

Session 3- Guidelines for qualification and approvals by State of the Operator, State of Registry or appropriate ATS authority concerning performance based communication and surveillance

“Post Implementation Monitoring, Analysis, and Problem Reporting”

NAT PBCS Seminar

Paris, France February 20-22, 2013



Data link - Enabling Benefits

- **Operational improvements using FANS1/A CPDLC and ADS-C data-link are predicated on certain communications, surveillance, and navigation requirements.**
- **We have an obligation to ensure that aircraft and operators are meeting these requirements.**
- **Operational improvements from FANS1/A data-link are often supported by other infrastructure e.g. ground system automation and AIDC if the data-link benefits are to be fully implemented with an appropriate level of safety.**
- **Operational improvements with global applicability also need globally agreed procedures.**

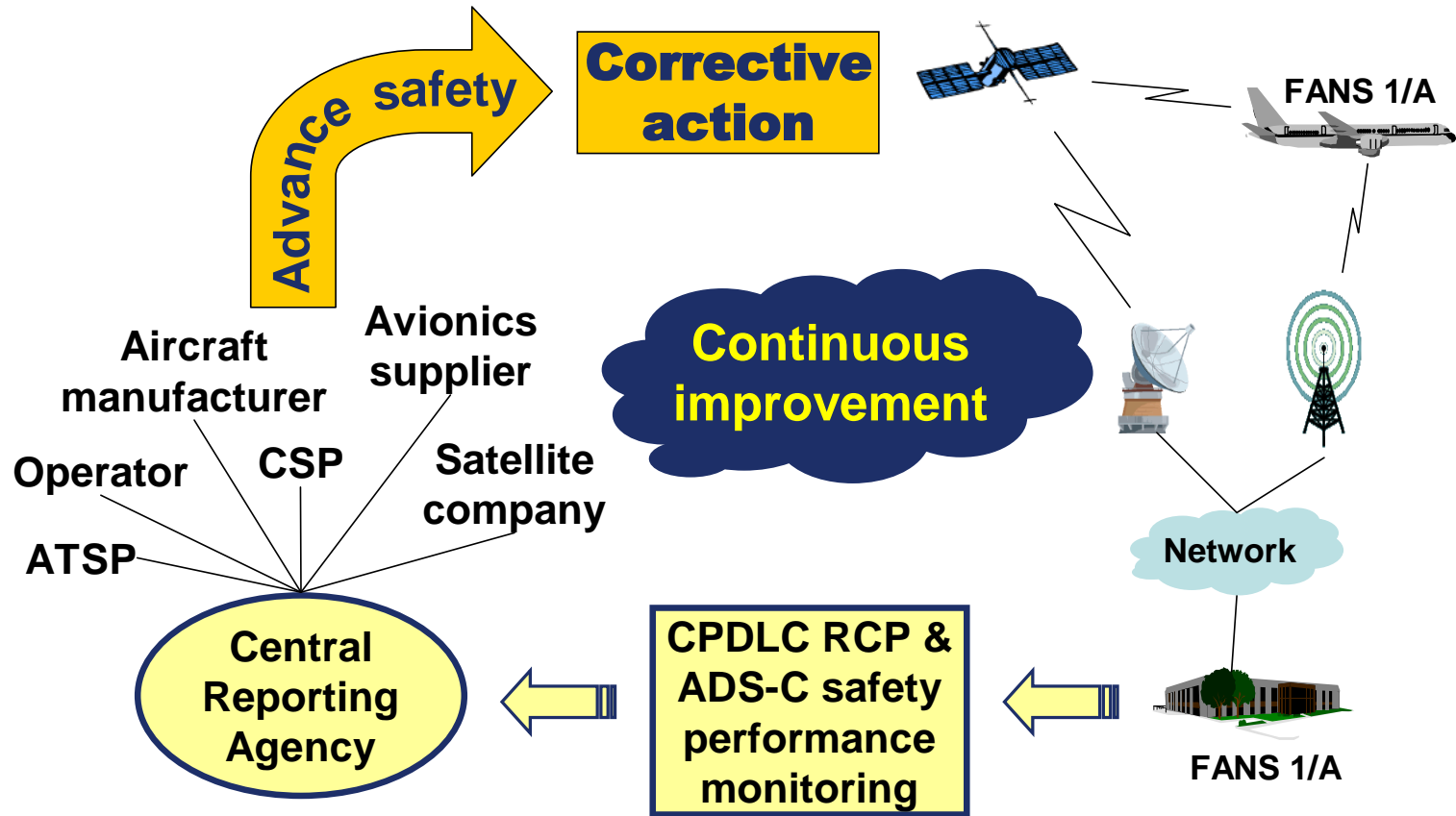


Data link – A performance based system?

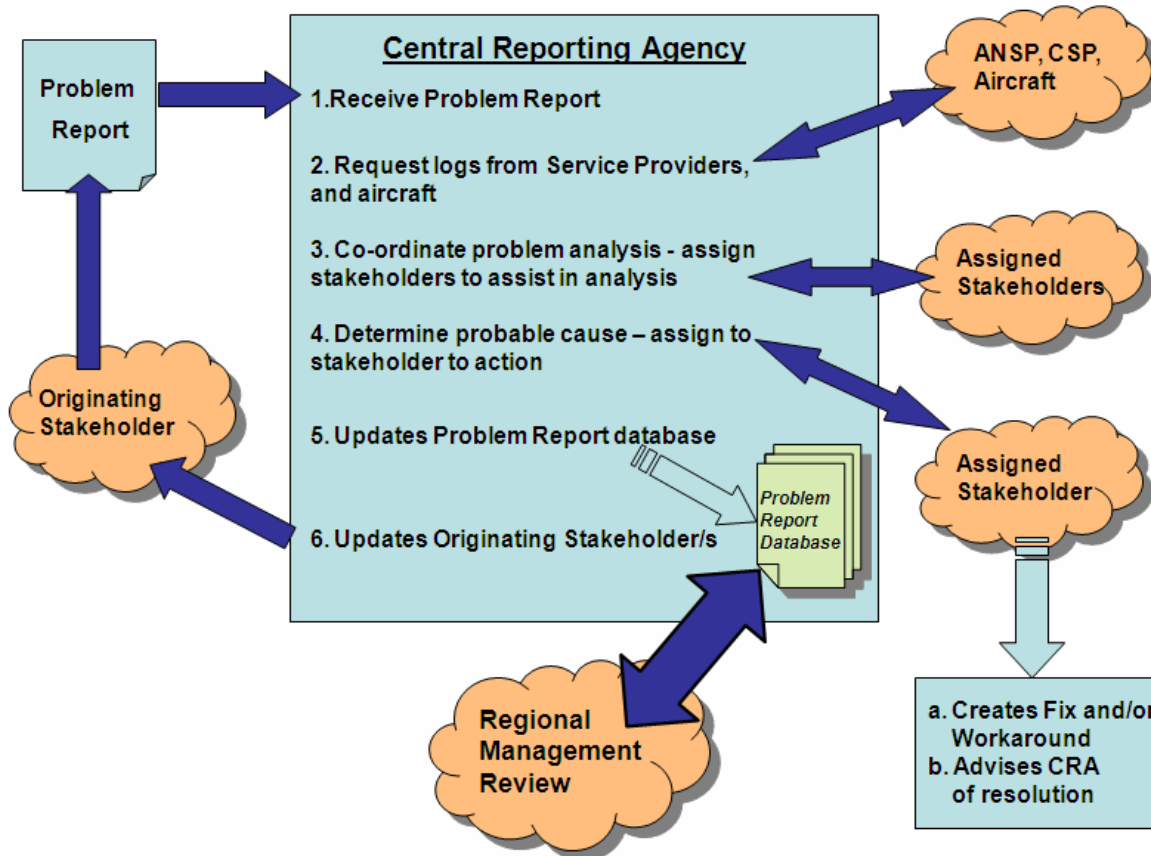
- **ICAO global plan requires a performance based system.**
 - **Regional Implementation Plan for performance based navigation in Asia/Pac.**
 - **A Regional Implementation Plan for performance based communication and surveillance has been recommended in Asia/Pac.**
- **ICAO Annex 11 – requires monitoring of performance to verify an acceptable level of safety continues to be met**



Data link - A Performance Based System



Continuous performance improvement



Web based problem reporting

- **In 2009 the Informal South Pacific Coordinating Group (ISPACG) FIT recommended the establishment of a website that would provide stakeholders with a readily accessible means of filing FANS1/A problem reports and provide the CRA with the means to provide feedback.**
- **The Asia/Pacific regional guidance material has a recommendation that when reporting FANS1/A problems the problem description, the results of the analysis and the plan for corrective action are entered into a database, both in a complete form to allow continued analysis and monitoring of the corrective action and in a de-identified form for the information of other stakeholders.**
- **ISPACG agreed that a web based system would provide such a facility.**



ISPACG CRA website

- The CRA web site at <http://www.ispacg-cra.com/> commenced operations in late 2009 with the ISPACG stakeholders.
- Stakeholders of the North Atlantic Data Link Monitoring Agency (NAT DLMA) joined the website in 2010 for problem reporting.
- Initial meeting of FIT ASIA recommended to stakeholders to use the website at their inaugural meeting in August 2012.
- Budget has been approved for a website upgrade this year.
- Website provides access to a secure problem reporting facility
- Website provides performance information for stakeholders



Web based problem reporting

- **It has been difficult to get all aircraft operators to register then participate in problem reporting.**
- **While ANSP will register - not all participate.**
- **Some operators have facilitated problem reporting by making it possible for flight crew to communicate the problem directly to the AOC via ACARS. The AOC then communicate the problem to a nominated person to file on the website.**
- **Take up is slow but steady – Now have 32 Airlines, 15 ANSP with a few more in the pipeline.**



Continuous Performance Improvement

- **Monitoring shows that the FANS1/A system is capable of meeting the RCP240 and RSP180 requirements.**
- **However, not all aircraft are meeting the requirements.**
- **For aircraft not meeting the requirements we are seeking to improve their performance by:**
 - **Identifying the performance problems by monitoring.**
 - **Reporting performance problems through a Central Reporting Agency that has buy in from all stakeholders.**
 - **Resolving the identified performance problems.**
 - **Providing feedback to stakeholders.**
- **We promote a culture of continuous performance improvement.**



CPDLC Performance Measures – Message Set

- According to the guidance in the Global Operational Data Link Document (GOLD) only a specific message set is considered
 - Assesses a subset of the message set that includes typical “intervention” messages such as climb clearances with an observed CPDLC “WILCO” response attribute.
 - These messages are considered to be intervention messages critical to the communications used when applying reduced separation standards
 - ❖ Message set used revised in 2012
 - ❖ Refer GOLD Edition 2 Appendix D



ADS-C Performance Measures

- **Surveillance Latency**
 - All downlink ADS-C messages are included
 - ❖ Duplicate messages are filtered out
 - Measures transit time for downlink message delivery

