



ICAO

International Civil Aviation Organization

Tenth Meeting of the FANS Interoperability Team – Asia
(FIT-Asia/10)

Video Teleconference, 03 – 06 August 2020

Agenda Item 2: Central Reporting Agency Reports

FANS INTEROPERABILITY TEAM (FIT) CENTRAL REPORTING AGENCY (CRA) PROBLEM REPORT (PR) BRIEFING

(Presented by the FIT CRA)

SUMMARY

This paper describes investigation and disposition of submitted Air Traffic Services (ATS) data link problem reports (PRs) that are relevant to the Asia Region.

1. INTRODUCTION

1.1 ATS data link stakeholders may submit PRs for investigation via the <http://www.fans-cra.com/> website.

1.1.1 Airways Corporation of New Zealand (ACNZ) graciously hosts and maintains this website.

1.1.2 Stakeholders from multiple regions use this website, including the North Atlantic region (including certain areas of Europe and Canada); the South Pacific region; the North and Central Pacific region (except for the Fukuoka Flight Information Region [FIR]), and certain areas of the Asia region (including the South China Sea, Bay of Bengal, Indian Ocean, and Arabian Sea areas).

1.2 Between preparation of the previous PR briefing for the FIT ASIA/9 meeting held in July 2019 and preparation of this PR briefing, ATS data link stakeholders submitted 66 PRs via the website.

1.3 **Figure 1** illustrates the number of PRs submitted per calendar year for the Asia region, starting in 2016.

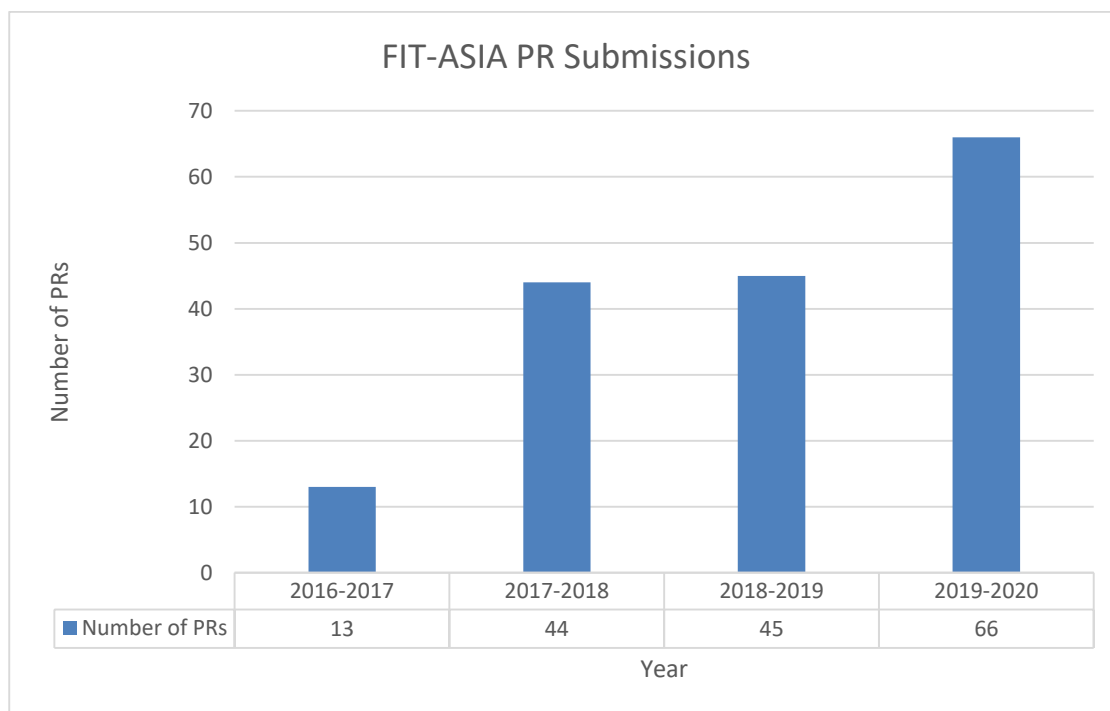


FIGURE 1

1.4 PR status definitions include the following:

- **RAISED:** The PR has been submitted by the originator but has not yet been processed by the DLMA
- **ACTIVE:** The DLMA has processed the PR and assigned it for investigation
- **OPEN:** The PR investigation is complete but some form of correction is required before it can be closed
- **OPEN – FIX AVAILABLE:** Corrective action has been implemented and fix is available for installation
- **CLOSED AS DUPLICATE:** The PR is closed because the problem is already tracked under another PR
- **CLOSED:** Corrective action has been implemented

