

FANS Interoperability Team Meeting (FIT/19)

Nadi, Fiji, 28-29 February 2012

Agenda Item 5 – System Performance Review

FANS1/A Performance Update NZZO

Presented by Airways New Zealand

SUMMARY

This paper reviews the current performance of FANS1/A operations in the NZZO oceanic FIR, comments on the current monitoring and improvement processes in the ISPACG region, and seeks improved participation by ISPACG stakeholders in the continuous improvement of FANS1/A operations in the SOPAC.

1. INTRODUCTION

- 1.1. Data obtained from post implementation monitoring is used to measure FANS1/A system performance against Required Communications Performance (RCP) and Required Surveillance Performance (RSP). Data is presented using guidance from GOLD Appendix D. System availability measurement is based on reported outages by the CSP and observed outages in the FANS1/A application data records
- 1.2. Overall performance continues to slowly improve as issues are identified and corrected through the regional Central Reporting Agency. Participation in the CRA process could be substantially improved as currently few stakeholders actually participate.
- 1.3. Detailed performance analysis for ISPACG stakeholders is available on the CRA website at <http://www.ispacg-cra.com/>.

2. DISCUSSION

- 2.1 ADS-C Performance. The observed performance of ADS-C downlinks continues to improve. The RSP180 requirement is for 99.9% of downlinks to be received within 180 seconds, and for 95% of downlinks to be received within 90 seconds. We observed 99.7% within 180 seconds in 2011 and 99.15% within 90 seconds in 2011. All of the 25 fleets monitored meet the 95% 90 seconds normal operations requirement. 13 fleets meet the 99.9% 180 second requirement, and a further 5 were

- above 99.5%. ADS-C performance data in tabular and graphical form is attached at Appendix A.
- 2.2 CPDLC Performance (RCTP). Performance continues to improve. For RCP240 Required Communications Technical Performance (RCTP) the requirement is for 99.9% of transactions to be completed within 150 seconds and 95% to be completed within 120 seconds. In the 2011 year 99.8% were completed in 150 seconds, and 99.8% were completed in 120 seconds. In December 2011 only 1 fleet in the 26 monitored did not meet the 95% standard, and only 6 did not meet the 99.9% standard. Actual Communication Technical Performance data in graphical and tabular form is attached at Appendix A.
- 2.3 CPDLC Performance (RCP). Performance continues to improve. For RCP240 Required Communications Performance (RCP) the requirement is for 99.9% of transactions to be completed within 210 seconds and 95% to be completed within 180 seconds. In the 2011 year 99.6% were completed in 210 seconds, and 99.3% were completed in 1800 seconds. In December 2011 only 1 fleet in the 26 monitored did not meet the 95% standard, and 11 did not make the 99.9% standard. Actual Communication Performance data in graphical and tabular form is attached at Appendix A.
- 2.4 CPDLC Performance – Summary. Nearly all fleets are meeting the 95% normal operations requirements and for those not meeting the 99.9% requirements most are close. For those individual aircraft or fleets that are below the standard then we use the ISPACG Central Reporting agency (CRA) to investigate and hopefully resolve the issues. We have had some success at continuous performance improvement over the years and it is an on-going process. Performance data in graphical form is attached that illustrates the performance improvement since 2009.
- 2.5 Post Implementation Monitoring. ICAO mandates post implementation monitoring to ensure that the required communications and surveillance performance is met. Post implementation monitoring will drive further performance improvement. A mature problem reporting system, and the investigation and resolution of identified issues is essential in today's data-link environment. The Figure 1 below illustrates the process and is well known. This requires a team effort by ALL stakeholders.
- 2.6 In the ISPACG arena few stakeholders appear to be fully involved in the continuous improvement process: we have limited airline representation on the problem reporting site; there are few airlines actually reporting problems with any frequency; there are few ANSP reporting problems with any frequency; and there are few ANSP reporting performance information. As a regional group we were leaders in implementing post implementation monitoring of FANS1/A data-link and using this to drive continuous performance improvement. There is more than enough evidence to support the contention that monitoring does drive improvement. However, we seem to struggle in achieving the required buy in from all stakeholders. The meeting is asked to reflect on this and determine ways to improve the situation.

