THE FORTIETH MEETING OF THE INFORMAL PACIFIC ATC CO-ORDINATING GROUP (IPACG/40)

THE TWENTY-SEVENTY MEETING OF THE FANS INTEROPERABILITY TEAM (FIT/27)

(Washington, DC, USA, 11 September 2014)

Agenda Item 3: Reports on the relevant activities

MEDIA TRANSITION ANALYSIS ON MEDIA ADVISORY "Auto Transfer Failure"

(Presented by Civil Aviation Bureau of Japan)

SUMMARY

This paper presents the analysis in regard with "Auto Transfer Failure" at Japan - U.S. FIR boundary based on Media Advisory to find out the practical solutions to mitigate effectively.

1. Introduction

1.1. The purpose of this paper is to find out the practical solutions to mitigate the "Auto Transfer Failure" which have submitted a lot as Problem Reports (PRs) to Central Reporting Agency Japan (CRA Japan) and to show where aircraft data link systems transitioning occurs based on Media Advisory (called MED or ACCON) .

1.2. A statistical analysis on failure patterns basis during the "Auto Transfer" from Air Traffic Service Unit (ATSU) to the next ATSU at the Flight Information Region (FIR) boundary has conducted to make sure the tendency on these issues.

1.3. In particular, Root Cause Analysis (RCA) only focus on some large proportion of the "Auto Transfer Failure" has conducted to mitigate them effectively.

2. Discussion

2.1. Benefits from "Auto Transfer" are described in the GOLD 5.2.3, under normal circumstances, the current and next ATSUs automatically transfer CPDLC and ADS-C services. The transfer is seamless to the flight crew.

2.2. "Auto Transfer" contributes seamless reduced separation operations between FIRs

2.3. statistical analysis

2.3.1. First, **Figure 1** presents a statistical analysis based on failure patterns during the "Auto Transfer" at the FIR boundary between Fukuoka and Oakland/Anchorage for the eighteen-month period from May 2012 to October 2013.