1.5 PR type definitions include the following:

- **TBA:** To be assigned
- **AIR:** Avionics or flight crew issue
- **AIR – Procedural:** Flight crew issue
- **AIR – Technical:** Avionics issue

- **GROUND:** ATS unit system or controller issue
- **GROUND – Procedural:** Controller issue
- **GROUND – Technical:** ATS unit system issue
- **NETWORK:** CSP or SATCOM service provider issue
- **MULTIPLE:** Multiple types of issues
- **NONE:** Report is a non-problem

2. DISCUSSION

2.1 Since the FIT ASIA/9 meeting, the CRA has investigated the following significant PRs that occurred in the Asia region:

- 2.1.1 2953-RP, CLOSED/AIR-Technical. An ATS Center reported delays in message delivery, as well as a failed CPDLC connection attempt with an aircraft. Analysis indicated that there were two issues contributing to this problem. The first was a temporary loss of SATCOM link while also out of VHF coverage. This led to message delivery delays until the link was re-established. The CPDLC connection failure was due to an instance of “ack-n-toss” where messages were confirmed received by the aircraft, but not delivered to the end system for processing. A fix for the ack-n-toss issue has been incorporated into CSB/CLR9 and CSB/CLR7.5.
- 2.1.2 2957-MM, CLOSED/Ground-Technical. An operator reported experiencing difficulties with an automatic transfer. The ACARS message logs indicated that the transfer of authority from CTR1 to CTR2 failed as CTR1 did not perform AFN address forwarding using CTR2s address. In discussing this with CTR1 they indicated this may have been due to a configuration issue which was updated in Nov 2019.
- 2.1.3 2977-SH, OPEN/AIR-Technical. A specific aircraft tail was identified as having consistently poor ADS-C performance. Initial analysis by the CRA showed the media switching between VHF and SATCOM was causing messages to be delayed and queued onboard, leading to further delays. Additional discussions with the operator indicated that the aircraft was operating with a different SATCOM configuration which may have been contributing to the media transitions. The operator was advised to contact the SATCOM supplier to discuss potential improvements.
- 2.1.4 2982-KS, CLOSED/Ground-Procedural. An ATS center reported receiving an error downlink indicating “invalid data”. Analysis of the data showed that the ground had uplinked a message which included UM175. The aircraft, an A350, does not support UM175 “REPORT REACHING [alt]” message per guidance in ICAO DOC 10037 (GOLD - §A.6.1). The ATC Center was advised of this for their awareness. Airbus strongly suggests disabling the sending of UM175, in line with ICAO recommended practices.

- 2.1.5 2984-KS, CLOSED/Ground-Technical. An ATS center reported receiving an error downlink indicating “Unexpected Reference Number”. Analysis showed that the ground uplinked a message with a MIN (Message Identification Number) of 1 but subsequently experienced some sort of system reset which resulted in the existing open messages being closed out. When the flight crew responded to the previous message, the system did not recognize the MRN since the previous message had closed. There have been no further reports of this issue and the PR has been closed.
- 2.1.6 2985-RP, CLOSED/AIR. An ATS center reported experiencing message delays. Analysis showed this was due to the aircraft being in an area of poor VHF coverage and attempting to retransmit the message via VHF before switching to SATCOM. Considering the route the aircraft was flying, this switching behavior is not unusual.
- 2.1.7 2992-MM, CLOSED/AIR-Technical. An ADS-C uplink failed to be delivered to the aircraft due to flying in an area with weak or no VHF coverage. The aircraft did not have SATCOM connection at the time of the uplink and it is unclear what caused the lack of connection. The PR was closed as being due to a technical issue on the aircraft. However, it is of note that the data showed the SATCOM link being established only seconds after the uplink failed. Which means had the ATS center resent the uplink after a short delay, then it most likely would have succeeded. Additionally ICAO DOC 4444 (Section 14.3.8) recommends that ATS facilities resend failed uplinks one time after a short delay.
- 2.1.8 3035-MM, ACTIVE/TBA. An operator reported inability to perform a manual logon to an ATS center although connection with subsequent centers were successful. The data analyzed showed that the flight crew attempted to logon five times over approximately 30minutes. Each logon attempt received a positive acknowledgement (AFN_Ack) uplink, however there was no CPDLC connection request (CR1) uplinked to the aircraft. The PR was assigned to the ATS center for further investigation.
- 2.1.9 3068-CJ, CLOSED AS DUPLICATE/AIR-Technical. An operator reported being unable to logon to CPDLC during their flight. Analysis indicated this was an instance of a known issue with the B747 Flight Management software where the logon page may freeze and prevent any manual logon attempts from being transmitted. This issue is being fixed in the upcoming software update “BP4.1” which is expected 1Q 2021. This PR was closed as a duplicate of the master PR 2892-KS.
- 2.1.10 3074-MM, OPEN/MULTIPLE. Report of poor RSP over SATCOM. Analysis showed that the problems are likely due to non-contiguous VHF coverage in the South China Sea. In this area, there are delays seen as the avionics attempt to repeat delivery of messages over VHF before reverting to SATCOM. CRA is continuing the investigation for potential additional causes.
- 2.1.11 3078-MM, OPEN/GROUND-Procedural. An aircraft was unable to establish a CPDLC connection with an ATS center. The analysis showed that the automatic transfer of the aircraft was not performed correctly from CTR1 to CTR2. Although CTR1 correctly designated CTR2 as the NDA, there was no attempt to perform AFN address forwarding to complete the transfer process. Additionally, the flight crew attempted to logon to CTR2 manually, but did not first terminate its existing connection with CTR1. This PR was transferred to CTR1 for further investigation and the operator was reminded that in situations like this, the flight crew should first terminate the existing CPDLC connection prior to logging on.