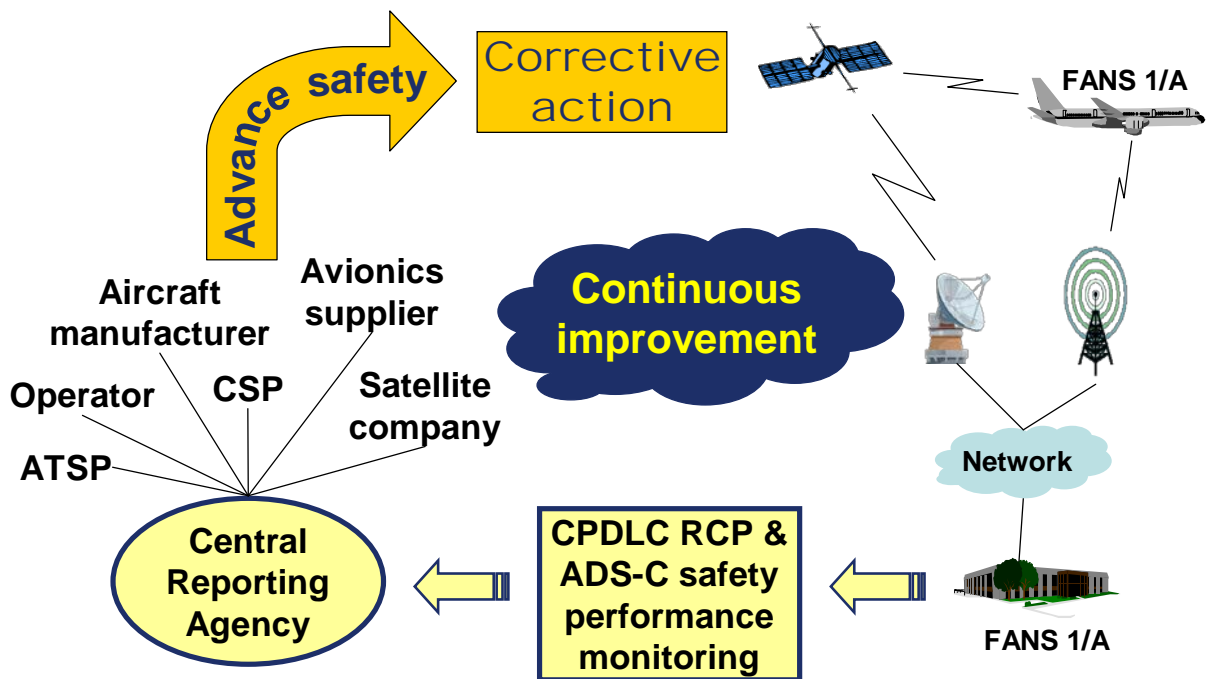


Figure 1: The Continuous Improvement Process

- 2.7 Availability. Availability of the Inmarsat I3 constellation suffered with a significant outage in October 2011. Before that outage the availability from the satellite and networks had achieved the 99.99% efficiency requirement when assessed on a rolling 12 month time frame.
- 2.8 The outage on October 22 at 0854UTC was classified as a Single Even Upset (SEU) by Inmarsat and was caused by the on-board frequency generation system switching off unexpectedly causing a total payload outage. While the outage was being investigated Inmarsat initiated a contingency procedure to restore service via the I2 satellites at 142W and 109E. We do not know when the contingency procedure restored service however the first data received in NZZO via XXC was not until 1800UTC and via AOE2 not until 1956UTC. We understand from discussions at the recent SOCM2 meeting that Inmarsat are targeting restoration within 1 hour if a similar failure occurs again. This would imply that there were significant issues with the implementation of the contingency after the October 22 event. However, this is only supposition as we have not received a full report on the outage nor on what if any steps have been taken to improve contingency arrangements. We have been singularly unimpressed at the lack of timely feedback from either Inmarsat or our CSP (ARINC) regarding this significant outage. Both Inmarsat and ARINC are major stakeholders in the FANS1/A community and Airways finds the lack of transparency and reporting on the October 22 event disappointing. Other ANSP may care to review the feedback they received from their CSP regarding this outage and determine if a joint ISPACG approach seeking clarification on the lessons learnt by Inmarsat and the CSP's during the October 22 event is required.
- 2.9 We have little Iridium traffic in NZZO but the Iridium network does suffer from only having a single GES which is significantly affected by weather outages. Since July

2011 we recorded 484 minutes of Iridium outages – the 99.9% safety requirement requires no more than 520 per year. We understand that Iridium have included additional GES in their Iridium-Next architecture. Airways have started monitoring Iridium availability in 2012 as more aircraft are fitted in our area of interest. We are currently struggling with the clarity of some of the Iridium reports. The use of the wording “degraded performance” and whether any reported “degraded performance” actually affects FANS1/A means we are not sure if an outage is occurred or not. Currently, we will record any degraded performance as an outage. We invite discussion on this assumption.

2.10 We have had no reported outages from MTSAT.

2.11 Availability data is attached at Appendix A.

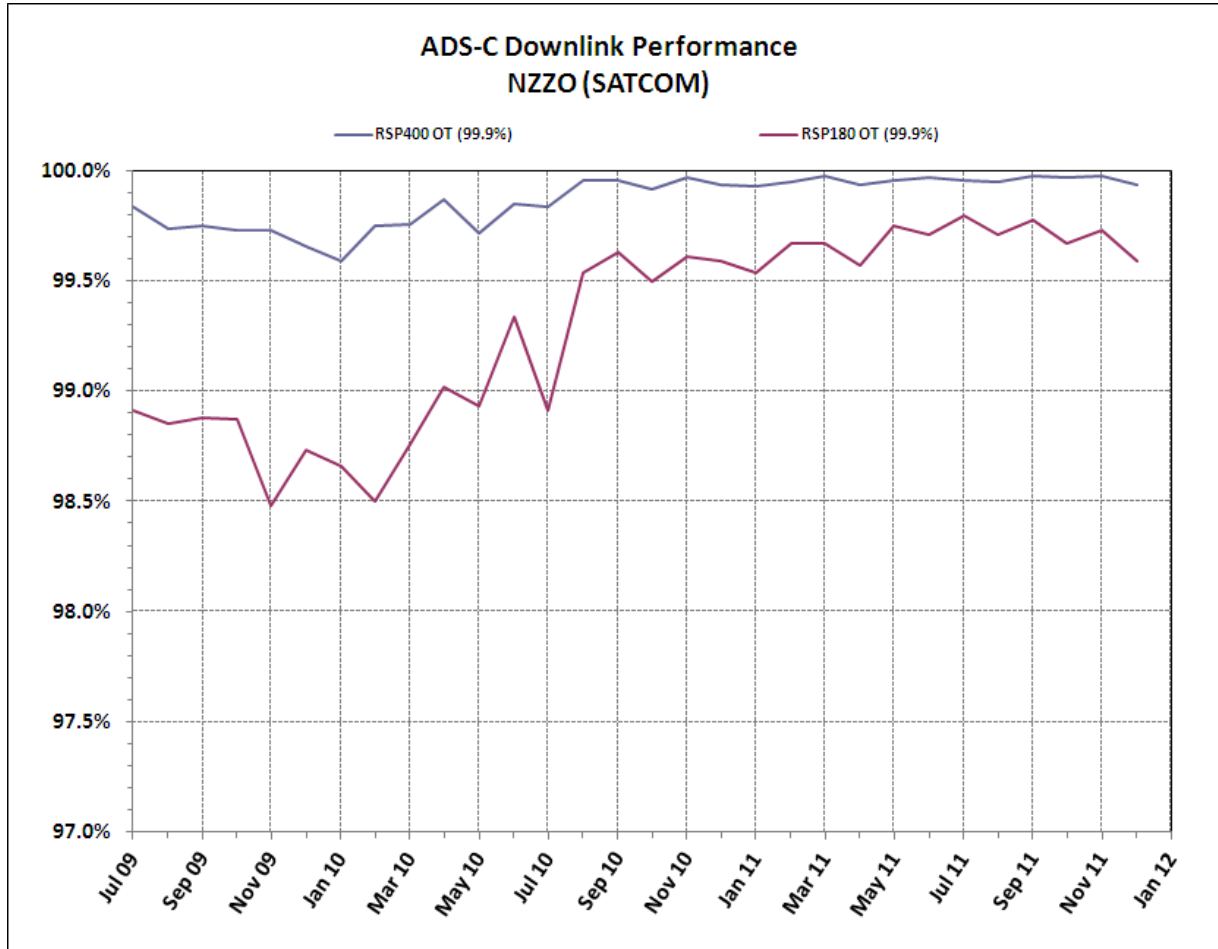
3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) Note the observed performance of FANS1/A data-link in NZZO.
- b) Review stakeholder support for the FANS1/A continuous improvement process in the region and investigate ways to improve participation.
- c) Review Inmarsat and CSP feedback following the October 2011 outage of the Inmarsat 3F3 satellite and determine if ISPACCG should seek clarification of lessons learnt from the CSP's and Inmarsat.
- d) Review use of the term “degraded performance” by Iridium and seek clarification of its meaning in regard to the classification of reported outages.

