Airbus Status

ISPACG38/FIT31

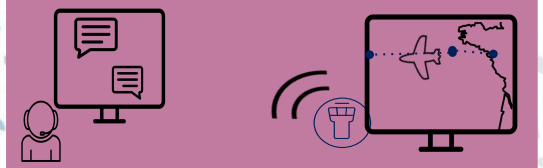
Airbus Amber - Export Control Not Technical

COMMERCIAL AIRCRAFT

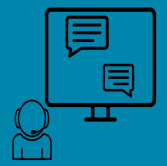
June 2024

AIRBUS

FANS 1/A (via ACARS)
CPDLC & ADS-C



ATN B1 (via ATN/OSI)
CPDLC (v1)



ATS B2 (via ATN/OSI)
CPDLC (v2) & ADS-C

ATC Centers

AIRBUS FANS A+

A220 A320 A330 A340 A380

AIRBUS FANS A+B

soon

A220 A320 A330 A380 A350

AIRBUS FANS B+

A220 A320

Airbus A/C config.

AIRBUS FANS C

A320 A330

A350: In 2027, FANS A+B with ADS-C B2 capability. Second step, FANS C (Date under construction)
A220: ATS B2 Development plan under construction

AIRBUS

Airbus ATC Datalink developments status (1/3)

S/W version	H/W prereq.	Capabilities	Major Fixes/Evolutions contained	Certification
CSB/CLR7.x (x= 4, 5, or 5.1)	None	FANS 1/A+	Predominant current S/W version in the field in Europe for A330/A340 aircraft	**Certified** **SB available**
CSB/CLR7.6	None	FANS 1/A+	Fixing of in-service issues/Enhancements for FANS 1/A operations over US area (incl. re-use of VDL2 improvements from FANS B+/FANS C products)	**Development ongoing**
CSB8 (A320 only)	None	ATN B1	Predominant current ATN S/W version in the field in Europe	/
CSB/CLR9 (a.k.a. 9.3.2)	A10	FANS 1/A+* & ATN B1* & B2*	FANS & ATN dual-stack (incl. ATS B2 services), ACARS over IP	**Certified** **SB available**
CSB/CLR9.4	A10	FANS 1/A+* & ATN B1* & B2*	ADS-C randomly not starting at power-on	**Certified** **SB available**
CSB/CLR10	A10	FANS 1/A+* & ATN B1* & B2*	ATN Over SATCOM, Misc. VDL2 improvements ACARS over IP, Connected EFB-FMS …	**Standard CSB/CLR10.2.1 Certified** **Limited deployment for in-service evaluation phase (from Q4 2023)** **CSB/CLR10.3 standard fixing some in-service issues from previous products planned for 2025** **Strategy for final standard (CSB/CLR10.4) under discussion**

*** = Option choice for the Operator**

AIRBUS

Airbus ATC Datalink developments status (2/3)

S/W version	Capabilities	Major Fixes/Evolutions contained	Certification
A380 ATC CLA4.2	FANS 1/A+ & ATN B1*	Spurious WILCO, Max Uplink Delay	/
A380 ACR S3		Media Transition improvements for FANS 1/A communication	/
A380 ACR Provider Database (PRODB)		Enhanced VHF M2 Ground Station Hand-Off management (QoS-based criteria) - CRO 953	**Certified SB Available**

S/W version	Capabilities	Major Fixes/Evolutions contained	Certification
A350 ATC CLV1.4	FANS 1/A+ & ATN B1	Spurious WILCO, Max Uplink Delay	/
A350 ACR S4		Media Transition improvements for FANS 1/A communication	/
A350 ACR Provider Database (PRODB) for ACR S4		Enhanced VHF M2 Ground Station Hand-Off management (QoS-based criteria) - CRO 953	**Certified SB Available**
A350 ATC CLV2	FANS 1/A+ & ATN B1 B2 ADS-C	Introduction of B2 ADS-C capability (including transmission of EPP data compliant with European CP1 mandate) Maturity/ additional enhancements for ADS-C/CPDLC including enhanced loading mechanism with nFMS	**2027**
A350 ACR S5		ATN over SATCOM capability; Misc. ATN/ VDL2 enhancements including implementation of Non use of IDRP	**2027**

