrival (STAR) preceded by a published transition fix, or the first fix on the common route. Other entry fixes are NOT loadable (i.e.....J78.AMA..KAMA).
3. Arrival procedures (i.e. STARs) should be filed with a published arrival transition.

## Dynamic Routes (International Flight Plans)

When included in the filed flight plan, NAT tracks or other dynamic routes will be handled as any other initial or revised departure clearance. The following is a summary:

1. If the filed route has not changed and the flight is eligible, a 'CLEARED AS FILED' uplink message will be sent as the initial CPDLC departure clearance. The portion of the route contacting NAT tracks, as either lat/longs or name (i.e. NATW), will be considered part of the 'AS FILED' clearance.
2. If the filed route does not match the en route automation processed route and the change is inside the flight information region (FIR) boundary, then you will receive a revision. However, if the change is outside the FIR boundary, the system will not be able to create a revision and the revision will be given over voice.

## Refiling a Flight Plan

If the only change to a filed flight plan is a change in P time the operator may keep their filed flight plan by calling the tower or center to update the P-time. For all other changes (e.g. tail swap, route amendment) that require a cancelation of a flight plan the operator should cancel the filed flight plan, wait until a confirmation of cancelation is received and then file a new flight plan in accordance with steps 1-5 below.

1. For U.S. domestic flights, if it is before P-45, the old flight plan should be cancelled, a new flight plan should be filed.
2. For international destinations, the old flight plan should be cancelled, and a new flight plan filed.
3. If after P-45, the old flight plan should be cancelled from the system.
4. If an Expect Departure Clearance Time (EDCT) is in effect, then it should be handled between AOC and Command Center.
5. AOC may use remarks field to include original assigned EDCT.

*Note: For all operators, both domestic and international, it is important to remove and receive acknowledgement of cancellation and refile a new flight plan.*

## FLIGHT PLAN FILING GUIDANCE FOR U.S. DOMESTIC CPDLC

- > If a flight plan needs to be amended; cancel the old flight plan, receive acknowledgment of cancellation, then file a new flight plan.
- > **SIDs and STARs:**
  - Must be valid and include a published transition
  - If the procedure is a short cut (joined after the transition fix), a **common point** must be included.
- > **Avoid filing:**
  - NavAid radials
  - Airway to airway junctions
  - Unpublished points (ghost fixes)
  - Multiple Flight Plans



Figure 7

## Tail Swap Procedures to Avoid the CPDLC Blocked List

When it becomes necessary to swap aircraft, cancel the old flight plan with acknowledgment and refile a new flight plan with the new aircraft.

Two CPDLC flight plans on file for one registration number on the same date, time, city pair, etc. will place the aircraft registration on the Blocked list. Once the flight has been placed on the Blocked list, the flight crews will not be able to receive their CPDLC-DCL until the conflict is resolved and the blocked aircraft registration is removed from the blocked list.

All figures listed in this document are also referenced in the appendix at a larger scale.

For additional questions please contact the DCIT [dcit@L3harris.com](mailto:dcit@L3harris.com)

## Appendix A: Acronyms

Term	Description
AC	Aircraft
ACARS	Aircraft Communication Addressing and Reporting System
ADR	Adapted Departure Route
ADAR	Adapted Departure Arrival Route
AOC	Airline Operations Center
CAF	Cleared as Filed
CDR	Center Designated Route
CPDLC	Controller Pilot Data Link Communications
Data Comm	Data Communications
DCL	Departure Clearance
discon	Discontinuities
EDCT	Expect Departure Clearance Time
ERAM	En Route Automation Modernization
FAA	Federal Aviation Administration
FIR	Flight Information Region
FIS	Flight Information Services
FOC	Flight Operations Center
FRD	Fix-Radial Distance
ICAO	International Civil Aviation Organization
IFCET	Inter Facility Communications Engineering Team
IFR	Instrument Flight Rules
InFO	Information for Operators
L/L	Latitude/Longitude
NAT	North Atlantic Track
PAR	Preferential Arrival Route
PDAR	Preferential Arrival and Departure Route
PDC	Pre-Departure Clearance
PDR	Preferential Departure Route
SDB	Subscriber Database
SID	Standard Instrument Departure
SOP	Standard Operating Procedure
STAR	Standard Terminal Arrival
TDLS	Tower Data Link Services
UM	Uplink Message
VFR	Visual Flight Rules

