FAA NEXTGEN DATA COMM

TOWER SERVICE: CPDLC DCL
NEW OPERATOR INTRODUCTION

HARRIS® TECHNOLOGY TO CONNECT, INFORM AND PROTECT™

Agenda

- Data Comm Basics

- Benefits of Data Comm

- Departure Clearance Explanation

- Operator Steps to Participation

- Data Comm Operator Documentation

- Airport Tower Rollout Schedule

Data Communication Basics

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.

Data Comm Overview

Provides data communications between the cockpit and controllers to supplement voice communications

Air traffic control (ATC) clearances, instructions, traffic flow management, flight crew requests and reports

Provides direct link between ground automation and flight deck avionics

Transformational program critical to the success of NextGen operations

Provides infrastructure supporting other NextGen programs and operational improvements

Enables efficiencies not possible using current voice system

Program Services Roadmap

HARRIS®

| CY | | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 | |

Segment 1 Phase 1 - Tower Service

IOC — Controller-Pilot Data Link (CPDLC) Departure Clearances (DCL)

Segment 1 Phase 2 - En Route Services

Initial En Route Services

IOC
- Transfer of Communications
- Initial Check-In
- Altimeter Settings
- Altitudes
- Speeds (Limited)
- Crossing Restrictions (Limited)
- Airborne Reroutes / Go Button
- Controller Initiated Reroutes (Limited)
- Direct-to-Fix (Limited)

Baselined May 2012

Baselined October 2014

To be Baselined FY2016

Full En Route Services

IOC
- Controller Initiated Routes (Full)
- Direct-to-Fix (Full)
- Crossing Restrictions (Full)
- Advisory Messages
- Holding Instructions
- Speeds (Full)
- Stuck Microphone
- Tailored Arrivals
- Beacon Codes
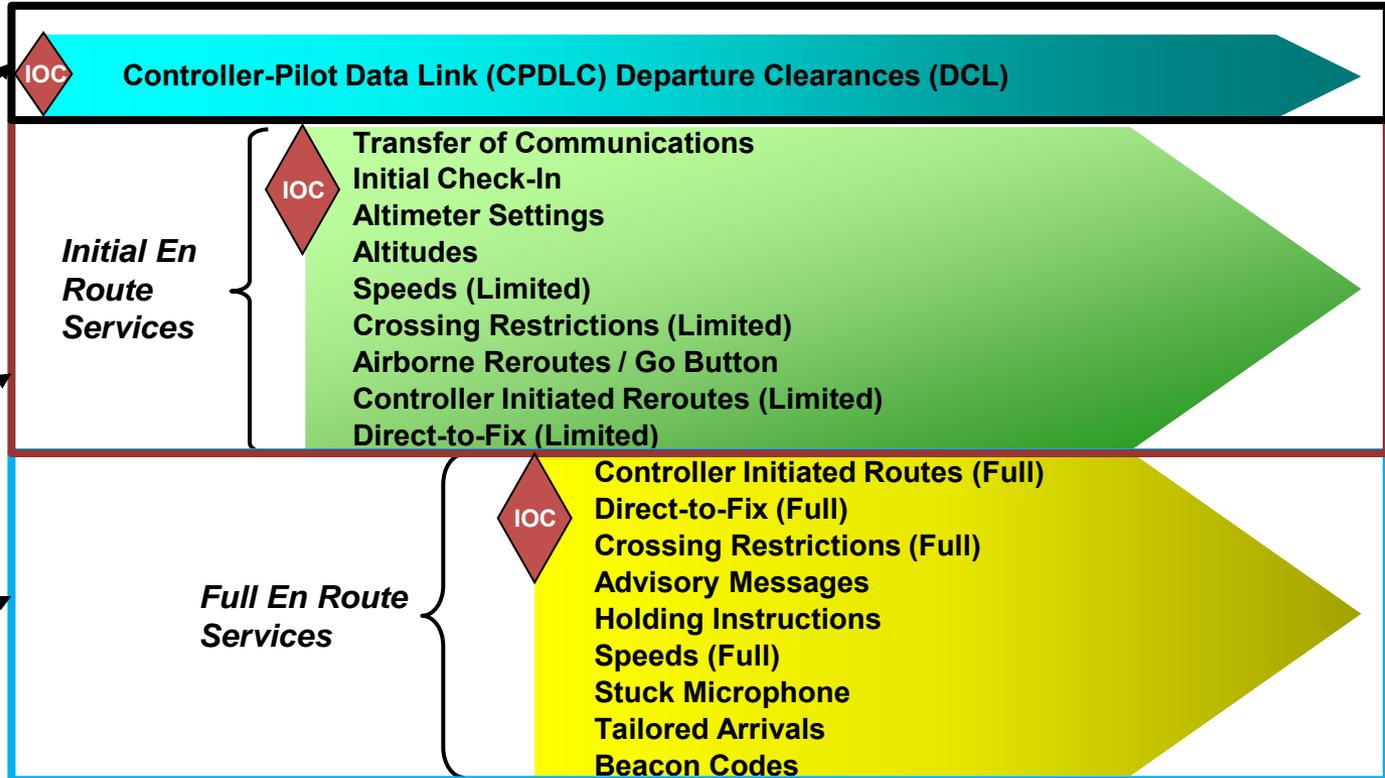
Avionics