AIRBUS

Airbus ATC Datalink developments status (3/3)

S/W version	Capabilities	Major Fixes/Evolutions contained	Certification
IMAA BL7.5	ATN B1	ATN B1 initial certification	Certified
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, flight plan loads)	Under construction

ICAO OPDLWG - UM79 Task Force

Conclusions of Datalink Task Force meetings 01/01/2024-20/02/2024

EUROCONTROL

Current avionics:

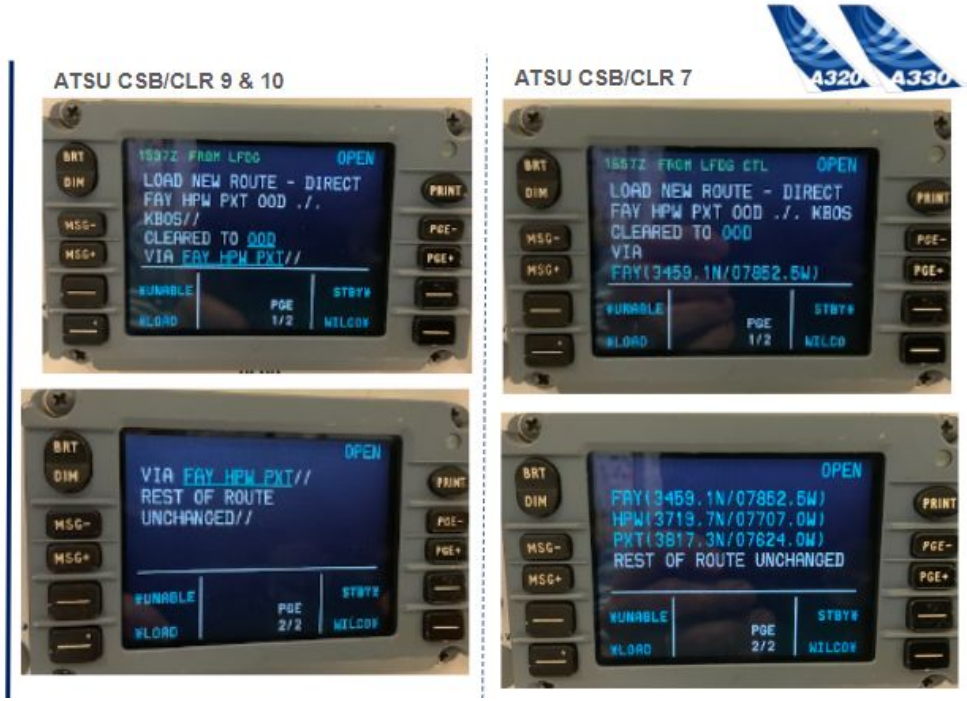
- No recommendation will be made for a unique free text message. The FAA and Europe will implement their own solutions and give feedback to OPDLWG.
- FAA: UM169 "LOAD NEW ROUTE DIRECT – [*route in freetext*]" + UM79 CLEARED TO [position] VIA [routeClearance] + UM169 "REST OF ROUTE UNCHANGED"
- Europe: *UM183 FREE TEXT "ROUTE CHANGE ---" + UM79 CLEARED TO [position] VIA [routeClearance] + UM183 FREE TEXT "REST OF ROUTE UNCHANGED"*
- Note in GOLD for possible future implementers to coordinate before implanting a new free text

Future avionics:

