

# **CPDLC A Pilot's Perspective Presentation and Talking Points for PBN RCP/RSP Workshop Paris 20-22 FEB**

***Objective: To illustrate crewmember CPDLC issues and the affect on PORT***

CPDLC is a great step forward in procedural airspace allowing crewmembers to communicate directly with ATC. In surveillance airspace it is a “nicety,” but it is not always as simple as it might seem.

[Conduct presentation with as much individual / group interaction as possible. Create scenarios with the slides shown and facilitate discussion]

## **FAMILIARITY**

***“Crewmember “use” of CPDLC in procedural airspace pales in comparison to that of the controller. Some crewmembers are in procedural airspace once a year, some less.”***

***“CPDLC in surveillance airspace can be even more confusing because of the various levels of functionality within the ATSU’s.”***

Discuss the learning curve for the ATSU’s

Discuss currency...discuss the fact that crewmembers from all regions are flying globally...we all need to be on the “same page.”

- Europe
- Middle East
- Asia
- South America
- US

\*\*\*Discuss different levels of functionality (in both procedural and surveillance airspace) and the necessity of the GOLD to foster a “global standard” for all ATSU’s.\*\*\*

- CDA (Welcome Message)
- Revised Estimates
- CPDLC Suffix (procedural airspace)

How do / can you "train" CPDLC?

- What processes are effective?
  - Books (misinformation)
  - Bulletins and DVDs
  - Hands on!!!

## DESIGN

***“The CPDLC design differences in Boeing and Airbus are significant.”***

Although the design is built around message elements and preformatted free text, crewmembers are generally oblivious to the concept of the design or of the differences in how Boeing and Airbus display response prompts (ACCEPT / WILCO or REJECT / UNABLE).

Discuss the “steps” required to respond to uplinks or to generate downlinks.

- On Boeing a/c the crew responds with an ACCEPT or REJECT which then generates and sends the appropriate ATC response.
- On Airbus the crew is offered the appropriate response, but after selecting it, they have to then SEND the reply.

The Boeing design is “simpler, (IMHO)” but “removes” the proper phraseology that all pilots have been taught. Only the prehistoric B767 shows what response has been generated.

*[Show slide]*

Discuss how crews of each type aircraft interface with CPDLC differently.

*[Slides]*

## MESSAGES

This presentation is centered on the most common CPDLC messages in procedural and surveillance airspace. It is important to understand the significance of “solicited and unsolicited” messages as it relates to PORT. All references are “Boeing / Airbus.”

- ATC COMM ESTABLISHED / ACTIVE ATC
- Welcome Message
- Climb Request
- Conditional Clearances
- Weather Deviation
- Route Uplinks
- Negotiation Request WHEN CAN YOU ACCEPT
- Contact Message

### ATC COMM ESTABLISHED / ACTIVE ATC

\*\*\*By current design crewmembers would expect that Current Data Authority (CDA) is established with the ATC COMM ESTABLISHED / ACTIVE ATC message; that is not the case and it is sure to create more issues going forward.\*\*\*

*[Slide]*

Welcome Message

The “unsolicited” Welcome Message, although intuitive to most, is only used in a few ATSU’s at this time. This is a global standardization issue.

[Slide]

Climb Request

“Solicited” Climb Request

There is confusion amongst crewmembers when applying climb “qualifiers” to a request. The controller can either approve the climb or not, regardless of the qualifier. There have been instances where all 5 qualifiers were selected in the request.

Once a request is made, the crew (from a PORT perspective) should be engaged in communication process and anticipating an uplink response.

Here is an example of the controller’s response to a crew’s request to climb from FL 310 to FL 330.

UNABLE.

or

UNABLE.  
DUE TO TRAFFIC.

Both of these message elements “close” the message. The crew will not be provided any “prompts.” However some controllers or (ATSUs) might send...

UNABLE HIGHER DUE TO TRAFFIC [ask someone what this means to them]

or

UNABLE ANY HIGHER DUE TO TRAFFIC [ask what this means]

These uplinks because of the FREE TEXT insertion will generate an ACCEPT / ROGER prompt. This can be confusing to the crew.

The first 3 uplinks leave confusion as to whether the traffic is at FL 320 or FL 330. The 4<sup>th</sup> example makes it very clear to the crew that higher is not available. From a PORT perspective if the crewmember is familiar with receiving the first of second message, they may not respond to the 3<sup>rd</sup> or 4<sup>th</sup>. This is “familiarity.”

[Audience participation...what do these messages mean to you...what do you expect them to mean to us]

*[Show slides for all]*

Discussion on “climb requests” via voice in a surveillance environment and how that differs from CPDLC from a pilot’s perspective. What does a crewmember dialogue does a crewmember expect to hear when asking for a higher altitude?

