Twenty Second Meeting of the
Informal South Pacific ATS Co-ordinating Group (ISPACG/22)
FANS Interoperability Team Meeting (FIT/15)

Papeete, Tahiti, 11-12 March 2008

Agenda Item 5& 6 System Performance and ATSU Monitoring

Monitoring FANS-1/A Performance against Oceanic SPR Standard

Presented by Airways New Zealand

SUMMARY

ICAO Annex 11 requires that datalink performance is monitored to verify that an acceptable level of safety continues to be met. New datalink performance requirements for the application of reduced separation standards, as defined in ICAO Doc444, are contained in the recently published RTCA DO-306 Oceanic SPR standard. These new requirements are specified in terms of Required Communications Performance (RCP) include surveillance requirements and will require changes to the current monitoring as detailed in the FANS-1/A Operations Manual (FOM) para 3.11.and in the ICAO Guidance Material for End-to-End Safety and Performance monitoring of ATS datalink Systems in the Asia Pacific Region. This paper proposes changes to both documents and also to the data supplied by individual ATSP to the Central Reporting Agency (CRA), in order to align ISPACG states to the Oceanic SPR standard.

1. INTRODUCTION

1.1 ICAO Annex 11 requires that datalink performance is monitored to verify that an acceptable level of safety continues to be met. New datalink performance requirements for the application of reduced separation standards, as defined in ICAO Doc4444, are contained in the recently published RTCA DO-306/EUROCAE ED 122 Oceanic SPR standard. The FOM needs to be aligned to these standards.

1.2 This paper provides information derived from monitoring aircraft FANS-1/A performance in the Auckland Oceanic FIR against the Oceanic datalink communication performance requirements contained in RTCA DO-306/EUROCAE ED122 Oceanic SPR standard. These requirements are specified in terms of Required Communications Performance (RCP) and surveillance. Analysis of the data emphasises the importance of end-to-end monitoring of performance by individual airline aircraft types at an ATSP level.

1.3 Significant performance differences between aircraft types and between different airlines operating the same aircraft type indicate that monitoring should include not only the communication service provider (CSP) performance but also the airline flight deck procedures and aircraft equipment. This will require significant changes to the type of monitoring that has been carried out in the past and as currently specified in the FANS-1/A Operations Manual. Determination of what monitoring will be required is still under development.

1.4 This paper proposes: ISPACG acceptance of the performance requirements contained in the Oceanic SPR Standard as modified by the INMARSAT SATCOM Improvement Team and the ICAO North Atlantic Systems Planning Group (NAT SPG); the development of new end-to-end monitoring requirements to ensure the system meets the requirements; the development of new periodic reporting requirements for individual ATSP to the Central Reporting Agency; and changes to the ICAO Guidance Material for End-to-End Safety and Performance monitoring of ATS datalink Systems in the Asia Pacific Region.

2. DISCUSSION

2.1 Current monitoring by ATS providers in the South Pacific has in general terms been aimed at looking at the performance of the combined FANS-1/A aircraft fleet in terms of compliance with the ADS and CPDLC round trip and downlink requirements specified in the FANS-1/A operating Manual. This monitoring was really able to determine little more than when overall performance was deteriorating and improvement was required. Figure 1 below depicts monitoring of downlink performance against current requirements.

