Air-ground data link deployment – A/C manufacturer perspective

Presented by
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AIRBUS
1. ATS Data Link context
2. AIRBUS Solutions
3. Future Roadmap
4. Air-ground interoperability
ATS Data Link context

**FANS 1/A**
- precursor of the FANS concept
- Initiated by industry (CDPLC & ADS-C)
- Use of ACARS network
- Operationally used in many oceanic remote and some continental areas

**ATN B1**
- ICAO FANS concept
- Defined by ICAO (CDPLC)
- Use ATN/OSI network
- Being deployed in European continental area (*Link2000+ - EC Reg. 29/2009*)

**Not interoperable**

- FANS 1/A applications
- ATN B1 Applications
- ACARS Router
- ATN/OSI Router
- HF
- SATCOM
- VHF
CPDLC & ADS-C in the World
CPDLC & ADS-C in the World

China
FANS A or A+ required on routes L888, Y1, Y2, Y3.
Source: CAAC AIP ENR3.3
CPDLC & ADS-C in the World

**North Atlantic**
FANS A or A+ required

- **Phase 1:** From 07FEB2013, 2 tracks between FL 350 to FL 390
- **Phase 2A:** From 05FEB2015, all tracks between FL 350 to FL 390
- **Phase 2B:** From 07DEC2017, NAT region between FL 350 to FL 390
- **Phase 2C:** From 30JAN2020, NAT region above FL 290.

*Source: Nav Canada AIC 2/14*
CPDLC & ADS-C in the World

**US Domestic (NextGen)**

*Segment 1:* FANS A or A+ under deployment
- *Phase 1:* From 2015, Departure Clearance in main NAS airports
- *Phase 2:* From 2019, En-route services in whole NAS

*Segment 2:* From 2023+, Baseline 2 services

*Source: NextGen Implementation Plan*
CPDLC & ADS-C in the World

**Domestic Europe**

**ATN B1** required above FL 290

New dates, following EC decision to postpone:
- All ground equipped before 5 Feb 2018
- All aircraft equipped before 5 Feb 2020

**ATN B2** planned from 2018 (IOC) to 2025 (full deployment)

*Source: EC 29/2009 and EU 2015/310 (ATN B1) EC 716/2014 (PCP AF6)*
**Datalink Recording Mandate**

- **FAA:** Forwardfit and Retrofit from 06DEC2010
- **EASA:** Forwardfit from 08APR2014
- **AIRBUS solutions available on all aircraft**
ATS Data Link context

AIRBUS Solutions

Future Roadmap

Air-ground interoperability
ATS Data Link context

- **AIRBUS FANS A+B**
  - All areas
  - Since 2014 (Basic)
  - Since 2015 (Option)

- **AIRBUS FANS A or A+**
  - Since 2008 (Basic)
  - Since 2000 (Basic)
  - Since 2006 (Option)

- **AIRBUS FANS B+**
  - Since 2011 (Option)
FANS A+B Dual Functional Architecture

ATC Applications

A623
- AOC
- D-ATIS
- DCL
- OCL

FANS A+
- AFN
- CPDLC
- ADS-C

FANS B+
- CM
- CPDLC

Cockpit automation

- Displays
  - Message display
- FMS
  - Route Loading
- RMP
  - Voice Freq Loading
- AESS
  - ITP integration
- CVR
  - Datalink Recording

A/C Router

- ACARS
- ATN

Comm Means

- VDL A
- VDL2
- SATCOM*
- HFDL

* SATCOM services can be provided via Inmarsat only
AIRBUS FANS in A320/A330/A340 Cockpit

**DCDU:** Datalink Control & Display Unit

Cockpit interfaces identical to FANS A/A+ and FANS B/B+

**MCDU:** Multi-purpose Control & Display Unit

Your mailbox

Your keyboard
Airbus FANS in A350 XWB and A380 cockpits

Attention getter

Shared ATC Mail Box

Downlink messages composition
On MFD (Multi-Functions Display)
Receiving an Uplink Message
Sending a Downlink Message
ATS Data Link context

AIRBUS Solutions

Future Roadmap

Air-ground interoperability
Next generation ATS Data Link package: Baseline 2

**AIRBUS FANS A or A+ (CDPLC & ADS-C)**
- Origin: Industry-initiated FANS standards
- Concept: precursor of the FANS CNS/ATM concept
- Communication network: ACARS (Aircraft Communications Addressing and Reporting System Network)
- In many oceanic remote and some continental areas

**AIRBUS FANS B+ (CDPLC)**
- Origin: ICAO-initiated CNS/ATM standards
- Concept: loyal to the native ICAO FANS definition
- Communication network: ATN/OSI (Aeronautical Telecommunication Network)
- In European continental area (Link 2000+ - EC Reg. 29/2009)

**AIRBUS FANS A+C (CDPLC & ADS-C)**
- Unique & convergent product supporting all technologies

**ATN B1**
- Origin: ICAO-initiated CNS/ATM standards
- Concept: global definition to support worldwide operations
- Communication network: ATN/OSI or ATN/IPS (Aeronautical Telecommunication Network)

**FANS 1/A**
- Origin: ICAO & industry-initiated CNS/ATM standards
- Concept: global definition to support worldwide operations
- Communication network: ATN/OSI or ATN/IPS (Aeronautical Telecommunication Network)
B2 in ICAO GANP
ATS Data Link context

AIRBUS Solutions

Future Roadmap

Air-ground interoperability
A/C supporting worldwide operations

- Air-ground interoperability is key for Aircraft Manufacturers

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A/C supporting worldwide operations

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Technical interop

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Facilitating coexistence of FANS 1/A and ATN B1

Prompt global convergence with Baseline 2

ANSPs involvement and collaboration is key to secure correctness and completeness of supporting standards and guidance materials
Mitigation of risks on air-ground interoperability

- Compliance with applicable standards and guidance
- Delivery of mature certified Airbus products
  - Thoroughly verified at test lab, during flight tests, in interoperation with many ANSPs
  - In Service Problems monitoring, analysis, and actions when required (new product releases for defects found on Airbus airborne systems implementation)
- Proactive interoperability tests campaigns with ground ATC Centers
  - At Airbus initiative in the scope of the certification of any new avionics product release
  - At ground ATC Centers initiative to validate new ground platform versions
- Airbus products particularities documented in ICAO GOLD
How to organize interoperability tests with Airbus?

• Send an e-mail to contact person marine.glimois@airbus.com

• Interoperability tests can cover
  • A623, CPDLC, and ADS-C applications
  • A/G traffic exchanged through ARINC or SITA operational networks

• An Interoperability tests campaign generally implies
  • Some teleconferences to agree on tests dates, and tests scope
  • Exchange of tests procedures documents through e-mail
  • Tests execution session (generally over a half day)
  • A teleconference for debriefing on the tests results
Conclusion

• Involvement and collaboration in standardization (in particular GOLD) is key
  • To ensure any particular needs are considered, documented and shared with all stakeholders
  • To make sure implementations comply to the applicable standards and guidance materials (avoid misinterpretations)

• Anticipate interoperability tests campaigns with aircraft systems

• Setup large scale trials with multiple partner Airlines for pre-operational validation of the datalink services when possible

• Participate to in-service monitoring agencies
  • Use CRA databases to report abnormal events and trigger analysis/fix
  • Share experience with other organisations and get awareness on reported issues and resolution status
THANK YOU FOR YOUR ATTENTION

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