FANS 1/A over VDL-2 transitioning to ATN

Ground System

Future Air Navigation System (FANS)

Aeronautical Telecommunications Network (ATN)

Segment 2 - Advanced Services

IOC
- 4D Trajectories
- Dynamic RNP
- Adv Flt Int Mgt with ATC winds
- D-TAXI

Benefits of Data Comm

HARRIS®

Reduce communication time between controllers & pilots

Improve re-routing around weather and congestion

Increase flexibility and accommodation of user requests

Enable NextGen Initiatives & Trajectory-Based Operations

Throughput/Efficiency

- Delay
- Fuel Burn
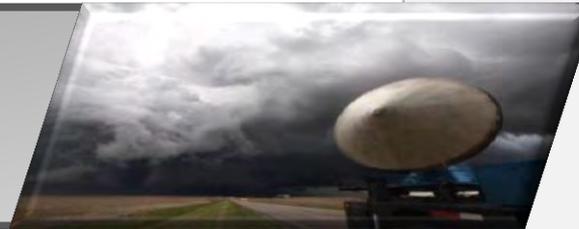
Controller Pilot/Efficiency

- Communication Time
- Controller Workload

Environmental

- Emissions (CO_2)

Safety

- Read/hear back errors
- Loss of Comm events

Departure Clearance

CPDLC DCL

- Cleared as filed
  - Flight Crew logs into airport at any time (Session established when next step occurs)
  - As Clearance Delivery approves flight plan, a session will be established and the clearance is sent directly to flight deck
  - For operators with a Flight Operations Center (FOC), dispatch copy of clearance and pilot response is sent to FOC.

- Revisions to clearance
  - Revised clearances are sent directly to flight deck.
  - Able to be loaded by crew.
  - For operators with an FOC, dispatch copy of all revisions and pilot responses are also sent to FOC.

Pre-departure Clearance (PDC)

- Flight cleared as filed
  - PDC is delivered to operator via service provider (e.g., ARINC/SITA)
  - If operator has an FOC, then FOC may be responsible for getting the clearance to the flight deck

- Revisions to clearance
  - Prior to P-30, PDC is not sent and clearance is delivered via voice.
  - After P-30, PDC is cancelled and new clearance is delivered via voice.