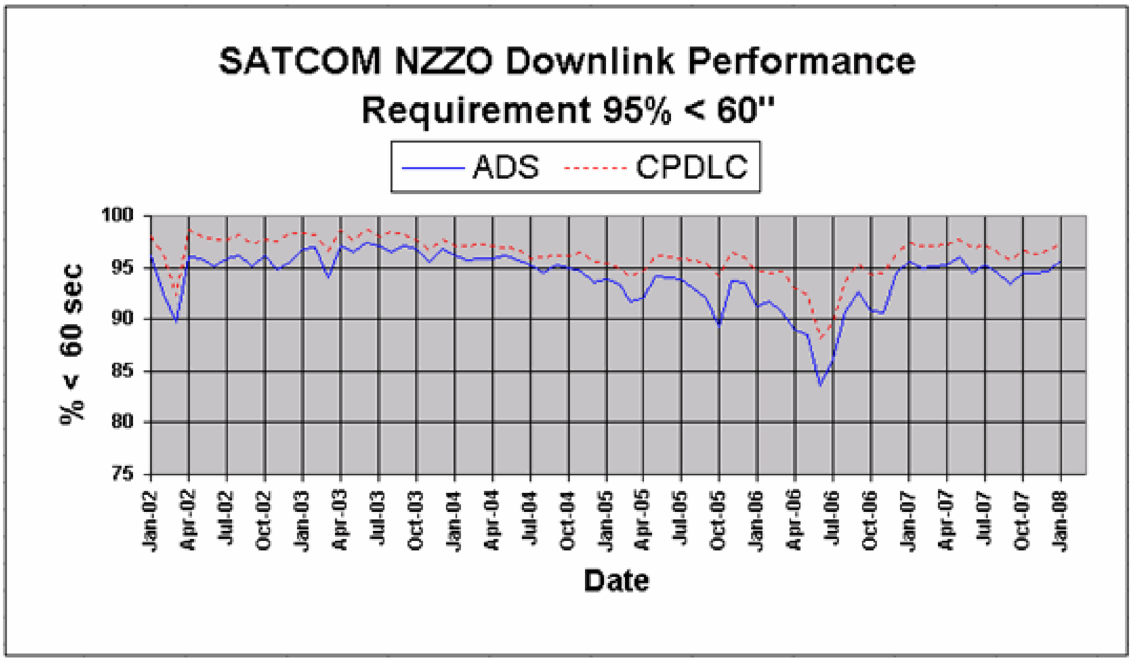


Figure 1: Historical FANS-1/A monitoring of SATCOM downlink performance

2.2 The gradual deterioration in performance seen in Figure 1 eventually resulted in the upgrades at the Pacific SATCOM GES stations at Perth and Santa Paula which were completed in November 2007. The completion of these upgrades has seen significant improvement in the availability and performance of SATCOM CPDLC and ADS. However, performance against the historical standard particularly for ADS was still marginal. The publication of RTCA DO-306/EUROCAE ED122 Oceanic SPR standard in October 2007 provided a basis for monitoring both communications performance in terms of ICAO RCP and surveillance performance. Discussion of the Oceanic SPR requirements in the INMARSAT sponsored SATCOM improvement Group, and the North Atlantic System Planning Group accepted that the 0.999 availability requirement for safety specified in the Oceanic SPR was insufficient for operational efficiency in some environments and that an availability of 0.9999 was required. Airways New Zealand supports this conclusion.

2.3 The FOM still reflects the historical performance requirements and should be updated to reference the requirements in the Oceanic SPR standard as modified for operational efficiency. Appendix A contains draft change proposals for the FOM which would adopt the new requirements.

2.3 Airways has been assessing FANS-1/A system performance using Oceanic SPR requirements since September 2007. For RCP we decided to initially monitor only those uplink messages that required a WILCO/UNABLE response. This decision was made because the critical communications requirement is provided by intervention messages when applying reduced separation standards. Incorporating other message types such as free text queries or information requests would skew the data because of the longer response times from the flight deck. The monitoring to date has concentrated on an analysis of round trip CPDLC intervention transactions i.e the CPDLC intervention uplink and the crew response, under SATCOM. This analysis is based on that subset of message transactions where the MAS response is received from a Satellite RGS, and the corresponding crew response downlink is also received through a satellite RGS. We decided to only monitor SATCOM because of parallel work for the INMARSAT sponsored Satcom Improvement Team, and did not want to introduce issues associated with VHF/ SATCOM transitions.

2.4 Our initial analysis for CPDLC was based on the calculation of Actual Comm Performance (ACP) used to monitor RCP time allocations for TRN, Actual Communications Technical Performance (ACTP) used to monitor RCTP time allocations, and Flight Deck Response used to monitor the flight deck responder element. We used CPDLC uplink messages and their corresponding downlink responses from the aircraft in this assessment. To calculate ACP the difference between the times that the uplink message is originated at the ATSU to the time that the corresponding downlink is received is used. To calculate ACTP the difference between the downlinks aircraft time stamp and the received time is added to half the round trip time determined by the difference between the uplink time when the message is sent from the ATSP and the receipt of the MAS response for the uplink at the ATSP (uplink transmission time – MAS receipt/2 + downlink time). Flight deck response times are calculated by the difference between ACP and ACTP for any given transaction. The Oceanic SPR also specifies surveillance performance requirements. An analysis of ADS downlink transit times from the time the ADS report is generated at the aircraft to the time received at the ATSU was used to monitor these requirements.