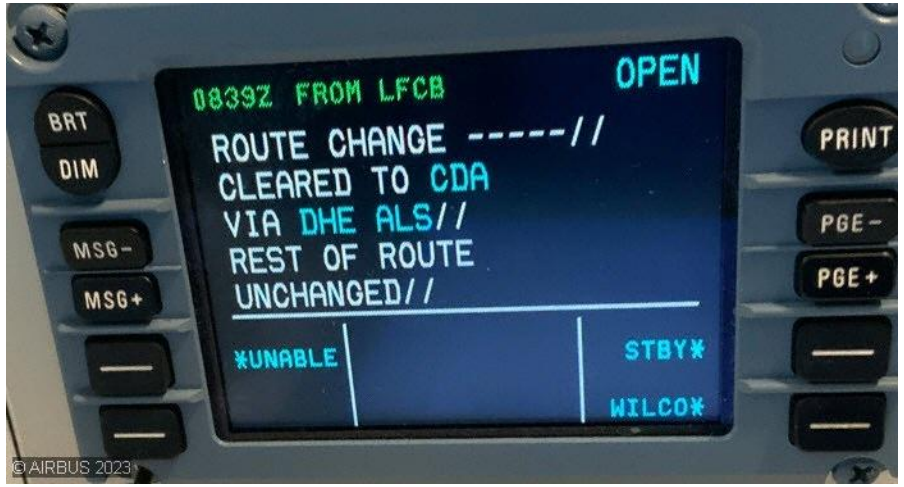
Recommendations in GOLD

- [Current UM79 - CLEARED TO (position) VIA (departure data[O]) (en-route data)] should be displayed as: **UM 79 - CLEARED (departure data)(route clearance) TO (position)**
- Current UM266 AT (position) CLEARED TO (position) VIA (route clearance) should be displayed as: **UM266 AT [positionATW] CLEARED [routeClearanceR] TO [positionR]**
- UM80 – CLEARED (route clearance) [No change]
- UM83 – AT (position) CLEARED (route clearance) [No Change]
- UM169/UM183 FREE TEXT "REST OF ROUTE UNCHANGED"
- UM169/UM183 FREE TEXT "EXPECT FURTHER CLEARANCE BEFORE PASSING [position]"
- UM169/UM183 FREE TEXT "CLEARANCE LIMIT [position]"

Airbus feedbacks on UM79 TF 1/2



FAA UM79 (FANS 1/A)

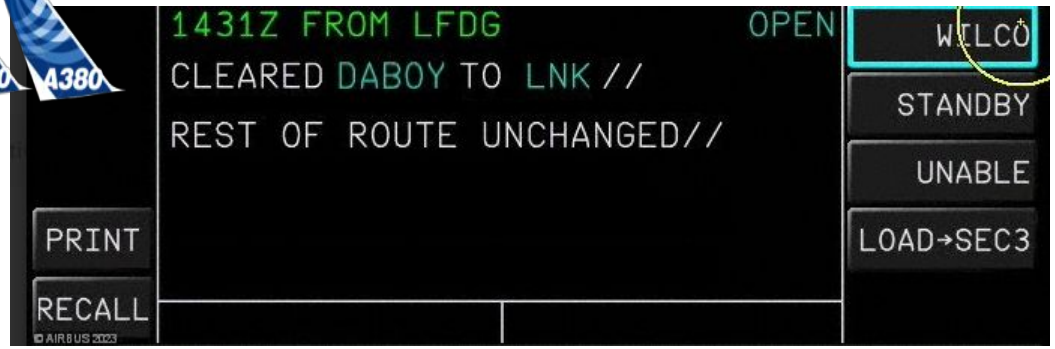


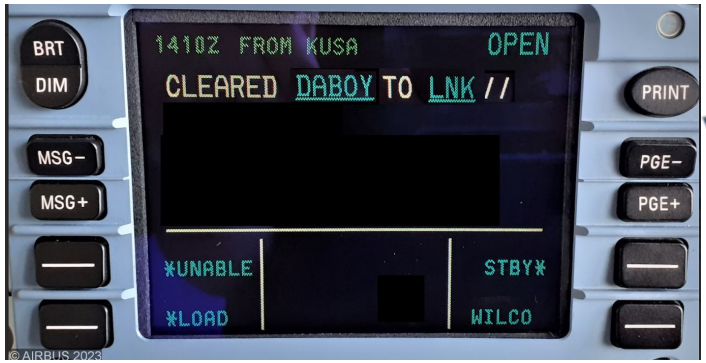
Eurocontrol UM79 (ATN B1)
ATSU CSB8 - FANS B+ product