Appendix A: Performance and Availability Data NZZO

ADS-C Performance: 2009-2011

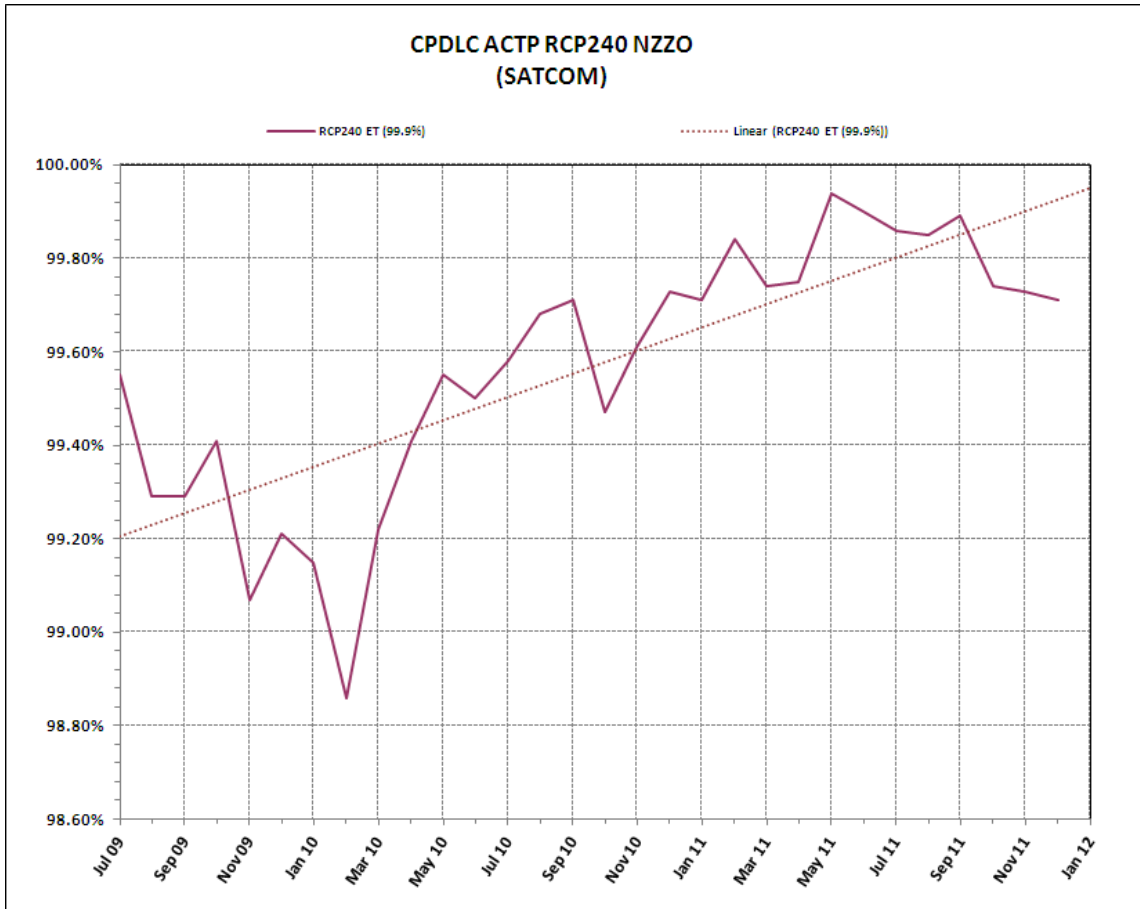




ADS-C Performance: December 2011 by Fleet

Operator	Type	# Messages	% of Total	% Dt 95% 90sec	%OT 99.9% 180sec	ADS-C NZZO December 2011 RSP180 Analysis
AAA	A343	616	3.88%	100.00%	100.00%	13 fleets achieved 99.9% 180 secs All fleets achieved 95% 90sec
TTT	A333	203	1.28%	100.00%	100.00%	
A2F	A332	236	1.49%	100.00%	100.00%	
MMM	A332	236	1.49%	100.00%	100.00%	
XXX	B744	1926	12.13%	99.90%	100.00%	
JJJ	A332	325	2.05%	99.69%	100.00%	
RRR	B772	274	1.73%	99.27%	100.00%	
KKK	B744	220	1.39%	99.09%	100.00%	
FFF	B772	251	1.58%	97.61%	100.00%	
VVV	B772	424	2.67%	97.41%	100.00%	
YYY	B77W	288	1.81%	97.22%	100.00%	
DDD	B772	2120	13.36%	99.86%	99.95%	
OOO	B77W	2099	13.22%	99.38%	99.86%	
OTHER	VARIOUS	476	3.00%	98.53%	99.79%	5 fleets between 99.5%-99.9% 180sec
MIL	VARIOUS	581	3.66%	98.62%	99.66%	
UUU	A388	280	1.76%	98.83%	99.64%	
GGG	B744	1435	9.04%	99.30%	99.44%	
A2E	A333	210	1.32%	98.10%	99.52%	
A2D	A332	485	3.06%	98.76%	99.38%	5 fleets between 99.0%-99.5% 180sec
ZZZ	A343	1731	10.91%	98.61%	99.13%	
CCC	B744	402	2.53%	97.26%	99.00%	
QQQ	B77W	1055	6.65%	97.54%	98.96%	4 fleets < 99.0% 180sec
SSS	A388	867	5.46%	97.35%	98.85%	
PPP	B77W	838	5.28%	98.57%	98.81%	
NNN	B744	661	4.16%	97.73%	98.79%	
		15873	100.00%			