2.5 The RCP and surveillance analysis was carried out for each airline and aircraft type operating in our area. The results indicate that significant performance differences exist. As an example Figure 2 below illustrates the differences seen between Airbus aircraft operating in the South Pacific, while Figure 3 illustrates the differences seen between Boeing 744 aircraft operated by different airlines. The graphs depict performance of the types via different CSP's (key = X or Y), whether aircraft are using the high or low speed channels (key = High or Low). The number of data points used is also shown in the key.

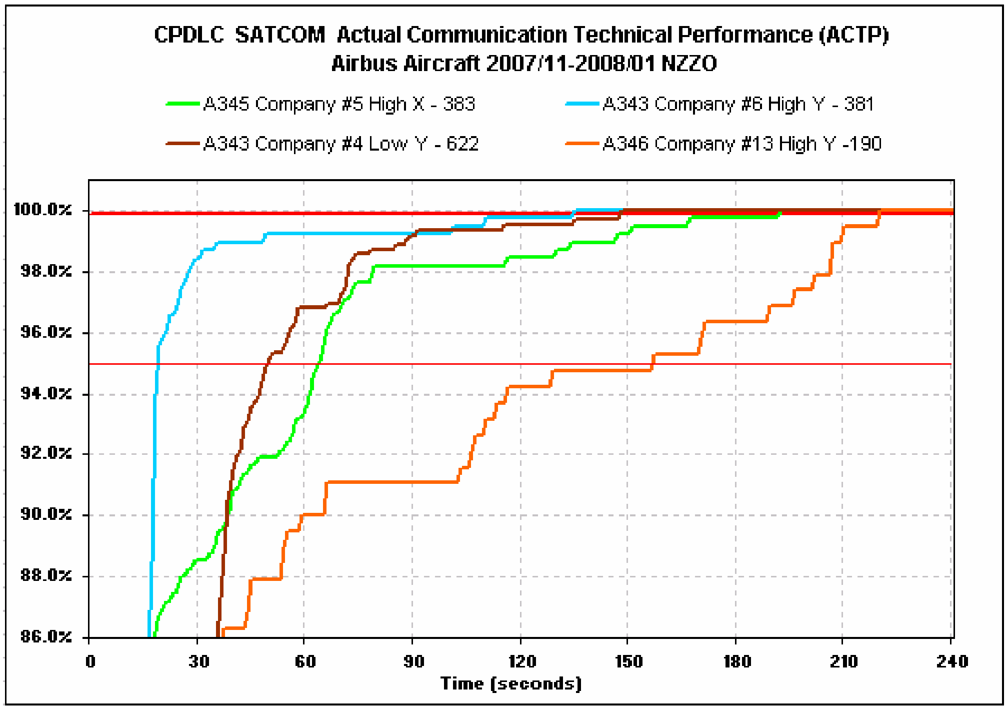


Figure 2: CPDLC SATCOM Analysis of Airbus Aircraft

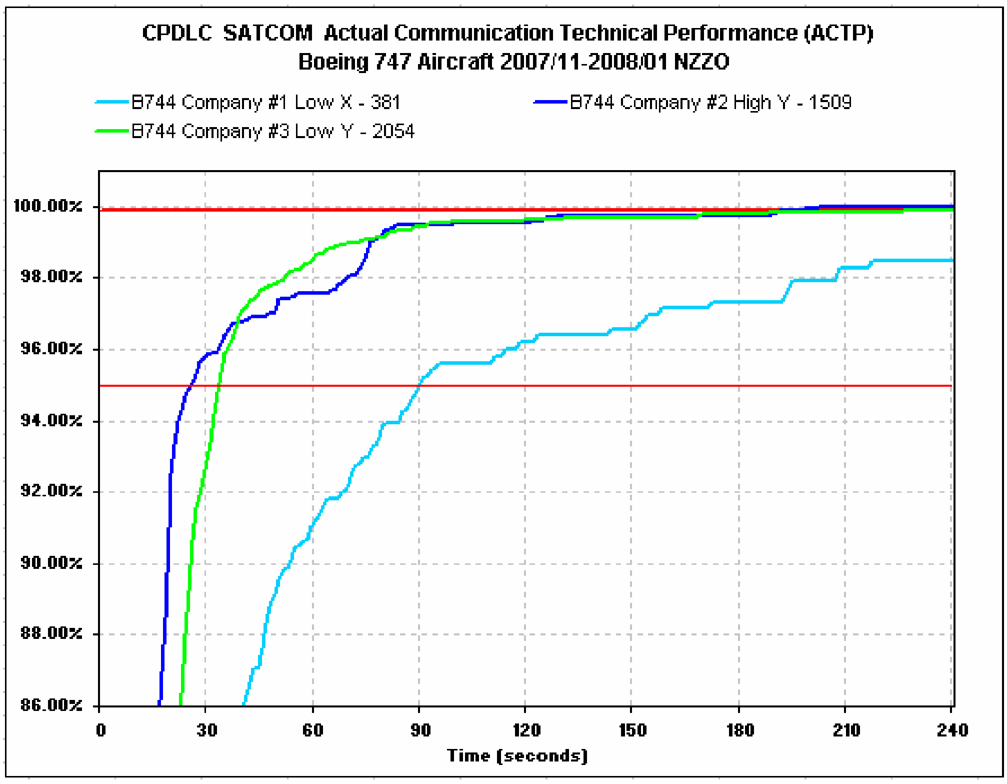


Figure 2: CPDLC SATCOM Analysis of B744 Aircraft

2.6 The aim of our analysis in the first instance is to provide data to the Central Reporting Agency (CRA) to enable the poor relative performers to be identified and to enable steps to be taken to improve their performance. We see this as a process of continuous performance improvement with individual aircraft types aimed at improving overall performance.

2.7 To date problem reports have been raised against the B777 aircraft type, Airbus A346 operated by one airline, and Boeing B744 operated by one airline. Investigation and further analysis is ongoing. What has become evident is that if we are to maintain regional performance figures in terms of RCP, and surveillance the CRA will require more specific periodic data from the Air Traffic service providers.

2.8 Appendix B contains examples of the current analysis work done by Airways New Zealand in determining requirements for the end-to-end monitoring of RCP for FANS-1/A CPDLC and of surveillance requirements for FANS-1/A ADS. While the performance requirements are specified in the Oceanic SPR standard, how an ATSP monitors these requirements is still open for discussion. It is our view that it is still too early to define exact requirements for individual ATSP monitoring and that the ISPACG datalink working group should be tasked with developing these during 2008. Oakland and Auckland have been monitoring the Oceanic SPR requirements for SATCOM since late 2007 using the same data extraction. It is