AGENDA

- Future Air Navigation System FANS 1/A+
- ICAO GOLD Document
- Components of FANS 1/A+
- Logon and Handoff Process
- Coverage Maps

- Mandates and Requirements
- PBCS
- FANS CPDLC DCL
- U.S. Enroute CPDLC
- ARINCDirect Support
- ARINCDirect FANS Testing
HOW DOES DATA LINK WORK?
THREE FORMS OF DATA LINK

ACARS, AFIS, ARINC 623
Via this protocol flight plans are recalled to the FMS, weather and ATIS is requested, messages are sent using auto forward codes. Global DCL, OCD, and PDC are broadcast via ACARS, AFIS & ARINC 623

ATN B1, Link 2000+
The Aeronautical Tele-communication Network in Europe uses the VDL network to communicate with equipped aircraft via CPDLC. Unlike FANS, there is no surveillance component. ATN and FANS are not interoperable.

FANS
The Future Air Navigation System is used to broadcast CPDLC between aircraft and ATC. FANS uses ADS-C for surveillance in remote regions, and is mandated for use in the North Atlantic Data Link Mandate Area (NAT DLM) between FL350-390. Equipped airports in the U.S. are using FANS to broadcast DCL (this service differs from the DCL issued via ARINC 623)
HUMAN FACTORS

• Increased “head down time” for flight crew.
• Flight deck Human Machine Interface limitations and issues.
• Time required for reading/interpreting uplinks.
• Time required for selecting/composing/sending downlinks
• Maintaining a shared crew awareness of the progress of ATC data link communications.
• Situational awareness & the inability of pilots to monitor other data link transmissions in the area of operations.
STATEMENT OF COMPLIANCE

WHAT DOES IT LOOK LIKE?

• Example of CL300/350

• Dated 12 June 2018

• Outlining Equipment Level

• Outlining Networks

• Outlining Capabilities

• Important for A056 and FPL
US DOMESTIC DATA LINK OVERVIEW

CREATED BY CHRISTIAN RENNEISSEN
DATA LINK DEPARTURE CLEARANCE OPTIONS

GETTING OFF THE GROUND

• Pre-Departure Clearance (PDC), North America
  • One per 12-18 hour period, per airport, per aircraft, revisions via voice

• Departure Clearance (DCL), Global
  • Used at 120 airports for ARINC-623 equipped aircraft (ACARS/AFIS), request prompt must be filled out on MCDU.

• FANS Departure Clearance (FANS DCL), US only
  • Used at 62 US domestic airports, considered “Push DCL” by the FAA as only a FANS logon to “KUSA” is required, revisions via FANS CPDLC uplink message.
US DOMESTIC FANS CPDLC DCL

DATA LINK DEPARTURE CLEARANCE

- FANS Logon to “KUSA” via VDL Mode A or VDL Mode 2
- No LOA required for US registered aircraft
- Flight Plan Field 18 entry or SDB record required
- DCL does not replace PDC
US FANS DCL AIRPORTS

62 ONLINE SINCE 2016

- A global first
- The first step to domestic Data Link
- All FANS equipped operators may use
- FANS DCL is not ARINC 623 DCL
DOMESTIC USE OF FANS DCL

DATA LINK DEPARTURE CLEARANCE

- Departure Clearance Service (DCL) provides automated clearance delivery for initial and revised departure clearances
- CPDLC message elements for the following:
  - Flight plan route
  - Initial and requested altitude
  - Beacon code assignment and
  - Departure frequency
HOW IS A CPDLC CAPABLE AIRPORT DEPICTED?

ASDE-X in use. Operate transponders with altitude reporting mode and ADS-B (if equipped) enabled on all airport surfaces.
EQUIPMENT AND FLIGHT PLAN REQUIREMENTS FOR FANS DCL

- The FAA does not recognize SAT Data Link as media for FANS DCL
- Depending on your equipage item 10a of the ICAO Flight Plan may indicate:
  - “J3” for FANS CPDLC VDL Mode A and, or
  - “J4” for FANS CPDLC VDL Mode 2
- Indicate DCL and PDC preferences in Field 18: “DAT/1FANS2PDC” (departure only)
- Indicate DCL and PDC preferences in Field 18: “DAT/1FANSE2PDC” (enroute)
- Alternatively indicate DCL and PDC preferences via the FAA’s Subscriber Database

Must use VDL M0/2 as media for FANS  
File ICAO Flight Plan  
Indicate equipage in Fields 10a and 18
FAA SUBSCRIBER DATABASE (SDB)

ARINCDIRECT CAN HELP

TDLS
Subscriber Database

Subscriber

Subscriber Information

<table>
<thead>
<tr>
<th>Airline</th>
<th>Flight/Tail Number</th>
<th>Airport Code</th>
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<tr>
<td></td>
<td>N</td>
<td>ALL (ALL)</td>
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Clearances

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<tr>
<th>Priority</th>
<th>Clearance Type</th>
<th>IATA Address for PDC and Dispatch Copy</th>
<th>Connection Provider</th>
<th>Start Date (mm/dd/yyyy)</th>
<th>End Date (mm/dd/yyyy)</th>
<th>Type of Dispatch Copy</th>
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<tr>
<td>1</td>
<td>FANS</td>
<td>ARINCXA</td>
<td>ARINC</td>
<td>03/22/2018</td>
<td>03/22/2050</td>
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<td></td>
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<tr>
<td>2</td>
<td>PDC</td>
<td>ARINCXA</td>
<td>ARINC</td>
<td>03/22/2018</td>
<td>03/22/2050</td>
<td>All</td>
<td>N</td>
<td></td>
</tr>
</tbody>
</table>
DISPATCH COURTESY COPY (DCC) FOR SDB USERS

NOW AVAILABLE IN YOUR MESSAGE CENTER, IPAD APP, AND TO EMAIL
NOW AVAILABLE IN YOUR MESSAGE CENTER, IPAD APP, AND TO EMAIL
HOW CAN I RECEIVE THE DCC?