2.2 Since the FIT ASIA/9 meeting, the CRA has investigated the following significant PRs that occurred in regions outside of Asia, which might be of interest to participants of FIT ASIA:

- 2.2.1 2559-MM, CLOSED / AIR – Technical. An ATS center observed that an aircraft operator’s 737 fleet performed below the 95% RSP level during the July to December 2017 period. Analysis by the CRA indicated that the poor performance was primarily due to CMU “next-on-busy” behavior, by which the CMU routes an ACARS downlink (including an ADS-C report) to less-preferred HF datalink if more-preferred SATCOM is already busy sending another ACARS downlink instead of waiting for SATCOM to become available. The aircraft operator recently disabled CMU “next-on-busy” behavior and the reporting center confirmed that ASP improved to above the 95% level
- 2.2.2 3004-KS, CLOSED AS DUPLICATE / AIR – Technical. A Gulfstream flight crew reported that they were unable to send a ROGER response to New York because the avionics displayed a BUSY SENDING PREV MSG indication. Gulfstream indicated that this is a known issue that will be resolved by the G650 Block 3 update scheduled for release in late 2020. The CRA is tracking this issue with master PR 2976-MM.
- 2.2.3 3009-SH, ACTIVE / AIR – Technical. Shanwick reported that seventeen 777 airplanes operated by different aircraft operators did not meet the 95% RSP requirement during September 2019. One aircraft reported had performance above 95% (error in calculation). Boeing found the following common causes for the poor performance.
 - 2.2.3.1 i) Downlinks were queued while waiting for a duplicate to be sent, as observed first in PR 2933-KS. These duplicate reports delay other reports from being sent on time. For two aircraft, once the duplicates were removed from the data, the aircraft performance was above 95%.
 - 2.2.3.2 ii) VHF to SATCOM transitions. Operators could consider tightening up their VHF region tables. This change would reduce the airspace where the avionics attempt VHF downlinks. Additionally, Boeing is considering implementing the RAT1 timer in a future 777 avionics block point update.
 - 2.2.3.3 iii) Slow SATCOM connectivity. Downlinks were delayed over SATCOM for undetermined reasons. Boeing and SATCOM avionics suppliers are investigating the cause for these events.

2.3 Since FIT ASIA/9, the CRA has investigated or received the following less significant new/updated PRs that occurred in the Asia region:

- 2.3.1 2897-SH, 2898-SH, 2899-GM, CLOSED/TBA. Multiple operators/aircraft types were reported to not meet RCP. This PR was subsequently split into multiple PRs to cover each airframe. Discussion with the submitting authority found that the airframes performance had improved in the recent months and therefore these PRs were closed without further investigation.
- 2.3.2 2907-MM, CLOSED/AIR-Procedural. A flight crew reported being disconnected from an ATS center. Data showed that the termination was manually terminated by the aircraft, perhaps unintentionally.
- 2.3.3 2919-RP, CLOSED/TBA. Several B777 aircraft were reported to not meet RCP/RSP. There were not enough data points available to determine the root cause.