interesting that we are seeing subtle performance differences in the recorded data for the same aircraft type and these are under investigation. One possible reason is that overall system performance is affected by the routing of the aircraft. For example, Auckland sees more SATCOM/VHF transitions through the Pacific islands in their airspace than Oakland, and this may be enough to show up as differences in the observed data. Further analysis is required.

2.9 Between the 27th and 29th of February 2008 Oakland and Auckland worked with ARINC and SITA to monitor downlink ADS performance on UAL B744 and ANZ B777 aircraft. Data analysis would tend to validate the data gathering from both ATSP's with the ARINC and SITA message timestamps on the ADS downlinks as they reach the RGS showing between a 1-3 second transit through the CSP ground networks.

2.10 Appendix C contains an example of the type of the raw data being extracted by Auckland for RCP monitoring, and an example of the raw data extracted for surveillance monitoring. One suggestion is that this data could be extracted in comma separated value (.csv) format on a monthly basis and passed to the CRA to complete regional performance analysis. Again, it is our view that it is still too early to define the reporting requirements and the ISPACG datalink working group should be tasked with developing these during 2008.

2.11 The only way we can estimate the time taken for an uplink to reach the aircraft is to halve the time taken for the MAS response round trip. This assumption is flawed in a percentage of cases because we know it is possible for the MAS to be received at the ATSP some time after the operational response is received. Apparently, this will happen if the CSP does not hear the network ACK from the aircraft sent on uplink receipt and resends the uplink at a later time. The CSP receives the network ACK to this second uplink and sends the MAS to the ATSP. In the meantime the aircraft has already responded with the operational response. ATSP will see this issue reflected in their data with crew response times with negative values. Our data analysis may indicate that the problem is restricted to only some aircraft. The time sequence diagram below in Figure 3 attempts to illustrate this.

