FANS Interoperability Team Meeting
(FIT/21)

Papeete, Tahiti
4-5 March 2014

Agenda Item 5: Working Papers

Iridium FANS1/A performance as observed in NZZO

Presented by Airways New Zealand

SUMMARY

This paper provides an analysis of Iridium FANS1/A performance as observed in NZZO and illustrates the difficulty in analysing performance when using small data sets.

1. INTRODUCTION

1.1 In NZZO we have not seen consistent use of Iridium FANS1/A until 2013. In 2013 HAL B767 aircraft have been operating on the Hawaii – American Samoa route and these flights together with irregular operations by freighters and private aircraft operators have provided enough data points to analyse Iridium ADS-C latency.

2. DISCUSSION

2.1 On the surface the aggregate of the Iridium ADS-C data points for 2013 indicates performance well below the standard expected for RSP180 operations. This aggregate performance uses 2614 data points and is illustrated in Figure 1. The performance falls well below the 95% normal operations requirement which requires 95% of downlinked reports to be received within 90 seconds.

2.2 Hawaiian Airlines B763 operations provided 82% of the 2614 Iridium data points available in 2013. An analysis of individual tail numbers is illustrated in Figure 2 and shows that while three tail numbers were meeting the RSP180 requirements seven were not. However, a check with the FAA indicated that they were observing performance from this fleet that was meeting the RSP180 performance requirements.

2.3 The Hawaiian Airline B763 fleet operates between Hawaii and Pago Pago in American Samoa. This route crosses the Auckland Boundary with Oakland at 5S latitude and spends less than an hour in Auckland Oceanic airspace before descending out of our airspace into the Samoa FIR. With both Auckland and Oakland having established ADS-C contracts with the aircraft as they cross the 5S boundary this is known to cause latency delays. This is not specific to Iridium but occurs with MTSAT and Inmarsat as well.

