



International Civil Aviation Organization

**SECOND SATELLITE DATA LINK OPERATIONAL CONTINUITY
MEETING TO REVIEW THE PERFORMANCE AND PROVISION OF
SATELLITE COMMUNICATIONS IN THE ASIA AND PACIFIC
REGIONS**

(Bangkok, Thailand, 8-10 February 2012)

Agenda Item 2: Data-link elements and role of stakeholders

FANS 1/A PERFORMANCE UPDATE NZZO

(Presented by New Zealand)

SUMMARY

This paper reviews the current performance of FANS1/A operations in the NZZO oceanic FIR. Performance information is provided in the form provided for in the GOLD (Global Operational Data-link Manual).

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)

1.2 System availability measurement is based on reported outages by the CSP and observed outages in the FANS1/A application data records.

1.3 Overall performance continues to slowly improve as issues are identified and corrected through the regional Central Reporting Agency.

1.4 Detailed performance analysis for the Auckland and Oakland FIR is available on the CRA website at <http://www.ispacg-cra.com/>. The performance information available on this site is available to all. The only area of the website where password access is required is the problem reporting section.

Agenda Item 2

08/02/12

2 DISCUSSION

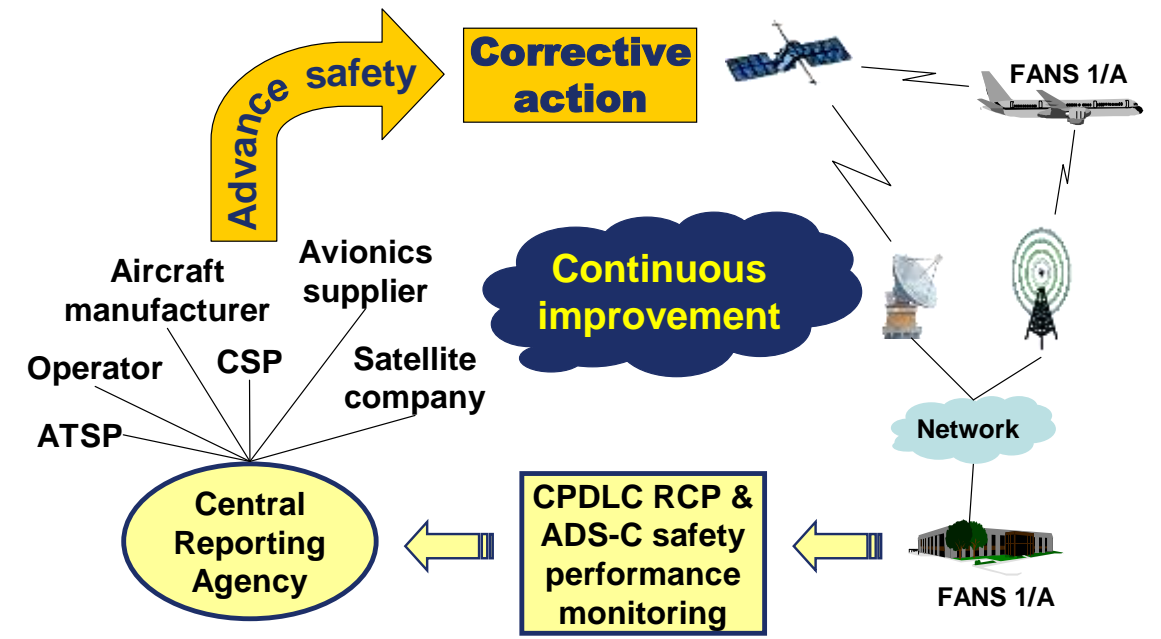
2.1 ADS-C Performance. The observed performance of ADS-C downlinks continues to improve. The RSP180 requirement is for 99.9% of downlinks to be received within 180 seconds, and for 95% of downlinks to be received within 90 seconds. We observed 99.7% within 180 seconds in 2011 and 99.15% within 90 seconds in 2011. All of the 25 fleets monitored met the 95% 90 seconds normal operations requirement. 13 fleets met the 99.9% 180 second requirement, and a further 5 were above 99.5%. Performance data is tabular and graphical form is attached.

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 make the 99.9% standard. Actual Communication Technical Performance data in graphical and tabular form is attached.

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.

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 improvements seen since 2009.

2.5 Post Implementation Monitoring. This is essential (and required by ICAO) if we are to see further performance improvement. A mature problem reporting system and detailed investigation of identified issues is essential in today's data-link environment. This is a team effort by all stakeholders as illustrated in Figure 1 below.



2.6 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 on a rolling 12 month assessment. We have little Iridium traffic in NZZO but the Iridium network does suffer from only having a single GES which is affected by weather that has caused most outages. Since July 2011 we recorded 484 minutes of outages – the 99.9% safety requirement requires no more than 520 per year. We have started monitoring Iridium in 2012 as more aircraft are fitted in our area of interest. We have had no reported outage from MTSAT which has achieved 99.9% safety and 99.99 efficiency requirements for availability. Availability data is attached.