AIRBUS

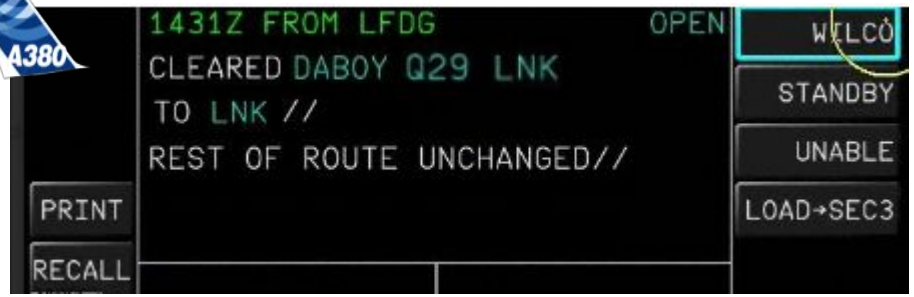
Airbus feedbacks on UM79 TF 2/2

UC1 - Simple enroute UM79





UC2 - Enroute UM79 with Airway and repetition of [Position]

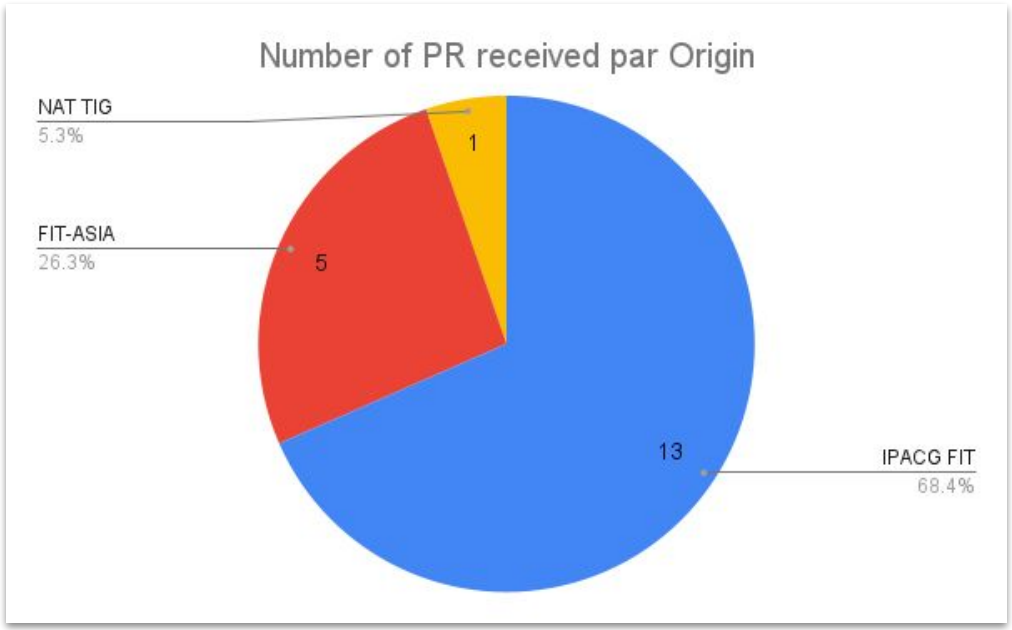


UC3 - Ground UM79 with [DepartureData], Airway and repetition of [Position]

