



Central Reporting Agency (CRA) Issues List

Global Operational Data Link (GOLD)

Familiarization with Performance Based Communications
and Surveillance (PBCS) Workshop

Dakar, Senegal 11-15 September 2017

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FAA



Federal Aviation
Administration

Background

- The North Atlantic Data Link Monitoring Agency (NAT DLMA) establishment by the was approved Forty-Fifth Meeting of the North Atlantic Systems Planning Group (NAT SPG/45) in June 2009.
- The United States agreed to provide the NAT DLMA at no additional cost to air navigation service providers (ANSPs) or airspace users.
- Airways New Zealand had in parallel been developing a web site to support collection, distribution and tracking of problem reports, performance data, and other information for the South Pacific sub-region with the potential for expansion within the Asia-Pacific and other Regions.
- The Airways New Zealand has since been used to host operational NAT DLMA.
- The web site can be found at <http://www.fans-cra.com>



NAT DLMA Terms of Reference

The main tasks of the NAT DLMA are:

Monitor and report communications performance, availability and problems, with respect to requirements.

Develop and promulgate forms, specifications and procedures required for reporting of problems and routine data.

Monitor and report message traffic statistics.

Co-ordinate end-to-end system functionality, performance and interoperability.

Co-ordinate in order to diagnose and resolve system problems.

Co-ordinate the development of ground system navigation databases.

Report ATSUs' data link capabilities with respect to trials and operational requirements for the Region. Receive advisories of same from ATS providers.

Co-ordinate with similar agencies for other airspaces.

Collect notices of service disruptions, restorations and major system changes. Correlate the information same to problems reported.



Overview

- The attached slides are a subset of the full NAT DLMA report to the FANS Interoperability Team Meeting (FIT/24) 7 March 2017
- The slides and report were prepared by:

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Problem Report Briefing



**FANS Interoperability Team Meeting
(FIT/24)**

Honolulu HI, USA

7 March 2017

Suzie Ness – FIT CRA

Agenda

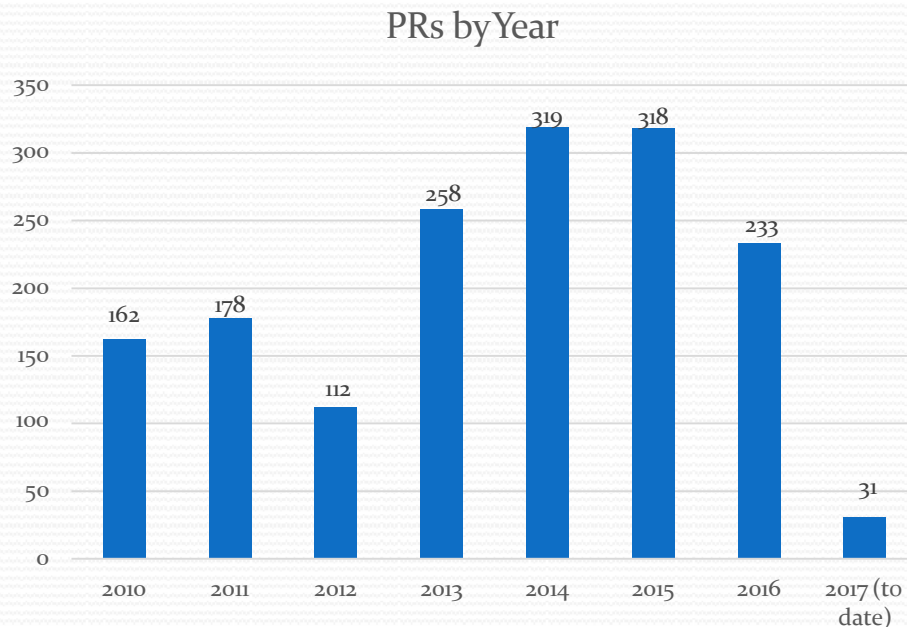
- Introduction
- PR Status Definitions
- PR Type Definitions
- Updates on old PRs
- Problem Report Metrics
- PRs Received Since FIT/23
- Summary of All ISPACG PRs Received Since FIT/23