Current DCL Operation

Normal Push-DCL Operations

```
┌─────────────────┐        ┌──────────────┐
│   Controller    │        │  Pilot Logon │
│ Processes DCL   │        │              │
└────────┬────────┘        └──────┬───────┘
         │        ( + )           │
         └──────────┼─────────────┘
                    │
┌──────────────┐   ┌▼──────────────┐
│  Controller  │──►│  TDLS Sends   │
│  Processes   │   │     DCL       │
│  Revision    │   └──────┬────────┘
└──────▲───────┘          │
       │         ┌────────▼──────────────┐
       │         │ Pilot Receives,       │
       │         │ Reviews, Accepts &    │
       │         │ Loads DCL             │
       │         └────────┬──────────────┘
  Yes  │                  │
       └──────◄ Clearance Revisions? ►
                          │
                         No
                ┌─────────▼────────┐
                │  Aircraft        │
                │  Departs         │
                └─────────┬────────┘
                ┌─────────▼────────┐
                │    Session       │
                │   Termination    │
                └──────────────────┘
```
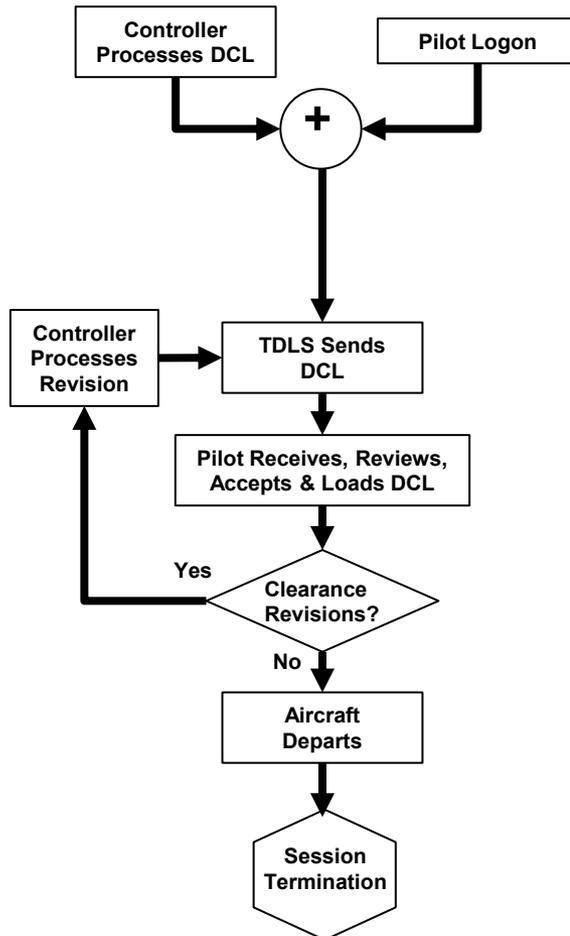
Non-normal Push-DCL Operations Examples

```
┌─────────────────────┐         ┌─────────────────────┐
│ Pilot Logon/        │         │ Pilot Logon/        │
│ Controller          │         │ Controller          │
│ processes DCL       │         │ processes DCL       │
└──────────┬──────────┘         └──────────┬──────────┘
┌──────────▼──────────┐         ┌──────────▼──────────┐
│ TDLS already        │         │ Pilot Requests DCL  │
│ uplinked a          │         │ after accepting     │
│ clearance, but not  │         │ initial clearance   │
│ yet Pilot accepted. │         └──────────┬──────────┘
└──────────┬──────────┘         ┌──────────▼──────────┐
┌──────────▼──────────┐         │ TDLS Sends          │
│ Pilot Requests DCL  │         │ Full Route          │
│ while Clearance is  │         │ Clearance           │
│ Pending             │         └─────────────────────┘
└──────────┬──────────┘
┌──────────▼──────────┐   ┌──────────────┐
│ TDLS Sends          │──►│ Pilot Acks   │
│ "Acknowledge        │   │ Clearance    │
│ Pending Clearance"  │   └──────────────┘
└─────────────────────┘
```
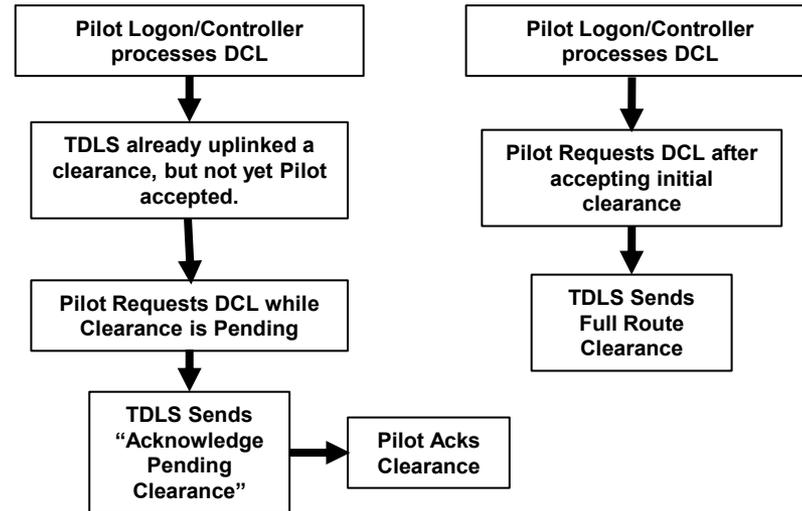
Operator Steps to Participation