Problem Reports Analyses

Airbus received PRs - overall status

Since the last FIT meeting, a total of 19 PRs were received with the following origins:



Among the 13 PRs received for the ISPACG FIT area:

- 2 PRs could not yet be analyzed (PR-3601, PR-3631, PR-3668) and will not be detailed hereafter. They will be presented on the next FIT
- 3 PRs were analyzed and are proposed to be closed (PR-3658, PR-3583)
- 1 PR was analyzed and is linked with an avionic evolution introduced on the CSB/CLR 9.x standard (PR-3575)
- 6 PRs could not be analyzed because the operator did not provide the necessary data.
- 1 PR was analyzed but is still under investigation (PR-3562)

The following older PRs will also be presented hereafter: PR-3440, PR-3442, PR-3469 and PR-3476.

PR-3658 : Aircraft consistently operating below RSP180 95% normal operating requirements

PR analysis

This PR indicates that the performance of the an Airbus A330 aircraft has been observed to be below the 95% operating requirement. A review of data from June to December 2023 shows ADS-C message delays.

The analysis of the air-ground logs confirmed the delays reported.
All these delays are due to SATCOM unavailability when the message needs to be sent to the ground.

The SATCOM unavailability can be explained by a too low signal power because of a lose connection of a coax on the RF path.

Airbus recommended troubleshooting actions to the airline on Feb 21st, 2024

Conclusion

- Airbus propose to close this PR.

PR-3583: PBCS certified A333 with significantly delayed ADS-C reports on two flight sectors

PR analysis

Airways New Zealand reports significant delays in ADS-C messages on two flight sectors.
Air/ground trace analysis reveals that the two A330 Airbus Aircrafts were flying in the Tasman Sea region during event time. A few instances of delays in ADS-C and CPDLC downlinks have been observed, during the period where Satcom was the only media available, and the Satcom connection was intermittent.

An analysis on the intermittent access of SATCOM was carried out. Based on the ACARS logs, the SATCOM was connected to the APAC I-4F1 Satellite.
This satellite has a SBB service coverage area that was limited at this time because of a solar panel failure. To save power, the SBB service was willingly deactivated by INMARSAT for I-4F1 (APAC) in the area already covered by I-6F1 (IOR).

A document received from Inmarsat identified transmission delays as a potential consequence of the degraded satellite network following I-4F1 failure

Hence the ADS-C and CPDLC downlinks were delayed because of the unavailability of a stable Satcom media due to this Satellite incorrect behavior.

Conclusion

- Airbus proposes to close PR-3583.

PRs 3656, 3657 and 3665: Aircrafts not meeting RSP180 95% normal operating requirements due to satellite RGS transition issues

PR analysis

Airways New Zealand reported PBCS non-compliance for three A330s of the same operator. The traces analysed covered December 2023 and January 2024.
The cause of the non-compliant delays was found to be:

- The VHF link is not available due to the Aircraft position or is about to be lost because the Aircraft is exiting the VHF coverage.
- The SATCOM is the only communication means available for the ATC transmissions.
- Many temporary SATCOM losses are observed. The SATCOM team has been contacted to provide further analysis.

For PR-3656 and PR-3657, in order to further investigate, the SATCOM logs are being requested from the operator.
For PR-3665, we suspect an anomaly on the SATCOM side. Troubleshooting actions have been recommended to the airline.

Conclusion

- Airbus proposes to leave PR-3656, PR-3657 and PR-3665 open until further information is received from the operators.

PR-3663 and PR-3592 : Significant delays

PR analysis

- PR-3663 Significant consecutive delays via IGW1 for a 50-minute period
- PR-3592: Significant delays on satellite RGS transition

We analyzed the data provided. We found that there were several delays in sending ATC messages to the ground.

For both PRs, the VHF link cannot always be maintained during the flight. This is because the aircraft is flying outside of VHF coverage. The Satcom link is the only remaining means of communication available for ATC exchanges. Several satellite link disconnections have been observed.