3 ACTION BY THE MEETING

3.1 The Meeting is invited to note the information in this paper.

FANS1/A Performance NZZO

SOCM

Bangkok, Thailand, 9-10 February, 2012



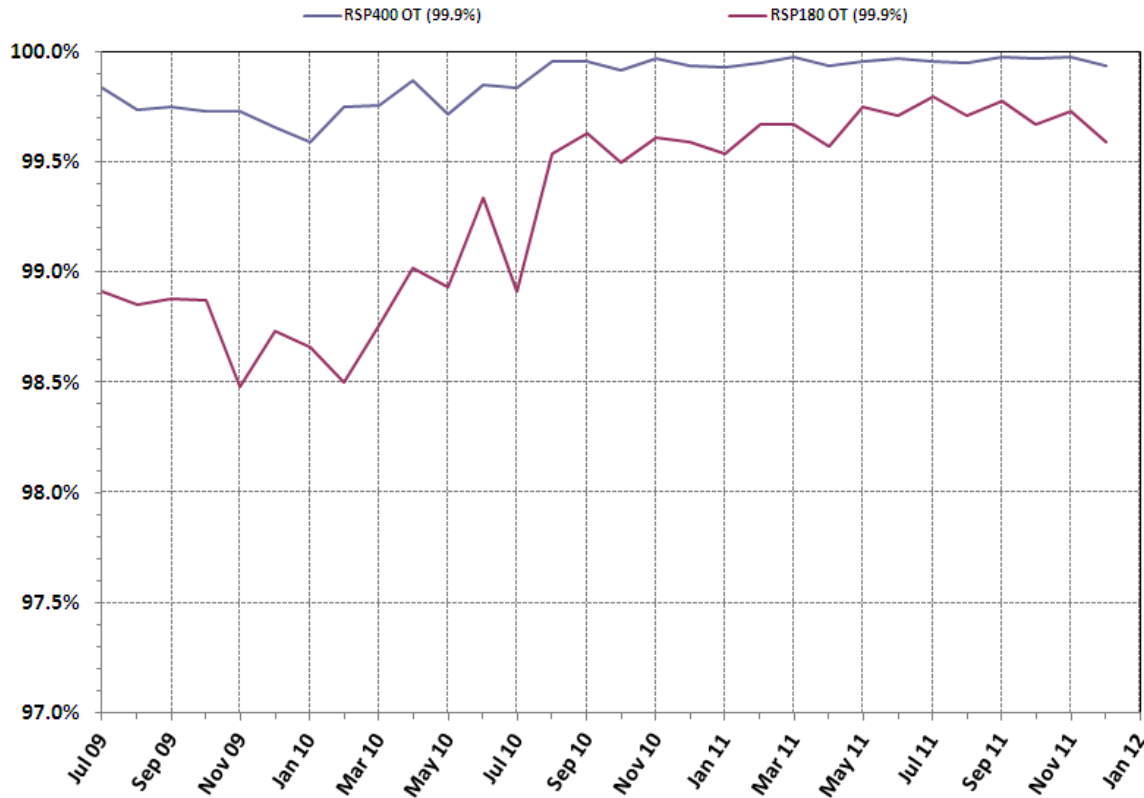
Introduction

- Data gained from post implementation monitoring is used to measure FANS1/A system performance against Required Communications Performance (RCP) and Required Surveillance Performance (RSP)
- System availability measurement is based on reported outages by the CSP and observed outages in the FANS1/A application data records
- Overall performance continues to improve
- Detailed performance analysis for the Auckland and Oakland FIR is available on the CRA website at <http://www.ispacg-cra.com/>



ADS-C Performance

ADS-C Downlink Performance
NZZO (SATCOM)



- RSP180 requirement is 99.9% within 180 seconds

- Achieved 99.6% in Jan 2012

- Achieved 99.8% in July 2011

- Achieved 99.68% for 2011 year

- RSP180 requirement is 95% within 90 seconds

- Achieved 99.15% for 2011 year



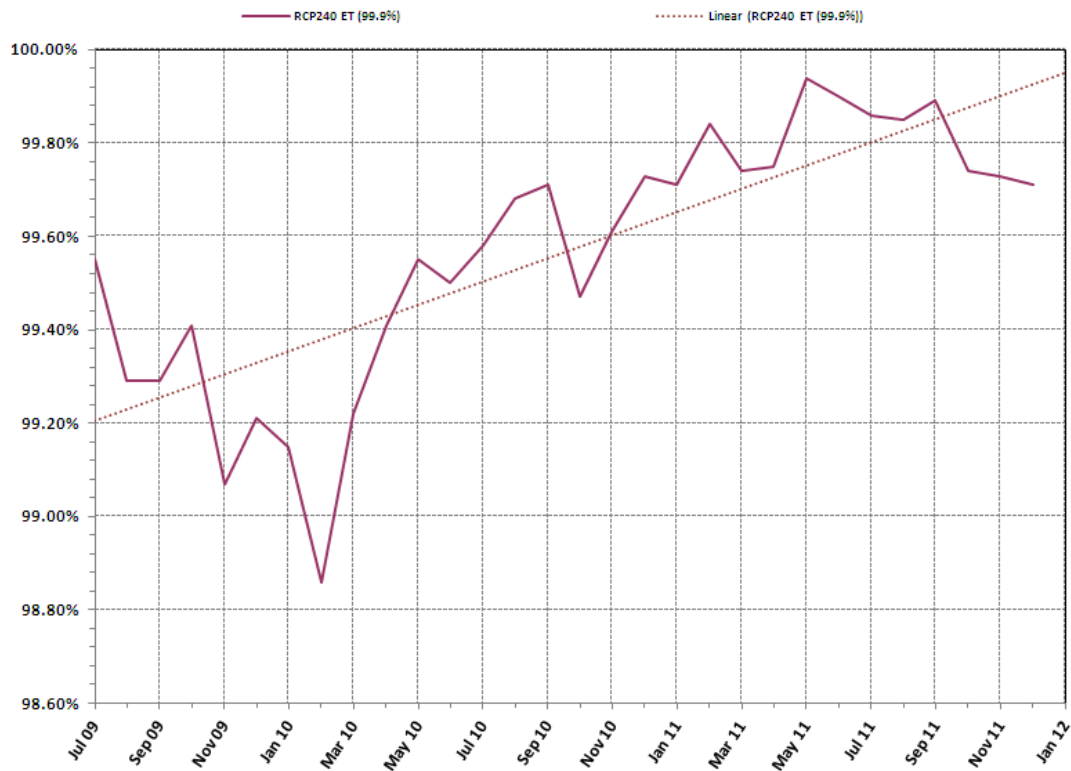
ADS-C Performance

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%	5 fleets between 99.0%-99.5% 180sec
A2D	A332	485	3.06%	98.76%	99.38%	
ZZZ	A343	1731	10.91%	98.61%	99.13%	
CCC	B744	402	2.53%	97.26%	99.00%	4 fleets < 99.0% 180sec
QQQ	B77W	1055	6.65%	97.54%	98.96%	
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 Performance - ACTP

CPDLC ACTP RCP240 NZZO
(SATCOM)