CPDLC ACTP: 2009-2011





CPDLC ACTP: Jan-Feb 2011 by Fleet

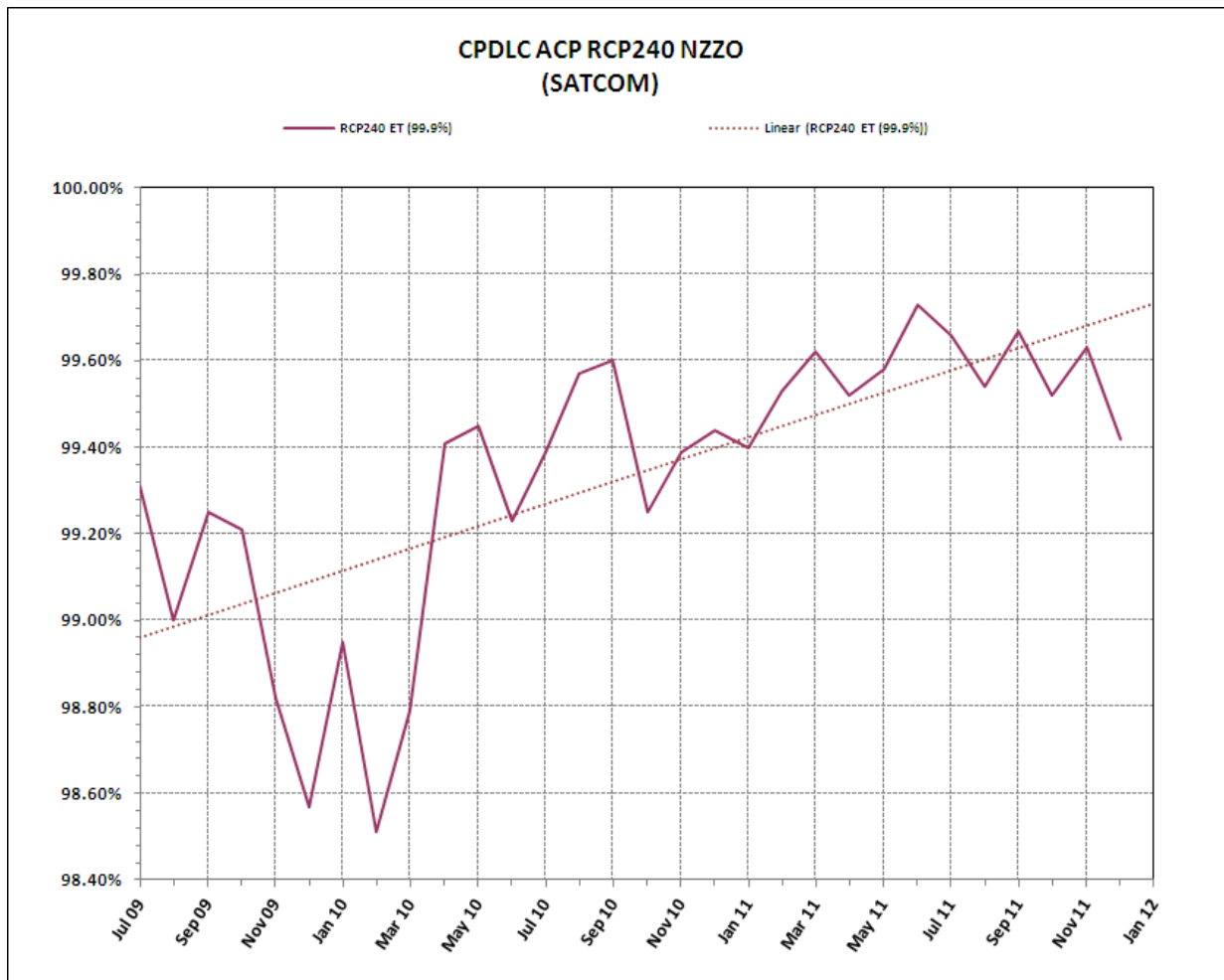
Operator	Type	# Messages	% of Total	RCTP 95% 120sec	RCTP 99.9% 150sec	CPDLC NZZO Jan-Feb 2011 RCP240 ANALYSIS
PPP	B77W	386	5.48%	100.00%	100.00%	50.48% messages achieved <u>RCTP 99.9% 150sec</u>
VVV	B772	242	3.44%	100.00%	100.00%	
OOO	B77W	197	2.80%	100.00%	100.00%	
AAA	A343	175	2.49%	100.00%	100.00%	
UUU	A388	131	1.86%	100.00%	100.00%	
SSS	A388	130	1.85%	100.00%	100.00%	
FFF	B772	93	1.32%	100.00%	100.00%	
A2A	B772	84	1.19%	100.00%	100.00%	
MIL	VAR	84	1.19%	100.00%	100.00%	
KKK	B744	60	0.85%	100.00%	100.00%	
JJJ	A332	49	0.70%	100.00%	100.00%	
HHH	B744	43	0.61%	100.00%	100.00%	
WWW	A343	30	0.43%	100.00%	100.00%	
TTT	A332	27	0.38%	100.00%	100.00%	
XXX	B744	1075	15.27%	99.91%	100.00%	
QQQ	B77W	402	5.71%	99.75%	100.00%	
EEE	B772	152	2.16%	99.34%	100.00%	
RRR	B772	94	1.34%	98.94%	100.00%	
OTHER	VAR	99	1.41%	98.28%	100.00%	
DDD	B772	937	13.31%	98.72%	99.79%	45.58% messages between 99.5% - 99.9%
NNN	B744	486	6.91%	99.38%	99.59%	
ZZZ	A343	454	6.45%	99.34%	99.56%	
GGG	B744	764	10.86%	99.35%	99.48%	
MMM	A332	567	8.06%	99.47%	99.47%	3.94% messages between 99% - 99.5%
CCC	B744	140	1.99%	99.29%	99.29%	
YYY	B77W	137	1.95%	99.27%	99.27%	