RECEIVING THE DISPATCH COURTESY COPY

• Ask ARINCDirect to create a record for your aircraft in the SDB.
• Enter an email address for PDC and DCC on the Filing Page:
LOGON TO “KUSA”
NEW IDENT DUE TO NSDA

- Up to 90 mins prior filed ETD
- Logon “Accepted” = AFN_AK
- No additional action required
ATC COMM ESTABLISHED
CPDLC IS ACTIVE

- 30 mins prior filed ETD
- Clearance Delivery approves FPL
- Behind the scenes exchange:
  - ATC sends “CR1”
  - Aircraft responds “CC1”
- CPDLC is now active
ATC MESSAGE

FANS DCL RECEIVED

- Aural Warning
- Visual Warning
DCL REVIEW

ACCEPTANCE

• Both crew should:
  
  • Review the DCL separately
  
  • Discuss the clearance
  
  • Choose to accept or reject
• DCL comes w/loadable route
• Loadable route modifies loaded flight plan
• May receive a revision during taxi
• Conditional auto-logoff after departure
LOGON FAILURE

ANY CPDLC FAILURE

• If no acknowledgement is received from the ground system within 10 minutes after performing a logon, the operator shall attempt another logon.

• If everything fails: Revert to voice!

• Do not attempt a logon with an existing Current Data Authority (CDA)
LOOKING AHEAD INTO NEXTGEN

FANS DCL IS JUST THE BEGINNING

• Transition from individual Logons to National Single Data Authority (NSDA) supporting enroute CPDLC
• A single FANS Logon “KUSA” designed for FANS DCL departures and Enroute CPDLC
• Enroute CPDLC rollout through the end of 2021
• Future integration with foreign partners
DATA COMM ENROUTE ROLLOUT SCHEDULE
WHERE IS DOMESTIC CPDLC?

RESOURCES

- Centers with Live 24/7 Ops:
  - KZKC (Kansas City)
  - KZID (Indianapolis)
- Data Comm Functional Verification (DFV) ongoing
- Work with your Service Provider for continued updates.
PARTICIPATION IN US ENROUTE CPDLC

US REQUIREMENTS

- Only VDL Mode 2 equipped operators are eligible (“J4” in Field 10a)
- Indicate Enroute FANS in Field 18 using “DAT/FANSE”
- If using FANS DCL and Enroute FANS enter “DAT/1FANSE2PDC”
- Other possible entries:

<table>
<thead>
<tr>
<th>Entry in DAT/ Field</th>
<th>Definition</th>
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<tbody>
<tr>
<td>1VOICE</td>
<td>Operator does not want a data link clearance.</td>
</tr>
<tr>
<td>1PDC</td>
<td>Operator only wants PDC.</td>
</tr>
<tr>
<td>1FANS</td>
<td>Operator wants FANS DCL without a fallback.</td>
</tr>
<tr>
<td>1FANS2PDC</td>
<td>Operator wants FANS DCL with PDC as fallback.</td>
</tr>
<tr>
<td>1FANSE2PDC</td>
<td>Operator wants FANS DCL with PDC as fallback and Enroute CPDLC.</td>
</tr>
<tr>
<td>1PDCFANSE</td>
<td>Operator wants PDC and Enroute CPDLC.</td>
</tr>
<tr>
<td>FANSE</td>
<td>Operator wants SDB preference departure clearance if any, otherwise voice departure clearance and Enroute CPDLC.</td>
</tr>
</tbody>
</table>
WELCOME MESSAGE

RESOURCES

• “CONFIRM CPDLC CONTACT WITH KUSA. ACCEPT/WILCO THIS MESSAGE”

• When to expect?
  • Entering Enroute CPDLC enabled airspace and having performed a Logon to “KUSA”

• What to do?
  • Acknowledge.

• If you don’t?
  • Session terminates.
SCENARIOS

RESOURCES

• DCL Departure from within Enroute CPDLC enabled airspace
  • If “DAT/FANSE” was filed, “KUSA” Logon remains from DCL on ground.
• Non-DCL Departure from within or outside of Enroute CPDLC enabled airspace
  • If “DAT/FANSE” was filed in Field 18, Logon to “KUSA” at any time.
• DCL Departure from within Enroute CPDLC enabled airspace, Logon to “KUSA” continues from Ground into Enroute airspace.
• DCL Departure from outside of Enroute CPDLC enabled airspace, Logon to “KUSA” remains from Ground into Enroute airspace, but no CPDLC Enroute until Enroute CPDLC enabled airspace.
Non-DCL Departure from inside or outside of Enroute CPDLC enabled airspace, Logon to “KUSA” may be performed and will be accepted at any time, but CPDLC will not be active until Enroute CPDLC enabled airspace.
THANK YOU.

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Sr. Flight Operations Trainer

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