- RCP240 ACTP requirement is 99.9% within 150 sec

-May 2011 achieved 99.9% within 150 seconds

- December 2011 achieved 99.7% within 150 seconds

-2011 annual performance saw 99.8% completed within 150 seconds

-RCP240 ACTP requirement is 95% within 120 sec

-2011 annual performance saw 99.8% completed within 120 seconds



CPDLC Performance - ACTP - Jan-Feb 2011

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%	
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%	
CCC	B744	140	1.99%	99.29%	99.29%	3.94% messages between 99% - 99.5%
YYY	B77W	137	1.95%	99.27%	99.27%	

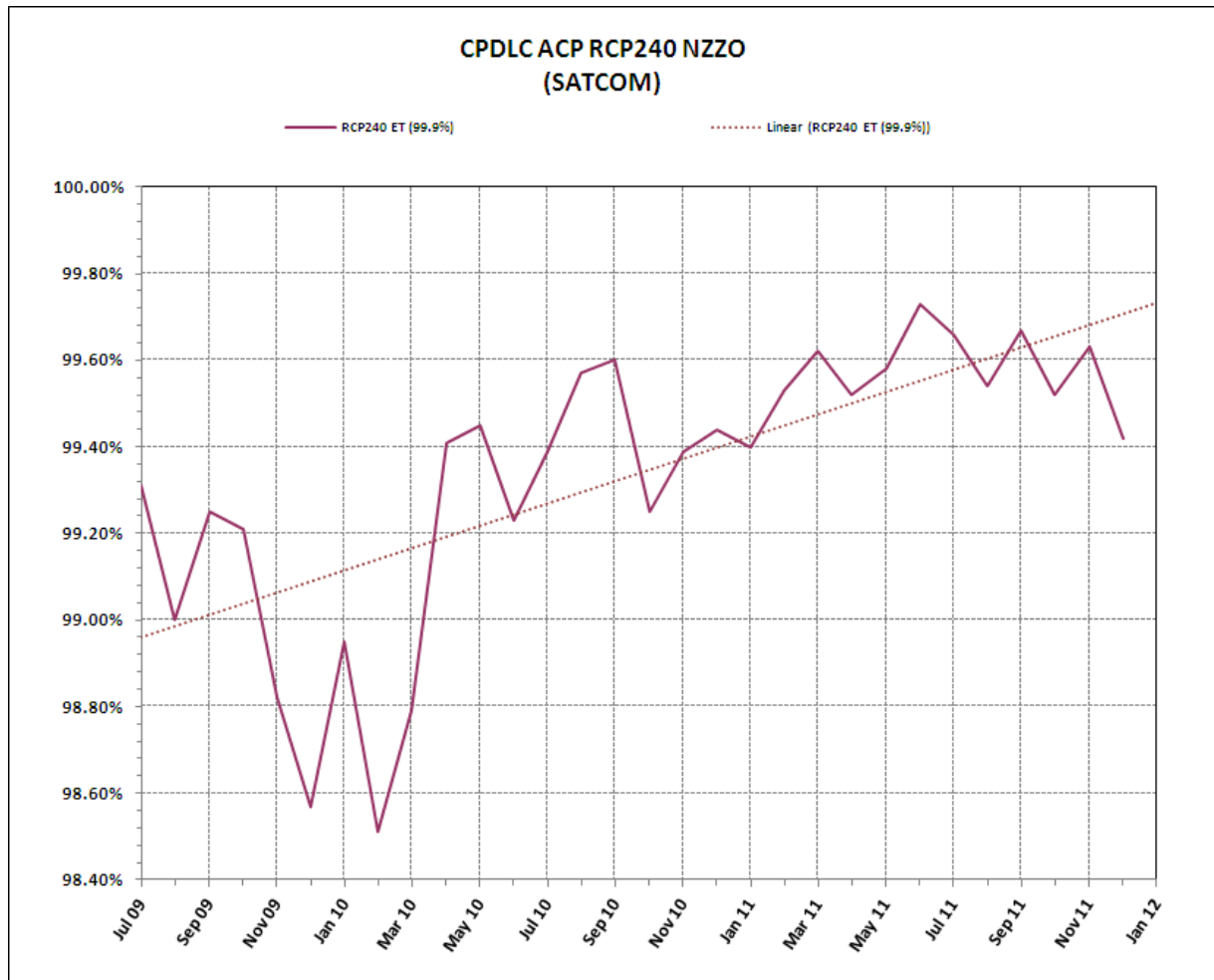


CPDLC Performance – ACTP – Dec 2011

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 Performance - ACP



- RCP240 ACP requirement is for 99.9% within 210 sec

- December 2011 achieved 99.42% within 210 seconds

- 2011 annual performance was 99.56% within 210 seconds.