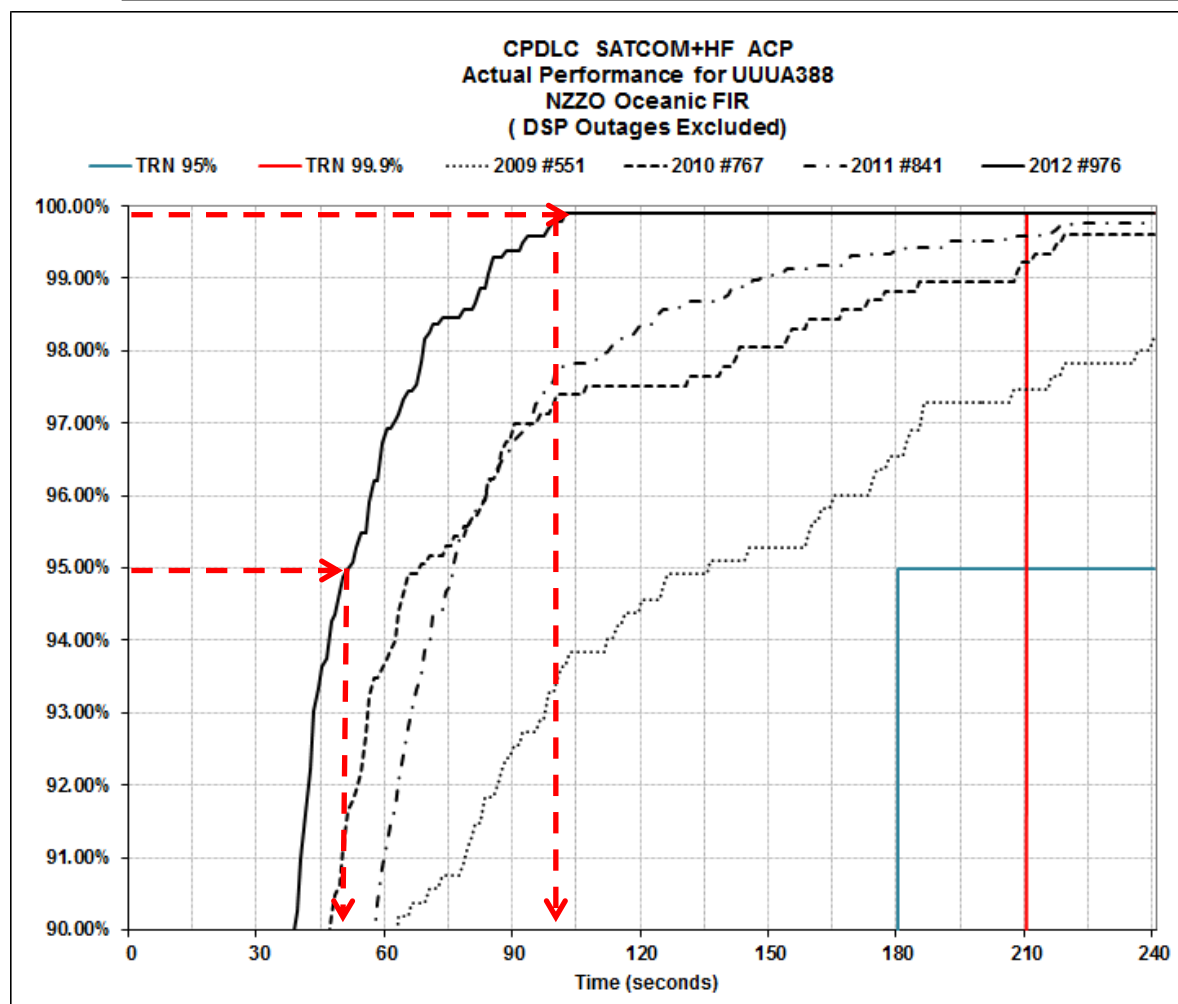


Performance Analysis

- Performance data is usually analyzed on a monthly basis to assess the “health” of the data link system.
- Analysis is performed on the aggregate data set (i.e. data link transactions from all media types – satellite, VHF, HF) for the defined analysis period and on subsets of interest (e.g. satellite transactions only)
- The data is analyzed in various ways:
 - By increments of time (one month, six months, year)
 - By media type
 - By Station ID
 - By Operator



Interpreting the results



In this example:

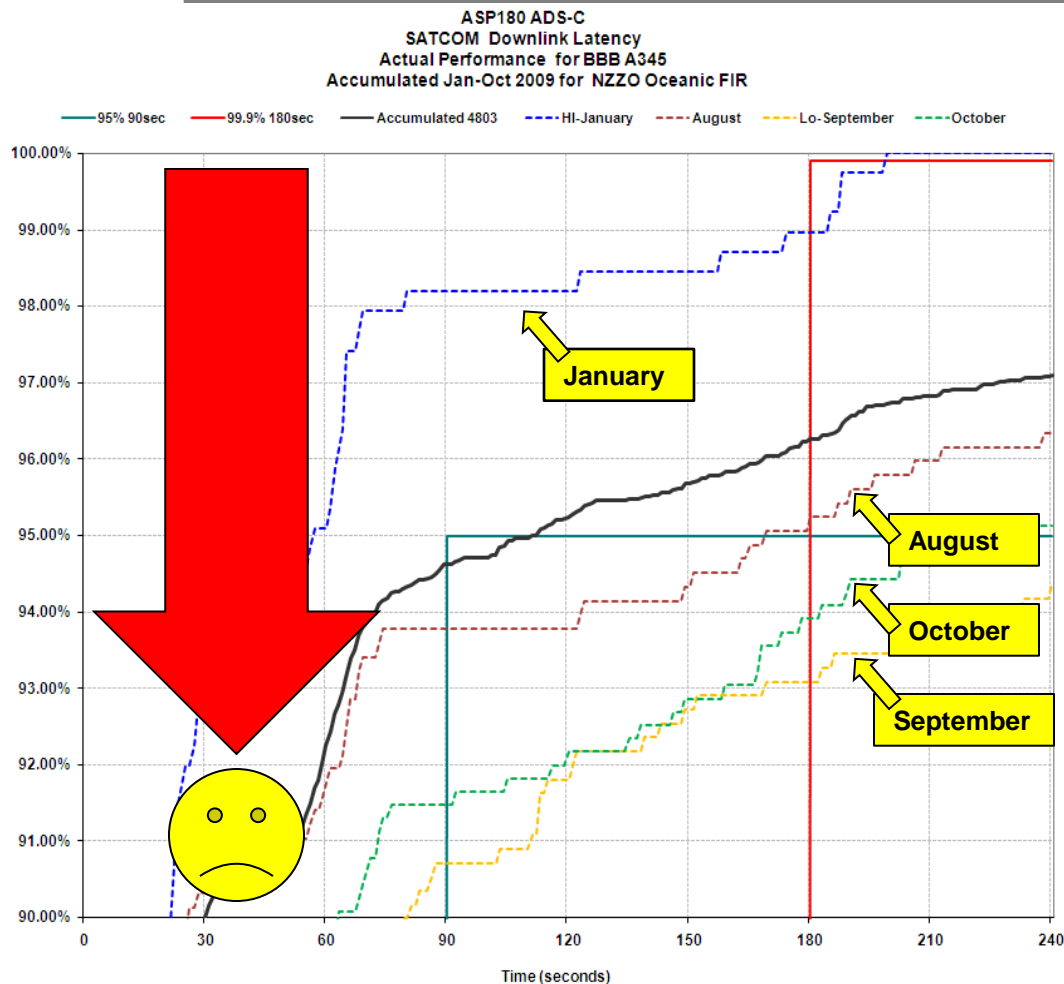
**2012 Actual
Communications
Performance meets the
RCP240 requirements:**

**99.9% of transactions
completed in 103"**

**95% of transactions
completed in 52"**



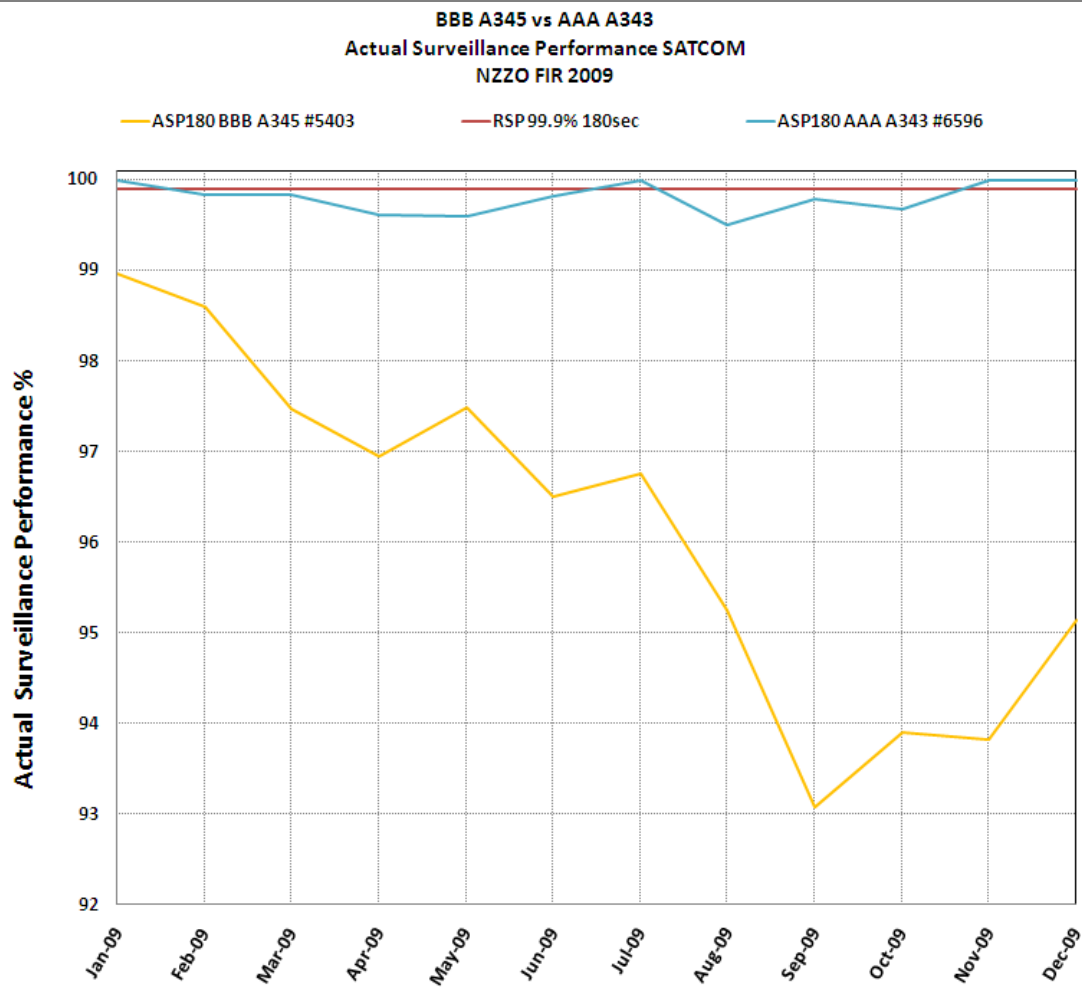
Some performance initiatives (1) Data2-Data3