Introduction

- PRs filed via ISPACG-CRA, NAT DLMA Problem Reporting website hosted by Airways Corporation of New Zealand Limited:
 - <http://www.fans-cra.com> ← NEW!
- Revamped website has up-to-date de-identified reports
 - De-identified reports are now available for all PRs from January 1, 2016 to present and all master PRs
 - Check them out on your smart phone!

Introduction

- **226** PRs received since FIT/23 (Feb 1, 2016 – Feb 14, 2017)
 - Last year reported 308 PRs received since FIT/22 (Feb 12, 2015 – Jan 31, 2016)
 - **31** PRs received in 2017 as of 1 March 2017
- Annual total plateaued in 2015 and decreased in 2016



PR Status Definitions

- **RAISED** - the PR has been filed by the originator but has not yet been processed by the CRA
- **ACTIVE** - CRA has processed the PR and allocated a CRA # and someone to investigate it. During this phase the PR is under investigation
- **OPEN – Fix Available** – Corrective action has been implemented and fix available for installation ← NEW!
- **OPEN** - The investigation is complete however some form of correction is required before it can be closed
- **CLOSED AS DUPLICATE** - Closed because problem is already covered under another PR
- **CLOSED** – Corrective action has been implemented or PR is a non-problem

PR Type Definitions

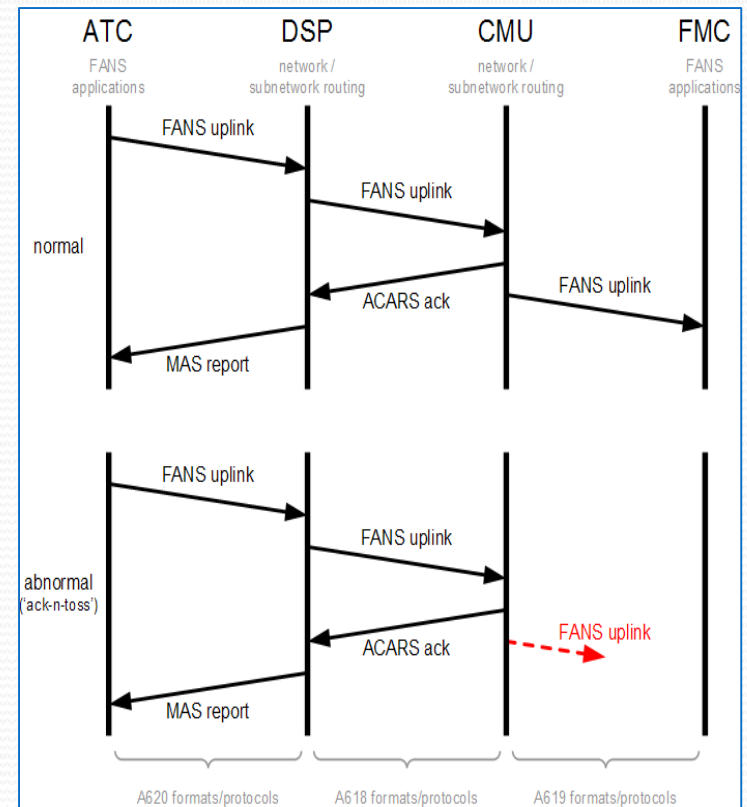
- Website choices: **AIR, GROUND, NETWORK, TBA**
- CRA tracking breaks out as:
 - **AIR – procedural** – Problem due to flight crew action
 - **AIR – technical** – Problem due to avionics fault
 - **GROUND** – Problem due to issue at ATSU (not clear if procedural or technical)
 - **GROUND – procedural** – Problem due to controller action ← NEW!
 - **GROUND – technical** – Problem due to ground automation fault ← NEW!
 - **NETWORK** – Problem at GES or in network
 - **Mult** - Problems occurred in more than one area
 - **None** - Problem was a non-problem
 - **TBA** – To Be Assigned – problem type not yet determined



