

**Twenty Fourth Meeting of the  
Informal South Pacific ATS Co-ordinating Group (ISPACG/24)**

**FANS Interoperability Team meeting (FIT/17)**

**Brisbane, Australia, 9-10 March 2010**

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**Agenda Item 10: HF Data link**

**OBSERVED HFDL PERFORMANCE AND USE IN AUCKLAND OCEANIC**

**Presented by Airways New Zealand**

**SUMMARY**

This paper an update on the observed use of HFDL in the Auckland Oceanic FIR.

**1. INTRODUCTION**

1.1 We last reported on HFDL use at ISPACG/23 FIT/16 in IP05. This paper updates that report.

**2. DISCUSSION**

2.1 Since FIT/16 we have seen HFDL in use on both A388 fleets (UAE, QFA), the UAE A345 fleet and isolated use by a UPS MD11, and a HAL B763. At FIT/16 we reported that a large number of uplinks were being sent via HFDL which was against the CSP routing policy. This was investigated under a FANS PR and we reported the issue fixed March 17<sup>th</sup> 2009 when ARINC advised they had modified their routing policy. This was verified in our March, and April analysis. However recent investigation (5 March) of deteriorating performance from the QFA A388 fleet identified that in September 2009 a large number of uplinks to that fleet were again being sent via HFDL. This is currently being investigated under the same FANS PR. Our understanding is that ARINC may still deliver uplinks via HFDL but only in a last ditch scenario when all other avenues are exhausted. We see this in operation with a low level of HF activity on the uplinks to our regular operators. Figure 1 illustrates the number of CPDLC uplinks sent via HFDL since April 2009.

2.2 While we have seen a low level of HFDL uplinks to the UAE A388 and A345 fleets during 2009 both fleets were experiencing Data2/Data3 interaction issues over the period. No uplinks via HFDL have been sent to these aircraft since R15 was installed at Santa Paula on February 16<sup>th</sup> to resolve the Data2/3 issues. We will continue to

monitor HF uplinks to these aircraft over the coming months to see if this correlation holds true.

Airline	Type	2009-04	2009-05	2009-06	2009-07	2009-08	2009-09	2009-10	2009-11	2009-12	2010-01	2010-02
UAE	A345	3	5	4	5	0	6	6	4	6	4	4
UAE	A388	11	1	6	3	3	7	1	1	3	5	5
QFA	A388	0	0	0	0	0	26	27	42	17	49	84
HAL	B763	0	0	0	2	0	0	0	0	0	0	0
UPS	MD11	0	0	0	0	0	0	2	0	0	0	0

Figure 1: CPDLC uplinks sent via HFDL

- 2.3 Figure 2 below illustrates observed HFDL downlink performance since 2008 and monitors performance using the historical benchmark of 95% within 60 seconds. HFDL downlink performance from these fleets is around 75% of messages within 60 seconds which while an improvement on the 45% of messages within 60seconds seen in 2006/2007 is still well below the requirement.