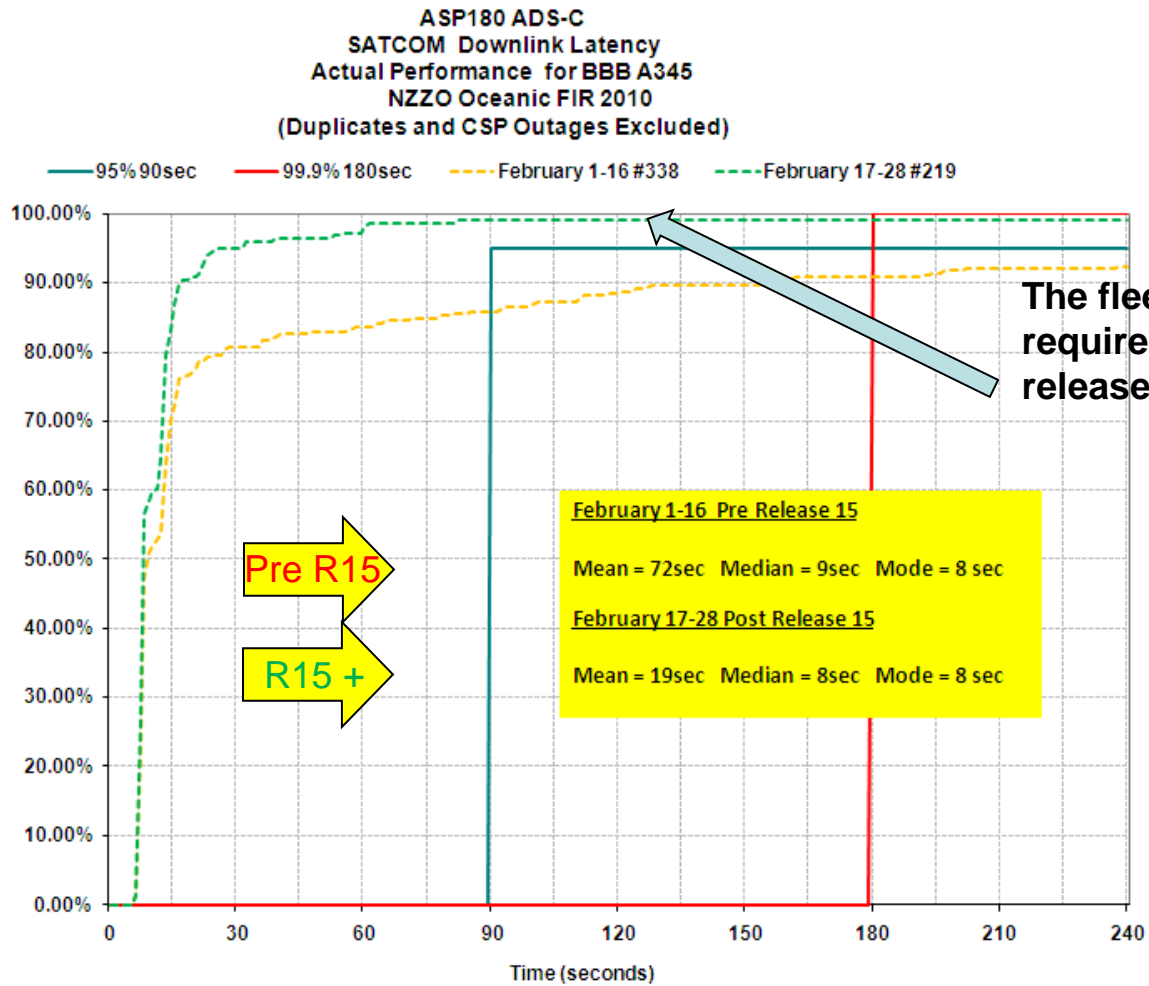
- This A345 fleet was gradually fitted with new cabin services using Data 3 from December 2008
- After FANS Problem Report investigation deterioration identified as being caused by an interaction between ACARS Data 2 and Data 3 cabin services.



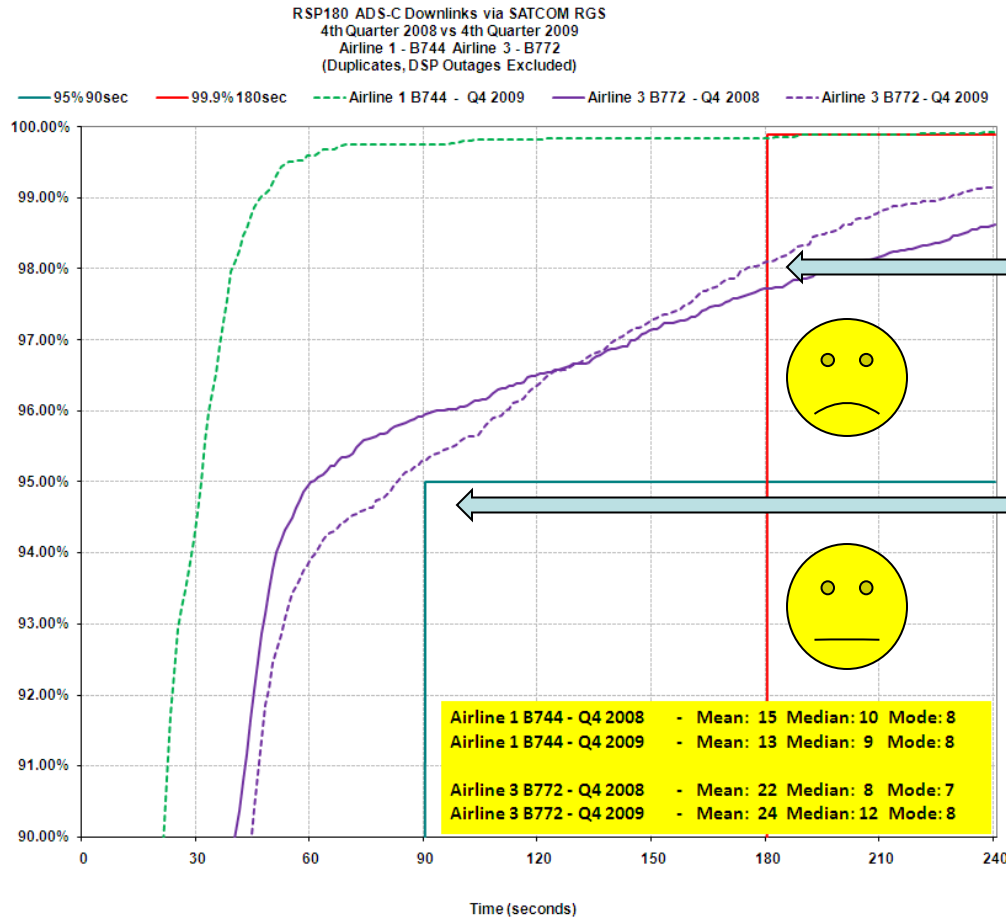
Some performance initiatives (1) Data2-Data3



Some performance initiatives (1) Data2/Data3



Some performance initiatives (2) - B777 2008-09

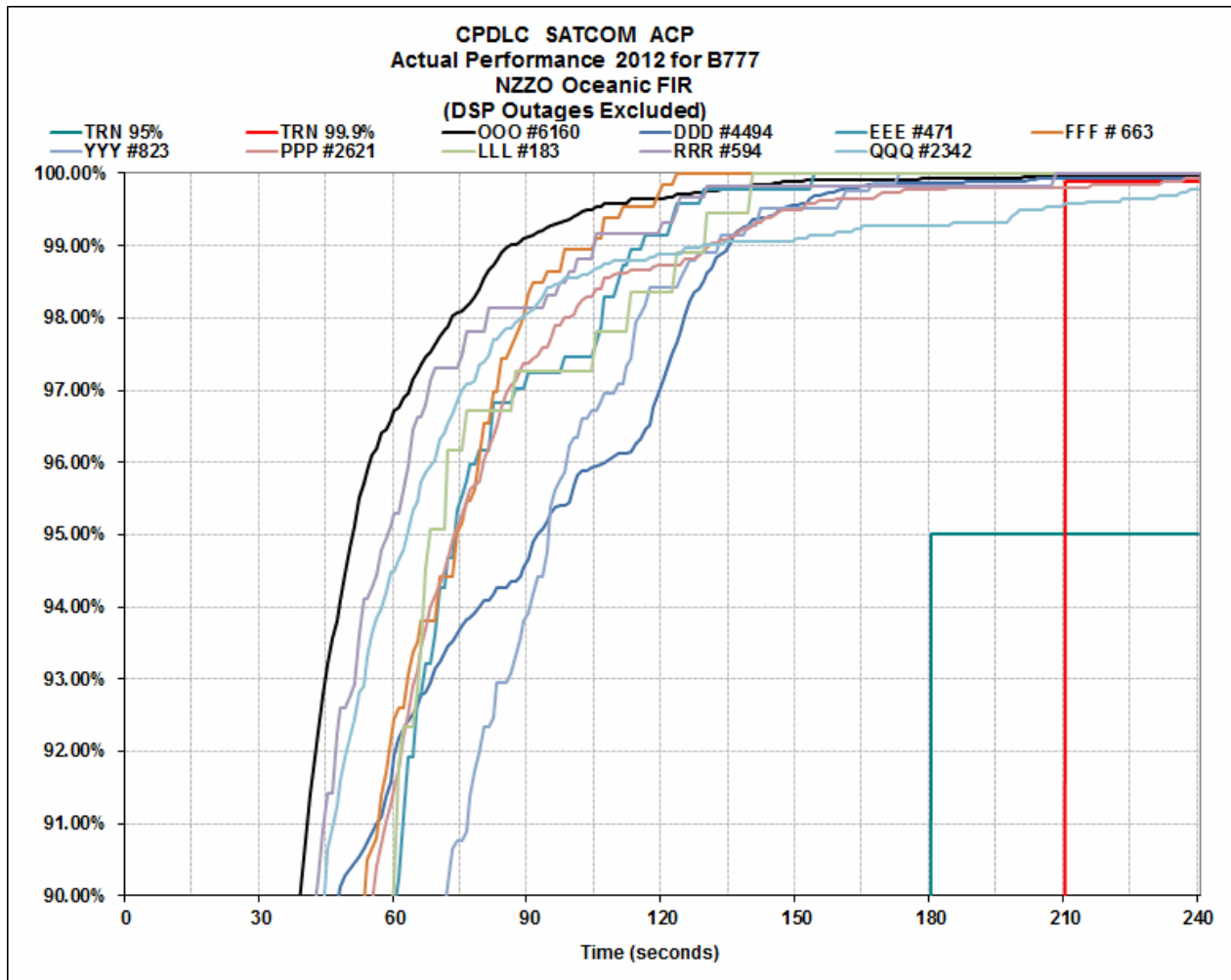


Required
99.9% < 180 sec
Achieved Q4 2008
97.7% < 180 sec
Achieved Q4 2009
98.1% < 180 sec

Required
95% < 90sec
Achieved Q4 2008
95.9% < 90 sec
Achieved Q4 2009
95.2% < 90 sec