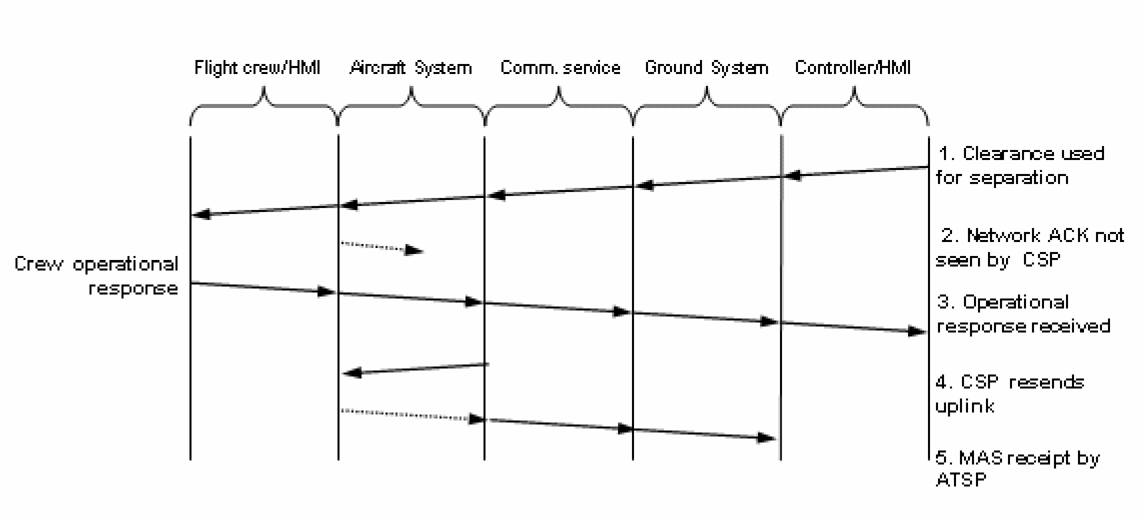


Figure 3: Issue with estimating uplink transit time as half MAS roundtrip

2.12 The NAT SPG Technical Task Force on datalink applications communications requirements met in Paris on 20-22 February, 2008. The ISPACG data link working group chair attended the meeting at the invitation of ICAO. At this meeting a number of amendments to the NAT guidance material for end-to-end safety and performance monitoring of ATS datalink systems were made. This guidance material was originally based on the ASIA/PACIFIC guidance material and to ensure consistency between the regions we suggest that ISPACG recommend to ICAO Asia and Pacific Office that the NAT amendments be incorporated in the ASIA/PAC guidance material. Two changes were made to the guidance material: In the first the diagram on page 5 of the ASIA/PAC guidance was replaced with a new diagram which was thought to better reflect the problem identification and resolution process, in particular a feedback loop to the originator of the problem report; in the second change the routine datalink monitoring requirements were extended to include those needed for RCP. The changes required to align the guidance material is contained in Appendix D.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) Recommend that ISPACG adopt the performance requirements contained in the Oceanic SPR Standard as modified by the INMARSAT SATCOM Improvement Team and the ICAO North Atlantic Systems Planning Group (NAT SPG), and recommend the FOM amendments as contained in Appendix A.

b) Note the RCP monitoring work completed to date by Airways as contained in Appendix B and C and agree that this be used as resource material for developing new monitoring and reporting requirements.

c) Recommend that ISPACG task the Datalink Working Group with the development of monitoring and reporting requirements for the Oceanic SPR standards to be completed by September 2008.

d) Recommend the changes to ICAO ASIA/PAC guidance material on end-to-end monitoring as contained in Appendix D.

Appendix A : Updates required to the FOM in order to adopt Oceanic SPR standards

Para 3.3 References

Add new reference for Oceanic SPR standard.

Id	Name of the document	Reference	Date	Origin	Domain
15	Safety and Performance Standard for Air Traffic Data Link Services in Oceanic and Remote Airspace, (Oceanic SPR Standard)	RTCA DO-306/ EUROCAE ED-122	October 11, 2007	RTCA/ Eurocae	CPDLC ADS AFN

Para 3.4 System Performance Criteria

Replace existing paragraph with new paragraph as follows:

RTCA DO-306/EUROCAE ED-122 Safety and Performance Standard for Air Traffic Datalink Services in Oceanic and Remote Airspace (Oceanic SPR Standard) contains the safety and performance requirements for datalink services that need to be met and verified.

