**1900z**       **ATC UPLINK**       **1/3**

## CONTROLLER PILOT DATA LINK COMMUNICATIONS

Controller Pilot Data Link Communication Departure Clearance Services (CPDLC-DCL) is one segment of the Future Air Navigation System (FANS) that has been recently implemented in the contiguous 48 states at local Tower Data Link Service (TDLS) equipped facilities to deliver departure clearances and revised departure clearances prior to takeoff.

As any new system is implemented, some "bugs" may be expected, and CPDLC-DCL is no exception. ASRS is receiving reports suggesting that crews are experiencing problems while using CPDLC-DCL for its intended objective. The problems that are experienced point to sources from system architecture, to precise meanings of specific words and formats used in the CPDLC-DCL syntax, to basic interpretation and understanding of the CPDLC-DCL information protocols and operational procedures.

This month, *CALLBACK* shares reported incidents of complications that arose from the crews' use of CPDLC-DCL to obtain departure clearances and revised departure clearances. While CPDLC-DCL offers many improvements and advantages over voice and Pre-Departure Clearance (PDC), some issues remain as we transition to this new system. As these examples may hint, ideas will emanate from the cockpit and formal solutions will be devised.

## Cautious Pilot Distrusts Link Communications

This Air Carrier Crew clarified an initial question they had about a revised departure clearance. Curiosity over the revised SID and transition that had not been "properly" LOADED resulted in a route portion that was manually loaded but not included in the clearance.

■ *During preflight, we received a revised clearance via CPDLC. The change was from the TRALR6.DVC to the STAAV6.DVC. I verified [the] clearance and received a full route clearance over the radio. When the LOAD feature was selected in CPDLC, the new revised route did not LOAD into the ROUTE page properly. It still showed [the] TRALR6. DVC, but now it had a discontinuity. At this point, I had to load the route manually. When I did load the STAAV SIX, however, I failed to select the DVC transition, [so the FMC] now had point STAAV direct to LAA in the LEGS page. When we did the route verification later, during the preflight, we*

*both failed to detect the missing transition that included the points TRALR, NICLE, and DVC.*

*This went unnoticed until passing point STAAV on the departure. That is when ATC queried us if we were headed to point TRALR. We indicated to ATC that we were direct LAA. He re-cleared us to TRALR to resume the departure. There was nothing significant to report for the rest of the flight.*

## Complications Perceiving Data Link Changes

After using CPDLC to obtain their clearance, this Air Carrier Crew saw no indications that their clearance had been revised. It appeared the same as the filed route, so they did not LOAD it. ATC soon called them off course.

■ *Prior to departing SNA we loaded the FMC using normal procedures…. We received a ready prompt but did not get a clearance. Shortly before push we still had not received a CPDLC clearance, so we requested a clearance via PDC. We got a PDC reply message stating to use CPDLC, and simultaneously a clearance was uploaded to the FMC ATC page. The clearance showed our departure and transition as filed, as well as the altitude restrictions, expected altitude, squawk, and departure frequencies as we expected to see. The ATC page did not state that it was a revised clearance or route. All obvious indications were [that] our clearance was unchanged from the filed route. A LOAD prompt and ACCEPT prompt were shown. We ACCEPTED the clearance, but because we had already loaded the flight plan, we did not LOAD the flight plan sent via CPDLC.*

*We departed as normal. Once airborne passing 10,000 feet, we received an ACARS flight progress print out that showed our originally filed course. After passing TRM, ATC stated they showed us off course. They gave us a revised route clearance…. There was no print out of our clearance to reference, and since the CPDLC did not display the full route clearance, we had difficulty tracking down whether or not there was actually a change to our originally filed route. We were able to find a LOAD prompt on page 3 of the ATC clearance page. When we selected LOAD, a new route was LOADED to the FMC, which was different from our originally filed route. We discovered our route had, in fact, been changed via CPDLC. We erased the change since we already had a new route assigned by ATC airborne and continued uneventfully to [our destination].*

# Complex Presentation — Desired Learning Cumbersome

Non-intuitive wording and convoluted clearance procedures coupled with incomplete systems knowledge caused this Crew to misinterpret the message that their clearance had been revised. The result was another call off course.