# Appendix B: ICAO Flight Plan

PRIORITY Priorité <<= FF =>		ADDRESSEE(S) Destinataire(s)	
FILING TIME Heure de dépôt		ORIGINATOR Expéditeur	
SPECIFIC IDENTIFICATION OF ADDRESSEE(S) AND/OR ORIGINATOR Identification précise du(des) destinataire(s) et/ou de l'expéditeur			
3 MESSAGE TYPE Type de message <<= (FPL		7 AIRCRAFT IDENTIFICATION Identification de l'aéronef	
9 NUMBER Nombre		8 FLIGHT RULES Règles de vol	
13 DEPARTURE AERODROME Aérodrome de départ		10 EQUIPMENT Équipement	
15 CRUISING SPEED Vitesse croisière		16 DESTINATION AERODROME Aérodrome de destination	
LEVEL Niveau		TOTAL EET Durée totale estimée HR MIN	
ROUTE Route		ALTN AERODROME Aérodrome de dégagement	
18 OTHER INFORMATION Renseignements divers		2 <sup>ND</sup> ALTN AERODROME 2 <sup>e</sup> aérodrome de dégagement	
SUPPLEMENTARY INFORMATION (NOT TO BE TRANSMITTED IN FPL MESSAGES) Renseignements complémentaires (A NE PAS TRANSMETTRE DANS LES MESSAGES DE PLAN DE VOL DÉPOSÉ)			
19 ENDURANCE Autonomie E / HR MIN		PERSONS ON BOARD Personnes à bord P /	
SURVIVAL EQUIPMENT/Équipement de survie S / P		EMERGENCY RADIO Radio de secours R / U V E	
POLAR Polaire		DESERT Désert	
MARITIME Maritime		JUNGLE Jungle	
DINGHIES/Canots		LIGHT Lampes	
NUMBER Nombre		FLUORES Fluores	
CAPACITY Capacité		UHF	
COVER Couverture		VHF	
COLOUR Couleur		UHF VHF	
AIRCRAFT COLOUR AND MARKINGS Couleur et marques de l'aéronef D / C			
REMARKS Remarques A / N			
PILOT-IN-COMMAND Pilote commandant de bord C /			
FILED BY / Déposé par		SPACE RESERVED FOR ADDITIONAL REQUIREMENTS Espace réservé à des fins supplémentaires	