Updates on Old PRs

Ack-n-Toss Issues Affecting Boeing Aircraft

- Three behaviors found in DSP log reviews are symptomatic of ack-n-toss:
 1. FMC/FMF responds to CR1 with DR1 after successful logon (CMU ack'd FN_AK)
 2. Flight crew does not respond to uplink
 3. Connection fails to transfer or terminate
- Boeing has received several FANS PRs and DCL OPRs where aircraft exhibit above behavior



Ack-n-Toss Issue Affecting Boeing Aircraft (cont'd)

- Master PR 1198 - "Ack-n-toss" with Rockwell Collins CMU-900 core -012 software
 - Can occur when operating on Satcom or HF (unlikely on VHF)
 - Affects B737, B747, B757, B767, MD-11
 - Occurrences since 2016 briefing: 2174-RP, 2196-SN, 2255-MM, 2288-SN, 2305-SN, 2306-SN, 2342-MM, 2366-MM
 - RCI has root-caused CMU problem; corrected S/W awaiting cert opportunity
- Boeing has not yet found root cause of B737, B747, B757, B767, MD-11 VHF ack-n-toss events
 - Primarily affects DCL operations
 - Unclear whether the CMU or FMC is "at fault" in these events
 - Investigation and testing continue

Ack-n-Toss Issue Affecting Boeing Aircraft (cont'd)

- Master PR 1358 - 777 ack-n-toss
 - Honeywell fielded fix with AIMS-2 Block Points 16/17.1/17A
- Master PR 1999 - 777 false-positive duplicate UBI ack-n-toss
 - Root cause identified and requirements added to ARINC 618-8
 - Target 777 block point currently TBD
 - Note: 787 “fix” incorporated in BPv4 (see PR 2311-MM)
- Boeing has not yet found root cause of remaining B777 events, but has eliminated some suspected scenarios
 - 2359-SN documents only confirmed occurrence since 2016 briefing
 - Unclear whether DCMF or FDCF is “at fault” in these events
 - Investigation and testing continue

“Spewing” B777s

- Master PR 1215 - 777 sends many duplicate WILCOs or other FANS downlinks with different ACARS MSNs
 - Characterized by aircraft transmitting multiple copies of a downlink (from tens to thousands of times)
 - First reported in Dec, 2012
 - Occurrences since 2016 briefing: 2203-SN, 2262-SN, 2310-SN, 2325-SN, 2341-SN, plus many DCL OPRs
- High priority to root cause and correct at next opportunity
- Per January meeting with Honeywell software and systems experts, we have a theory as to when and in which region of code the problem may have been introduced
 - Investigation and testing continue

B777s Holding onto Old Active Center

- Master PR 2130 - 777 persistently sends DR1s with dM64 containing the designation of a previous CDA
 - Occurrences since 2016 briefing: 2183-MM, 2194-MM, 2324-MH, 2370-MH, 2379-MH, plus many DCL OPRs
 - Three scenarios have been identified:
 1. Flight crew executes Datalink Master Reset while there is an active CPDLC connection
 - This scenario has been reproduced in the lab
 2. Airplane does not respond to End Service with DR1, ATC LOGON/STATUS screen clears (flight crew cannot terminate connection), but connection persists
 - This scenario has not been reproduced and is under investigation
 3. Airplane does not respond to CR1 (no CC1)
 - This scenario has not been reproduced and is under investigation

PR 1145-SN - B777 unable to send CPDLC messages after Data Authority Transfer

Region: ISPACG

Status: Open - Fix Available

Type: Air - Technical

- Description:
 - Flight crew were unable to send CPDLC messages after Data Authority transfer
- Analysis results:
 - The problem occurred if a CPDLC downlink and the EOS messages were both sent during a media transition or period of No Comm
 - **Problem was corrected in 777 AIMS2 BPv17A**

