AIRBUS Status

ISPACG36 – FIT29 presentation
EC_FR_NL ; EC_US_EAR99
Presented by Guillaume MOLINIER,
ATM, Flight Test Center

August 2022

AIRBUS

General Information

Status on AIRBUS FANS-related developments

AIRBUS

Airbus developments status (1/3)

S/W version	H/W prereq.	Capabilities	Major Fixes contained	Certification
CSB/CLR9 (a.k.a. 9.3.2)	A10	FANS 1/A+ Or FANS 1/A+ & ATN B1 Or FANS 1/A+ & ATN B1 & B2	Features: B2 (CPDLC & ADS-C) capability, MCDU & DCDU HMI rationalization and improved FMS loading mechanisms... Fixes: **Ack'n'Toss**, Spurious WILCO, Max Uplink Delay, Next on Busy HFDL removal, Unrecognized MRN, **VDL2 hand-offs improvements, Invalid CRC**	**Certified** **SB available**
CSB/CLR7.5	070/A10	FANS 1/A+	Fixes: **Ack'n'Toss**, Spurious WILCO, Max Uplink Delay (incl. Midnight issue), Next on Busy HFDL removal, Media Transition improvements (A618-8 RAT1/SAT7 timers), **VDL2 hand-offs improvements**	**Certified** **SB available** **Except for H/W 40 & 50 (Dataloading issue)**
CSB/CLR9.4	A10	FANS 1/A+ Or FANS 1/A+ & ATN B1 Or FANS 1/A+ & ATN B1 & B2	Fixes: ADS-C not starting at power-on	**Certified** **SB : Available**
CSB/CLR7.5.1	None	FANS 1/A+	Fixes: **Dataloading issue on H/W 40 & 50**	**Certified (ATSU)** **SB : Available**
CSB/CLR10	A10	FANS 1/A+ Or FANS 1/A+ & ATN B1 Or FANS 1/A+ & ATN B1 & B2	Features: ATN over SATCOM capacity, D-VOLMET (D-ATIS ENR), display of the # of active Monitorings on the DCDU Fixes: Media Transition improvements (A618-8 RAT1/SAT7 timers), Max Uplink Delay Midnight issue, VDL2 ATN-related improvements...	**End 2022/Beg 2023**

Airbus developments status (2/3)

ATSU CSB/CLR 7.4
(FANS 1/A+ - All H/W)

ATSU CSB/CLR 9.3.2
(FANS 1/A+, ATN B1 & B2)
(H/W A10 only)
(ACARS over IP option)

ATSU CSB/CLR 9.4
(FANS 1/A+, ATN B1 & B2)
(H/W A10 only)
(ACARS over IP option)

ATSU CSB/CLR 10
(FANS 1/A+, ATN B1 & B2)
(ATN over SATCOM option)
(H/W A10 only)
(ACARS over IP option)
(Connected EFB-FMS option)

ATSU CSB/CLR 7.5
(FANS 1/A+ - All H/W)
(Connected EFB-FMS option)

ATSU CSB/CLR 7.5.1
(FANS 1/A+ - All H/W)
(Connected EFB-FMS option)

AIRBUS

Airbus developments status (3/3)

S/W version	Capabilities	Major Fixes/Evolutions contained	Certification
A380 ATC CLA4.2	FANS 1/A+ & ATN B1	Spurious WILCO, Max Uplink Delay	Certified
A380 ACR S3		Media Transition improvements (A618-8 RAT1/SAT7 timers)	Certified

S/W version	Capabilities	Major Fixes/Evolutions contained	Certification
A350 CLV1.4	FANS 1/A+ & ATN B1	Spurious WILCO, Max Uplink Delay	Certified
A350 ACR S4		Media Transition improvements	Certified
A350 ACR PRODB		VGS Hand-Off management (QoS-based criteria)	End 2022

S/W version	Capabilities	Major Fixes/Evolutions contained	Certification
IMAA BL8.0A	FANS 1/A+ or ATN B1	FANS 1/A+ initial certification and ATN altitude req fix	Certified
IMAA BL8.0A2	FANS 1/A+ or ATN B1	No changes to CPDLC application	Certified
IMAA BL8.0A3	FANS 1/A+ & ATN B1	FANS/ATN seamless transfer, Eurocontrol blacklist fixings, Clearance format, AFM limitations (dm59/dm26, WHEN CAN WE + altitude, Route Clearance (flight plan) loading fixes...)	Q4 2023

Airbus developments status: External Documentation

ANSPs & Operators (via AIRBUS TechRequest) are kindly invited to request a copy of the Airworthiness Approval Summary documents that are released every time a new FANS S/W version is certified on a given A/C family. The FMS CPDLC Loading Rules document has also been released, and is available to all.
These documents contain in particular the list of known deviations & clarifications to the standard, as well as various ground & airborne recommendations.


