

CPDLC



Controller Pilot Data Link

Communications (CPDLC) is a two-way data-link system by which controllers can transmit non-urgent 'strategic' messages to an aircraft as an alternative to voice communications. The message is displayed on a flight deck visual display.

CPDLC was first implemented in Europe by Eurocontrol's Maastricht Upper Airspace Control Centre. Since then, many other ANSPs worldwide have implemented CPDLC. Nowadays, most aircraft flying as GAT above FL285 within the [Single European Sky \(SES\)](#) must be CPDLC equipped (with a few exceptions).

In Germany, CPDLC is only available in UACs Maastricht (MUAC) and Karlsruhe (KUAC). ACCs Bremen, Langen and München do not offer CPDLC services.

Benefits and Risks

Multiple studies describe the following benefits of CPDLC:

- Less communication on the ATC frequency
- Increased sector capacities
- More pilot requests can be dealt with simultaneously
- Reduced probability of miscommunication (e.g. due to callsign confusion)
- Safer frequency changes, hence fewer loss of communication events

The following risks can exist:

- Long and complex CPDLC messages resulting in higher workload and/or misinterpretations of ATC clearances

- Wrong messages to an aircraft or transmission of a message to the wrong aircraft
- General misinterpretation of ATC clearances
- Use of CPDLC during time-critical situations, resulting in unsafe traffic situations
- Clearances from two different controllers when establishing voice communications with the new sector while still connected on CPDLC with the previous sector



Click on the picture to see the video on Skybrary

Main Principles of CPDLC

In general, the following main principles exist for the use of CPDLC:

- **Voice and data link shall co-exist.** Pilots are required to monitor ATC's frequency and have to make an initial call after changing frequencies. Additionally, ATC can always use voice communications when necessary.
- **CPDLC shall only be used in the context of non-time-critical communications.** Time-criticality is mainly determined by the following factors: ATC traffic situation, end-to-end performance (systems and flight crew/controller response time) and recovery time. Users should be aware that while a voice response is generally expected in a few seconds, the latency of CPDLC is usually much longer (up to several minutes).
- **Only one open dialogue of the same type (climb/descent, direct, speed, heading, squawk) with the same aircraft at any given time is allowed.** For example, it is not allowed to issue two climb instructions without a response from the pilot between both messages. This is to avoid confusion and misinterpretation of ATC clearances.
- The decision to use either voice or CPDLC shall be at the discretion of the controller and/or pilot involved.
- The provision of CPDLC shall respect the following standard as provided in ICAO Annex 11, Chapter 3, par. 3.5.1: "A controlled flight shall be under the control of only one air traffic control unit at any given time".

CPDLC Operations

In Germany, CPDLC services will only be provided in the upper airspace (EDYY/EDUU). When covering upper sectors on Vatsim, controllers connected as EDWW, EDGG, or EDMM may choose to provide CPDLC service. In this case, controllers shall only allow CPDLC logons and issue CPDLC messages for aircraft within the upper airspace. For traffic using CPDLC services, CPDLC shall be disconnected by the controller when the aircraft is leaving the upper airspace.

CPDLC can be used for the following messages:

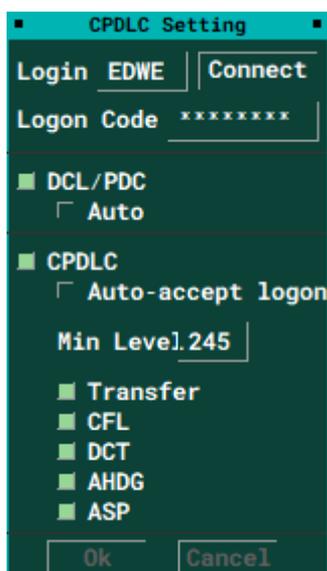
- ATC clearances (level changes incl. vertical rates, vectoring, direct routings, speed control)
- Change of SSR code
- Transfer of control and communication
- Response to CPDLC Free-Text messages

For the Vatsim environment, controllers intending to offer CPDLC services need to use the [Hoppies ACARS server](#). For Vatsim Germany, service will be provided by using the Topsy Plugin, which is implemented in all Euroscope controller packages.

Expand this box to view the CPDLC functions of the Topsy Plugin.

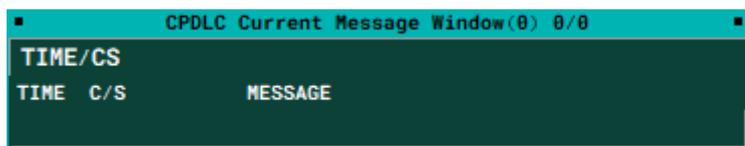
Connect to the Hoppies Server

To connect to the CPDLC server, the controller needs to enter the Hoppies Logon Code and CPDLC Login code of the desired station which can be found [here](#). Usually, the CPDLC Login code is already entered by default. You can save your Hoppies Logon Code in the Topsy directory of the Euroscope controller package (TopSkyCPDLChoppieCode.txt).