Some performance initiatives (2) B777 today

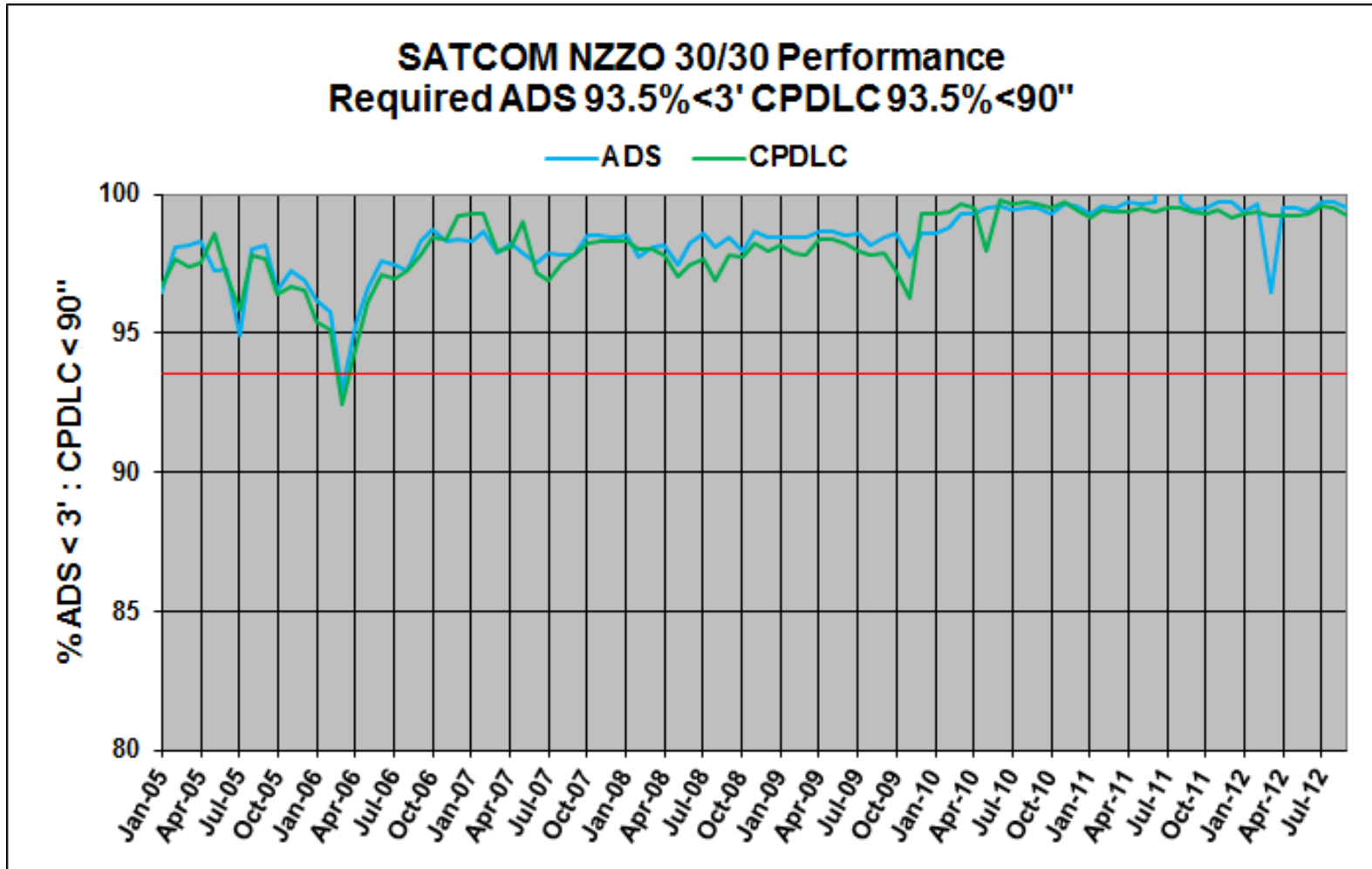


ANSP RCP/RSP Monitoring

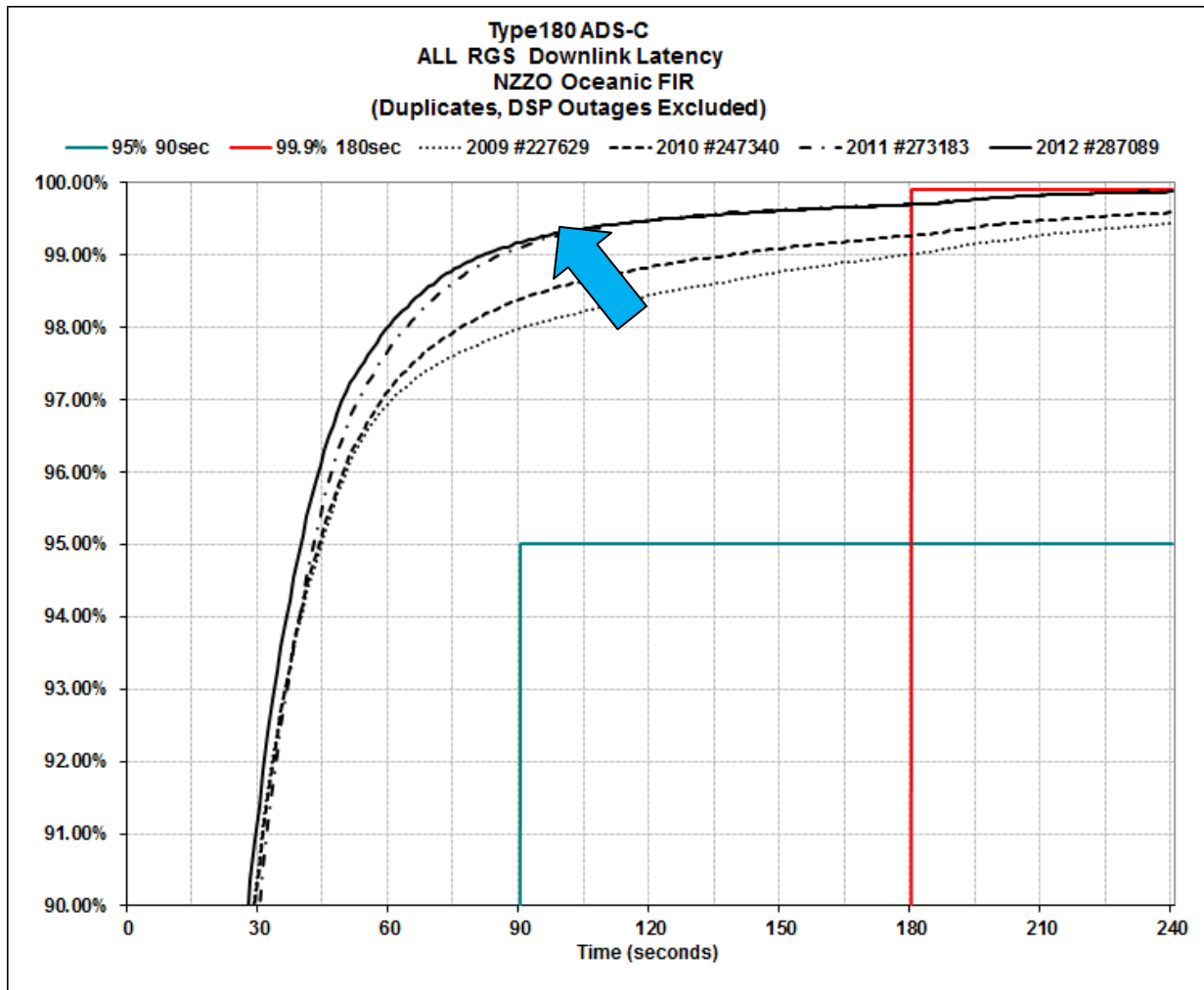
- **RCP/RSP based monitoring is a significant improvement on historical methods.**
- **GOLD Appendix D provides guidance on RCP/RSP based monitoring and interpreting the results.**
- **GOLD Appendix D based monitoring provides basis for continuous performance improvement by:**
 - **Providing all stakeholders with clear indications of actual performance.**
 - **Providing all stakeholders with clear indications of where improvement is needed.**
 - **Verifying the effect of any changes to the FANS-1/A “system”**



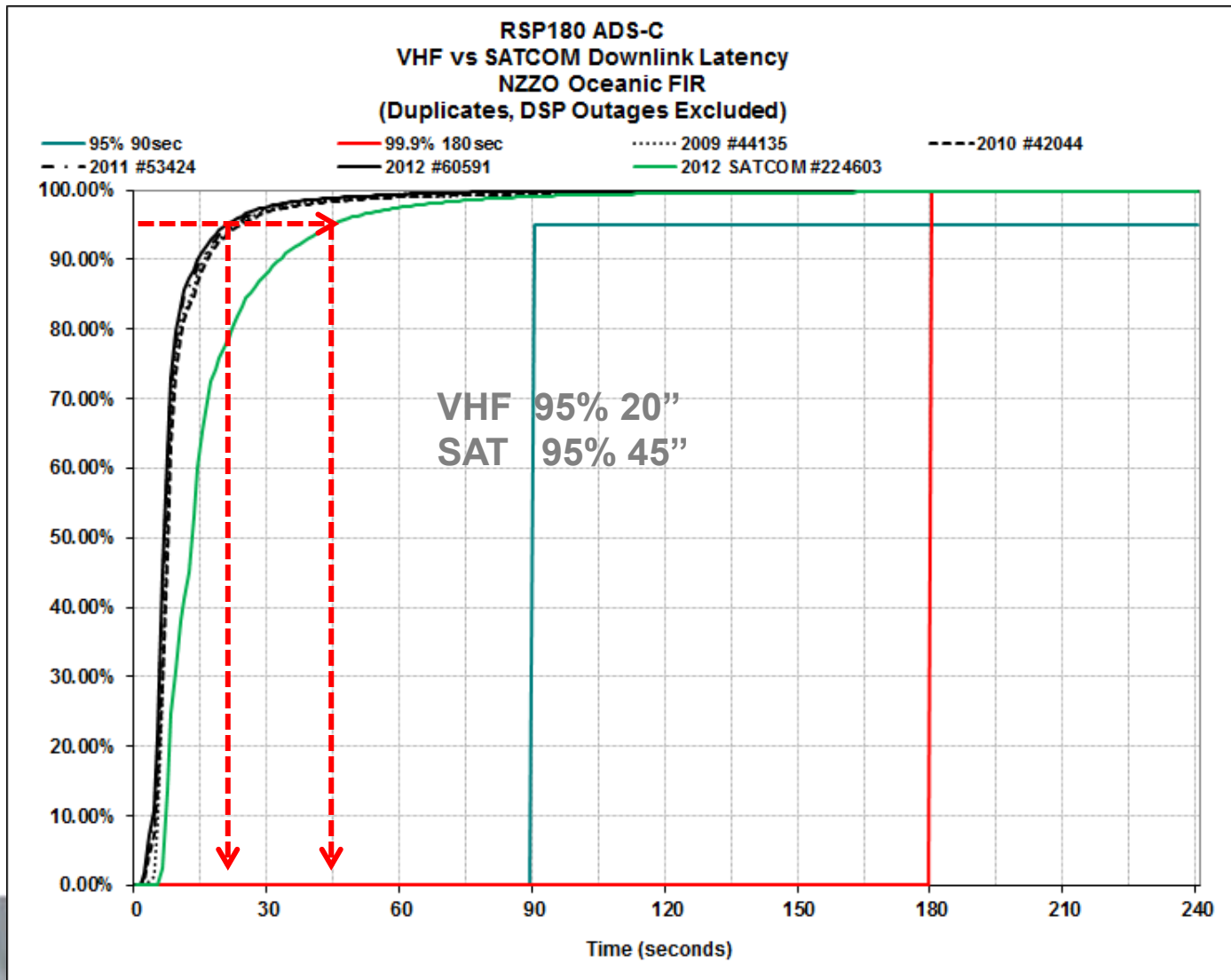
Pre RCP/RSP – Monitoring downlink latency