SATCOM logs were requested from the operator. We have contacted the operator several times since March, but have yet to receive a response.

Conclusion

- Airbus propose to let these PRs open until further information is received from the operator.

PR 3575: ADS-C application not responding to contract requests and not sending reports

PR analysis

Airways New Zealand reported difficulties with on A321 Airbus Aircraft in Sept 2023:

1. The initial notification procedure between the aircraft and the ATC center was successfully performed, with however numerous messages exchanged, leading to delays observed in other exchanges (CPDLC, ADS-C).
    - At the applicative level, AFN messages have priority over CPDLC messages, and CPDLC messages have priority over ADS-C messages. The large amount of AFN messages exchanged creates a delay for transmission of lower-priority messages.
    - The UM161 END SERVICE sent by ATC Center NFFF was necessary to allow ATC Center NZZO to establish itself as Current Data Authority with the aircraft.
    - No issues with CPDLC exchanges were found in the traces for the duration of the flight.

2. ADS-C uplink messages were rejected by the ATSU system with the label HX:
    - The first label HX rejected an AA message.
    - The consecutive HX labels rejected A6 messages.

This behavior seems to be linked to a known anomaly on the CSB/CLR9.x ATSU standard and described in TFU 46.21.00125 "*ATSU Inoperative - ATSU Halt Mode*".

The "ATSU HALT MODE" issue can have the following impacts:

- The ATSU prompt is no longer available on the MCDU
- "INVALID DATA" is displayed on the DCDUs
- The ECAM Warning "DATALINK ATSU FAULT" is triggered
- CPDLC and ADS-C messages are unduly rejected by the ATSU unit

The investigation of this anomaly is still ongoing; in the meantime the recommended mitigation is to apply on ground a long ATSU power OFF/ON sequence.

Conclusion

- This behavior is present on the ATSU CSB/CLR9.x; the investigation is still ongoing.
- Airbus strongly recommends the operators to report any similar event via FAIR Item ATA 46.21: 23.0201 - [SYSTEMS] ATSU IN HALT MODE DURING FLIGHT or via Tech Request.

PR 3595: Continual CPDLC transfer failures

PR analysis

Melbourne ATC reports regular data link transfer issues (i.e. failures) between YBBB and YMMM for an Airbus A21N aircraft (both northbound and southbound)

The analyzed traces confirm that:

- The VHF media is the only available media for Datalink exchanges
- A CPDLC connection is established with YBBB
- A transfer is initiated with YMMM (UM#160 ATC message received and passive CPDLC connection established)
- Nevertheless, short after these exchanges, the Datalink is lost with the Aircraft as it is flying outside the VHF coverage.
- When the VHF connection is finally re-established, a DR1 is sent to the active and passive ATC centers (which is the expected behavior since the loss of the communication means lasted more than 16 minutes)

This behavior is thus due to the fact that the VHF is the only available media and is lost when the Aircraft is flying outside the VHF Coverage.

As the Aircraft is fitted with an Iridium Satcom, a question was addressed to the operator to determine whether or not this Satcom was operative for datalink exchanges since no Satcom connection was ever observed on the traces provided.
Airbus is still expecting a feedback from the operator.

Conclusion

- Airbus proposes to let PR-3595 open as a feedback is still expected from the operator.

PR-3562 A380 ADS-C reports all indicate navigational accuracy completely lost (1/3)

PR analysis

Airways New Zealand reported that all ADS-C reports received from an A380 Aircraft indicated nav accuracy completely lost. The other elements of the ADS-C reports are correct but the ATM system rejects all reports and does not process them because of the navigational accuracy indication.