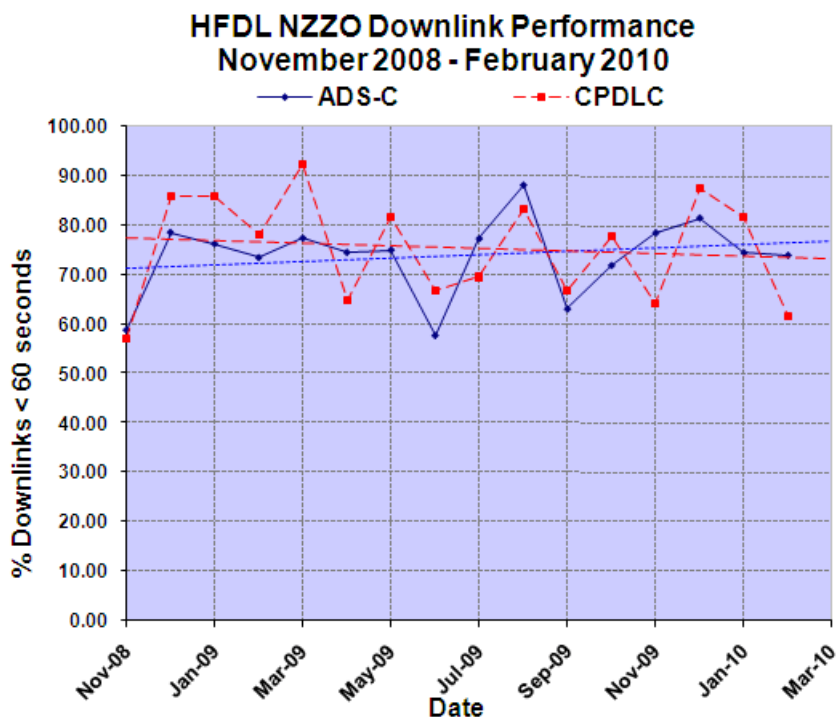
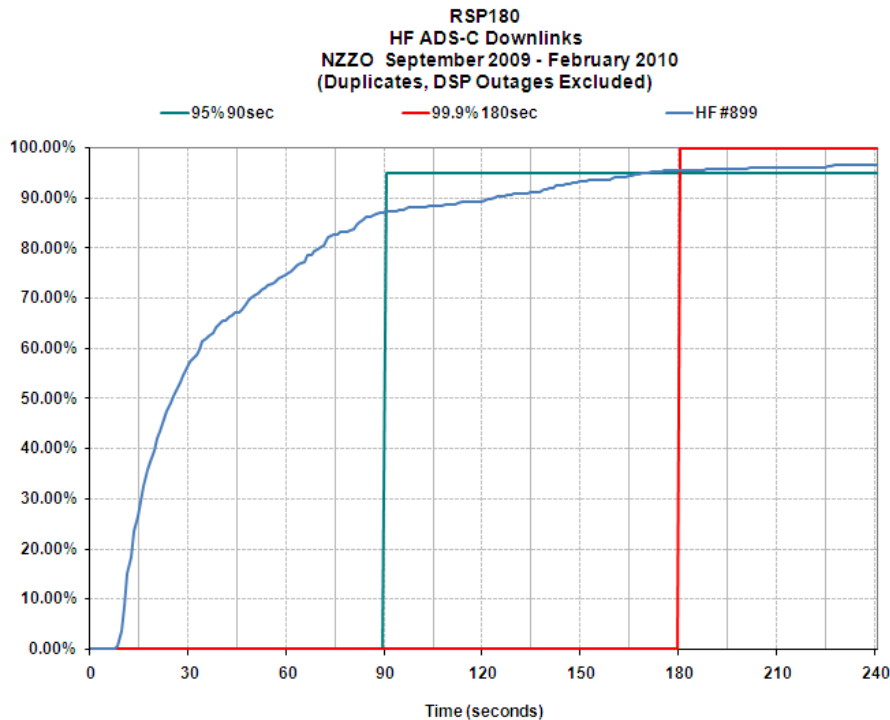