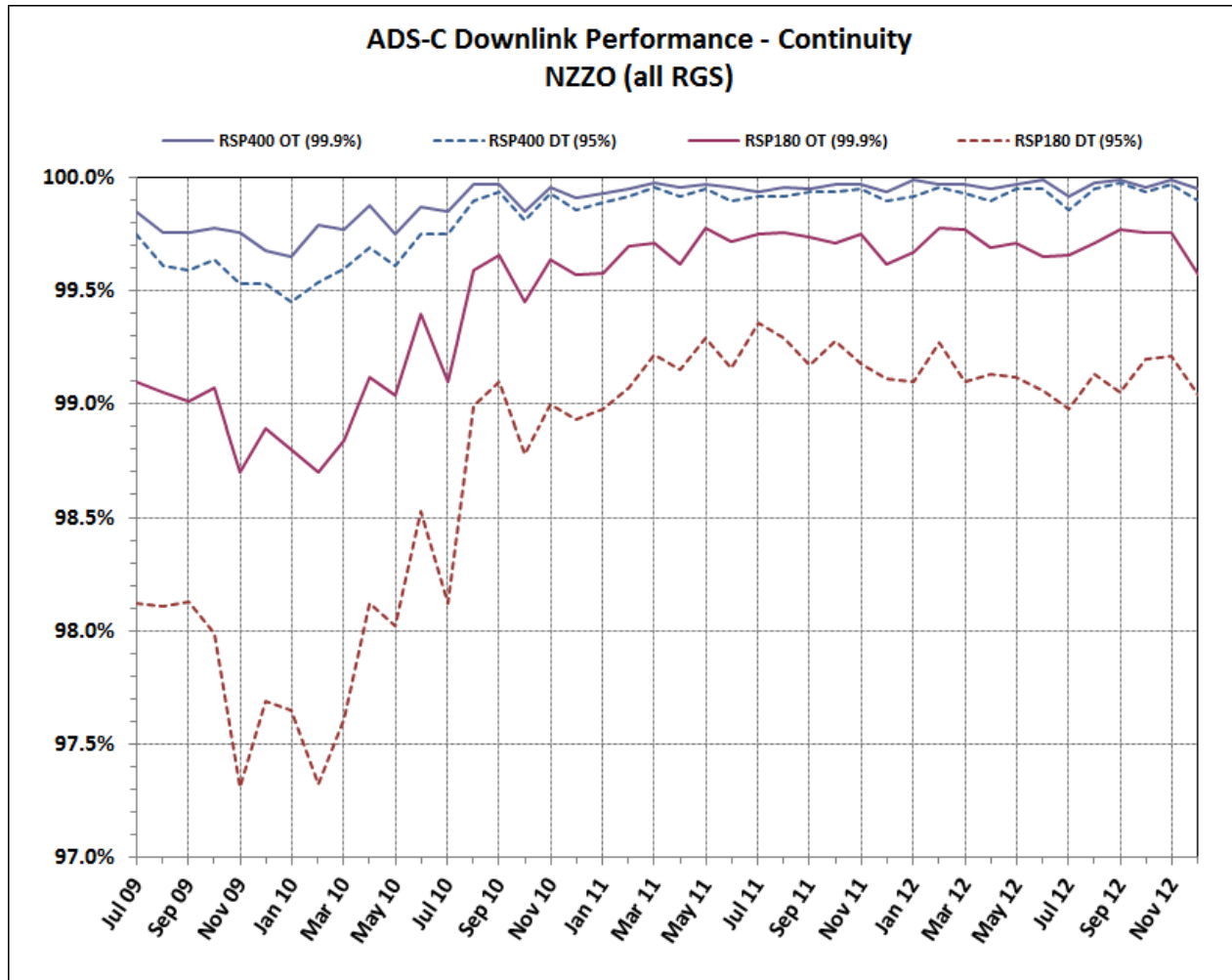
FANS-1/A Current Performance – ADS-C



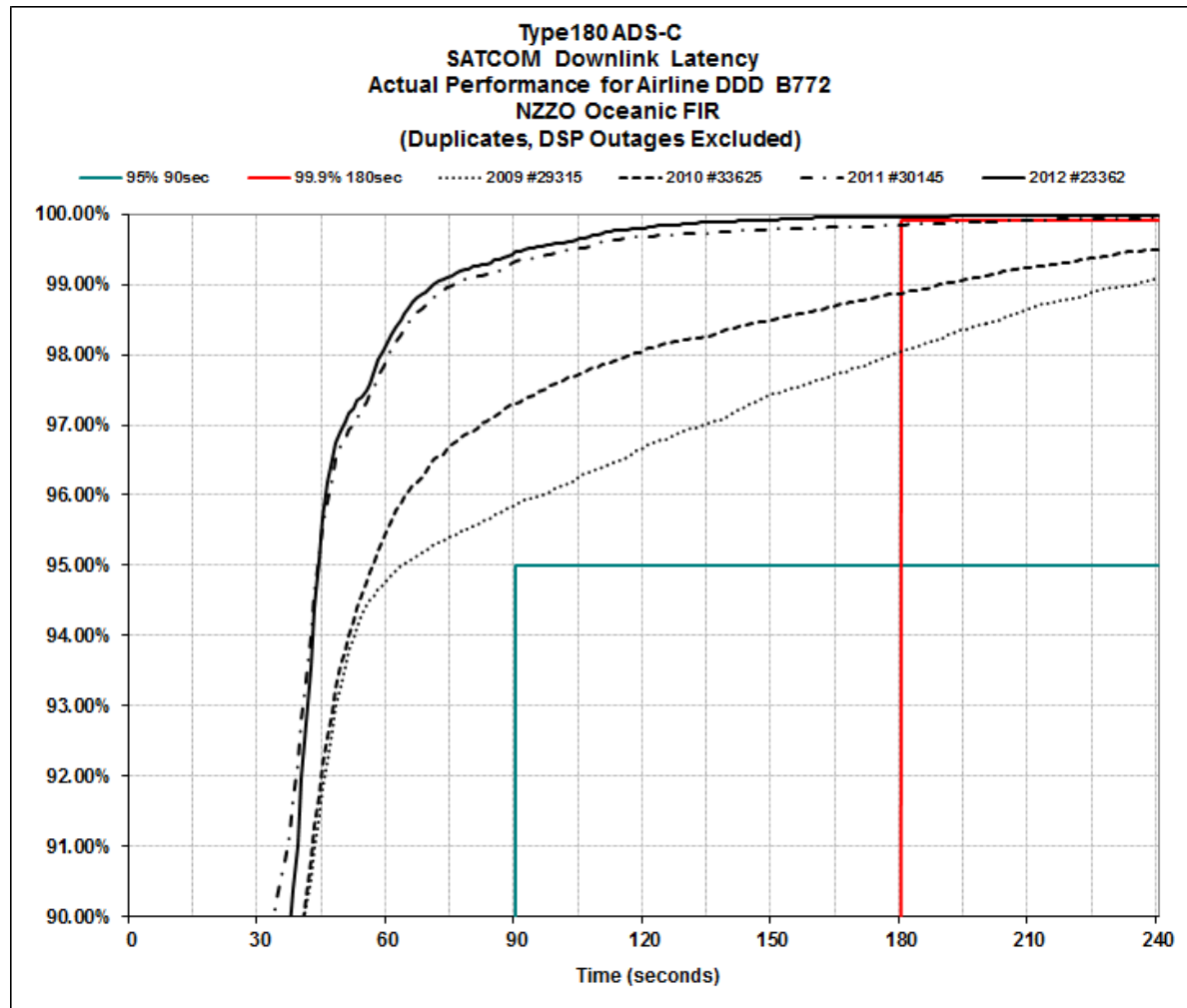
ADS-C : VHF vs SATCOM



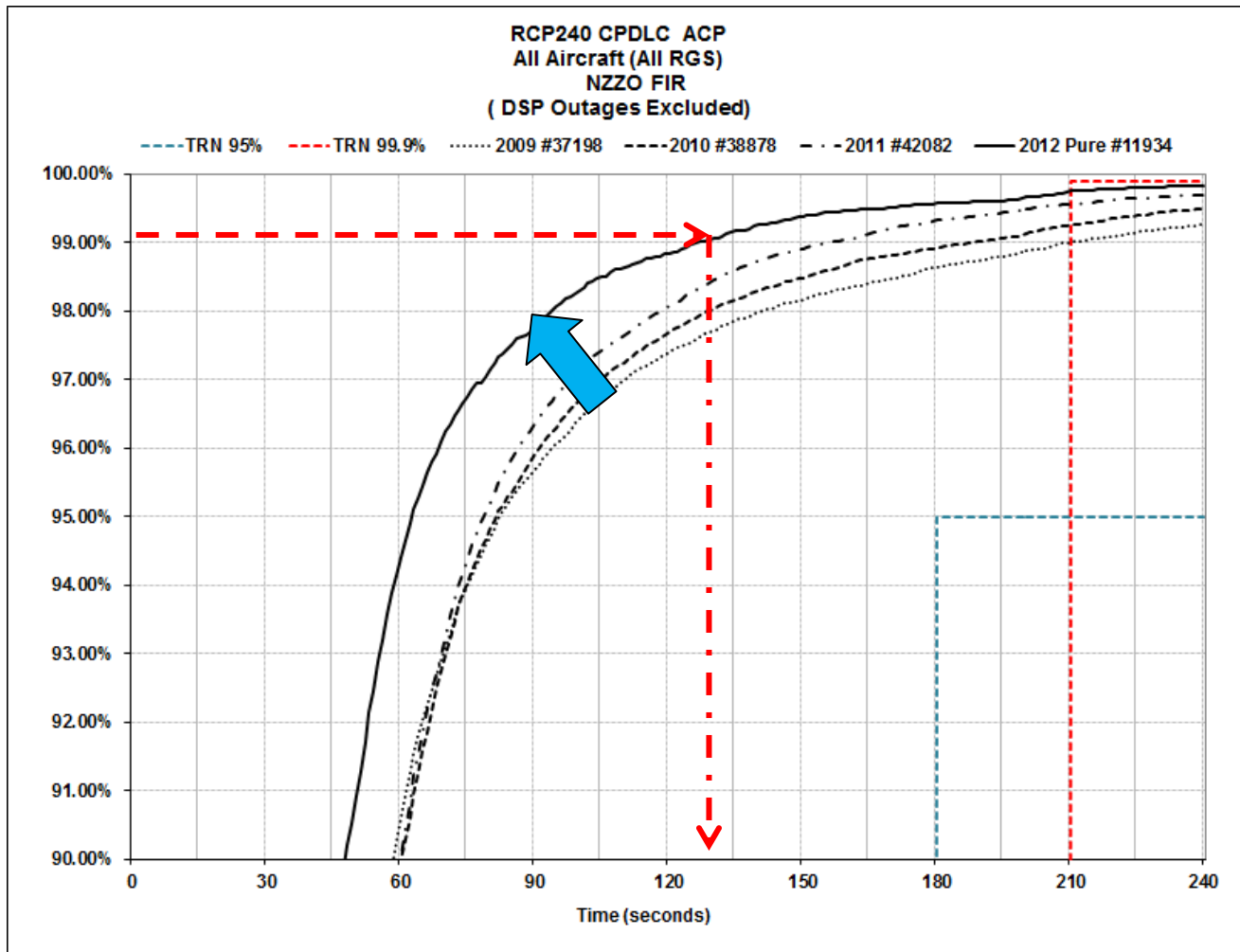
Performance ADS-C 2009-2012



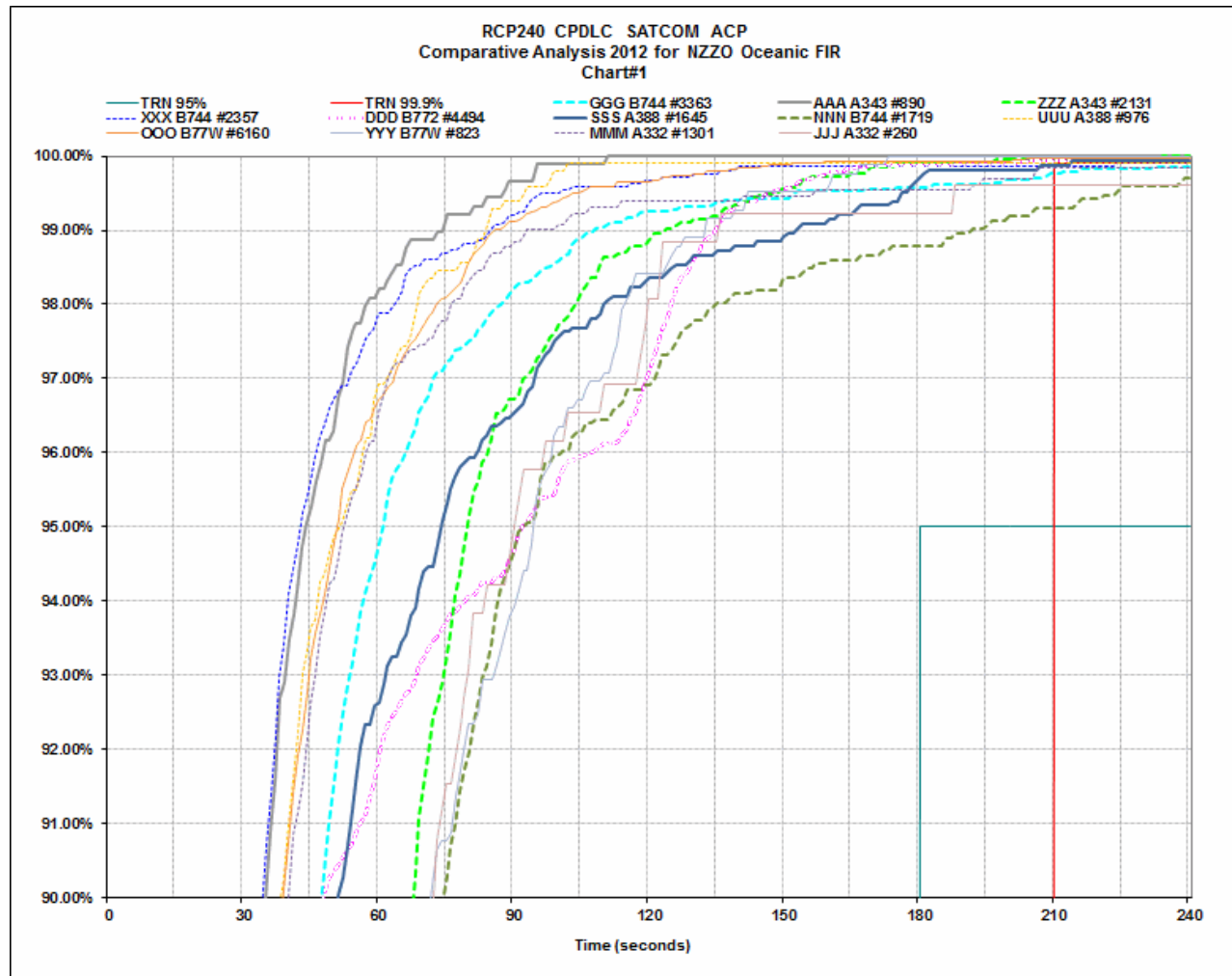
Performance ADS-C B772 Fleet 2009-2012



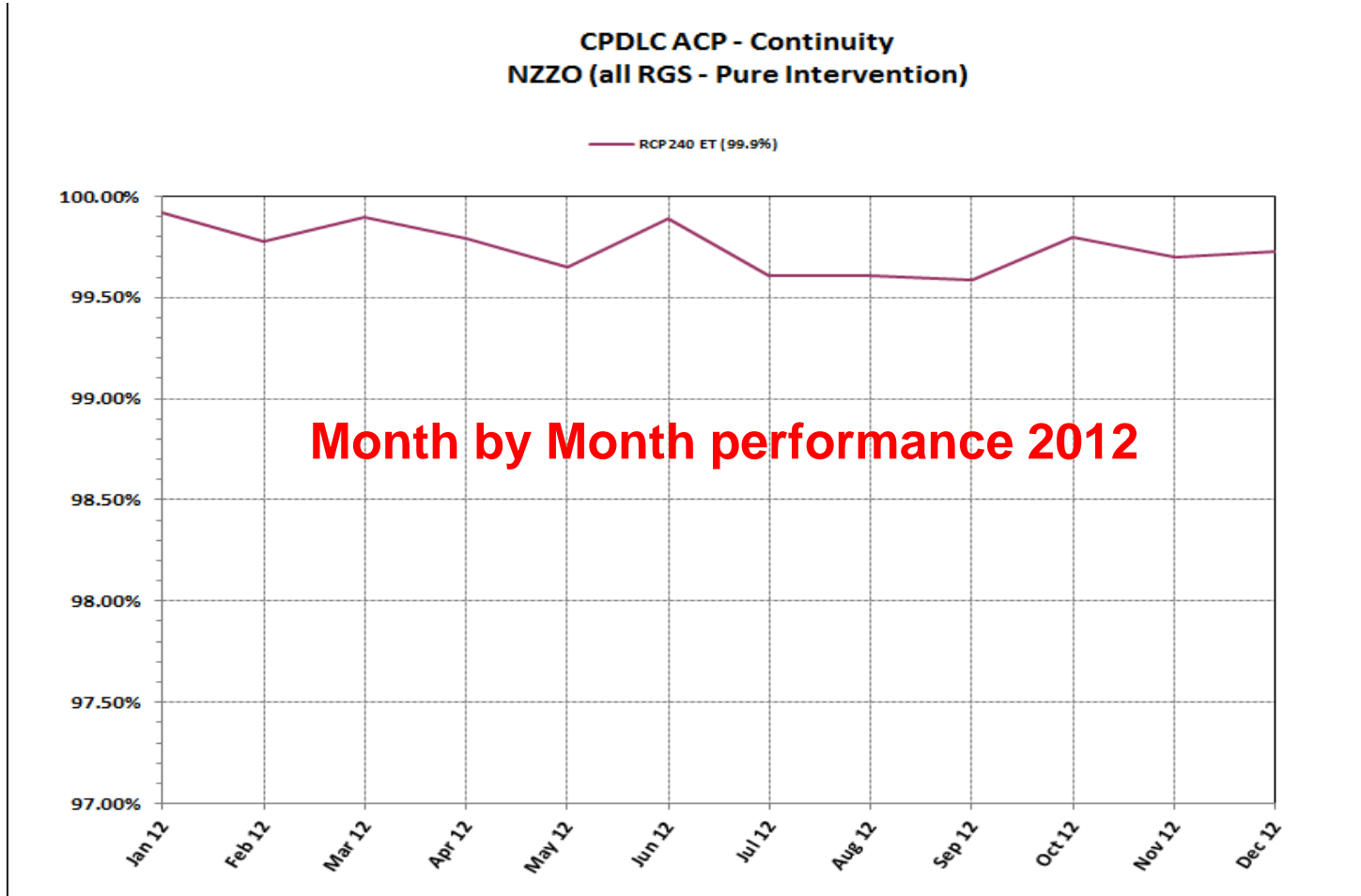
FANS-1/A Current Performance - CPDLC