The analysis showed that the FOM used in the ADS-C reports was impaired because the crew manually selected the Clock in Internal Mode.
When this is the case, the Figure of Merit has to be downgraded as per the FMS design.
The selection of the clock in INT Mode was performed before a known area of GNSS interferences based on an indication provided in the FCOM to avoid corruption of the A/C time:

- **Before the Interference Area (Before Departure or during the Flight)**

  In order to maintain the ATC datalink communication (ADS-C, CPDLC and PBCS) and the FMS predictions, the flight crew should apply the following:

  CLOCK..... INT

  If the clock was previously synchronized with the GPS, the INT mode of the clock maintains the ATC Datalink capabilities for 24 h.

- **After the Interference Area**

  GPS MODE..... CHECK

  Check that the POSITION / GNSS page displays GPS1 in NAV mode with at least 5 satellites tracked. Refer to POSITION / GNSS page.

  CLOCK..... GPS

  The clock should remain on INT mode until the GPS NAV mode is recovered.

PR-3562 A380 ADS-C reports all indicate navigational accuracy completely lost (2/3)

It seems that on several occurrences, the crew forgot to reselect the clock in GPS Mode after the GNSS Interference area was over leading thus to the reported behavior.

The Aircraft documentation (FCOM) has been updated to adapt existing note (in red above) to warn the crew about the degradation of the Figure Of Merit transmitted via ADS-C with Clock in INT mode. The goal is to emphasize the need to set the clock back to GPS mode after the interference area.

This behavior is regularly seen on A380 Aircraft after an upgrade from batch 6 to batch 7 was performed.
This is due to the correction of an anomaly on the new FMS Standard L3 installed in the frame of batch 7.
Before the FMS Standard L3, the Figure of Merit provided by the FMS to build the ADS-C reports was not downgraded when the GPS synchronized clock was not available (incorrect behavior). This means that whenever the crew selected the Clock in internal Mode, the ADS-C reports kept on being sent to the ground with the same Figure of Merit, not passing on the unavailability of a GPS synchronized time source.

Please note that after the Aircraft flew in an area with Radio Frequency interferences, the Navigation accuracy may still be reported as lost even after the crew selected the Clock back in GPS mode due to a known issue that may occur in Aircrafts fitted with the MMR GLU-925 and described in TFU 34.36.00.030.

Indeed, Radio Frequency Interferences (RFI) can lock the GPS card of this MMR in degraded mode until an MMR cold start on ground.
Please note that this anomaly is not corrected on the GLU-925 but is not expected to be present on the GLU-2100

PR-3562 A380 ADS-C reports all indicate navigational accuracy completely lost (3/3)

Please note that the behavior is different for an A350 Aircraft.

Indeed, when an A350 Aircraft is flying in a GNSS interference area, it is recommended to the crew in the FCOM documentation to set the clock in Manual and to enter a Time reference in the FMS pages.

The impacts of this manipulation on the ATC is:

- FOM value set to 0 in the ADS-C messages
- CPDLC is inhibited
- The Time field is no more provided in the AFN downlink messages sent by the Aircraft

The ATC behavior is back to normal when the crew reselects the Aircraft clock in Automatic Mode after the GNSS interference area.

Conclusion

- Airbus proposes to monitor PR-3562 in order to collect data about GNSS interferences impacts on the FIT Area.

PR 3442: Iridium - consecutive ADS-C latency delays on single airframes

PR analysis

Airways New Zealand reported significant unexplained delays on occasional flights operating IGW1:

The analyzed traces confirm that:

- Some ADS-C messages are delayed by 2 to 15 minutes
- These delays are observed when the A/C is flying above the Tasman sea and the Satcom link is the only available media.
- The Satcom link is not stable and keeps on being disconnected / reconnecting during the flight.

The retrieved traces do not show any avionic ATSU issue.
Unfortunately, Airbus was not able to retrieve enough data to further analyze the Satcom link behavior.

Conclusion

- Airbus proposes to close PR-3442 as the data needed to further investigate are not available anymore. Should there be another occurrence of the same behavior, a new analysis would be performed.