CPDLC ACTP: December 2011 by Fleet

Operator	Type	# Messages	% of Total	RCTP 95% 120sec	RCTP 99.9% 150 sec
DDD	B772	457	13.08%	100.00%	100.00%
OOO	B77W	414	11.85%	100.00%	100.00%
XXX	B744	392	11.22%	100.00%	100.00%
GGG	B744	218	6.24%	100.00%	100.00%
VVV	B772	118	3.38%	100.00%	100.00%
SSS	A388	104	2.98%	100.00%	100.00%
AAA	A343	85	2.43%	100.00%	100.00%
YYY	B77W	76	2.18%	100.00%	100.00%
UUU	A388	67	1.92%	100.00%	100.00%
RRR	B772	63	1.80%	100.00%	100.00%
MIL	VARIOUS	60	1.72%	100.00%	100.00%
FFF	B772	59	1.69%	100.00%	100.00%
A2F	A332	50	1.43%	100.00%	100.00%
KKK	B744	43	1.23%	100.00%	100.00%
JJJ	A332	37	1.06%	100.00%	100.00%
A2E	A333	36	1.03%	100.00%	100.00%
TTT	A332	34	0.97%	100.00%	100.00%
HHH	B744	31	0.89%	100.00%	100.00%
A2C	B744	92	2.63%	98.91%	100.00%
OTHER	VARIOUS	31	0.89%	93.55%	100.00%
MMM	A332	258	7.38%	98.84%	99.61%
ZZZ	A343	219	6.27%	99.54%	99.54%
QQQ	B77W	155	4.44%	99.35%	99.35%
PPP	B77W	220	6.30%	98.18%	98.64%
NNN	B744	114	3.26%	97.37%	97.37%
A2D	A332	61	1.75%	91.80%	93.44%
		3494	100.00%		