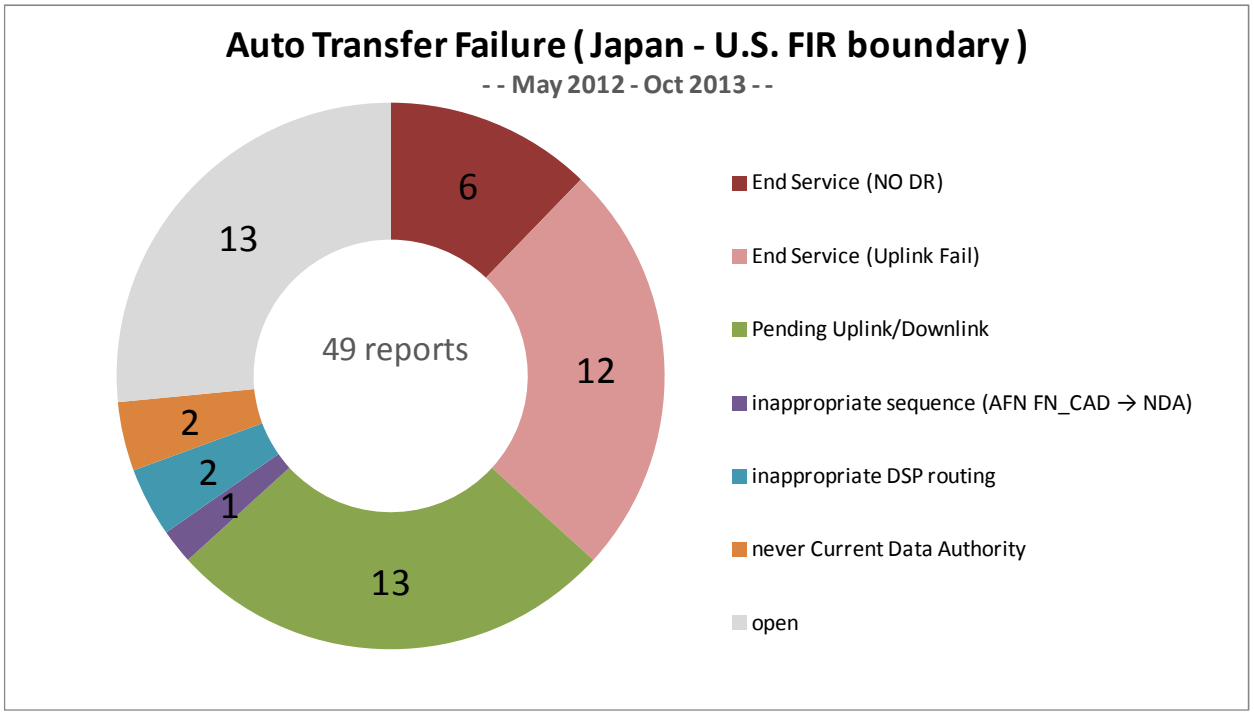
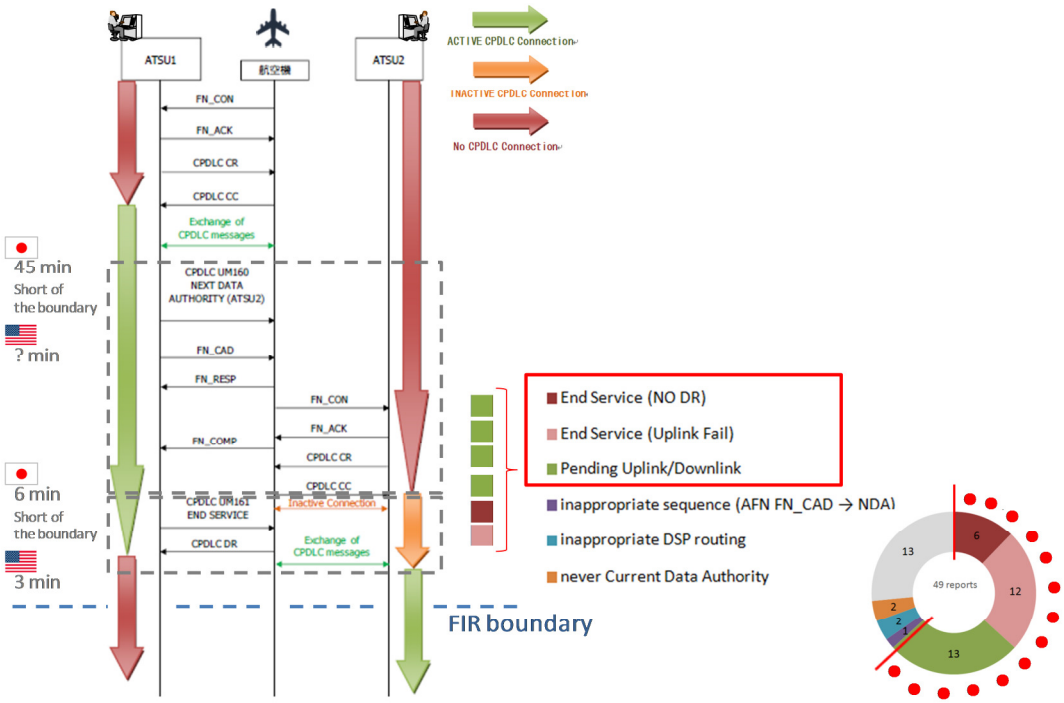


Figure 1 statistical analysis based on failure patterns

2.3.2. **Figure 1** illustrates the proportion of failure pattern classified by the reason shown in the legend key. Three cases, End Service (NO DR: No Disconnection Request), End Service (Uplink Fail), Pending Uplink/Downlink which means End Service not being automatically sent due to a pending downlink / uplink, dominate the reports. These cases are related with "End Service" which is usually uplinked at a couple minute short of FIR boundary. This suggests that Auto Transfer Failures are caused by geographical factor. "Open" are under investigation or unachievable due to no part/ all of data available.