Note: The Oceanic SPR standard provides an availability requirement for safety of 0.999, however to enable operational efficiency in some environments the FANS1/A availability requirement is set at 0.9999. This 0.9999 availability requirement translates on a per ATSP basis to:

- *No more than 4 outages (affecting a significant portion of aircraft) greater than 10 minutes for any 12 month period;*
- *Failures causing outages for multiple OACs are not counted more than once; and*
- *No more than 50 minutes of total downtime for any 12 month period.*

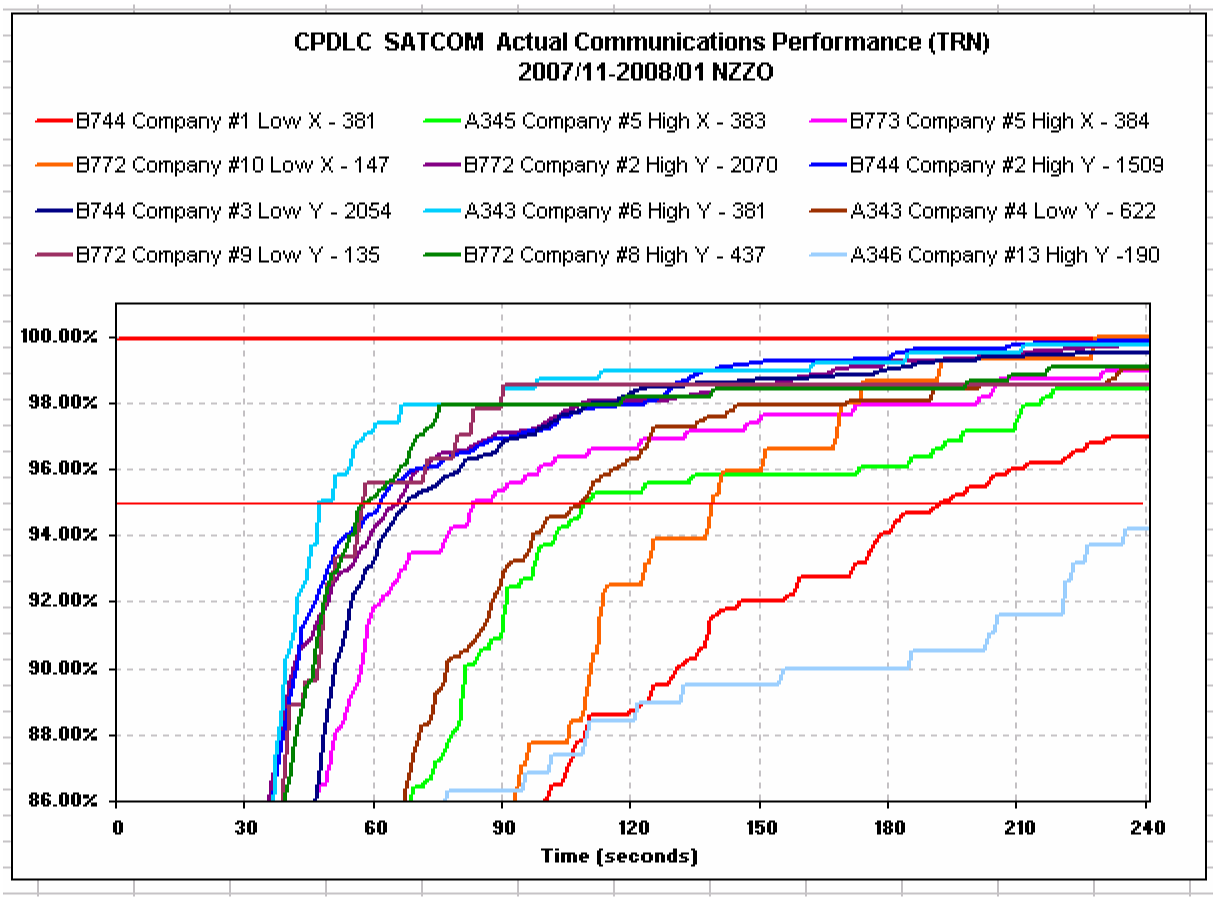
The table below summarizes the Oceanic SPR Standard requirements.