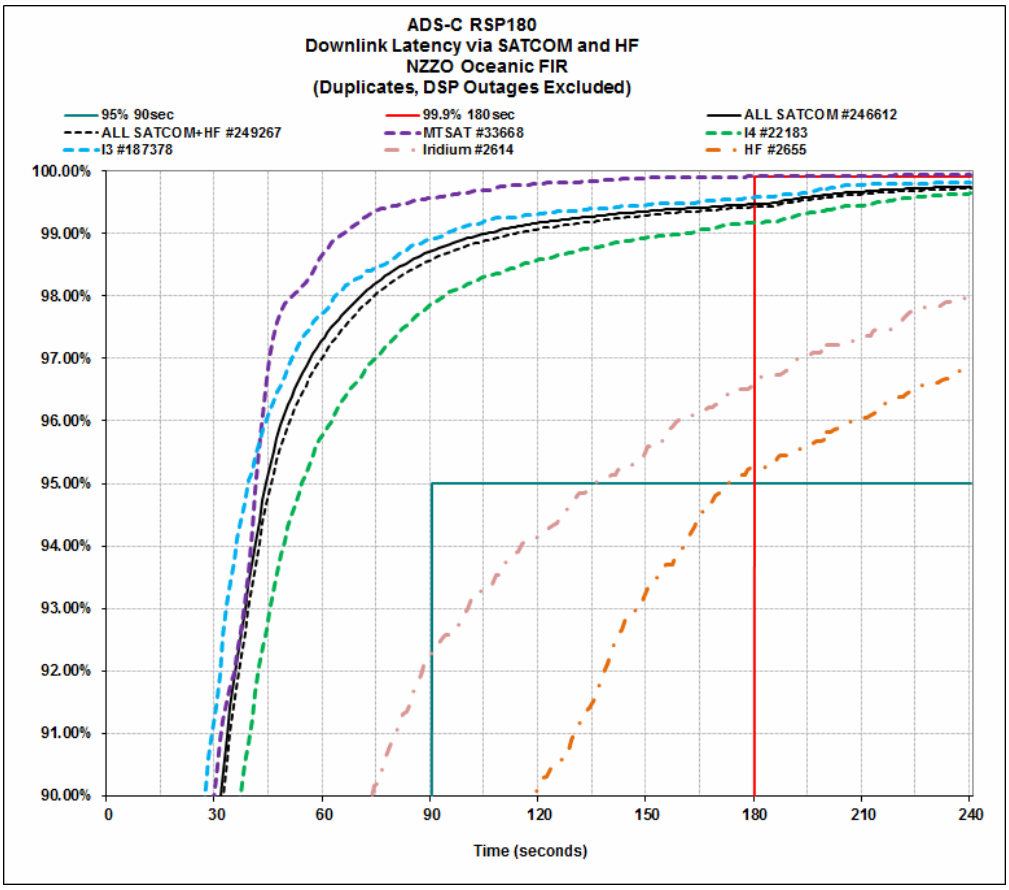


Figure 1: 2013 aggregate of ADS-C latency in NZZO

2.4 A geographical analysis of delays of more than 180 seconds using Google earth illustrates the expected delays around the boundary with Oakland. Also noted on the geographical analysis is a large number of yet unexplained large number of delays inside VHF coverage just North of Samoa. This is illustrated in Figure 3.

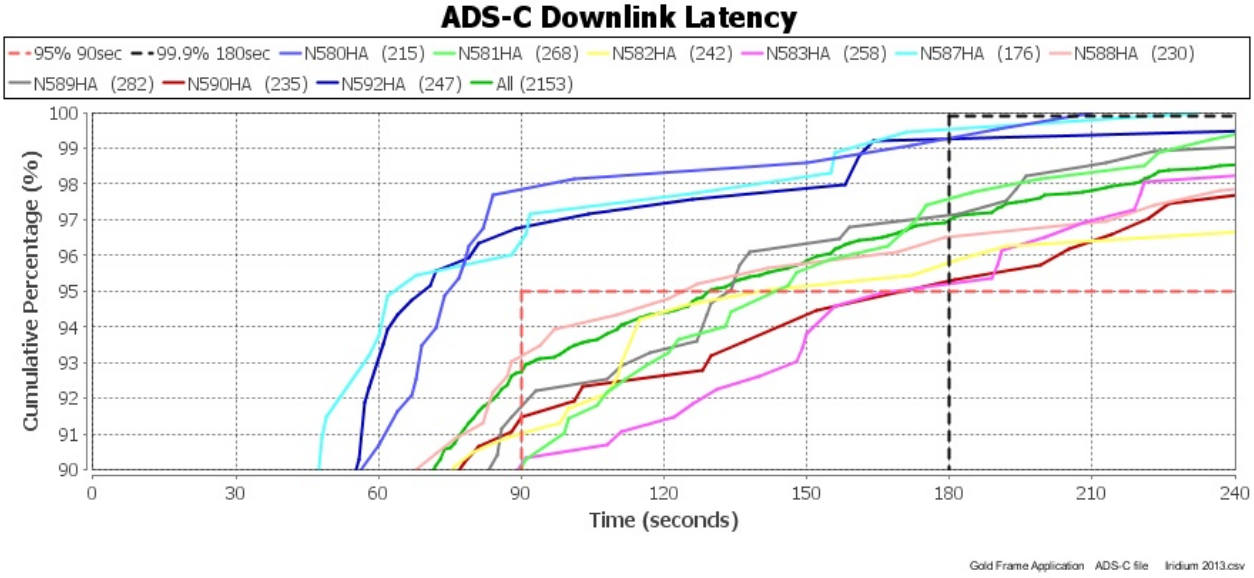


Figure 2: 2013 Analysis of individual HAL tail numbers
(This graph created using FAA supplied GPAT analysis tool)