- RCP240 ACP requirement is for 95% within 180 sec

- 2011 annual performance was 99.3% within 180 seconds



CPDLC Performance – ACP – Jan-Feb 2011

Operator	Type	# Messages	% of Total	RCP 95% 180sec	RCP 99.9% 210sec	CPDLC NZZO Jan-Feb 2011 RCP240 ANALYSIS
QQQ	B77W	402	5.71%	100.00%	100.00%	24.41% messages achieved <u>RCP 99.9% 210 sec</u>
VVV	B772	242	3.44%	100.00%	100.00%	
AAA	A343	175	2.49%	100.00%	100.00%	
EEE	B772	152	2.16%	100.00%	100.00%	
SSS	A388	130	1.85%	100.00%	100.00%	
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FFF	B772	93	1.32%	100.00%	100.00%	
A2A	B772	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%	
YYY	B77W	137	1.95%	99.27%	100.00%	
DDD	B772	937	13.31%	99.57%	99.79%	36.1% messages between 99.5% - 99.9%
ZZZ	A343	454	6.45%	99.12%	99.56%	
OOO	B77W	197	2.80%	99.49%	99.49%	
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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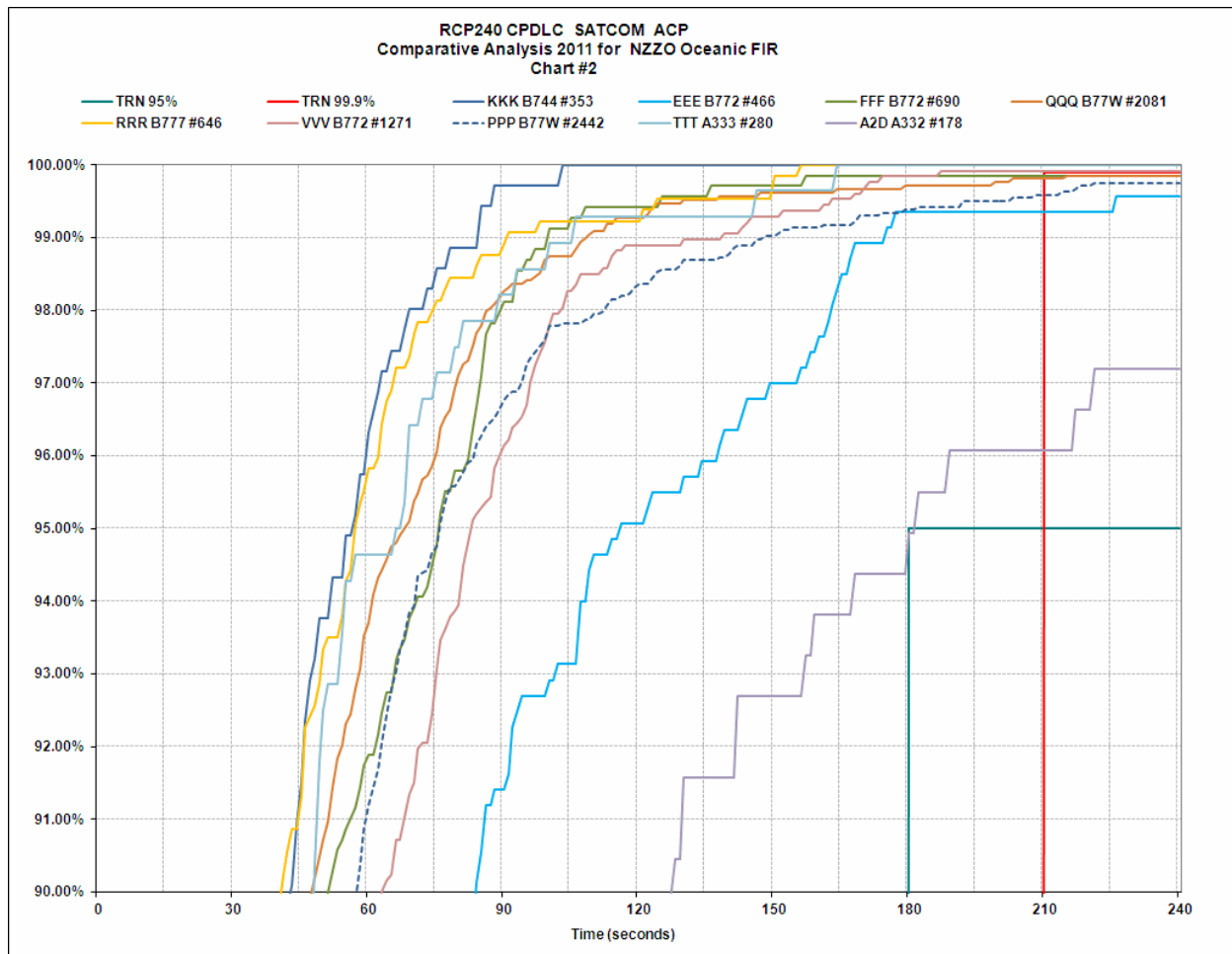