AIRBUS

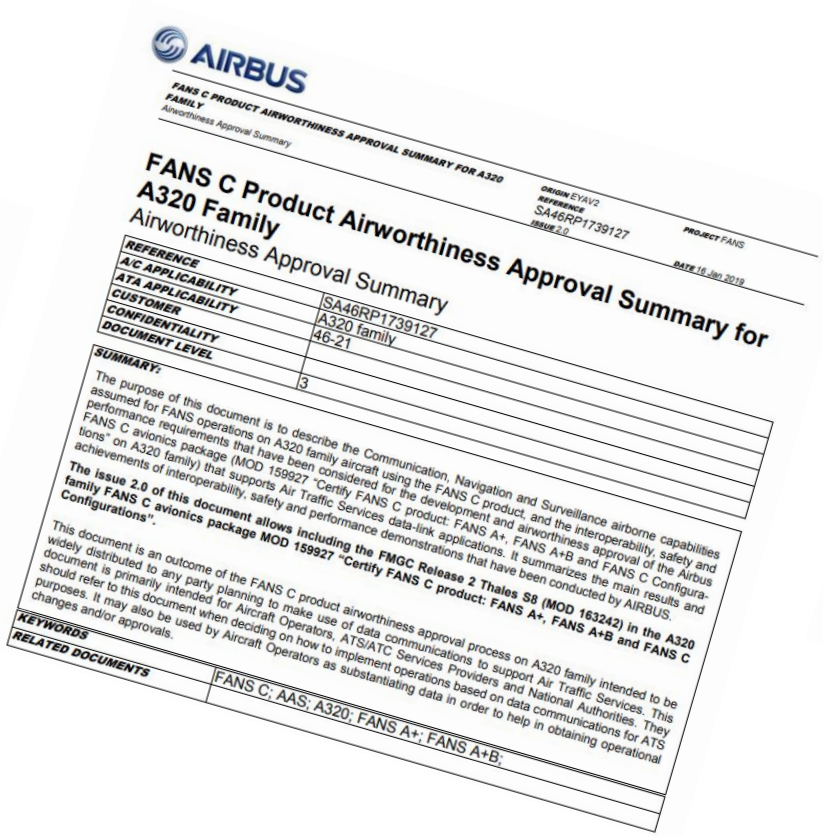
FANS A+ AIRWORTHINESS APPROVAL SUMMARY FOR A320 FAMILY AIRCRAFT
Technical Report

REFERENCE SA46D04027647 ISSUE 7.0 DATE 1 Jul 2019

FANS A+ Airworthiness Approval Summary for A320 family Aircraft
Technical Report

REFERENCE	
A/C APPLICABILITY	SA46D04027647
ATA APPLICABILITY	A320 family
CUSTOMER	46
CONFIDENTIALITY	
DOCUMENT LEVEL	3

SUMMARY:
The purpose of this document is to describe the Communication, Navigation and Surveillance airborne capabilities assumed for FANS A+ operations on A320 family aircraft, and the interoperability, safety and performance requirements that have been considered for the development and airworthiness approval of the Airbus FANS A+ avionics package (MOD 35227 "Certify FANS A+ configuration" on A320 family aircraft) that supports Air Traffic Services data-link applications. It summarizes the main results and achievements of interoperability, safety and performance demonstrations that have been conducted by AIRBUS.
This document is an outcome of the FANS A+ airworthiness approval process on A320 family aircraft intended to be widely distributed to any party planning to make use of data communications for Air Traffic purposes. This document is primarily intended for operators, ATC Service Providers and National Authorities. They should refer to this document when deciding on how to implement operations based on data communications for ATS purposes. It may also be used by operators as substantiating data in order to help in obtaining operational changes.
Initial FANS A+ Airworthiness Approval Summary (ref. SA46D04027647) was edited to support initial FANS A+ approval process on Single Aisle aircraft (MAS 35227 Issue 1 – March 2005).
Issue 2.0 was an updated edition to introduce some additional information/clarifications in the frame of Iridium introduction in FANS configuration.
Issue 3.0 was edited to introduce FANS A+ function with Datalink recording capability, based on ATSU CSB7 standard.
Issue 3.1 was edited to update the statement regarding compliance with AC20-140
Issue 4.0 was an updated edition that merges issues 1.0 and 3.1 in order to get a unique document applicable to ATSU CSB 4 and CSB 7 standards. It also covers the last FANS A+ standard (supported by ATSU CSB7.3) which includes FANS product improvements and anomalies corrections.
Issue 5.0 covered the last FANS A+ standard supported by the ATSU CSB7.3
on ATSU CSB7.3 and, so, which replaces the ATSU CSB7.4 which fixes a blocking anomaly identified
Issue 6.0 stated the compliance with the RCP 240 and RSP 180 specifications allocated to the aircraft system when using the VDL Mode A/2 and SATCOM (Inmarsat and Iridium) communication means.