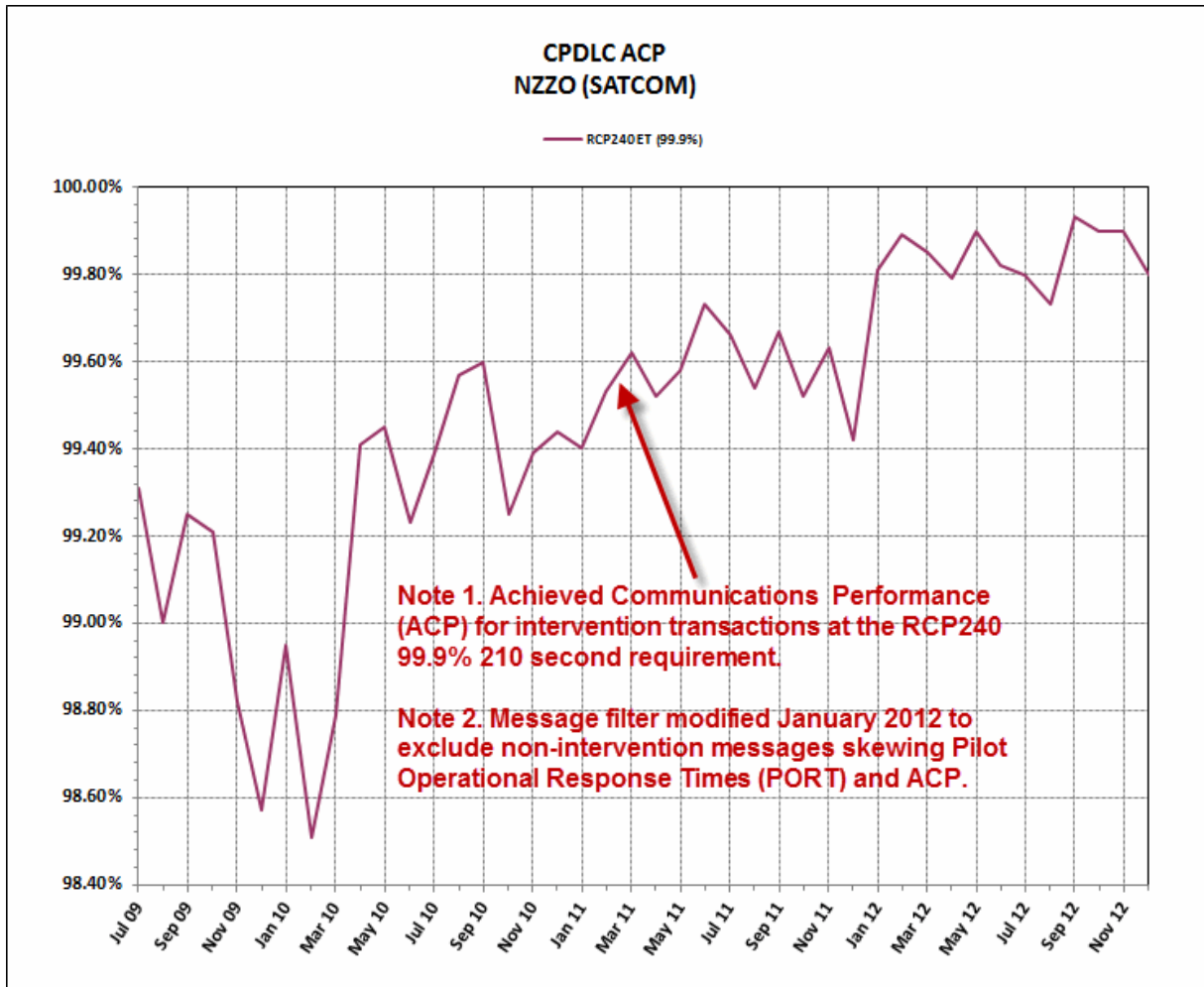
Performance – By Fleet – 2012 - ACP



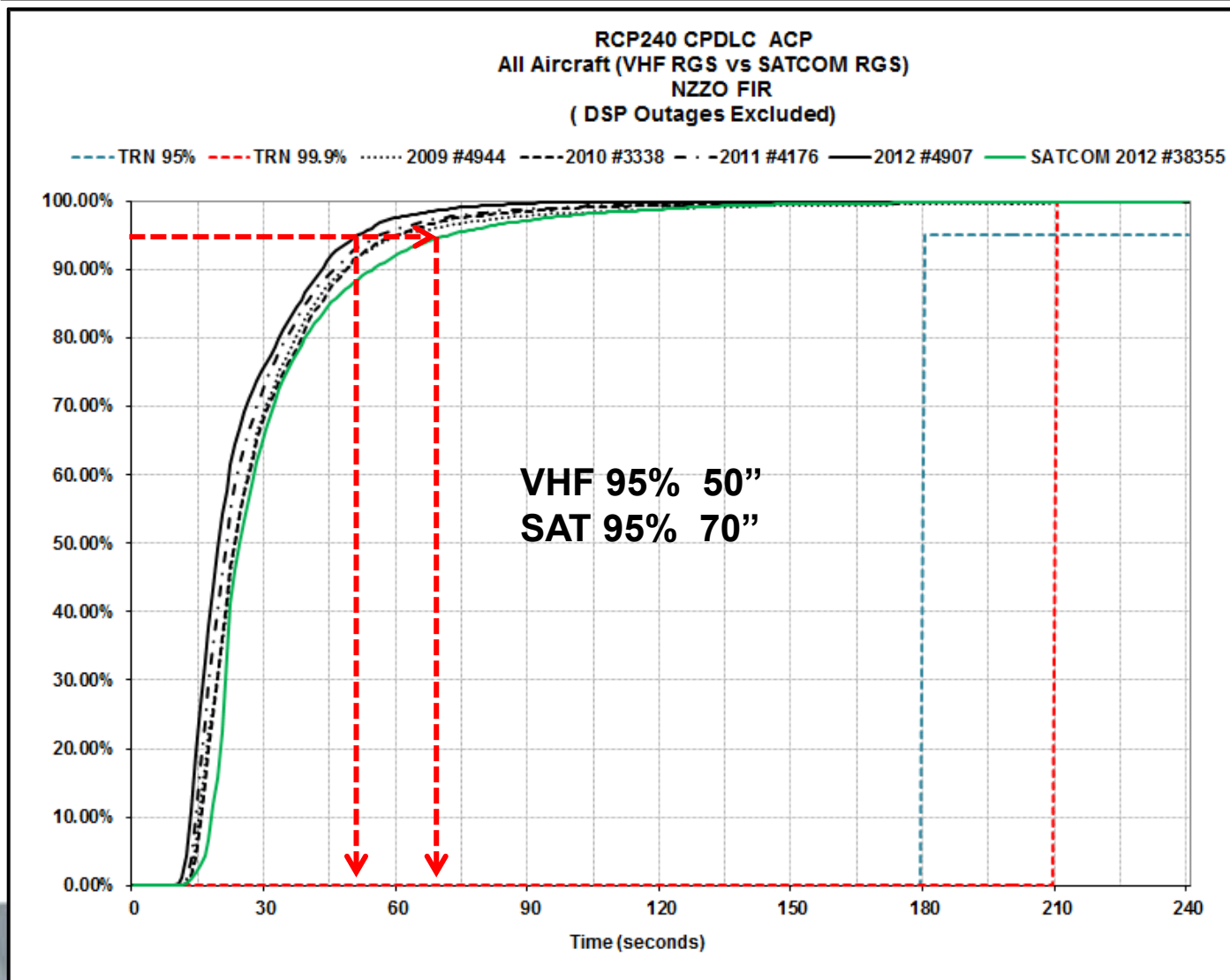
FANS-1/A Current Performance - CPDLC



Performance – CPDLC ACP 2009-2012



Performance – CPDLC ACP VHF vs SATCOM

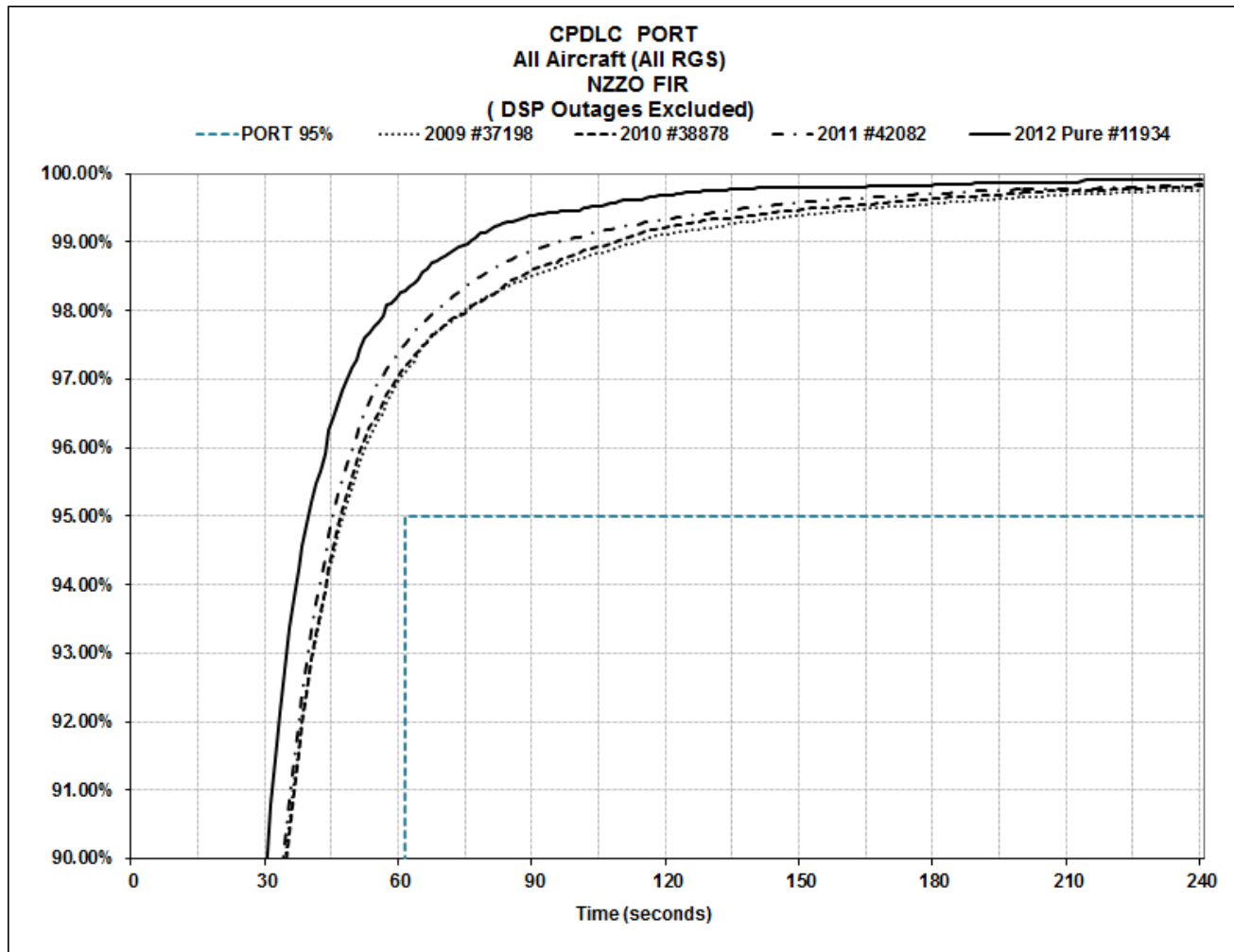


Performance – CPDLC ACTP 2012-12

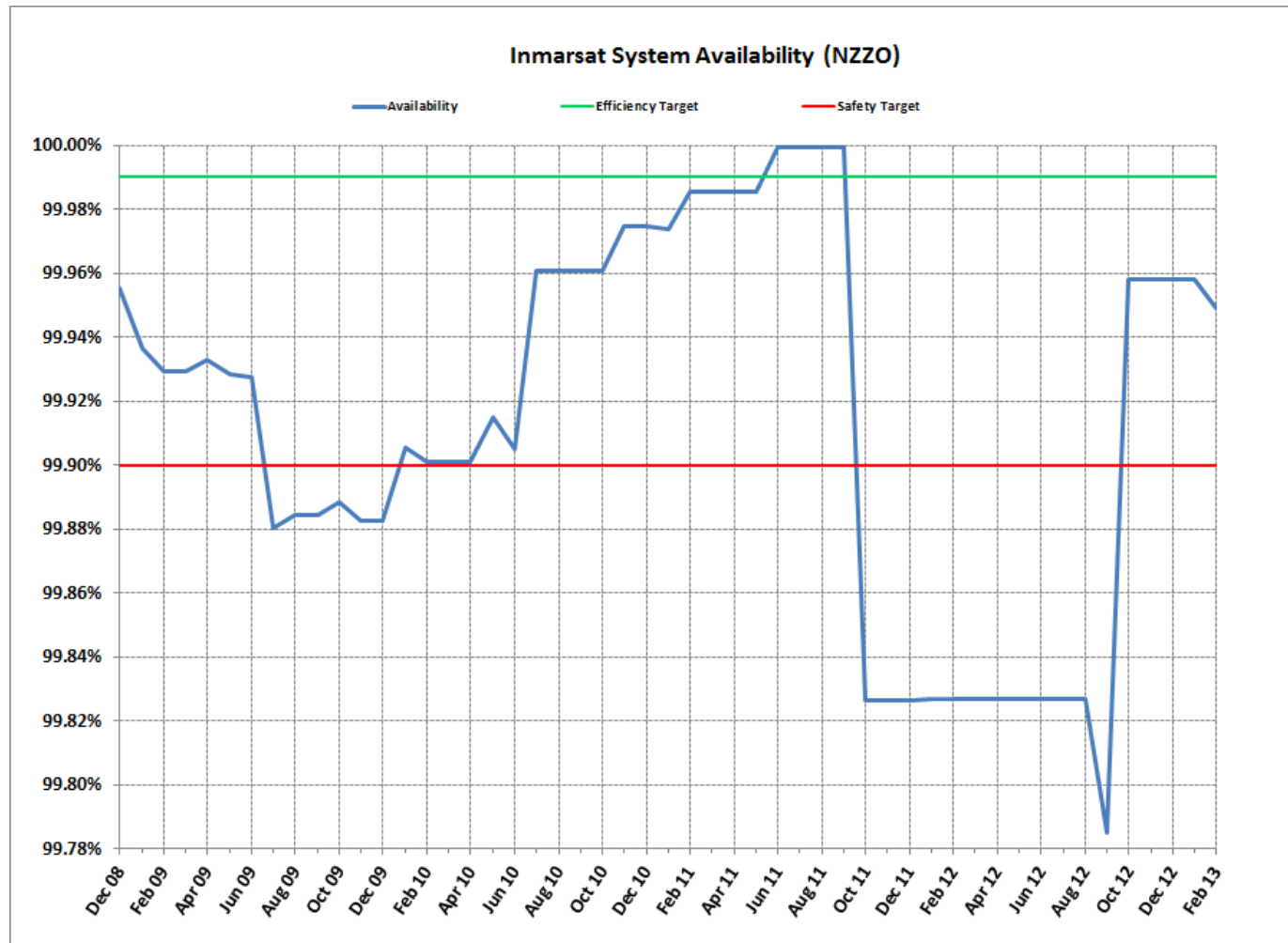
Operator	Type	# Messages	% of Total	RCTP 95% 120sec	RCTP 99.9% 150 sec
DDD	B772	457	13.08%	100.00%	100.00%
OOO	B77W	414	11.85%	100.00%	100.00%
XXX	B744	392	11.22%	100.00%	100.00%
GGG	B744	218	6.24%	100.00%	100.00%
VVV	B772	118	3.38%	100.00%	100.00%
SSS	A388	104	2.98%	100.00%	100.00%
AAA	A343	85	2.43%	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	A333	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%