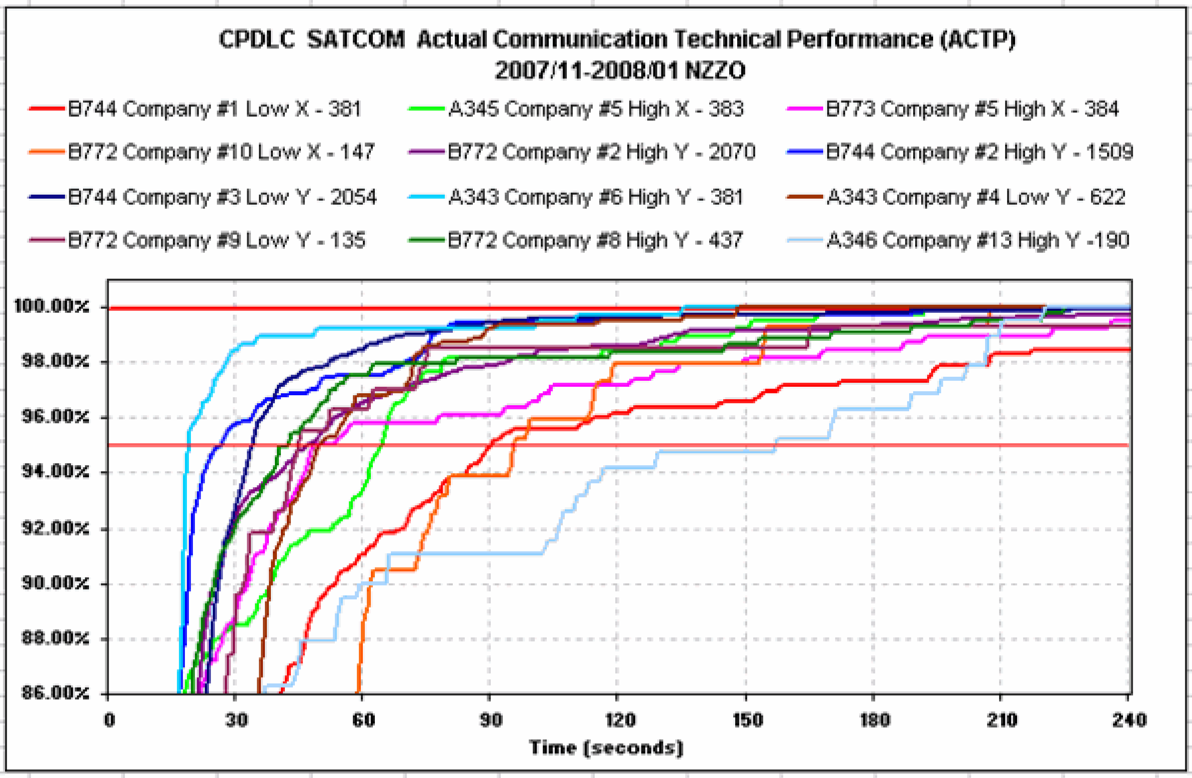
Performance Criteria	Definition	Values
RCP 240/D	Normal means of communication for application of 30 NM lateral separation and reduced distance-based longitudinal separation minima	Communication Transaction time (ET) 240 (sec) *Note: Communication Transaction time is defined as the maximum time for the completion of an operational transaction after which the initiator reverts to an alternative procedure. (ICAO Doc 8689)*
RCP400/D	Normal means of communication for application of lateral separation greater than or equal to 50 NM and time-based longitudinal separation. Alternative means of communication for application of 30 NM lateral separation and reduced distance-based longitudinal separation minima	Communication Transaction time (ET) 400 (sec)
Surveillance **50nm Longitudinal** **30nm Longitudinal**	Normal Surveillance: (position report delivery) Non-normal Surveillance:	ET 180 (sec) ET 240 (sec)