PR 1898-MM - Loss of ADS-C by a B789

Region: ISPACG

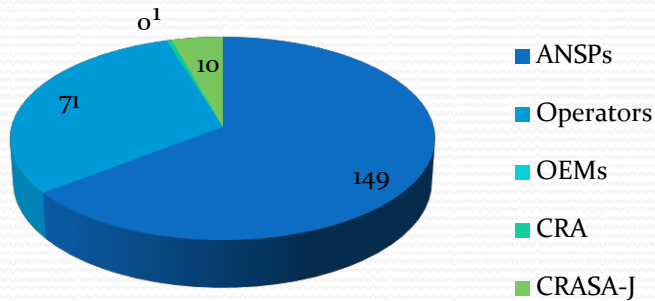
Status: Open - Fix Available

Type: AIR - Technical

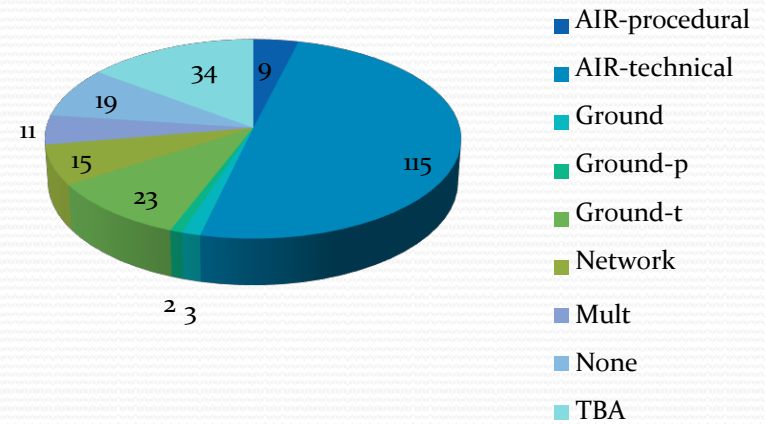
- Description:
 - An ATSU did not receive responses to two ADS-C contract requests.
 - While ADS-C was eventually restored, it appears that for approximately 15 minutes that ADS-C was not available.
 - PR-2140 and new PRs-2161 -2184, -2191 are related
- Analysis results:
 - An issue with queuing of messages between the router and the applications was identified
 - Cause uplinks to be missed and/or downlinks to be repeated after around 10 minutes
 - Subsequent downlinks were delayed behind the repeated downlink
 - **Problem was corrected in 787 BPv3 and BPv4**
 - BPv3 improved inter-partition interface
 - BPv4 made additional improvements to inter-partition interface and specifically addressed PR-1898

Problem Report Metrics

All Problem Reports by Reporting Agency Type
January 1, 2016 - Dec 31, 2016



All Problem Reports by Problem Type
January 1, 2016 - Dec 31, 2016





PRs Received Since FIT/23

PR 2186-RP - Protocol Error Received 1 minute after FN_CAD (B744)

Region: NAT

Status: Open - Fix Available

Type: AIR - Technical

- Description:
 - An ATSU reported a large number of automatic transfers failing with a reason code of 1
 - These all occurred with B744 aircraft
- Analysis results:
 - This is a known issue with BP3.0 of the NG FMC when installed on a 747-400 aircraft
 - **Problem was corrected in NGFMS BP3.1**

PR 2200-MM - Incorrect time in the predicted route group - B788

Region: IPACG

Status: Open - Fix Available

Type: AIR - Technical

- Description:
 - The time in the predicted route group incorrectly showed 04:33:04.
 - The controller issued a demand and the subsequent report showed the correct time.
- Analysis results:
 - This was determined to be a problem in the way that the FMS communicates with the ADS application, to indicate that the ETA prediction is not available.
 - **Problem was corrected in 787 BPv4**