Figure 2: HFDL downlink performance 2008-11 through 2010-03

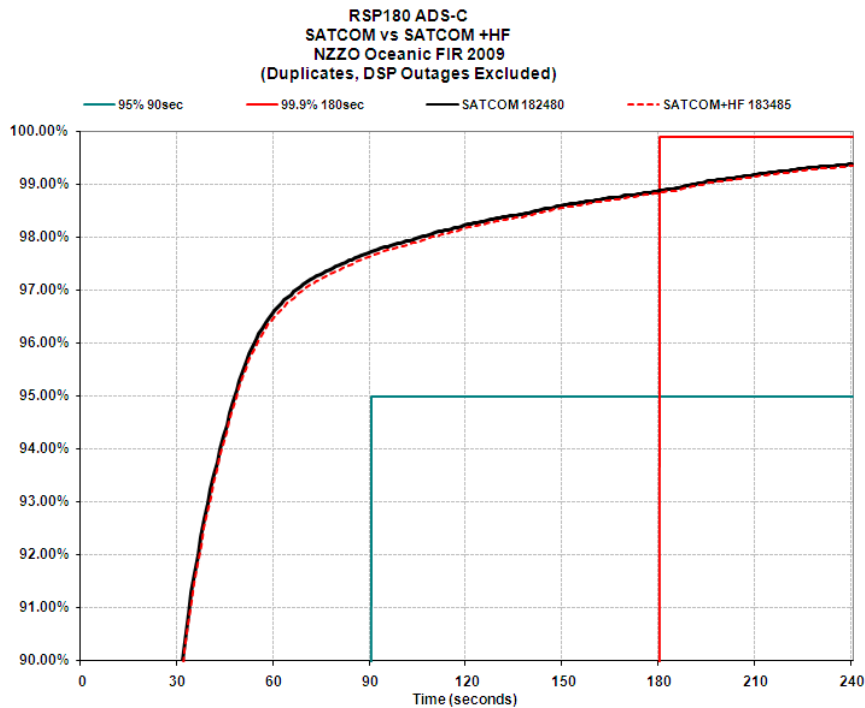
- 2.4 With the Airbus next on busy implementation with HFDL we see around 15% of ADS downlinks from the A388 fleets being routed via HFDL. Of these downlinks 75% are waypoint event reports and this is probably because the aircraft has a contract with 2 ANSP and NZZO has the later contract. Aircraft sends first waypoint event via SATCOM to other ANSP and to us via HFDL.
- 2.5 The Data2/3 interaction issues affecting SATCOM may have affected HFDL use and now that these issues have been fixed it will be interesting to monitor HFDL in

operation through the coming months. HF DL performance for ADS-C downlinks observed over the last six months from all operators and measured against the RSP180 requirement is illustrated in Figure 3 below. The observed performance of “pure” HF DL is well below the requirements.



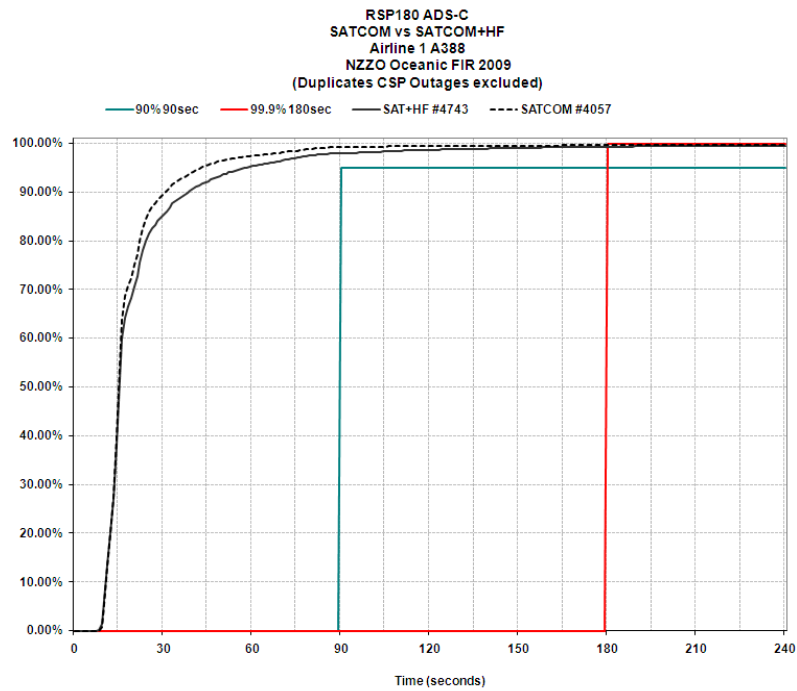
**Figure 3: ADS-C downlink latency 2009-09 through 2010-02**