CPDLC ACP: 2009-2011





CPDLC ACP: Jan-Feb 2011

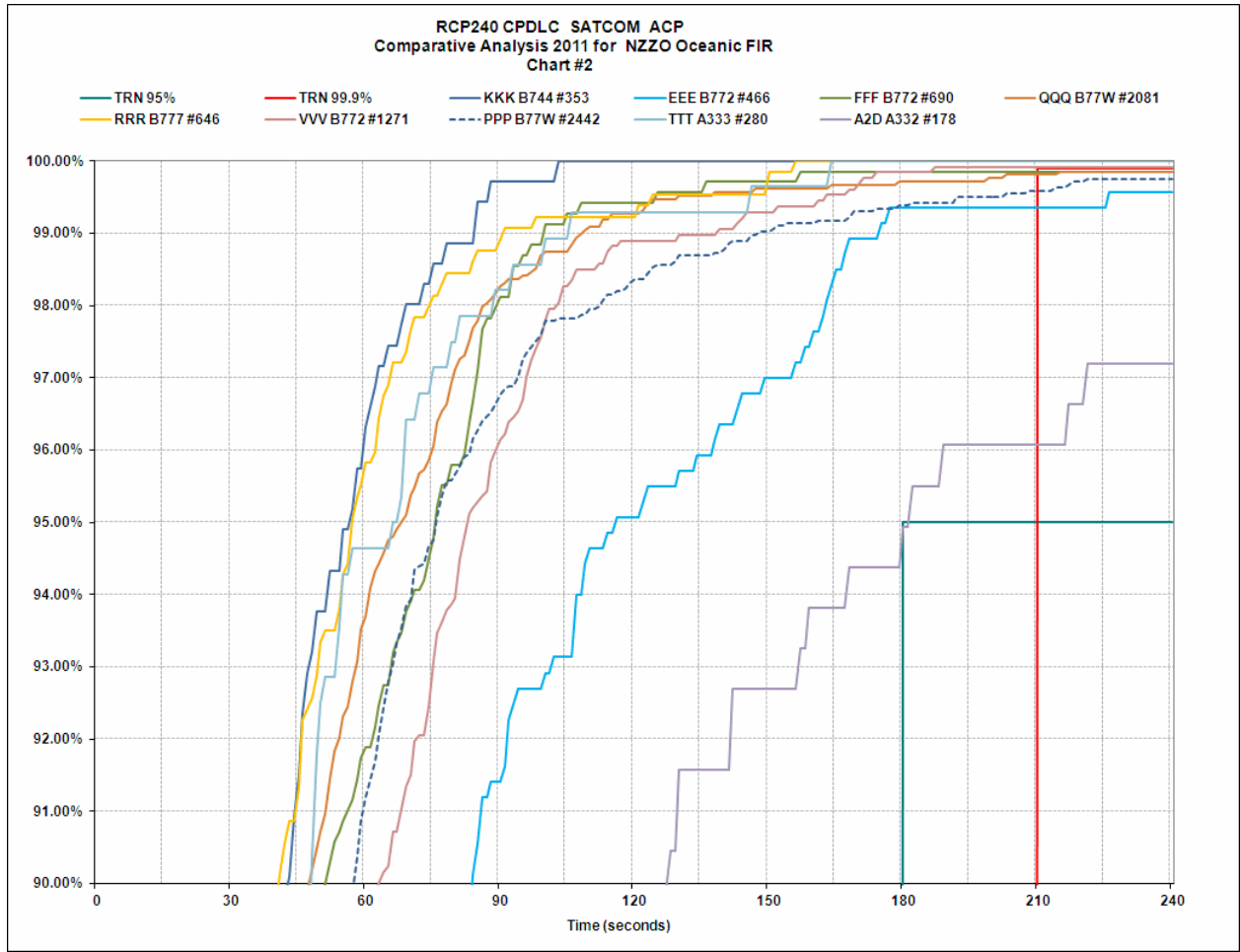
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VVV	B772	242	3.44%	100.00%	100.00%	
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KKK	B744	60	0.85%	100.00%	100.00%	
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PPP	B77W	386	5.48%	99.48%	99.48%	
MMM	A332	567	8.06%	99.12%	99.47%	26.13% messages between 99% - 99.5%
GGG	B744	764	10.86%	99.21%	99.35%	
XXX	B744	1075	15.27%	99.16%	99.35%	13.36% messages less than 99%
NNN	B744	486	6.91%	97.74%	98.97%	
MIL	VAR	84	1.19%	98.80%	98.80%	
CCC	B744	140	1.99%	98.57%	98.57%	
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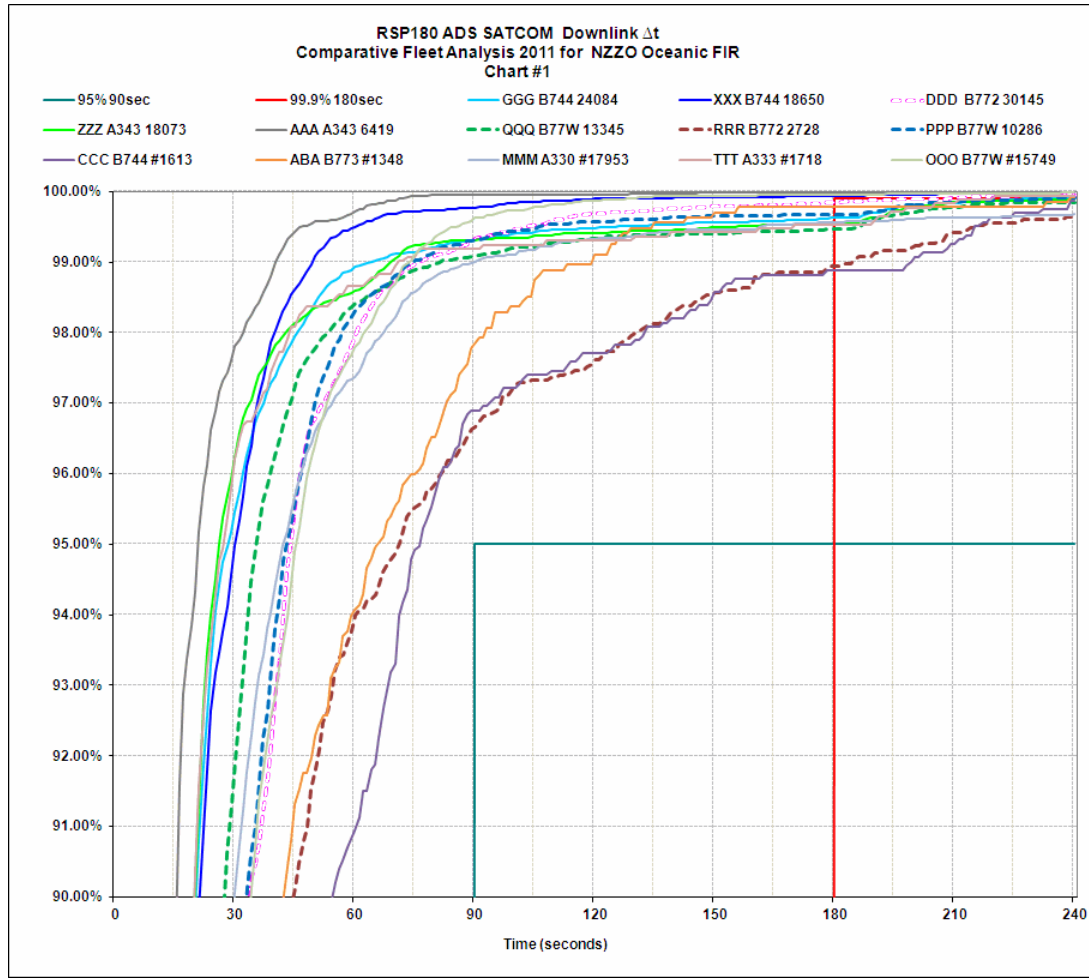
CPDLC ACP: December 2011