CPDLC Performance – ACP – Dec 2011

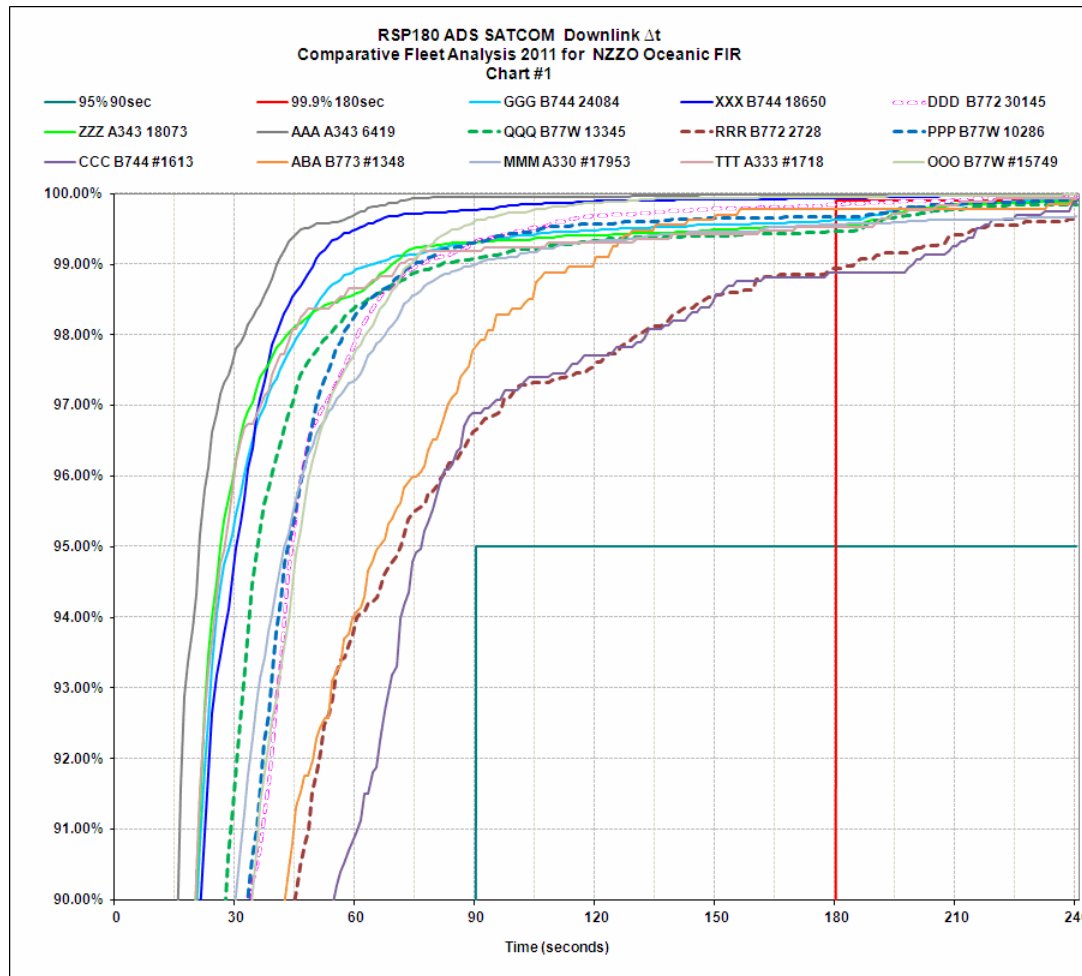
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A2D	A332	61	1.75%	90.16%	93.44%
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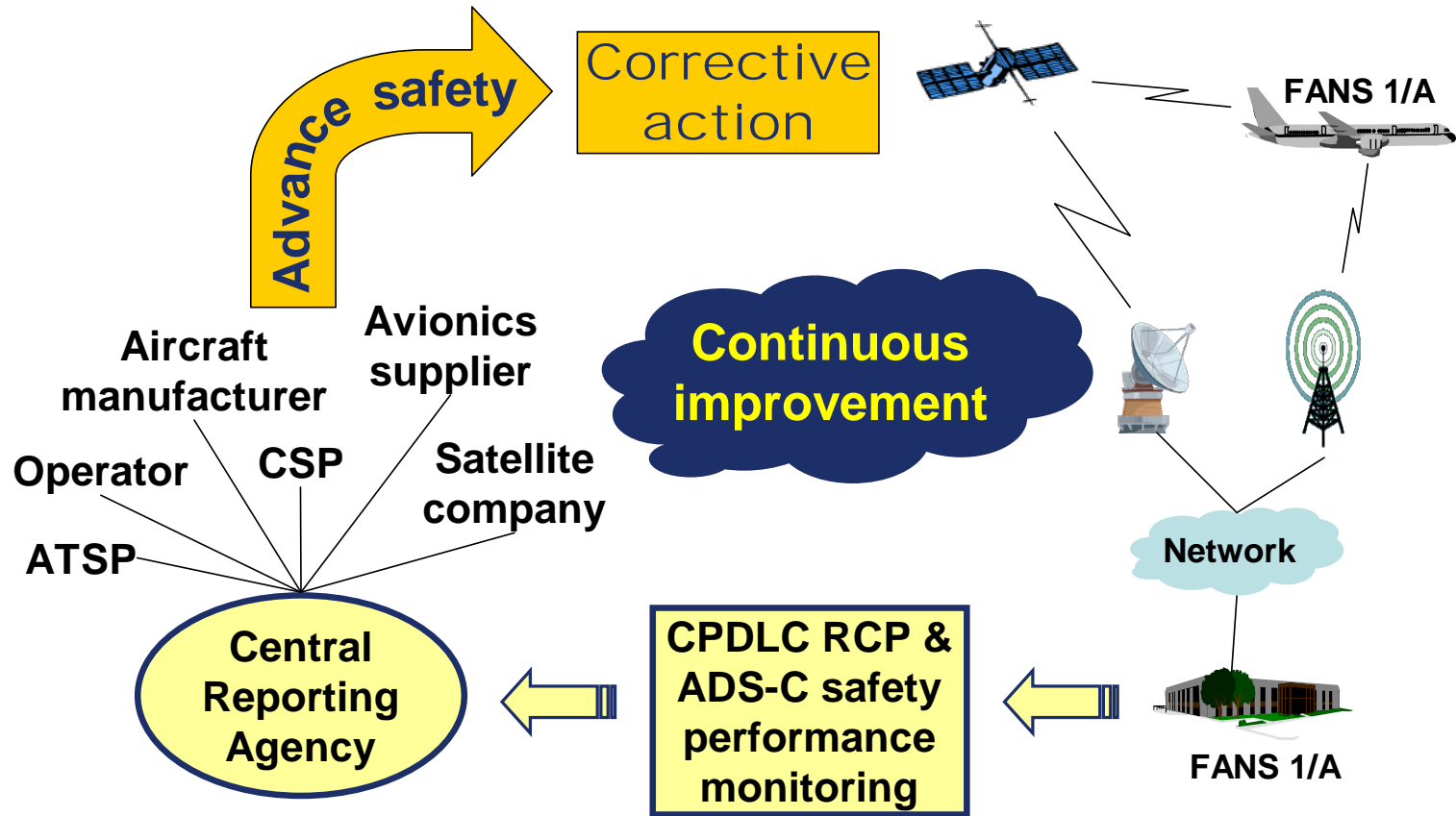
CPDLC : The Good - The Bad - and the ugly ??