- 2.6 The Airbus next on busy implementation only uses HF DL for a downlink transmission if the SATCOM is already sending a downlink and we measure performance for these fleets using the combined SATCOM+HF data. When measuring the different performance of SATCOM and SATCOM+HF across all aircraft operating in our area because of the small relative number of aircraft using HF DL little difference in the performance graphs is seen. This is depicted in Figure 4 below.
- 2.7 When you observe the difference in performance between SATCOM and SATCOM+HF on those Airbus fleets using HF DL in the next on busy mode the difference is more marked. This is illustrated in Figure 5 below which illustrates the performance for one of the A388 fleets during 2009. This fleet when using HF DL in next on busy mode is meeting the RSP180 95% in 90 seconds requirement but is below the 99.9% 180 seconds requirement for both SATCOM and SATCOM+HF.

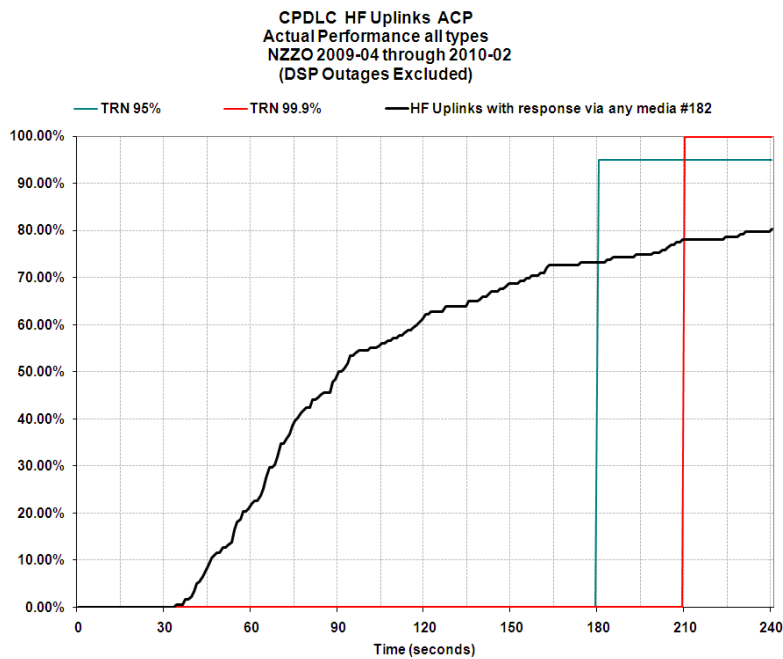


**Figure 4: SATCOM vs SATCOM+HF all aircraft operating NZZO**

- 2.8 With SATCOM the fleet is achieving 99.58% at 180 seconds and with SATCOM+HF the fleet is achieving 99.26% at 180 seconds. This differential of around 0.3% at the 180 second mark is consistent across the two Airbus A388 fleets operating in NZZO. We are still trying to determine why the SATCOM performance for these aircraft is below that expected. If we can get that up to where it should be then the SATCOM+HF may close to meeting the 99.9% 180 second requirement. We are hopeful that this can be achieved.
- 2.9 NZZO see very little “pure” HF DL transactions for CPDLC however with the issue identified in paragraph 2.1 above where a number of CPDLC uplinks are going via HF DL we have graphed ACP for these “mixed mode” transactions where the downlinks are usually via SATCOM or VHF. The results are illustrated in Figure 6 below. Observed performance is well below requirements however we should not draw too many conclusions at this stage because the issues with Data2 and Data 3 interactions that occurred through the period of these observations probably would have had some impact.



**Figure 5: A388 comparison between SATCOM and SATCOM+HF**



**Figure 6: CPDLC ACP “Mixed Mode” transactions**

### 3. ACTION BY THE MEETING

- 3.1 The meeting is invited to note the performance and issues with HF DL use in NZZO