■ *We received our departure clearance via CPDLC. During my preflight, I loaded the FMC with the route we were given on our release paperwork (PORTT THREE DEPARTURE). Our release had the following FMS route: KEWR BIGGY PTW J48 BYRDD J230 SAAME STEVY HVQ UNCKL MAUDD4 KSDF. When it came time to log on to the CPDLC, the Captain and I received the following [departure clearance]: CLEARED ROUTE CLEARANCE ORIGIN: KEWR DEST:KSDF ARRIVAL: DARBY 5.UNCKL +LOAD NEW RTE TO KSDF+ EWR2, CLB VIA SID EXC MAINT 2500FT EXPECT FL340 10 MIN AFT DP, DPFRQ 119.2 SQUAWK 1534, CTC GROUND 121.8 FOR TAXI.*

*When we saw that this was a change, I manually changed the SID to the NEWARK TWO off of Runway 22R. I did not select the LOAD prompt as I did not see any other change to our clearance. I believed our clearance was now the NEWARK TWO (flown in LNAV), and our first fix was still BIGGY then PTW, etc. The Captain and I agreed on this. I printed the CPDLC clearance, folded it, and laid it on the center console.*

*After takeoff, we were handed off to Departure Control. He cleared us to fly directly to a fix which neither the Captain nor I saw on our route. He said, "Don't you have the PARKE J6" on your routing. We said, "Negative, we have BIGGY PTW J48." He then just told us to fly a heading. He came back a short time after that and told us to fly directly to LRP and join J6 and expect a further clearance later. He did come back shortly thereafter, and told us to fly J6 to UNCKL, then the arrival....We obviously knew we had been expecting something different than the Controller had been, so I picked up the "printed" copy of the CPDLC clearance we had received, and on it was also the following: PARKE J6 UNCKL Note that this was NOT on the original CPDLC clearance we looked at on the FMC. I don't know if it had been truncated off due to space, or it had been inadvertently left off or what, but we both went back and looked and noticed this. That was why we thought the only change to our clearance was to the NEWARK TWO, [while keeping] the same fixes as we originally had on our paperwork (i.e. BIGGY PTW J48).*

*Contributing factors to this confusing situation are numerous. I now know that I am supposed to select the LOAD prompt when we have a change to our routing.... The method we are transitioning into with respect to getting our clearances via CPDLC is very confusing. The wording...*

*on the FMC is not intuitive, and the overall procedure... is very convoluted.... We now receive our clearances in several different ways, at different airports, and in different airplanes, [which] all lead to a higher chance of mistakes.*

# Complicated Process Destines Lowered Cognizance

This CPDLC message arrived at precisely the wrong time. The Crew's attention was diverted, and their situational awareness suffered as they attempted to eliminate the confusion generated when they could not quickly resolve the revised clearance CPDLC message.

■ *We were taxiing out of a very congested, weather-impacted, JFK airport the other day. The ground frequency was non-stop due to long taxi routes because of 20 mile in-trail spacing for departing aircraft in all directions. A CPDLC message [reading] "THIS IS A REVISED CLEARANCE" appeared with no other information. No revised route [was] included. [We] spent [the] next 5 to 10 minutes heads down, while taxiing, trying to figure out what was happening, in addition to eventually calling Clearance Delivery on the radio, and Dispatch. [There was] no place to pull out of [the] way due to long taxiways with no exits. And, we were getting automatic ACARS messages [that we] must be airborne in 15 minutes due to [the] 9 hour flight time restriction. A simple printout of the revised clearance would have resolved the issue in a few moments and would have been much more intuitive....*

*The current system of having an ATC clearance, current or revised, stored on multiple, disjoint pages of the ACARS or FMS display is confusing and causes excessive heads down time while taxiing. It will cause a gross navigational error,... is a defective system, and is going to harm someone.*

# Common Precautions Demystify Link Confusion

This Air Carrier Crew noticed an ambiguity in their departure clearance. Although the syntax was confusing, Clearance "cleared up" their misunderstanding.

■ *The First Officer loaded [the filed route] into the FMC before requesting a CPDLC clearance. The clearance came back, "CLEARED ROUTE CLEARANCE. FREE TEXT. POM9.GMN. FREE TEXT CLB VIA SID EXC MAINT 14000FT." The First Officer noticed a LOAD prompt, and [saw that] the new route [read], "DIRECT GMN DIRECT RGOOD RGOOD.EMZOH3.SKIZM." Because we were now confused, we called Clearance to see if we were now filed direct to GMN, but they cleared up our confusion. We were still on the POM9.GMN.*

| ASRS Alerts Issued in October 2016 | |
|---|---|
| **Subject of Alert** | **No. of Alerts** |
| Aircraft or Aircraft Equipment | 5 |
| Airport Facility or Procedure | 5 |
| ATC Equipment or Procedure | 1 |
| Hazard to Flight | 1 |
| **TOTAL** | **12** |

| October 2016 Report Intake | |
|---|---|
| Air Carrier/Air Taxi Pilots | 4,368 |
| General Aviation Pilots | 1,255 |
| Controllers | 498 |
| Flight Attendants | 404 |
| Military/Other | 336 |
| Mechanics | 205 |
| Dispatchers | 159 |
| **TOTAL** | **7,225** |