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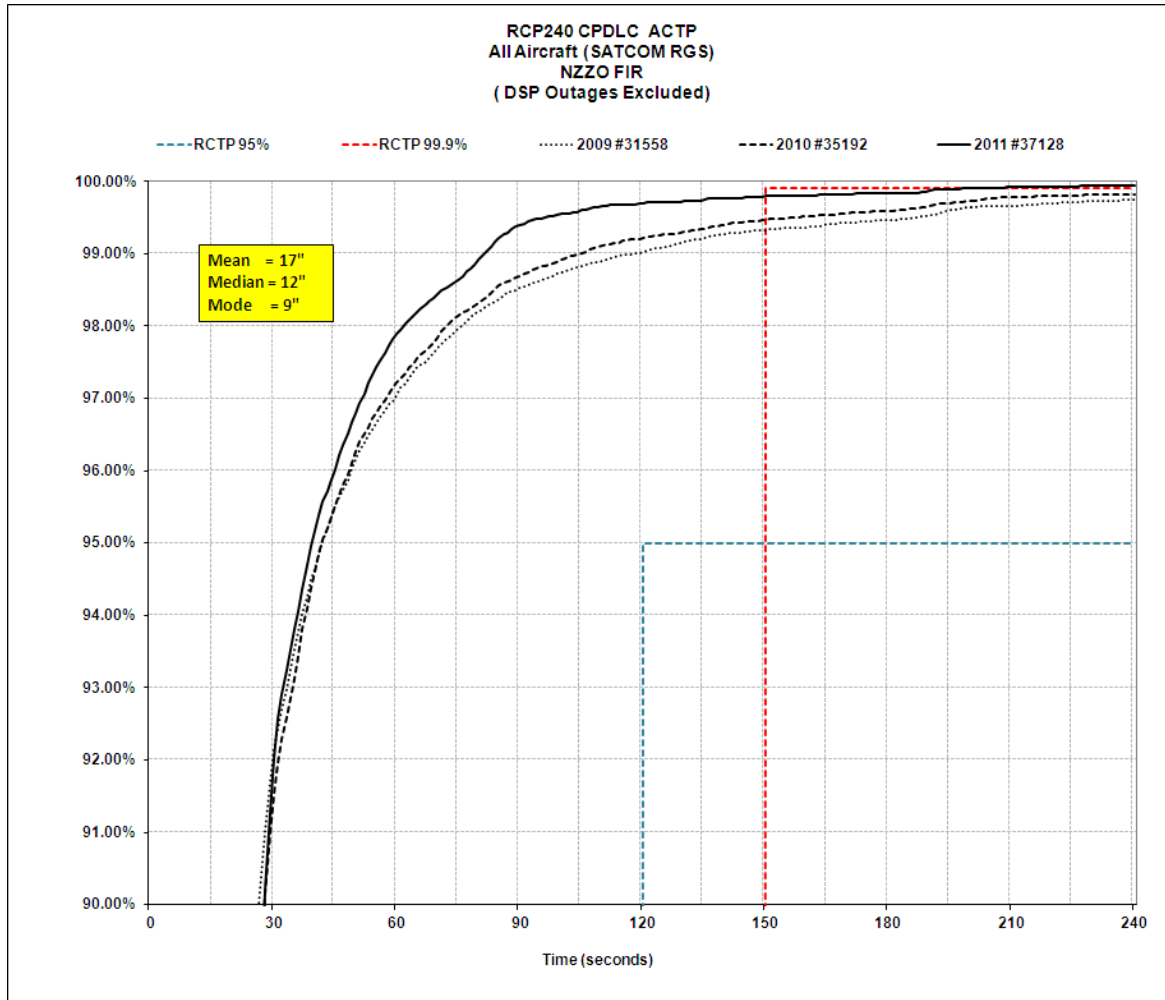
CPDLC – The good, the bad, and the ugly.



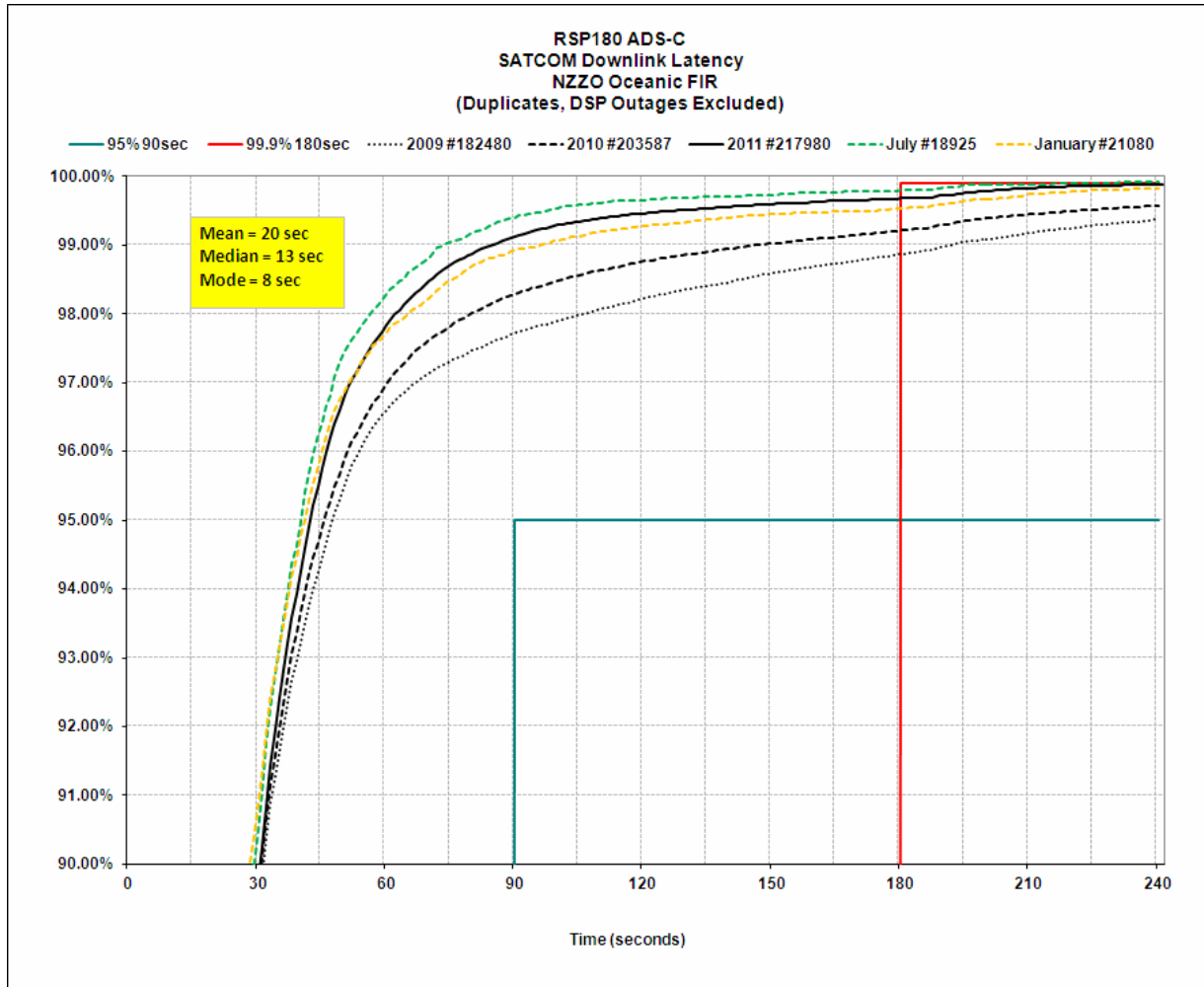
ADS-C : The good, the bad, and the ugly.