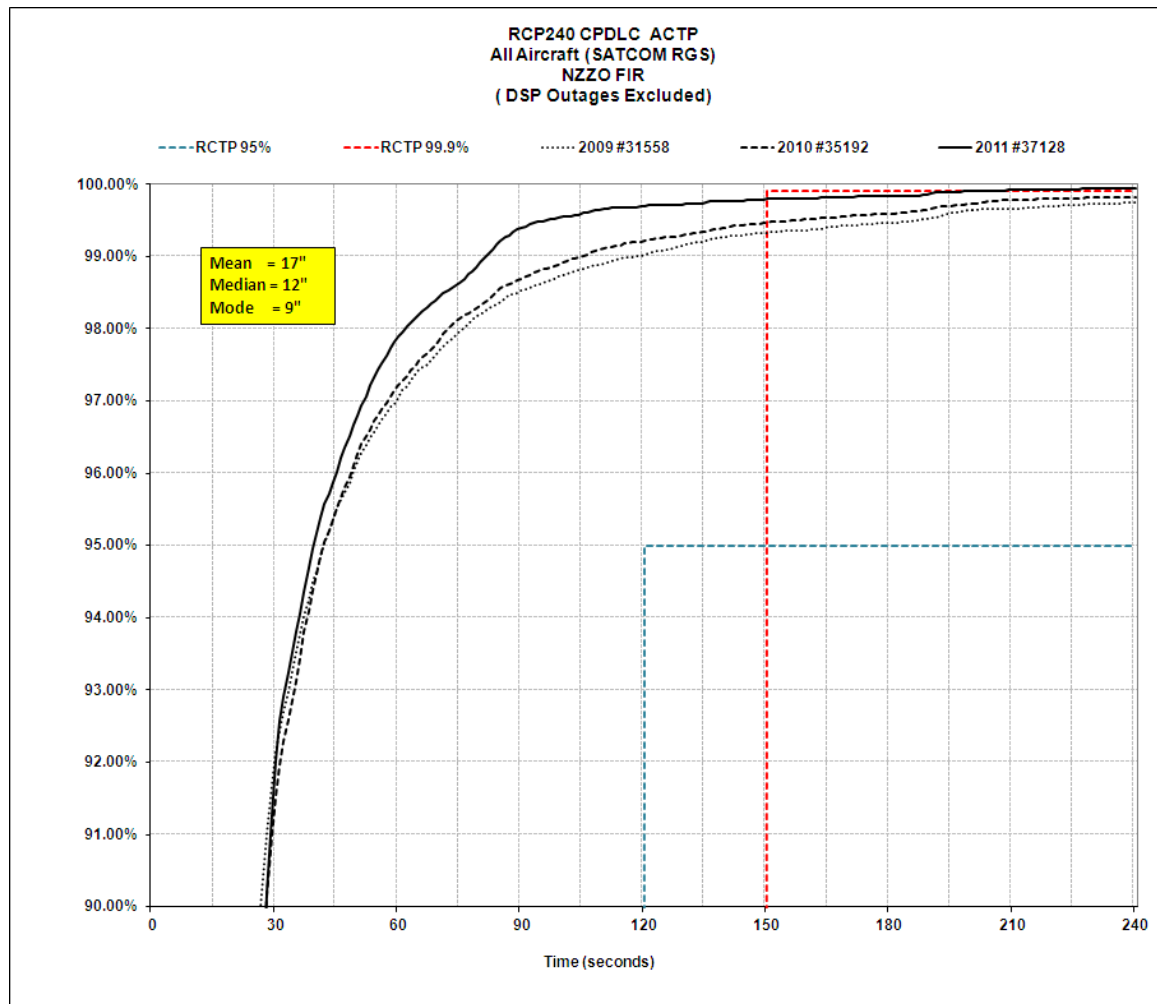
ADS-C : The Good - The Bad - and the ugly ??