- 2.3.4 2920-SH, ACTIVE/TBA. Several B747 aircraft were reported to not meet RCP/RSP. This is still under investigation.
- 2.3.5 2923-RP, CLOSED/TBA. List of airframes not meeting 95% RCP/RSP requirements. Not enough data was available to determine root cause.
- 2.3.6 2945-KS, ACTIVE/TBA. Multiple airframes were reported to not meet RCP/RSP. This is still under investigation.
- 2.3.7 2951-RP, ACTIVE/TBA. Report of message delivery failure. This issue is still under investigation.
- 2.3.8 2952-RP, CLOSED/MULTIPLE. CPDLC connection was reported to have failed. This was found to be due to multiple reasons: loss of VHF link, unexpected loss of SATCOM and potential avionics issues which could not be reproduced.
- 2.3.9 2954-RP, ACTIVE/TBA. Report of message delivery failure. This issue is still under investigation.
- 2.3.10 2960-KS, ACTIVE/TBA. Multiple airframes were reported to not meet RCP/RSP. This is still under investigation.
- 2.3.11 2963-MM, CLOSED AS DUPLICATE/TBA. Poor RSP performance over SATCOM was reported. This PR was closed as a duplicate of PR 3031-MM which was for the same issue, but with more recent data.
- 2.3.12 2971-RP, ACTIVE/TBA. Report of intermittent CPDLC and ADS connectivity with an aircraft. This is still under investigation.
- 2.3.13 2973-KS, ACTIVE/TBA. Multiple airframes were reported to not meet RCP/RSP. This is still under investigation.
- 2.3.14 2974-SH, CLOSED AS DUPLICATE/TBA. Poor RSP performance over SATCOM. This PR was closed as a duplicate of PR3074-MM which is for the same issue, but with more recent data.
- 2.3.15 2978-KS, CLOSED/NON Problem. Report of a Next Data Authority (NDA) message not being successfully delivered. However the data available for the date and aircraft identified did not have any indication of this issue.
- 2.3.16 2979-CJ, ACTIVE/TBA. Report of multiple messages not being delivered. The issue looks to be due to VHF-SATCOM transitions but has been reassigned to the OEM for further investigation.
- 2.3.17 2980-CJ, ACTIVE/TBA. Report of messages not being delivered. This also looks to be due to VHF-SATCOM transitions but has been reassigned to the OEM for further investigation.
- 2.3.18 2981-KS, ACTIVE/TBA. Report of messages not being delivered. This issue has been re-assigned and is currently under investigation.
- 2.3.19 2986-RP, CLOSED AS DUPLICATE/AIR. Report of messages not being delivered. This was closed as a duplicate of PR 2985-RP.

- 2.3.20 2987-MM, CLOSED/NON Problem. Report of delay in receiving messages. PR was closed out as a non-issue as the delay was quite short, and such delays are unavoidable when transitioning between media coverage.
- 2.3.21 2988-GM, ACTIVE/NETWORK. Report of messages not being delivered. Initial data review showed that messages from this ATS center were being queued by the CSP for a period of time. PR has been reassigned to the CSP for further investigation.
- 2.3.22 2989-GM, ACTIVE/NETWORK. Report of messages not being delivered. Initial data review showed that messages from this ATS center were being queued by the CSP for a period of time. PR has been reassigned to the CSP for further investigation.
- 2.3.23 2990-RP, CLOSED/NETWORK. Report of messages being delayed. Analysis showed that this was due to the messages being transmitted on VHF even though the aircraft had reported losing VHF. Subsequent SATCOM transmissions were successful.
- 2.3.24 2991-RP, CLOSED/TBA. Report of delayed message transmission, however the data available did not have any anomalies and all messages was received in a timely manner.
- 2.3.25 2993-CJ, ACTIVE/TBA. Report of messages not being delivered. This issue has been re-assigned to the OEM for further investigation.
- 2.3.26 2995-MM, CLOSED AS DUPLICATE/AIR-Technical. Report of a failed CPDLC connection attempt. This PR was closed as a duplicate of PR 2382-MM (SATCOM issues with B787).
- 2.3.27 2996-MM, CLOSED AS DUPLICATE/AIR-Technical. Report of an ADS demand contract not being delivered. This was found to be due to an avionics fault with the B777 airframe. A software fix for this issue has been released in 777 AIMS-2, V17B. This PR is closed as a duplicate of PR 2666-GM.
- 2.3.28 2997-MM, CLOSED/NON-Problem. Report of a failed CPDLC logon attempt. The data provided indicated all logon attempts were successful.
- 2.3.29 3011-MM, CLOSED/TBA. Report of FANS logon failures with a B787 aircraft. Analysis showed that the logon attempts were correctly transmitted from the aircraft however there was no response received. The ATS center indicated that they did not receive the message. Upon further investigation with the CSP, no root cause could be determined. This PR was closed and will reopen if further instances are seen of this issue.
- 2.3.30 3012-SH, CLOSED AS DUPLICATE/MULTIPLE. Aircraft reported not meeting RSP over SATCOM. This PR was closed as duplicate of PR 3074-MM which was a report of the same issue but with more recent data.
- 2.3.31 3013-KS, ACTIVE/TBA. Report of certain aircraft not meeting RCP/RSP. This issue is still under investigation.
- 2.3.32 3014-KS, ACTIVE/TBA. Report of certain aircraft not meeting RCP/RSP. This issue is still under investigation.
- 2.3.33 3015-MM, CLOSED AS DUPLICATE/TBA. Report of aircraft not meeting RSP over SATCOM. This PR has been closed as a duplicate of PR 3031-MM which was a report of the same issue, but with more recent data.