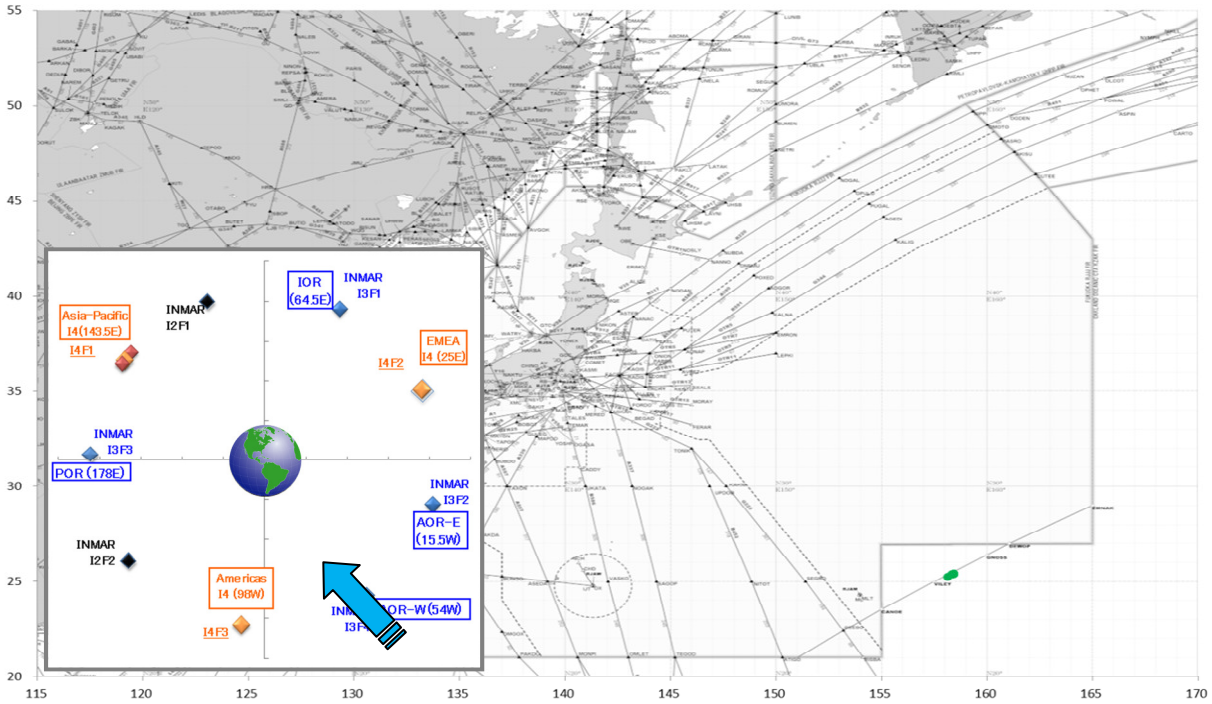


Figure 3 the nearest ADS-C report under End Service (Uplink Fail) case

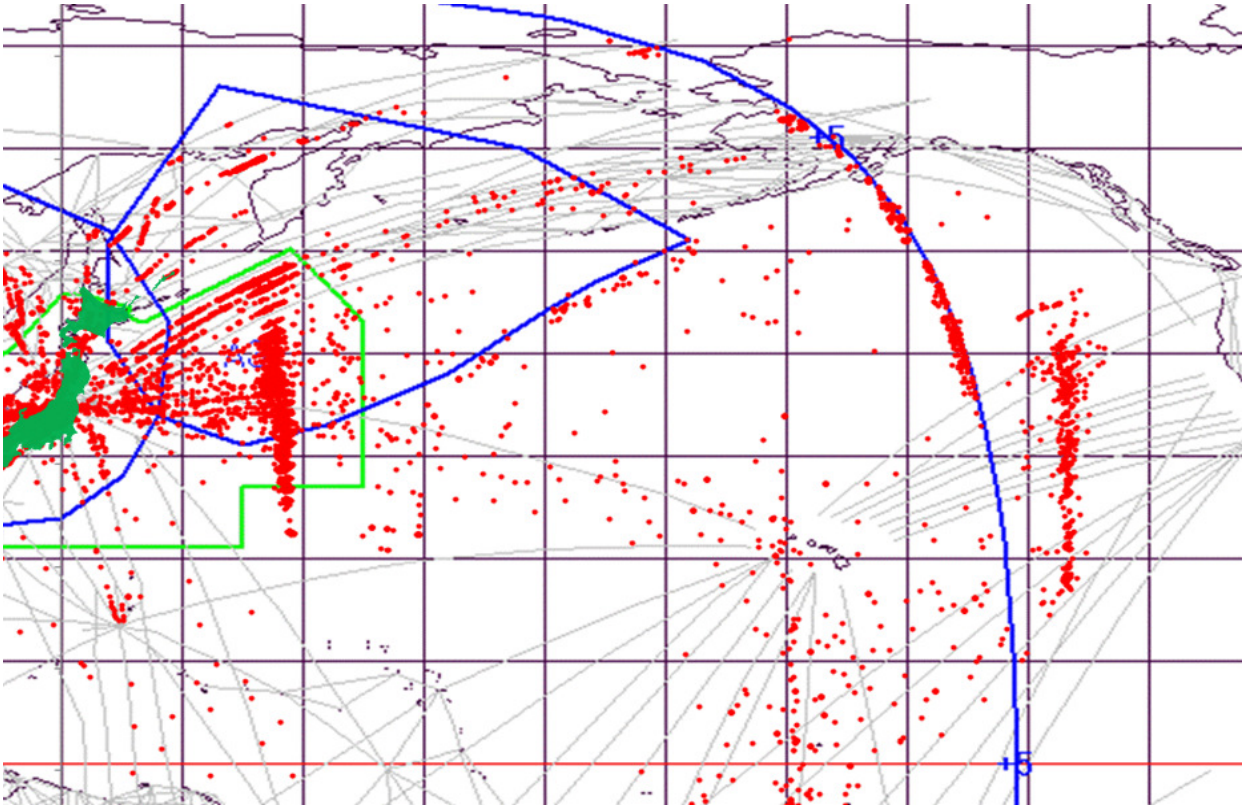


Figure 2 The nearest ADS-C report where the Satellite Link Established (Media Advisory)

2.4. Route Cause Analysis

2.4.1. Figure 2 illustrates the ADS-C position report which is nearest (within 4 minutes) from End Service Uplink time under "End Service (Uplink Fail)" case. These failures apparently occurred at specific point.

2.4.2. Figure 3 illustrates the ADS-C position report which is nearest (within 5- 13 minutes) from media advisory (Satellite Link Established) received time. The advisory, Red dots, mainly represents "Enter the Satellite beam", "Link up just after short causeless link down" and "Satellite transition" which point depends on airline routing policy.

2.4.3. Figure 2 and Figure 3 indicate that "End Service (Uplink Fail)" near the actual FIR boundary between Fukuoka and Oakland is related with "Satellite transition", namely from Inmarsat3 Flight3 (I3F3) POR [178E] to MTSATs [142.5E]. Meanwhile, transitions from I3F3 POR[178E] to I4F1 Asia-Pacific[143.5E] are likely same with that transition point, as these satellite orbital position are almost same. Therefore, the sequence and log analysis as follows will be addressed as non-specific satellite issue. Plus the satellite position is lasting for long time since International Telecommunication Union (ITU) Filing for satellite frequency linked to orbit position is priceless.

2.4.4. Figure 4 The relation between "Auto Transfer" and "Satellite transition" sketches the auto transfer sequence and result of log analysis related with auto transfer failure. The log analysis indicates some uplink/downlink sequences for auto transfer was interrupted due to satellite transition and DSP routing gap which is the time gap from Media Advisory generated on board to Media Advisory down linked and applied into DSP routing table. The uplink/downlink sequences for "auto transfer" are combined with FIR boundary. As such, "Auto transfer failures" tend to occur at specific point. It takes about 3minute to switchover from Satellite to Satellite and DSP routing table update.