- Determine equipage
  - FANS 1/A and VDL Mode 2 or VDL Mode 0 (Plain Old ACARS) required
- Establish or Update OpSpec A056 for Part 121, 135, 91K or A003 for Part 129
  - Contact your FAA POI
  - Not required for Part 91 operators
- Optional: Submit entry into FAA subscriber database to receive dispatch copies
  - Generally coordinated through flight planning service provider
- File appropriate equipment code in field 10a of ICAO flight plan
  - J3 for FANS 1/A over VDL Mode 0
  - J4 for FANS 1/A over VDL Mode 2
- File desired DAT/ code in field 18 of ICAO flight plan
  - Recommend DAT/1FANSP2PDC for DCL flights
  - This establishes the desired hierarchy for receiving departure clearance (e.g. DCL, then PDC, then voice)
- Distribute flight crew materials
  - Updates to SOP and required training bulletins
- Begin use of the CPDLC DCL service.
  - Currently available as SLC, IAH, and HOU. Rolling out to 53 additional US sites in 2016

Data Comm Operator Documents

CPDLC Departure Clearance End to End Description

This document describes the Future Air Navigation System (FANS) 1/A Controller Pilot Data Link Communication (CPDLC) Departure Clearance (DCL) for the Data Comm system that is being deployed by the Federal Aviation Administration (FAA) in 2016, from an end-to-end view.

CPDLC Demonstration Video

Teaser Video

Full Video

.
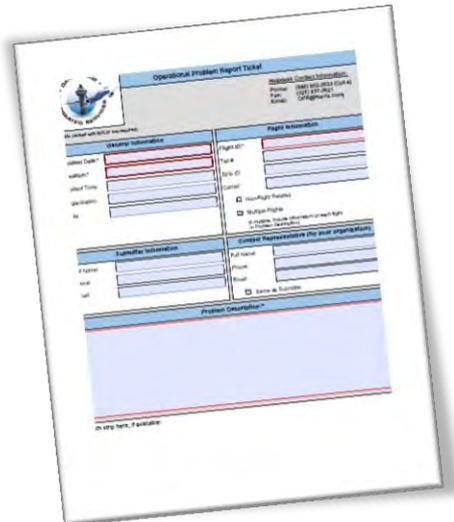
Ops Problem Reporting
Directions on how to contact the Data Comm team regarding operational problems.
Operational Problem Report Ticket
Please use this ticket to report all issues

Data Comm Flight Deck Documents

Flight Deck

Flight Desk User Guide

The Flight Desk User Guide will assist in bringing the flight crew up to speed on the Data Comm process within the cockpit.

Flight Deck Brief PowerPoint

PDC versus DCL overview presentation.

CPDLC DCL Crew Job Aid

Tablet & Print versions available

Airport Tower Rollout 2016

Over the course of 2016 Data Comm will be launched at airport towers across the country for the first stage of implementation. This initial stage of service is referred to as Segment 1, Phase 1 (S1P1) Services.

CPDLC DCL (S1P1) Services

The Logon Service for aircraft to request Data Comm Services and DCL Service for delivering initial and revised departure clearances to aircraft prior to take-off will be implemented in S1P1. This service will be provided to aircraft equipped with FANS avionics.

Note that in S1P1, the current Pre-Departure Clearance (PDC) capability will be augmented to incorporate DCL service. The legacy PDC service will continue to provide current capabilities after Data Comm is implemented.

Enhancements of the DCL service over PDC are:
- DCL allows the Clearance Delivery (CD) Controller to dialog via A/G data communications directly with the pilot.
- DCL permits the CD Controller to issue revised DCLs as required
- DCL service includes the ability to request and receive information specifically for DCL flight gate information from the AOC. This capability will be used to assist with surface traffic management.