- 2.3.34 3030-MM, CLOSED/AIR-Technical. Aircraft first lost ADS connection and then subsequently also lost CPDLC connection. This was found to be due to a known issue with the B777 AIMS 2 V17.1 software. A fix for this issue has been released in V17B.
- 2.3.35 3033-KS, ACTIVE/TBA. Report of certain aircraft not meeting RCP/RSP. This issue is still under investigation.
- 2.3.36 3036-MM, CLOSED AS DUPLICATE/AIR-Technical. ATS center reported a fault with a CPDLC message. Analysis indicated this was due to a mismatch in timestamp between the header and the message. This issue was closed as a duplicate of PR 2382-MM. Additionally, improvements to the SATCOM network have since been performed to help mitigate the issue.
- 2.3.37 3049-CJ, CLOSED/GROUND-Technical. An ATS center reported not being able to uplink CPDLC messages to an aircraft. Investigation showed this was due to an issue at the ARINC processing center which has subsequently been fixed.
- 2.3.38 3053-GM, ACTIVE/TBA. Report of ADS-CPDLC failure in the Bay of Bengal. This issue is currently under investigation.
- 2.3.39 3061-KS, ACTIVE/TBA. Report of certain aircraft not meeting RCP/RSP. This issue is still under investigation.
- 2.3.40 3062-MM, CLOSED AS DUPLICATE/TBA. Report of poor RSP performance over SATCOM. This PR has been closed as a duplicate of PR 3069-MM.
- 2.3.41 3067-CJ, ACTIVE/TBA. An operator reported losing datalink connection during part of their flight. This issue is currently under investigation.
- 2.3.42 3069-MM, CLOSED AS DUPLICATE/TBA. Report of poor RSP performance over SATCOM. This PR has been closed as a duplicate of PR 3074-MM.
- 2.3.43 3070-KS, ACTIVE/TBA. Report of certain aircraft not meeting RCP/RSP. This issue is still under investigation.
- 2.3.44 3076-CJ, CLOSED AS DUPLICATE/AIR-Technical. An operator reported not being able to logon to CPDLC. This PR was closed as a duplicate of PR 2892-KS.
- 2.3.45 3077-SH, ACTIVE/TBA. List of airframes not meeting 95% criteria for RCP/RSP. This is currently under investigation.
- 2.3.46 3079-KS, ACTIVE/TBA. List of airframes not meeting 95% criteria for RCP/RSP. This is currently under investigation.
- 2.3.47 3086-SH, CLOSED/NETWORK. Report of an issue with the ground network at the ATS center. This was already resolved therefore PR was closed without investigation.

- 2.4 Issues hindering PR investigations
- 2.4.1 2896-SH, 2917-SH, 2918-MM, 3031-MM, CLOSED/TBA. Reports of various airframes which did not meet required RCP/RSP. However no detailed analysis was able to be performed due to lack of data. In some instances there were not enough data points to make a statistically viable assessment of the issue. And in others, the required supporting data, such as performance broken down by aircraft registration and date was not provided. The CRA stresses that at least 100 data points are required (at the bare minimum) to make an assessment of what may be occurring. If an aircraft does not have greater than 100 data points in a certain airspace, it is suggested to combine data with a neighboring airspace to see if the data set can be completed.
 - 2.4.2 2983-KS, CLOSED/NON Problem. Report of a delayed message delivery. However there were missing details in the report which prevented further investigation of this issue. Follow up with the originator did not finalize the details in time to perform additional analysis.
 - 2.4.3 2994-CJ, CLOSED/TBA. Report of message delivery failures. However, the aircraft operator did not authorize release of the datalink logs. Additionally, the operator had not signed the PBCS charter. This issue was closed without investigation.

3. ACTION BY THE MEETING

- 3.1 The meeting is invited to:
- a) note the information contained in this paper; and
 - b) discuss any relevant matters as appropriate.

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The following Attachment is provided with this working paper as a separate file:

ATTACHMENT A in a separate document:

< FIT ASIA/10 CRA Problem Report Briefing Presentation >