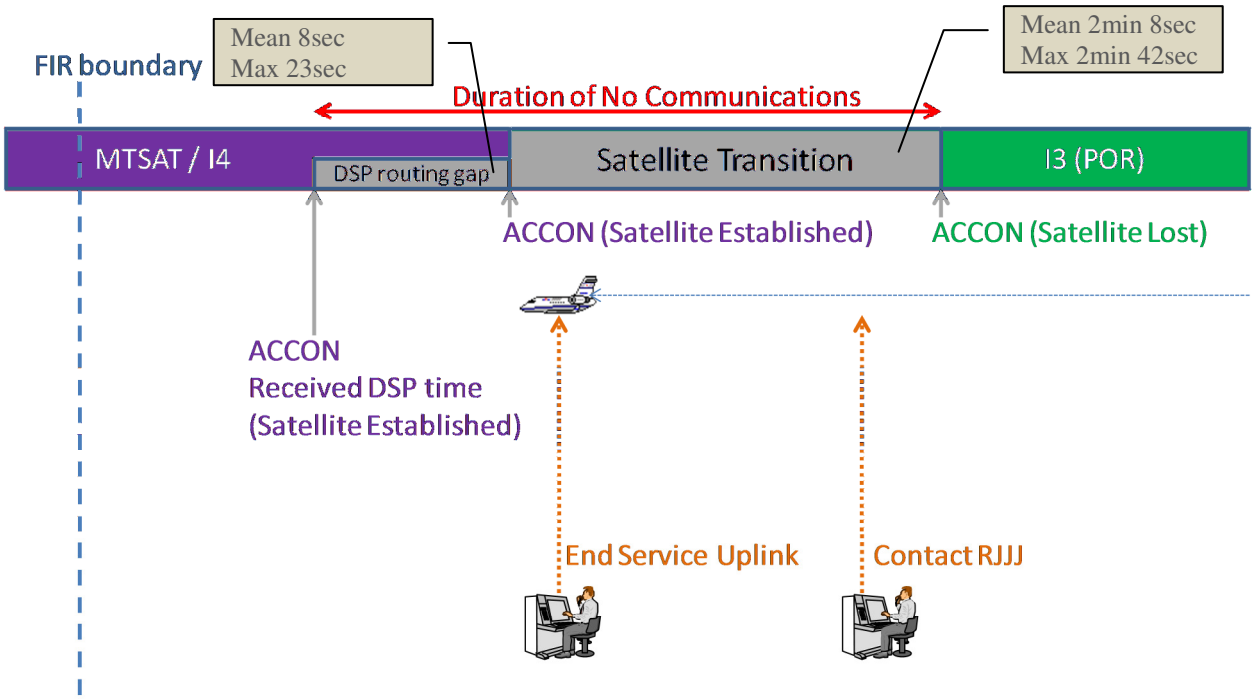


Figure 4 The relation between "Auto Transfer" and "Satellite transition"

2.4.5. Figure 4 The relation between "Auto Transfer" and "Satellite transition" illustrates the ADS-C position report which is nearest (within 5- 13 minutes) from media advisory (VHF Link Lost) received time. The advisory, Red dots, mainly represents "Edge of the VHF coverage".

2.4.6. Figure 3 and Figure 5 present the ADS-C position report which is nearest (within 5- 13 minutes) from media advisory (Satellite Link Established and VHF Link Lost, respectively) during the period from May 2012 to February 2014. The both ADS-C report and Media Advisory are extracted from MTSAT Ground Earth Station (GES). The anonymity is ensured and the function creep is limited for safety purpose.