AIRBUS

FANS C PRODUCT AIRWORTHINESS APPROVAL SUMMARY FOR A320 FAMILY
Airworthiness Approval Summary

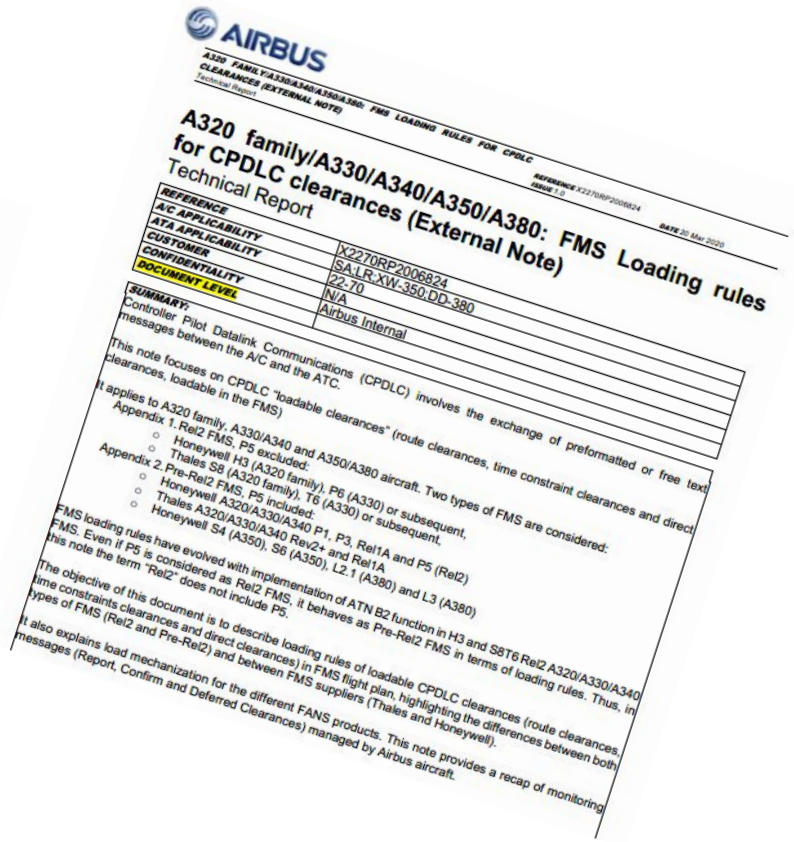
ORIGIN EYAV2 REFERENCE SA46RP1739127 ISSUE 2.0 PROJECT FANS DATE 16 Jan 2019

FANS C Product Airworthiness Approval Summary for A320 Family
Airworthiness Approval Summary

REFERENCE	
A/C APPLICABILITY	SA46RP1739127
ATA APPLICABILITY	A320 family
CUSTOMER	46-21
CONFIDENTIALITY	
DOCUMENT LEVEL	3

SUMMARY:
The purpose of this document is to describe the Communication, Navigation and Surveillance airborne capabilities assumed for FANS operations on A320 family aircraft using the FANS C product, and the interoperability, safety and performance requirements that have been considered for the development and airworthiness approval of the Airbus FANS C avionics package (MOD 159927 "Certify FANS C product: FANS A+, FANS A+B and FANS C Configurations" on A320 family) that supports Air Traffic Services data-link applications. It summarizes the main results and achievements of interoperability, safety and performance demonstrations that have been conducted by AIRBUS.
The issue 2.0 of this document allows including the FMGC Release 2 Thales S8 (MOD 163242) in the A320 family FANS C avionics package MOD 159927 "Certify FANS C product: FANS A+, FANS A+B and FANS C Configurations".
This document is an outcome of the FANS C product airworthiness approval process on A320 family intended to be widely distributed to any party planning to make use of data communications to support Air Traffic Services. This document is primarily intended for Aircraft Operators, ATS/ATC Services Providers and National Authorities. They should refer to this document when deciding on how to implement operations based on data communications for ATS purposes. It may also be used by Aircraft Operators as substantiating data in order to help in obtaining operational changes and/or approvals.