Update on PRs already presented during the past FIT meetings (1/2)

PR analysis

PR-3469: Unable to connect on datalink

The issue observed was due to delays in the transmission of AFN messages during the Contact procedure because of temporary unavailability of communication means. This PR was left opened to allow Airbus to retrieve more data for a Satcom analysis.
Unfortunately, no data could be retrieved => PR proposed to be closed.

PR-3440: CM Contact Failure

The contact issues reported were found linked to delays in the transmission of AFN messages during the Contact procedure because of temporary unavailabilities of communication means. This PR was left opened to allow Airbus to retrieve more data for a Satcom analysis.
Unfortunately, no data could be retrieved => PR proposed to be closed.

Conclusion

- Airbus proposes to close both PR-3469 and PR-3440 as no additional data can be found anymore to investigate the Satcom link unavailabilities.

Update on PRs already presented during the past FIT meetings (2/2)

PR analysis

PR-3476 Unable to send CPDLC reports

– The Current ATC Center sends to the Aircraft the CPDLC Uplink message N 020 CLIMB TO 370 / N 129 REPORT LEVEL 370
– Then a Report Response, automatically prepared by the avionic is displayed on the cockpit and sent by the crew: N 037 LEVEL 370.
This message is properly acknowledged but appears as “SEND FAILED”.

This behavior is due to an ATSU anomaly on the CSB/CLR9.x ATSU standard:
The Aircraft is connected in FANS1/A with an ATC center. After receiving a Report Request from the ground (UM#129 Report level 370):
The message is properly answered by the crew and the condition is properly set in monitoring.
After the condition is reached, the message to be sent is properly displayed on the DCDU screen.
The crew can properly initiate the sending of the message to the ground.
If the ACK DSP for the Report Request takes more than 40s to reach the Aircraft, then the "SEND FAILED" indication is displayed in the Info area of the DCDU. This Timer Tack value correspond to the value that has to be used in case of an ATN/B1 connection, not in case of a FANS 1/A connection
Please note that the message is properly received on the ground side.
This scenario is also true for the answer to the Confirm Assigned Route Uplink message.

Conclusion

- Airbus proposes to monitor PR-3476. The correction of this incorrect ATSU behavior will be considered for the next ATSU development

Thank you

AIRBUS

Backup slide (presented during FIT/30)

PR 3440 : CM Contact Failure / PR-3469 : Unable to connect on datalink - A350

PR analysis

- These two PRs opened by NiuSky Pacific Limited report issues on CM Contact procedures from AYPM to YBBB from 2 different A350 A/C from the same Operator.
- The A/G logs retrieved shows that (hour for one occurrence but the overall phenomenon is the same):
  - The Satcom link is not available throughout the flight:
    - The PFR data show that there was a Satcom failure during this flight.
    - The operator was contacted to confirm that maintenance actions were conducted on the Satcom side (w/o answer).
  - The VHF and HF link are working sporadically throughout the contact procedure (due to VHF coverage for the VHF and bad performances for the HF link).
  - Then the following occurs:
    - The AFN Contact Uplink from AYPM to YBBB is received on board and answered by a FN_RESP (reason code: “Successful”) through HF at 20h36.40.
    - At this time, even if this message is not present on the ground traces, the FN_CON transmission to YBBB should have been attempted and the ATST1 Timer is launched in the Aircraft (Timer of 10 minutes for waiting the AFN Acknowledgement).
    - After 10 minutes, since no FN_AK was received from YBBB, the Contact procedure is considered as failed with the reason “Protocol Error”.
    - The FN_COMP message is then transmitted to the originator Center AYPM with the Reason code set to Protocol-Error.

The issue observed is thus due to delays in the transmission of AFN messages during the Contact procedure because of temporary unavailabilities of communication means.
For PR-3469, delays were also observed on CPDLC exchanges due to the Satcom and VHF unavailabilities.
Further Data are expected on the Satcom side to determine the reason for this unavailability.

Conclusion

- Airbus propose to let these PRs open until further information is received from the operator about the Satcom equipment.