2.4.7. Figure 3 and Figure 5 must complement the IPACG40/FIT27 IP02 / IP03 related with MEDIA TRANSITION prepared by Federal Aviation Administration (FAA)

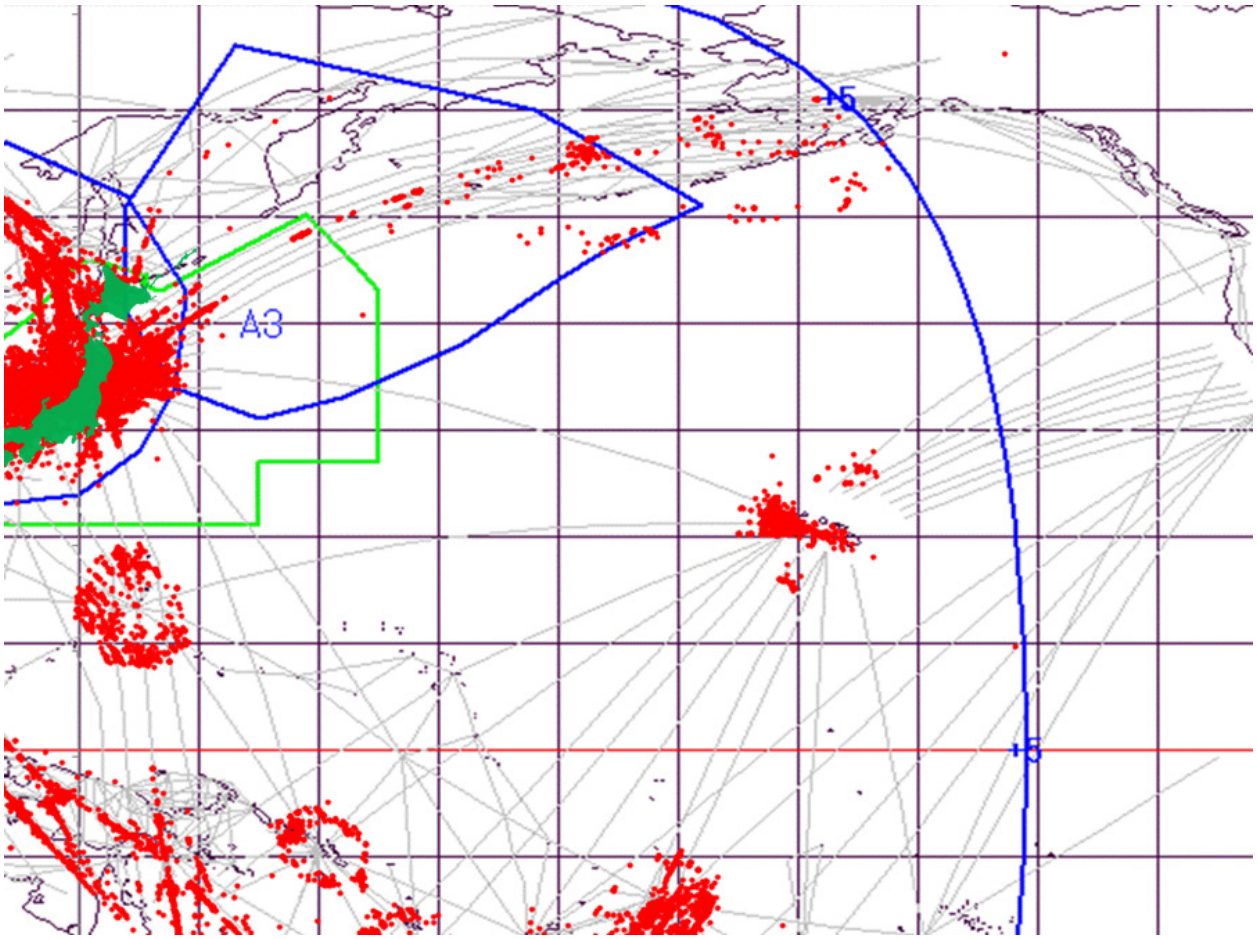


Figure 5 The nearest ADS-C report where the VHF Link Lost (Media Advisory)

*JCAB would like to express many thanks to all, Fukuoka (JCAB), Oakland/ Anchorage (FAA), MTSAT(Kobe/Hitachiota), Inmarsat, DSP(SITA), Pilots(Airlines) for their contribution to this IP.

3. Action by the meeting

3.1. The meeting is invited to:

A) Note the information in this paper.