CPDLC Current Message Window

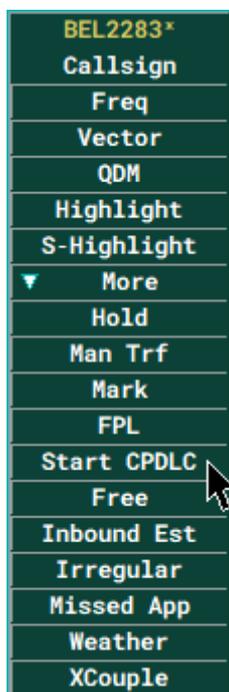
The CPDLC Current Message window shows every CPDLC transmission sent between the pilot and controller. Completed CPDLC messages will be automatically deleted after a couple of minutes.



Establish CPDLC Connection to the Pilot

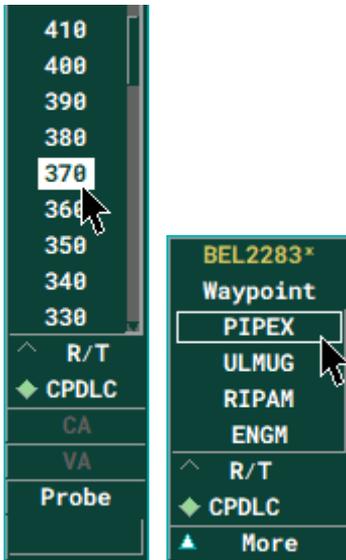
When a pilot requests to establish CPDLC connection, it will be indicated by two flashing square brackets ("[]") around the aircraft callsign in the label. Additionally, you will receive a CPDLC message in the Current Message window.

To establish CPDLC connection, the controller must answer the request by clicking on the message in the Current Message window or by using the "Start CPDLC" button in the Topsky Callsign label menu.



Issuing Clearances

CPDLC clearances can be generated by using Topsky's normal CFL/ASP/Waypoint/Heading windows. To send the CPDLC message, the controller first needs to make sure that "CPDLC" at the bottom of the window is selected. Then the controller just clicks on the desired clearance. When selecting "R/T" (radio transmission) the clearance will just be entered in the label without sending a CPDLC message. This can be particularly useful when the clearance has already been transmitted by voice communications.



Clearances issued to the pilot will be displayed in squared brackets in the label. Once the pilot confirms the clearance, it will be automatically entered in the label. To transmit vertical rates via CPDLC, the controller must first enter the assigned rate in the label and then selected to desired level in the CFL menu.

Transfer of Communications

When a pilot needs to be transferred to the next station, the controller can use the "Transfer" or "Transfer and Release" function of Topsy's Callsign menu. Besides the usual "CPDLC" and "R/T" option, there is also a "Monitor" and "Contact" option available to choose from. This option enables the controller to choose whether to send a CPDLC message to the pilot instructing to contact or to monitor the next frequency. By default the "Contact" option is selected.



Whenever the next ATC station is also connected to CPDLC, the CPDLC connection will be transferred automatically. Be aware that this function might not work for all aircraft in the simulator.

When intending to send an aircraft to Unicom/Advisory (122.800) the Free-Text option, which can be found in Topsky's callsign menu, needs to be used. When using this message, the aircraft's label will be automatically released once the CPDLC message is answered by the pilot. Additionally, the CPDLC connection will be terminated.

CPDLC Free Text

Besides the Unicom/Advisory message, there are multiple other CPDLC free text messages available. This section is highly individual. Please your Euroscope controller package's manual for further information.

Topsky Datalink Manual

Further information about Topsky's CPDLC functions can be found in the documentation folder of your Topsky directory of the Euroscope controller package.

Reverting to Voice

Usually, when a controller or pilot communicates via CPDLC, the response should be via CPDLC. When a controller or pilot communicates via voice, the response should be via voice. The following circumstances describe potential situations where the air-ground communications should revert to voice:

- When it is required to clarify the meaning or the intent of any CPDLC message
- When it is necessary to ensure the timely execution of an instruction issued by CPDLC
- When corrective actions are required with respect to unintended messages that have been sent using CPDLC
- When a system generates a time-out or an error for a CPDLC message

CPDLC Related Phraseology

The following phraseology regarding the use of CPDLC is defined in the AIP:

Deutsch	English
Failure of CPDLC	
[AN ALLE FUNKSTELLEN] CPDLC Ausfall (Anweisungen)	[ALL STATIONS] CPDLC FAILURE (instructions)
Failure of a single CPDLC message	
CPDLC NACHRICHTEN FEHLER (angemessene Freigabe, Anweisung, Information oder Anfrage);	CPDLC MESSAGE FAILURE (appropriate clearance, instruction, information or request)
To correct CPDLC clearances, instructions, information or requests	

Deutsch	English
IGNORIEREN SIE CPDLC (Art der Nachricht) NACHRICHT, TRENNUNG (korrigierte Freigabe, Anweisung, Information oder Anfrage)	DISREGARD CPDLC (message type) MESSAGE, BREAK (correct clearance, instruction, information or request);
To instruct all stations or a specific flight to avoid sending CPDLC requests for a limited period of time	
[AN ALLE FUNKSTELLEN] [BIS AUF WEITERES] KEINE CPDLC ANFRAGEN MEHR SENDEN [(Gründe)]	[ALL STATIONS] STOP SENDING CPDLC REQUESTS [UNTIL ADVISED] [(reason)]
To resume normal use of CPDLC	
[AN ALLE FUNKSTELLEN] NEHMEN SIE DEN NORMALEN CPDLC-BETRIEB WIEDER AUF	[ALL STATIONS] RESUME NORMAL CPDLC OPERATIONS

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