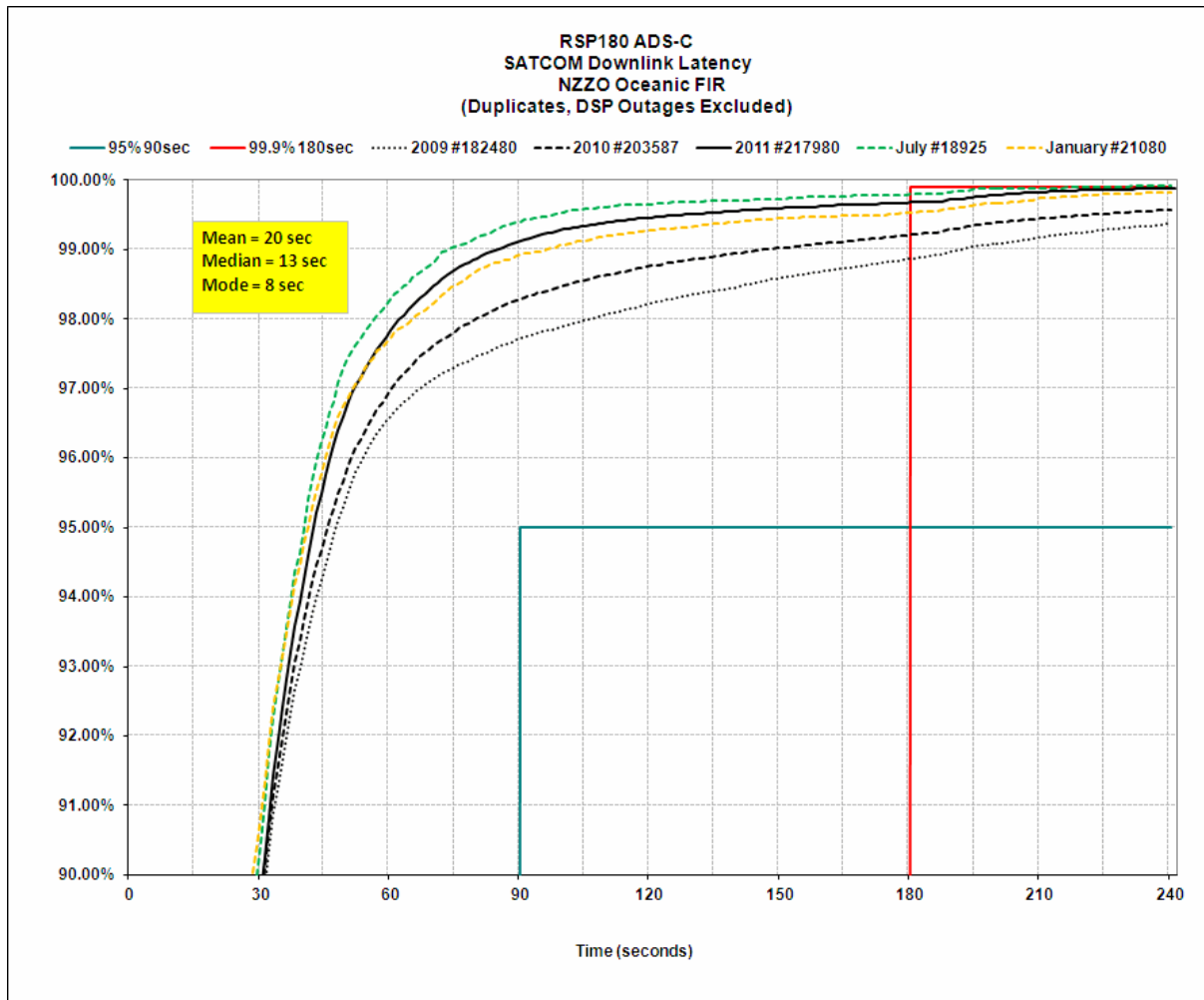
A Performance Based System ----



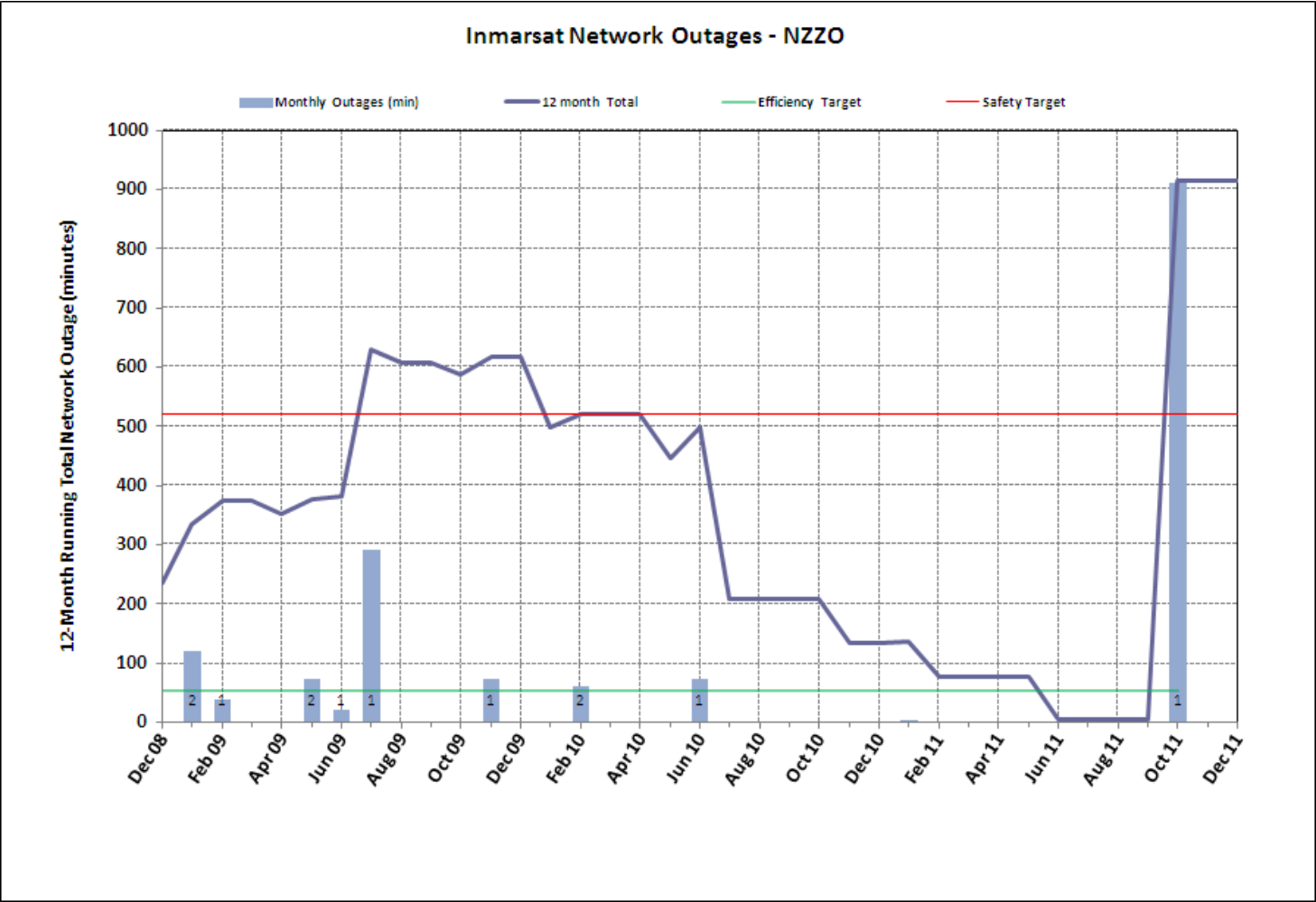
Continuous Performance Improvement?



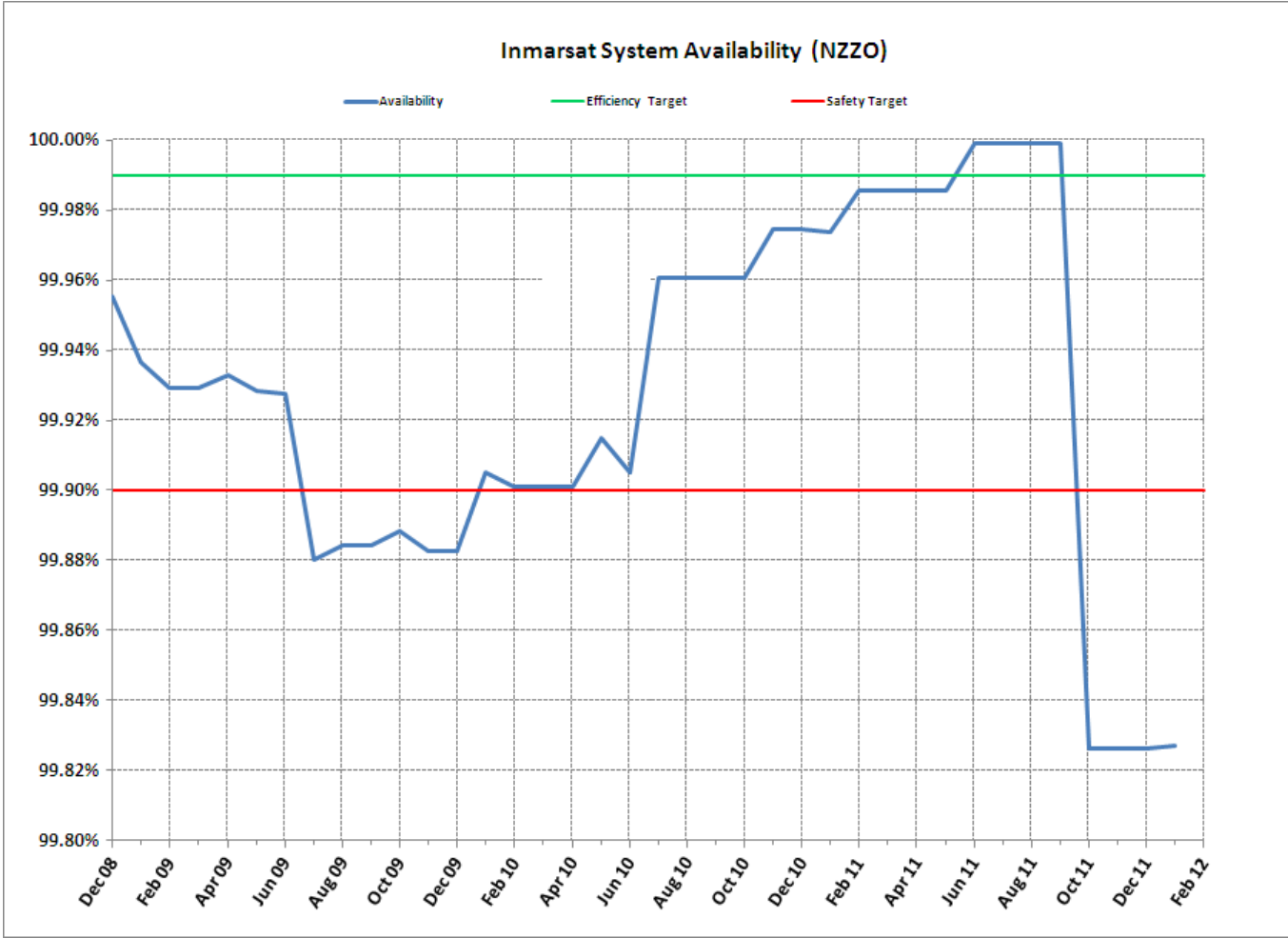
Continuous Performance Improvement?