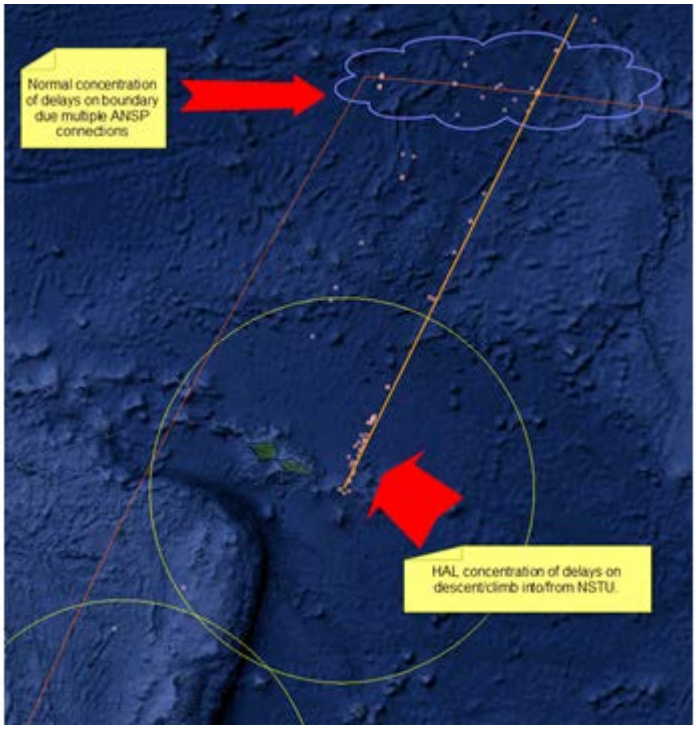
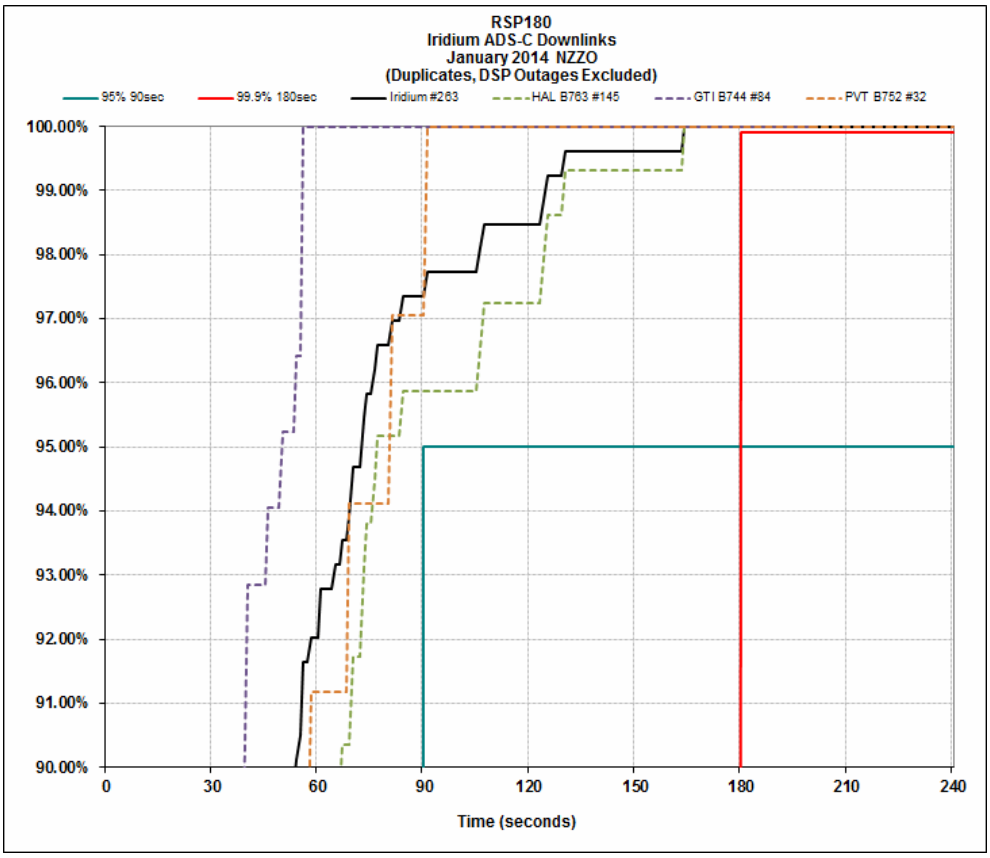


Figure 3: Delays of more than 180 seconds

2.5 The large number of delays on Iridium SATCOM within apparent VHF coverage of Samoa is puzzling. We understand that VHF RGS exist at both Faleolo in Western Samoa and Pago Pago in American Samoa and we see two RGS designator (APW1, and APW2) in use. The delays could be caused by low level shielding causing delays around VHF/SATCOM transitions or an outage in the Pago Pago RGS but this is pure supposition.

2.6 An analysis of Iridium performance observed in January 2014 shows no delays and all aircraft meeting the RSP performance standard. This is depicted in Figure 4 below. The intention is to continue monitoring through 2014 and if further delays occur within expected VHF coverage around Samoa raise a FANS PR to try and arrive at a satisfactory conclusion.

2.7 The positions of the delays around Samoa are in the main located below Auckland airspace where Auckland Oceanic controllers will have ADS-C contracts established but are not in control of the aircraft. This probably explains why we are not receiving controller performance complaints even though overall performance is below the 95% 90 second normal operations threshold.



3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) Note the performance of Iridium satellite ADS-C latency in NZZO, and

b) provide feedback on the analysis provided.