KEYWORDS
RELATED DOCUMENTS FANS C; AAS; A320; FANS A+; FANS A+B;


AIRBUS

A330 FAMILY/A330/A340/A350/A380: FMS LOADING RULES FOR CPDLC CLEARANCES (EXTERNAL NOTE)
Technical Report

REFERENCE X2270RP2006824 ISSUE 1.0 DATE 30 Mar 2020

A320 family/A330/A340/A350/A380: FMS Loading rules for CPDLC clearances (External Note)
Technical Report

REFERENCE	
A/C APPLICABILITY	X2270RP2006824
ATA APPLICABILITY	SA;LR;XW-350-DD-380
CUSTOMER	22-70
CONFIDENTIALITY	N/A
DOCUMENT LEVEL	Airbus Internal

SUMMARY:
Controller Pilot Datalink Communications (CPDLC) involves the exchange of preformatted or free text messages between the A/C and the ATC.
This note focuses on CPDLC "loadable clearances" (route clearances, time constraint clearances and direct clearances, loadable in the FMS)
It applies to A320 family, A330/A340 and A350/A380 aircraft. Two types of FMS are considered:
Appendix 1. Rel2 FMS, P5 excluded:
- Honeywell, H3 (A320 family), P6 (A330) or subsequent.
- Thales S8 (A320 family), T6 (A330) or subsequent.

Appendix 2. Pre-Rel2 FMS, P5 included:
- Honeywell A320/A330/A340 P1, P3, Rel1A and P5 (Rel2)
- Thales A320/A330/A340 Rev2+ and Rel1A
- Honeywell S4 (A350), S6 (A350), L2.1 (A380) and L3 (A380)

FMS loading rules have evolved with implementation of ATN B2 function in H3 and S8T6 Rel2 A320/A330/A340 FMS. Even if P5 is considered as Rel2 FMS, it behaves as Pre-Rel2 FMS in terms of loading rules. Thus, in this note the term "Rel2" does not include P5.
The objective of this document is to describe loading rules of loadable CPDLC clearances (route clearances, time constraints clearances and direct clearances) in FMS flight plan, highlighting the differences between both types of FMS (Rel2 and Pre-Rel2) and between FMS suppliers (Thales and Honeywell).
It also explains load mechanization for the different FANS products. This note provides a recap of monitoring messages (Report, Confirm and Deferred Clearances) managed by Airbus aircraft.

AIRBUS

Problem Reports Analyses

General Status overview since ISPACG35/FIT28

- Since ISPACG35/FIT28, a total of 6 new PR have been allocated to Airbus by the DLMA
  - 5 PRs have been analyzed and will be presented
  - 1 PR (PR 3341) is still under analysis (PR assigned to Airbus on July 2022)

- Among the 5 PRs analyzed, the following breakdown was observed:
  - 2 DATALINK avionics Normal behavior
  - 1 Ground Network issue
  - 2 with no root causes (to be monitored)

PR 3405 : A20N - Route uplink failed to load

PR analysis

- Air New Zealand reported that on one occasion, a route Uplink message received by the A/C could not be loaded in the FMS on-board (LOAD FAILED displayed on DCDU).
- The A/G logs retrieved do not allow determining the root cause of the observed behavior:
  - The UM#83 received was: N 083 AT MISLY (fixname) CLEARED [ATROP (fixname) TEBOT (fixname) BN (fixname)]
  - Position Reports sent to the ground showed that MISLY was indeed in the current FMS Flight plan when the ATC Uplink was received.
  - The loading rules associated with the UM#83 can not explain the LOAD FAILED displayed on the DCDU
    Indeed, there might be a LOAD FAILED status in case the UM#83 does not follow the rules below (depending on the FMS standard):
    - *No matching for 'position' element of [position]/[positionATW] is found in ACTIVE flight plan*
    - *Uplink contains arrival elements but does not contain an arrival airport (only true for some FMS standard)*
    - *When the optional 'ATWDistance' element of [PositionATW] is defined (only true for some FMS standard)*
    - *[position] is an airport and A/C is airborne (only true for some FMS standard)*
    - *[position] is an airport and [route clearance] contains a departure airport that it is not the same. (only true for some FMS standard)*

The other data that might have been useful in order to further investigate were no longer available (ATSU and FMS internal traces, TSD data, …)
As a result, Airbus propose to monitor this PR

Conclusion

- Airbus propose to monitor this behavior in order to collect more traces if a new occurrence is observed

PR 3346 : A359 - DAL41 - No MRN in WILCO

PR analysis

- Airservices Australia reported that one WILCO downlink message was received from an Airbus A/C without MRN indication
- A/G logs were provided and decoded:
  - There is no evidence of any DM#0 WILCO that does not contain the MRN information
  - The last CPDLC downlink in the traces is present at 18h03 whereas the reported behavior was observed at 18h07
  - Airbus was not able to retrieve more traces from the other DSP (ARINC)
- Please note that the avionic specifications were checked. Airbus was not able to identify any scenario that would lead to the sending of a DM#0 WILCO without MRN information.
- The only way for the crew to send a WILCO message is from the ATC Mailbox where it is automatically associated to the request it is answering. The WILCO button is only available next to the ATC Uplink message.