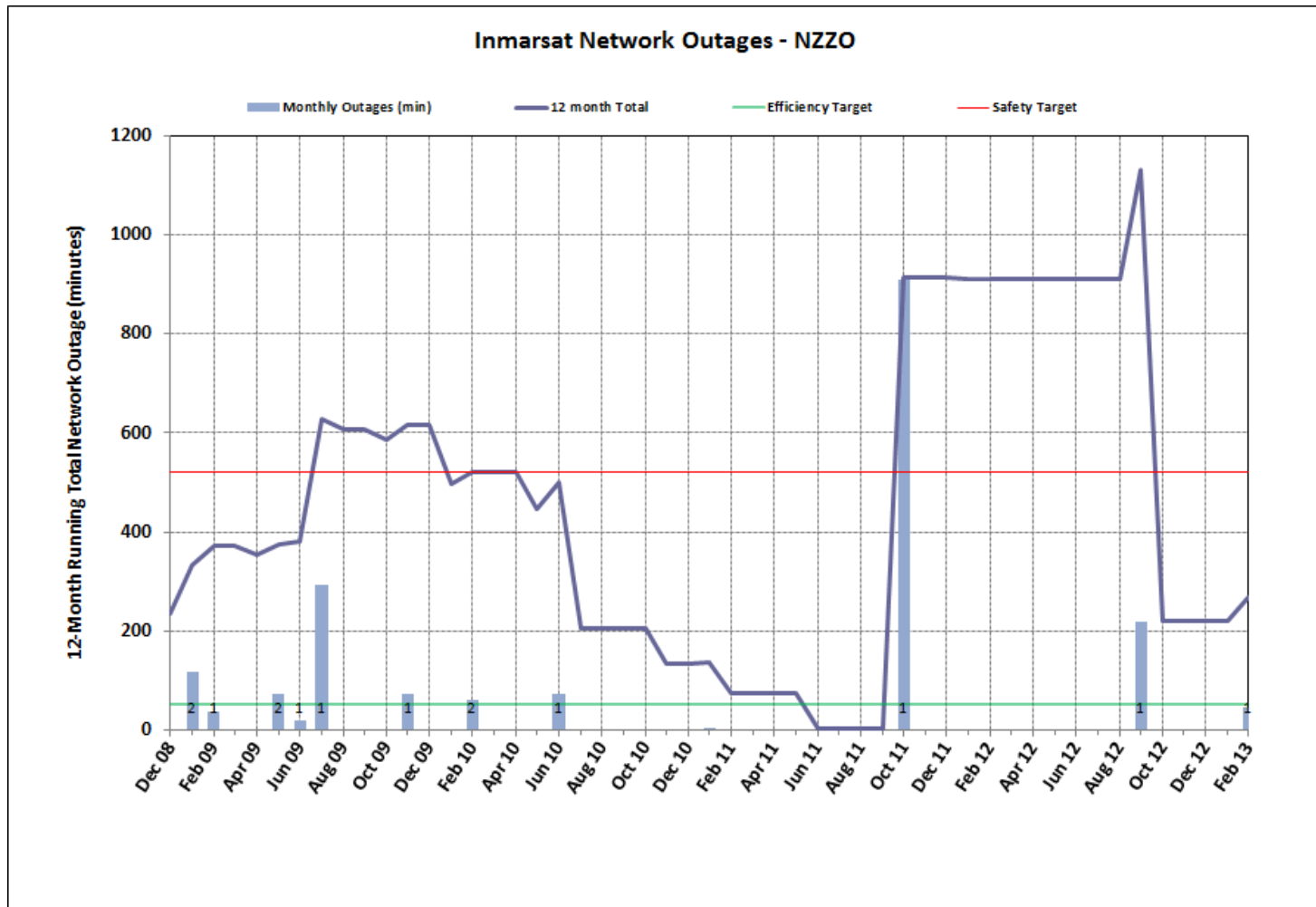
CPDLC PORT – Pilot operational response



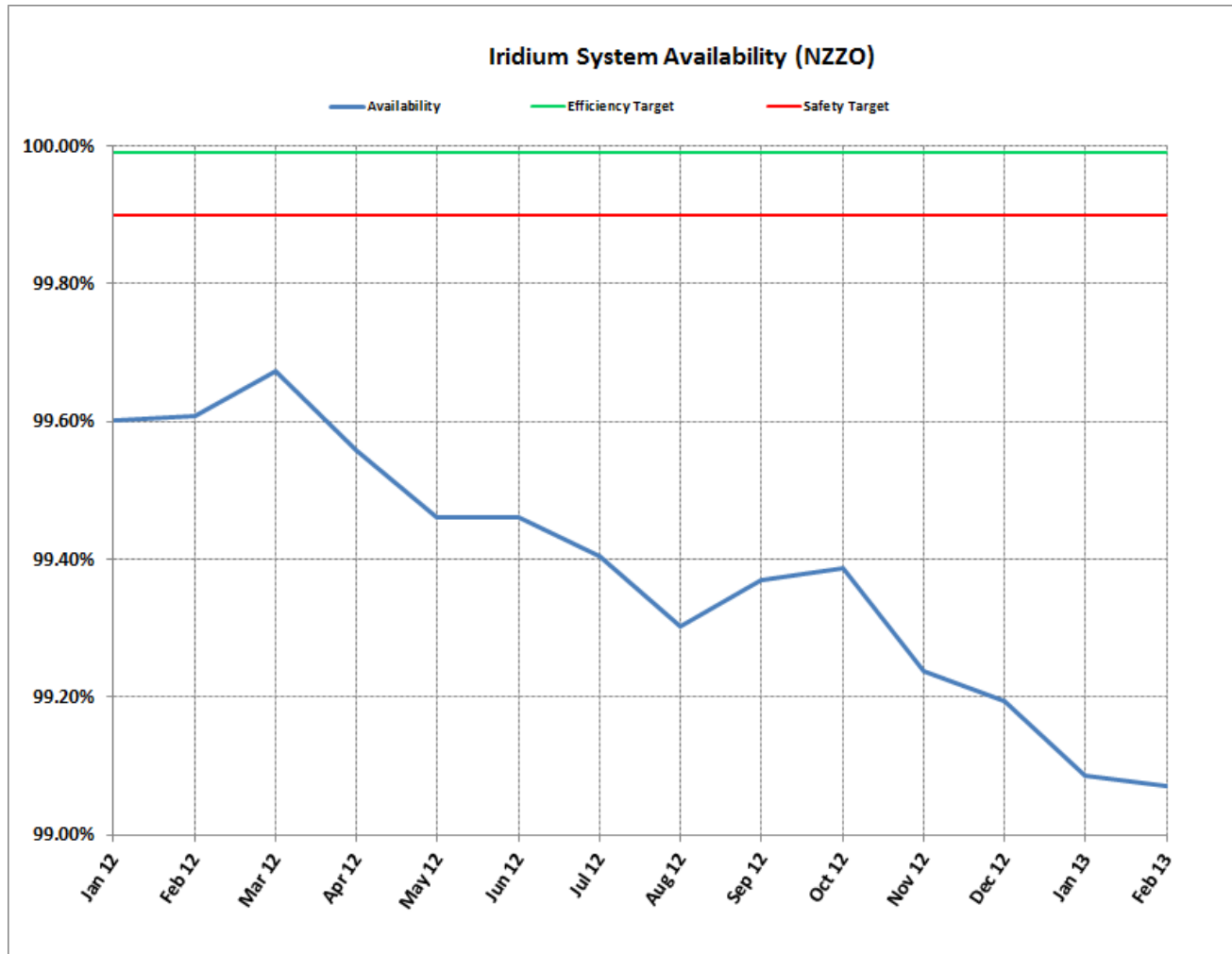
Availability - Inmarsat



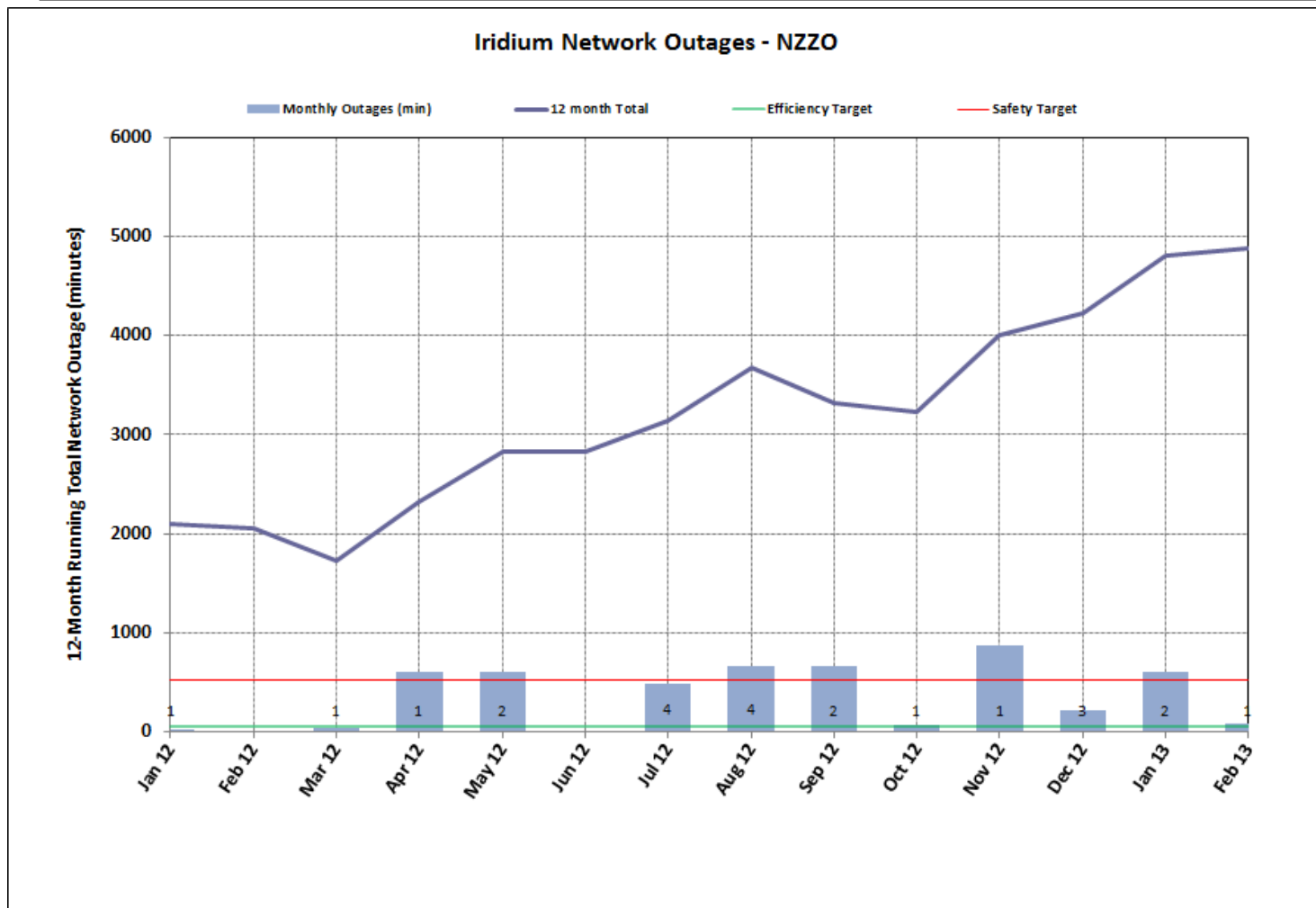
Availability - Inmarsat



Availability - Iridium



Availability - Iridium





Thank you

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