PR 2264-MM - SATCOM issues with B788

Region: ISPACG

Status: Closed As Duplicate

Type: AIR - Technical

- Description:
 - Starting on July 1st and continuing through July 3rd numerous SATCOM issues.- were observed with one aircraft.
- Analysis results:
 - The lack of a SATCOM connection was caused by a timing issue in the ACARS avionics that resulted in the avionics declaring SATCOM to have failed after IRS alignment.
 - Boeing provided a mitigation procedure to 787 operators.
 - **Problem was corrected in 787 BPv3**

PR 2311-MM - No ADS-C disconnect received after MAS S on disconnect request (B788)

Region: ISPACG

Status: Closed

Type: MULTIPLE

- Description:
 - ATC received no operational response to an ADS terminate contract request, although MAS S was received.
 - The airplane continued to send periodic reports for the remainder of the flight.
- Analysis results:
 - The airplane ignored the ADS-C terminate request due to a shortcoming in the ACARS protocol (see “Ack-n-Toss Issue Affecting Boeing” slides)
 - **Requirements added to ARINC 618-8**
 - **“Fix” incorporated in 787 BPv4**

PR 2205-MM - Multiple CPDLC disconnections from B788

Region: ISPACG

Status: Open

Type: AIR - Technical

- Description:
 - Multiple CPDLC connections were established then lost.
- Analysis results:
 - This problem was the result of the infamous “Gordo” problem and has been reproduced in the lab.
 - Problem is related to use of the “direct-to-with-abeam points” function.
 - This problem will be fixed in a future 787 FMF software release.

PR 2197-RP - Unrequested ADS-C intent information received from aircraft (B77W)

Region: ISPACG

Status: Active

Type: AIR - Technical

- Description:
 - A controller reported that the ADS-C position symbol displayed for one aircraft 'froze' on the controllers screen.
 - A subsequent ADS-C report (as a result of a Demand Contract Request) allowed the track to extrapolate normally.
 - Investigation indicated that ADS-C Intent Groups were being received from the aircraft despite these groups not being requested in ADS Contracts.
 - PR 2307 describes similar behavior
- Analysis results:
 - The aircraft had an ADS connection with CTR1 which included aircraft intent data.
 - CTR1 disconnected and CTR2 started an ADS contract with the aircraft which did not include aircraft intent data.
 - The aircraft then started downlinking the ADS reports it had with CTR1 to CTR2.
 - This issue is under investigation.

PR 2292-SN - Unable to logon (B77W)

Region: NAT

Status: Open

Type: AIR - Technical

- Description:
 - The following was reported by a flight crew:
 - "When we got on the aeroplane in LHR there was an "ATC Comm Terminated" message on the centre MFD which seemed strange to me as that should have occurred over Ireland on the way in. A bit like Auzzie where the Comm terminated occurs on blox. After we were airborne and could not get a logon prompt I asked Scottish to check with Shanwick to see if the previous flight was still logged on, (as has happened to me ex Auz). They said no".
- Analysis results:
 - Boeing confirmed this is a known problem.
 - Target 777 block point currently TBD

PR 2387-MM - B788 omits FacilityDesignation in DM64

Region: NAT

Status: Open

Type: AIR - Technical

- Description:
 - DR1 + DM64 message received from B787 has no ICAOfacilitydesignation field, leading to decode failure in FDPS and discard of the DR1.
- Analysis results:
 - The problem occurs if the flight crew performs a Manual Reset from the Reset Manager Page while there is an active CPDLC connection. A subsequent attempt to establish a connection will fail. CMF will respond to a CR1 with a DR1 and DM64 containing no data (not four spaces).
 - Exposure is limited to aircraft with the ATN option disabled.
 - Problem will be corrected in 787 BPv5



Thank you!