Availability - Network Outages



Availability



Availability - other satellite providers

- MTSAT

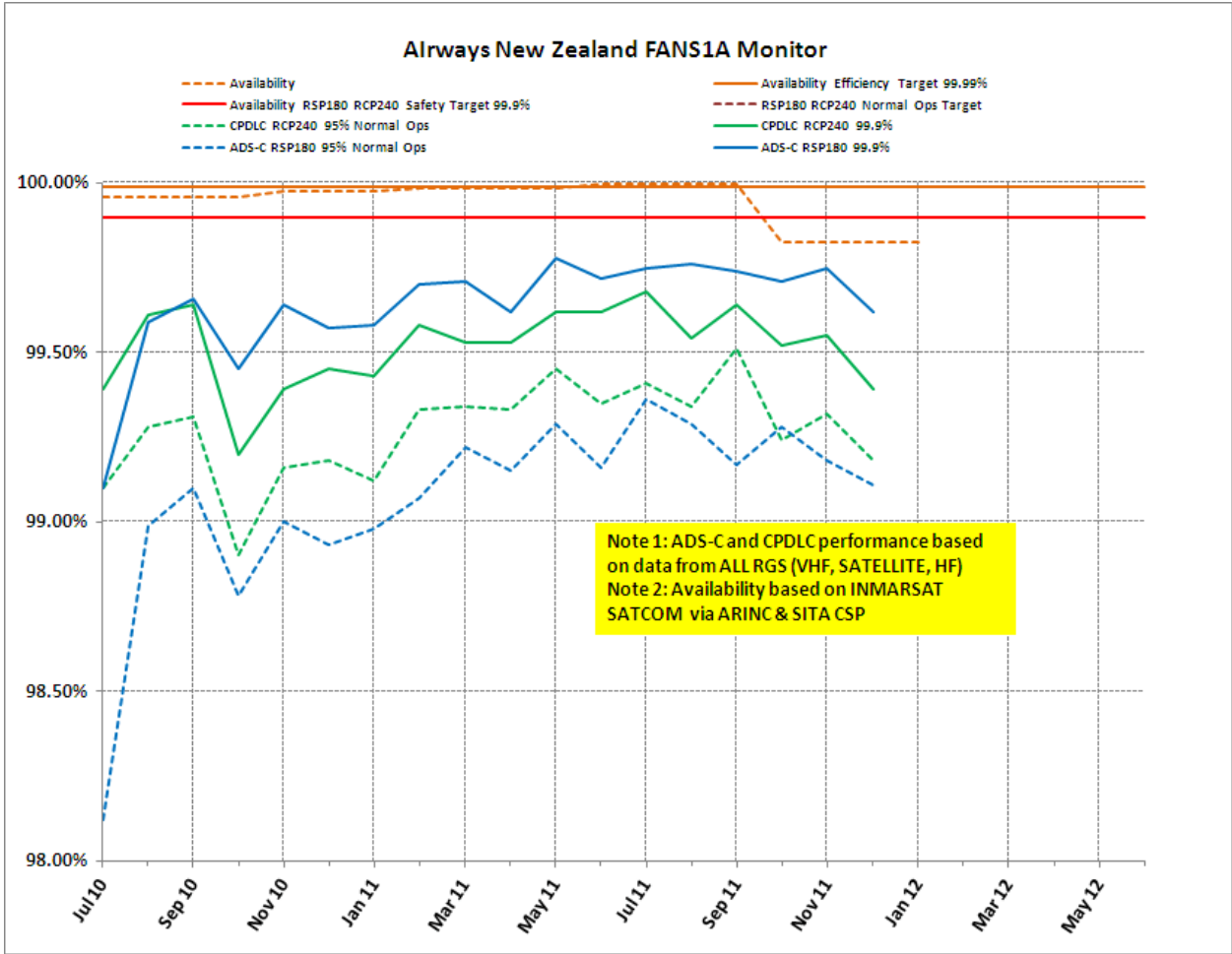
- No reported or observed outages

- Iridium

- Since July 2011 we have recorded notified weather related outages at Tempe RGS of 1 minute, 5 minutes, 3 minutes, 180 minutes, 1 minute, and 304 minutes.
- The outage notifications are not very specific and usually just refer to “degraded” operations.
- Outages since July total 484 minutes. The 99.9% safety requirement requires no more than 520 minutes of outage per year.



FANS1/A Overall Performance





Thank you

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