## Appendix C: Field 18 Codes

User Preference	Data Comm Capability Description	ICAO 2012 Field 10a	Data Comm Field 18 DAT/ Code	Comments
PDC and CPDLC-DCL				
PDC only*	Not ACARS equipped but gets PDC via manual means.	Z	1PDC	Some aircraft are non-ACARS equipped, and 10a is a physical equipage. Still get PDC via other means (e.g. gate printer). Optional if currently getting PDC.
PDC only*	Equipped only for ACARS/PDC	E3 Z	1PDC	Optional if currently getting PDC
PDC only*	Equipped for ACARS/PDC and FANS but wants PDC only.	E3J4x Z	1PDC	Equipped for ACARS/PDC and FANS 1/A or 1/A +, and possible other capabilities (Jx)
FANS 1/A & FANS 1/A+ CPDLC-DCL/PDC	Equipped for ACARS/PDC and FANS but wants FANS 1/A or FANS 1/A+ only for CPDLC-DCL	J4Jx Z	1FANS	Identifies US domestic preference for FANS 1/A or FANS 1/A+ CPDLC-DCL
FANS 1/A & FANS 1/A+ CPDLC-DCL/PDC	Equipped for ACARS/PDC and FANS, with primary/secondary preferences.	E3J4Jx Z	1FANS2PDC	Code number shows priority preference (e.g. CPDLC-DCL is primary preference; PDC is secondary that will be used if primary is unavailable and feasible.)
PDC only and En Route Data Link Clearances				
FANS 1/A & FANS 1/A+ No En Route UM80 load issues	For flights authorized for en route data link with no UM80 load issues and for PDC services only	E3J4Jx Z	1PDCFANSE	This code is to be used to obtain PDC and CPDLC enroute clearances with aircraft that <u>have no</u> en route UM80 issues.
FANS 1/A & FANS 1/A+ With en route UM80 load issues	For flights authorized for en route data link with UM80 load issues and for PDC service only	E3J4Jx Z	1PDCFANSER	This code is to be used to obtain a PDC and CPDLC en route clearances with aircraft that <u>have</u> en route UM80 load issues.
CPDLC-DCL and En Route Data Link Clearances				
FANS 1/A & FANS 1/A+	For flights authorized for enroute data link with no UM80 load issues.	E3J4Jx Z	1FANSE2PDC	This code is to be used to obtain CPDLC-DCL and en route clearances with aircraft that <u>have no</u> UM80 load issues.
FANS 1/A & FANS 1/A+	For flights authorized for en route Data Comm with UM80 load issues	E3J4Jx Z	1FANSER2PDC	This code is to be used to obtain CPDLC-DCL and en route clearances with aircraft that <u>have</u> UM80 load issues.
En Route Data Link Clearances ONLY				



FANS 1/A & FANS 1/A+ No En Route UM80 load issues	For flights authorized for En Route Data Comm with no UM80 load issues.	J4 Z	FANSE	This code is to be used to obtain CPDLC en route clearances with aircraft that <b>have no</b> UM80 load issues. (No tower DCL or PDC)
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## Appendix D: E & Z Code

Code	Description	Notes
<b>E-Code</b>		
E1	Flight Management Computer (FMC) WayPoint Reporting (WPR) ACARS	A number of airlines routinely receive ACARS position reports from their aircraft via satellite as part of their AOC flight monitoring. These position reports can be forwarded to an ATS provider and used to replace HF voice position reports. This method of delivery for aircraft position reports is known as FMC WPR.
E2	Data link (D)-Flight Information Services (FIS) ACARS.	The flight information services provided can be weather reports and operational data.
E3	Pre-Departure Clearance (PDC) ACARS.	PDC from ATC can be received in the cockpit via the ACARS.
<b>Z-Code</b>		
Z-Code	Indicates that other equipment or capabilities which are not specified in that Item, apply to that flight.	Additional equipment or capabilities, for the aircraft shall be specified in Item 18 preceded COM/, NAV/, DAT/.

## Appendix E: J Codes

J-Code	Description	Notes
J3	CPDLC FANS 1/A VDL Mode A	Accepted for DCL ONLY
J4	CPDLC FANS 1/A VDL Mode 2	Required media for U.S. Domestic En Route CPDLC

J5	CPDLC FANS 1/A SATCOM (INMARSAT)	
J7	CPDLC FANS 1/A SATCOM (Iridium)	

## Appendix F: Data Comm Rules Card

### FLIGHT PLAN FILING GUIDANCE FOR U.S. DOMESTIC CPDLC

- > If a flight plan needs to be amended; cancel the old flight plan, receive acknowledgment of cancellation, then file a new flight plan.
- > **SIDs and STARs:**
  - Must be valid and include a published transition
  - If the procedure is a short cut (joined after the transition fix), a **common point** must be included.
- > **Avoid filing:**
  - NavAid radials
  - Airway to airway junctions
  - Unpublished points (ghost fixes)
  - Multiple Flight Plans