S1P1 Tower Service Implementation Waterfall

Key Sites

Site Name	Site ID	ARTCC ID	IOC
KS 1: Salt Lake City	SLC	ZLC	08/07/15
KS 2: Houston Intcl	IAH	ZHU	09/03/15
KS 3: Houston Hobby	HOU	ZHU	09/10/15

Group A

Site Name	Site ID	ARTCC ID	IOC
New Orleans	MSY	ZHU	01/21/16
Austin	AUS	ZHU	02/04/16
San Antonio	SAT	ZHU	02/22/16
Los Angeles	LAX	ZLA	03/14/16
Las Vegas	LAS	ZLA	03/28/16
San Diego	SAN	ZLA	04/11/16
John Wayne	SNA	ZLA	04/25/16
Burbank	BUR	ZLA	05/09/16
Ontario	ONT	ZLA	05/23/16
San Francisco	SFO	ZOA	06/14/16
Oakland	OAK	ZOA	06/28/16
San Jose	SJC	ZOA	07/13/16
Sacramento	SMF	ZOA	07/27/16
Phoenix	PHX	ZAB	08/17/16
Albuquerque	ABQ	ZAB	08/31/16
Seattle	SEA	ZSE	09/22/16
Portland	PDX	ZSE	09/22/16
Dallas Love	DAL	ZFW	10/13/16
Dallas FTW	DFW	ZFW	10/27/16

Group B

Site Name	Site ID	ARTCC ID	IOC
Louisville	SDF	ZID	02/10/16
Indianapolis	IND	ZID	03/14/16
Memphis	MEM	ZME	04/04/16
Nashville	BNA	ZME	04/18/16
Denver	DEN	ZDV	05/09/16
Atlanta	ATL	ZTL	05/23/16
Charlotte	CLT	ZTL	06/07/16
Jacksonville	JAX	ZJX	06/28/16
Orlando	MCO	ZJX	07/13/16
Miami	MIA	ZMA	08/03/16
Ft Lauderdale	FLL	ZMA	08/17/16
Tampa	TPA	ZMA	08/31/16
Palm Beach	PBI	ZMA	09/15/16
St Louis	STL	ZKC	10/06/16
Kansas City	MCI	ZKC	10/20/16
Minn-St Paul	MSP	ZMP	11/10/16

Group C

Site Name	Site ID	ARTCC ID
Newark	EWR	ZNY
J F Kennedy	JFK	ZNY
La Guardia	LGA	ZNY
Teterboro	TEB	ZNY
Westchester	HPN	ZNY
Philadelphia	PHL	ZNY
Boston	BOS	ZBW
Providence	PVD	ZBW
Bradley	BDL	ZBW
Detroit	DTW	ZOB
Cleveland	CLE	ZOB
Pittsburgh	PIT	ZOB
Balt/Wash	BWI	ZDC
Dulles	IAD	ZDC
Reagan	DCA	ZDC
Raleigh/Durham	RDU	ZDC
Chicago Midway	MDW	ZAU
Chicago O'Hare	ORD	ZAU

TDLS Sites Color Key

CPDLC DCL Site	
Site Operational	

- Waterfall reflects **challenge** schedule dates (calendar year)
  - Baseline schedule Tower deployment dates are 2016-2019
- Waterfall validated by stakeholder community through the NIWG and aligned with operator plans for avionics equipage
- Tower Phase provides infrastructure for En Route Phase – Initial Services deployment 2018-2021

TEB & HPN Test & Deployment Schedule

KTEB			ZNY
DFV Dry Run	14-Mar	**WJHTC**	
	15-Mar	**UPS / WJHTC**	
	16-Mar	**WJHTC**	
File & Fly	17-Mar	25-Mar	

KHPN			ZNY
DFV Dry Run	28-Mar	**WJHTC**	
	29-Mar	**UPS / WJHTC**	
	30-Mar	**WJHTC**	
File & Fly	31-Mar	8-Apr	

Contact

HARRIS®

For further information and documents on Data Comm please visit
http://dcis.harris.com/ or email DCIT@Harris.com

Chris Collings
chris.collings@harris.com

Chris Sutherland
csutherl@harris.com

Michael Earl
mearl@harris.com

Moranda Reilly
mReilly@cghtech.com