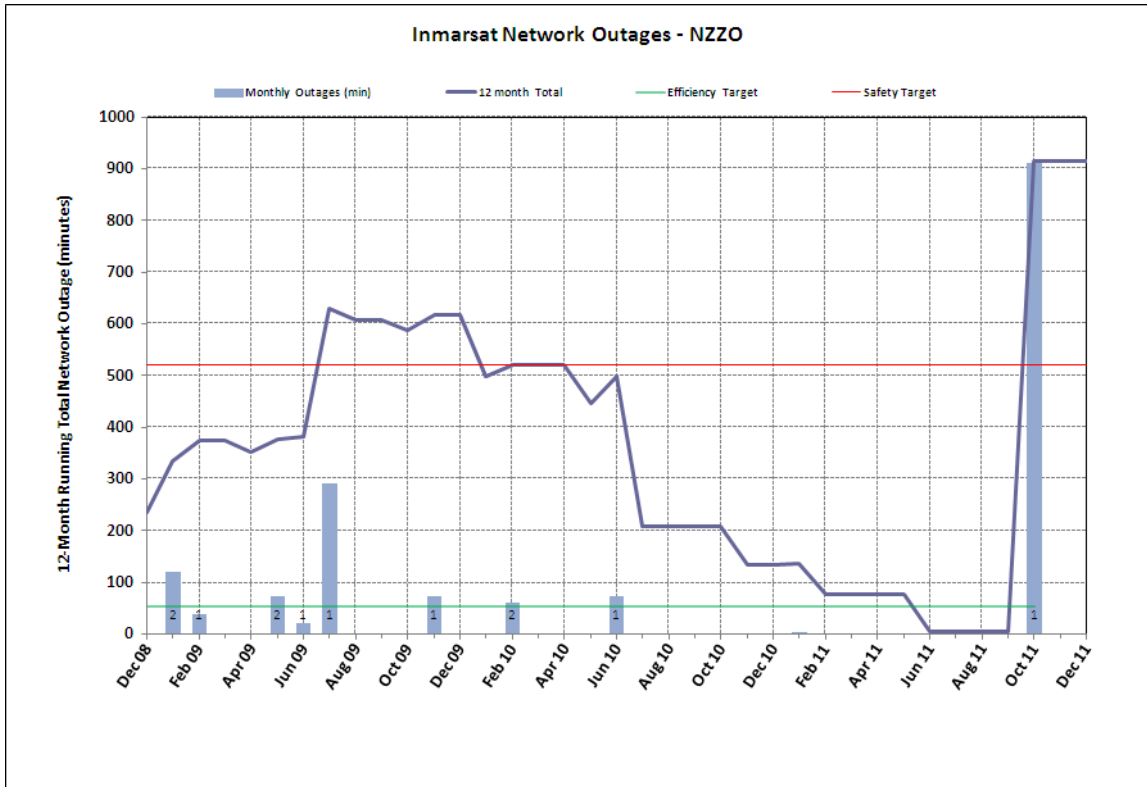
CPDLC ACTP – Continuous Performance Improvement?



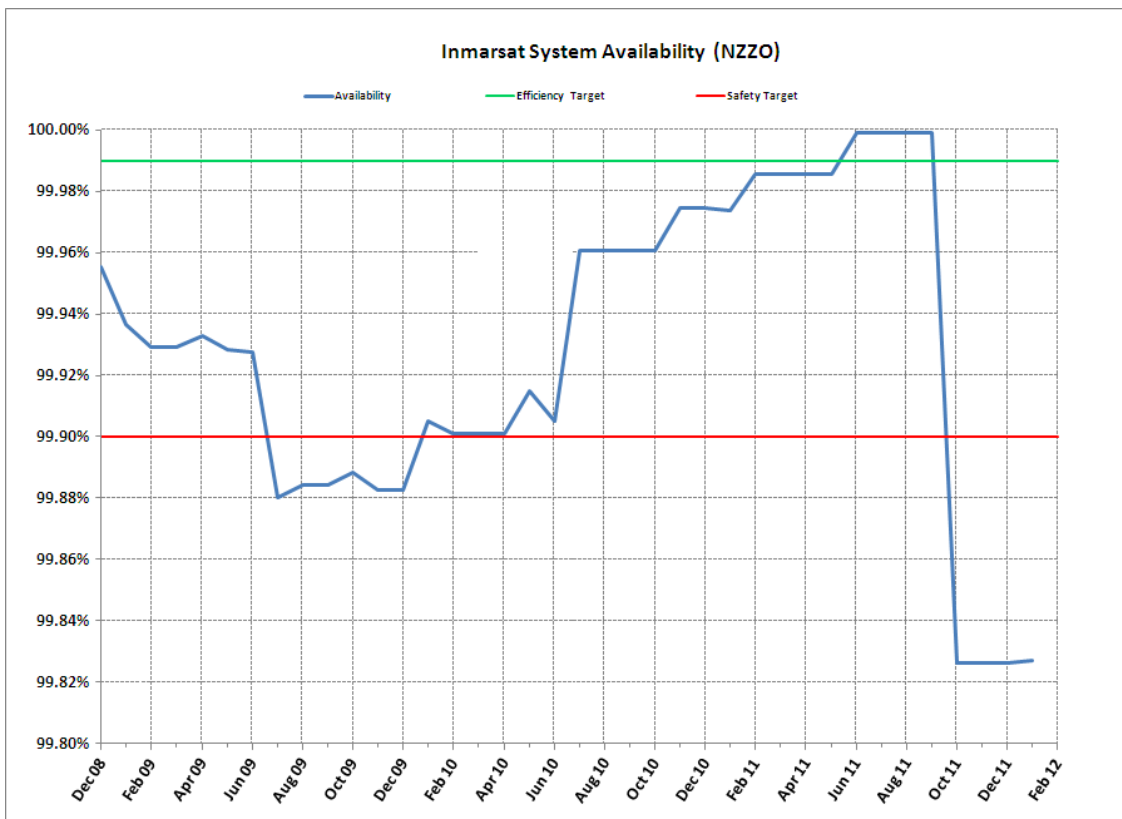
ADS-C: Continuous Performance Improvement?



Inmarsat Availability : Network Outages



Inmarsat Availability



NZZO – Combined Performance Monitor July 2010 – December 2011