Conclusion

- Airbus propose to monitor this behavior in order to collect more traces if a new occurrence is observed or suggest ASA to check DM number at 18:07 (DM#0 or free text DM)

PR 3337: A333 - MAS125 - Significant error in internal clock

PR analysis

- AirServices Australia reported that for exchanges performed with an A330 Aircraft some CPDLC messages were rejected with an error message "UPLINK DELAYED IN NETWORK AND REJECTED - RESEND OR CONTACT BY VOICE"
- The traces analyzed showed that the Aircraft time reference was different from the ground time reference.
  Indeed, the time seen in the CPDLC Uplink messages was considered a few seconds in the future from the Aircraft time reference point of view (from 1s to 7s).
  The consequence with the avionic installed on the concerned Aircraft is that the Uplink message is considered as delayed by more than 23h59 and thus is rejected.
- Please note that the Timestamp in the ADS-C reports seems to be correct

This behavior corresponds to the one described in the FANS Problem solution Tracker with the Problem ID A17:
Following a manual selection of the on-board clock, the on-board FANS system tries to switch to a secondary source to get a GPS synchronised time. AFN and CPDLC source for the timestamp is different than for ADS-C. ADS-C timestamp comes directly from the FMS whereas AFN and CPDLC follow a different logic.
On older FANS standards this secondary source is not always taken into account due to an anomaly. If this secondary source cannot be used the drifting or manually set clock is then used for computing AFN or CPDLC timestamp.
The root cause of the issue is **therefore a manual setting of the clock or a clock set in internal mode and an anomaly (applicable to CLR4 and previous standards only) of the FANS onboard system preventing the selection of a GPS synchronized secondary source.**

Conclusion

- The avionic behavior is already documented in the solution tracker (ID A17) and a corrective standard is available (CLR7 or CLR9 ATSU standards). PR proposed to be closed.

PR 3271: A332 - Route clearance receives a DM62 response

PR analysis

- The FAA complained about the reception of a DM62 Error message as a response for a Route Clearance request Uplink message.

- The analysis of the the traces confirmed the scenario described:
  - A first “Route clearance request” Uplink message (UM#80) was received on A/C and displayed on DCDU.
    A WILCO answer was sent but we believe that the Route message was kept on the DCDU screen by the crew.
  - A second “Route clearance request” Uplink message (UM#80) was received 6 minutes afterwards.
    A DM62 error message (ERROR insufficientMsgStorageCapacity) was sent as an answer.
  - The Same scenario occurs later on.

The reported scenario seems to correspond to a known avionic behavior that is as per design:
Whenever an ATC Route Uplink message (UM#79, 80 or 83) is received while an ATC Route message is already displayed on the DCDU, the avionic ATC sends a DM62 error message as an answer (reason: “ERROR insufficientMsgStorageCapacity”) and the second route message is not displayed to the crew.

Conclusion

- The ATC avionic behavior is as expected and thus Airbus suggest to close this PR

AIRBUS

PR 3224 : A333 - Non-Delivery of ADS-C Contract Cancellation

PR analysis

- Fiji Limited reported that they received an error message ‘No Link Delivery confirmation from : <QFA6034>' when the ATM system sent a Uplink message for the cancellation of all contracts.

- The analysis of the Air/Ground traces shows that:
  - At 06:05:00, the ‘cancel all contracts and terminate connection request’ is seen on A620 traces.
  - Nevertheless, this message is never sent to the Aircraft and the reason code provided by the DSP is ‘UP INTERCEPT AIRCRAFT NOT LOGGED ON’.
  - According to the A620 norm, this message is sent whenever the DSP is unable to transmit the message via satcom when aircraft is not logged on
  - Nevertheless, the Air/Ground logs show that during the whole period, the Satcom connection is available (ADS-C messages exchanged before and after without issue).

The analysis performed show that the ADS-C Uplink was never sent to the A/C even if a Satcom connection was existing.
There is no avionic issue and the reported behavior needs to be explained by the Ground DSP

Conclusion

- Airbus propose to transfer this PR to the Ground DSP.

AIRBUS

Thank you

AIRBUS