### Conditional Clearances

Conditional clearances can pose significant issues for crewmembers for an interpretation and PORT perspective.

The use of AT / BY or AFTER / BEFORE can be confusing for those who do not have English as a first language. Execution of the clearance can be confusing, complicated and time consuming depending on aircraft type and crew training.

Although some aircraft have FMS “reminders,” no current aircraft (to my knowledge) are capable of “programming the FMS” with the conditional clearance.

*[Show slides and discuss the “process”]  
[Show slide with “extreme” conditional clearance]*

### Weather Deviation

This functionality is displayed to crewmembers in various ways. On the Airbus and Boeing 777, the OFFSET and WEATHER functions are “separate,” but on the B767 a request for deviation DUE TO WEATHER is part of the OFFSET request.

There has been confusion for crewmembers as to how to properly make the request for a “weather deviation.” Crews have requested an OFFSET not realizing that if approved, they must establish the appropriate OFFSET and not maneuver for weather.

Additionally there can be confusion when trying to populate the AT field for an OFFSET or ROUTE REQUEST. On the B767 there are 5 spaces under the AT field. If your intention is to populate a “time” and you are familiar with the fact that any times generated on the FMC require adding “Z,” then you will be surprised to learn that on the AT field the “Z” if used will generate a INVALID ENTRY. In fact, the “Z” needs to be left off and it will then auto populate. How confusing is that?

There is also confusion as to “what to do” if ATC denies the request for traffic. It is not always apparent to the crew that the traffic could be 50nm away and that they always have the option of using the Weather Contingency procedures documented in PANS / ATM 4444. ATSU’s should “offer” more information on the reason for UNABLE DUE TO TRAFFIC.

\*\*\*A simple FREE TEXT stating traffic is 50nm to the right would give considerable comfort to the crew to use the appropriate contingency procedures.\*\*\*

The GOLD (5.7.4.1 a) mentions the option of requesting a DIRECT at the end of a weather deviation; this is a difficult / impossible process for most ATSU

a) *If during the weather deviation, the flight crew receives a clearance to proceed direct to a waypoint – and the flight crew accepts (WILCO) this clearance – the aircraft is considered to be on the cleared route. Therefore, the flight crew should send the **BACK ON ROUTE** report after they execute the “direct to” clearance.*

*[Show slides]*

Discussion on “weather deviations” via voice in a surveillance environment and how that differs from CPDLC from a pilot’s perspective.

#### Route Uplinks (Unsolicited or Solicited)

UM 74 CLEARED DIRECT TO [xxxx] or UM 80 CLEARED [ROUTE] CLEARANCE

Both of these uplinks generate a LOAD prompt. The crew should LOAD the FMS and evaluate the routing. The crew would REJECT / UNABLE the uplink for any of these messages.

- PARTIAL CLEARANCE LOADED / LOAD PARTIAL
- UNABLE TO LOAD CLEARANCE / LOAD UNAVAIL
- PARTIAL ROUTE X UPLINK / LOAD PARTIAL
- INVALID ROUTE UPLINK / NO LOAD

Unsolicited route uplinks can be very time consuming from a PORT perspective because of the loading and verification process (especially with a full route clearance). In most cases STANDBY should be selected by the crew.

\*\*\*Discuss ICAO Radio Phraseology and the HMI disconnects\*\*\*

*[MT and CHS uplinks]*

Discuss the fact that full route uplinks will require the crew to re-load the winds.

\*\*\*Discuss the fact that ATSU need to “embrace” all route uplinks going forward as mitigation for RLat track changes, volcanic activity and potential radar outage.\*\*\*

#### WHEN CAN YOU ACCEPT

This uplink cannot be “seen” or trained to, because it only “appears” when an ATSU uplinks this message. Crews can be easily confused as to how to respond to this message.

*[Show slides]*

### Contact Messages

The “unsolicited” CONTACT message is a perfect example of how PORT can be totally ignored. Crews will read the message and “mentally” acknowledge by then dialing in the frequency and never pushing the ACCEPT / WILCO prompt.

[Audience participation]

[Show slides]

### **Summary / Questions**

CPDLC is different from DCPC in design and functionality and that lends itself to moments of confusion (read “time loss”) as it relates to PORT.

Discuss all of the above functionalities and how they would be handled in a DCPC environment.

- Altitude request
- Weather deviation
- Change in route

Discuss region of operation

PORT from a cockpit perspective is adversely affected by

- FMS, ATC, and ICAO radio phraseology differences
- Regional vs. worldwide procedures
- Variances in cockpit functionality
- A lack of standardized PM / PF defined duties
- Crews can be trained to respond “rapidly,” but they must respond accurately

***“Pilots, by nature, will do their best to respond to your instructions...”***