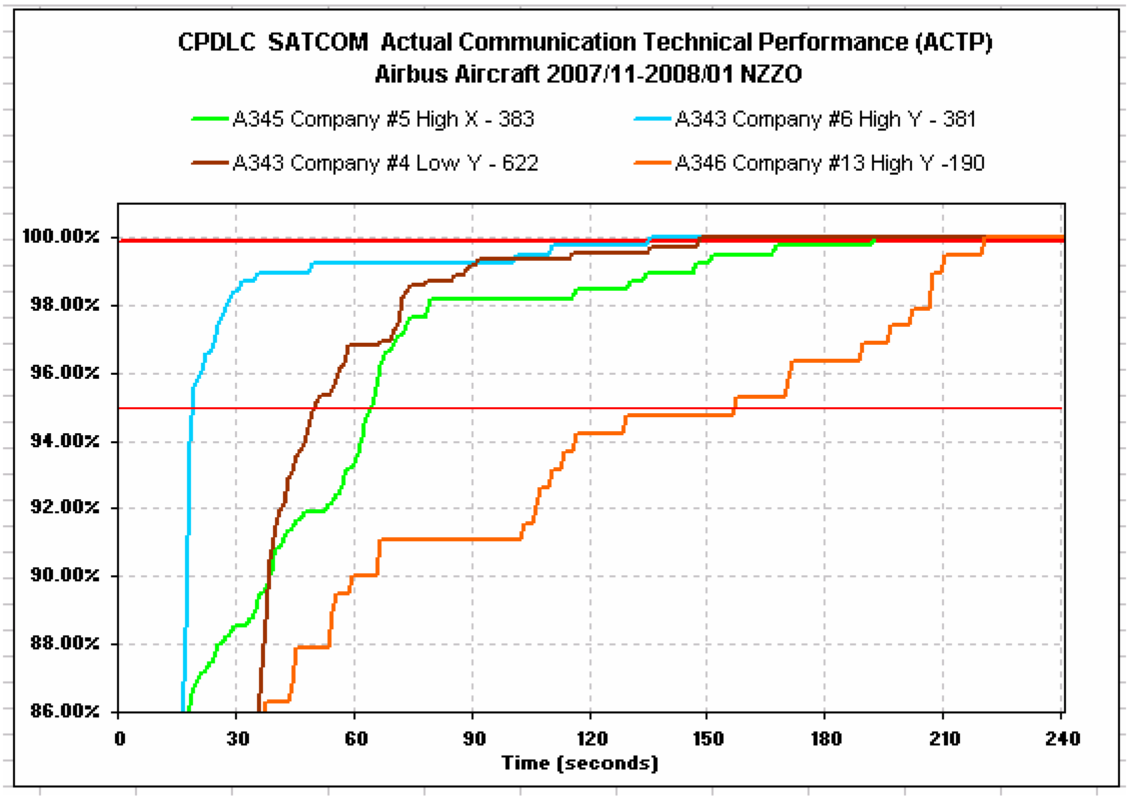
Performance Criteria	Definition	Values
30nm Lateral	(Controller initiated position report request)	
Surveillance >50nm Lateral >=10mins time based	Normal Surveillance	ET 400 (sec)
Availability	The probability that an operational communication transaction can be initiated when needed (ICAO Doc 8689)	99.99%
Continuity	The probability that an operational communication transaction can be completed within the communication transaction time (ICAO Doc 9869)	99.9%
Integrity	The probability of one or more undetected errors in a completed communication transaction.	10^{-5}/hour

Appendix B – SATCOM Monitoring by Airways New Zealand in NZZO Oceanic FIR

1. CPDLC PERFORMANCE




CPDLC SATCOM Actual Communication Technical Performance (ACTP)
2007/11-2008/01 NZZO
B744 Company #1 Low X - 381
A345 Company #5 High X - 383
B773 Company #5 High X - 384
B772 Company #10 Low X - 147
B772 Company #2 High Y - 2070
B744 Company #2 High Y - 1509
B744 Company #3 Low Y - 2054
A343 Company #6 High Y - 381
A343 Company #4 Low Y - 622
B772 Company #9 Low Y - 135
B772 Company #8 High Y - 437
A346 Company #13 High Y -190
100.00%
98.00%
96.00%
94.00%
92.00%
90.00%
88.00%
86.00%
0
30
60
90
120
150
180
210
240
Time (seconds)


CPDLC SATCOM Actual Communication Technical Performance (ACTP)
Airbus Aircraft 2007/11-2008/01 NZZO
A345 Company #5 High X - 383
A343 Company #6 High Y - 381
A343 Company #4 Low Y - 622
A346 Company #13 High Y -190
100.00%
98.00%
96.00%
94.00%
92.00%
90.00%
88.00%
86.00%
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30
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90
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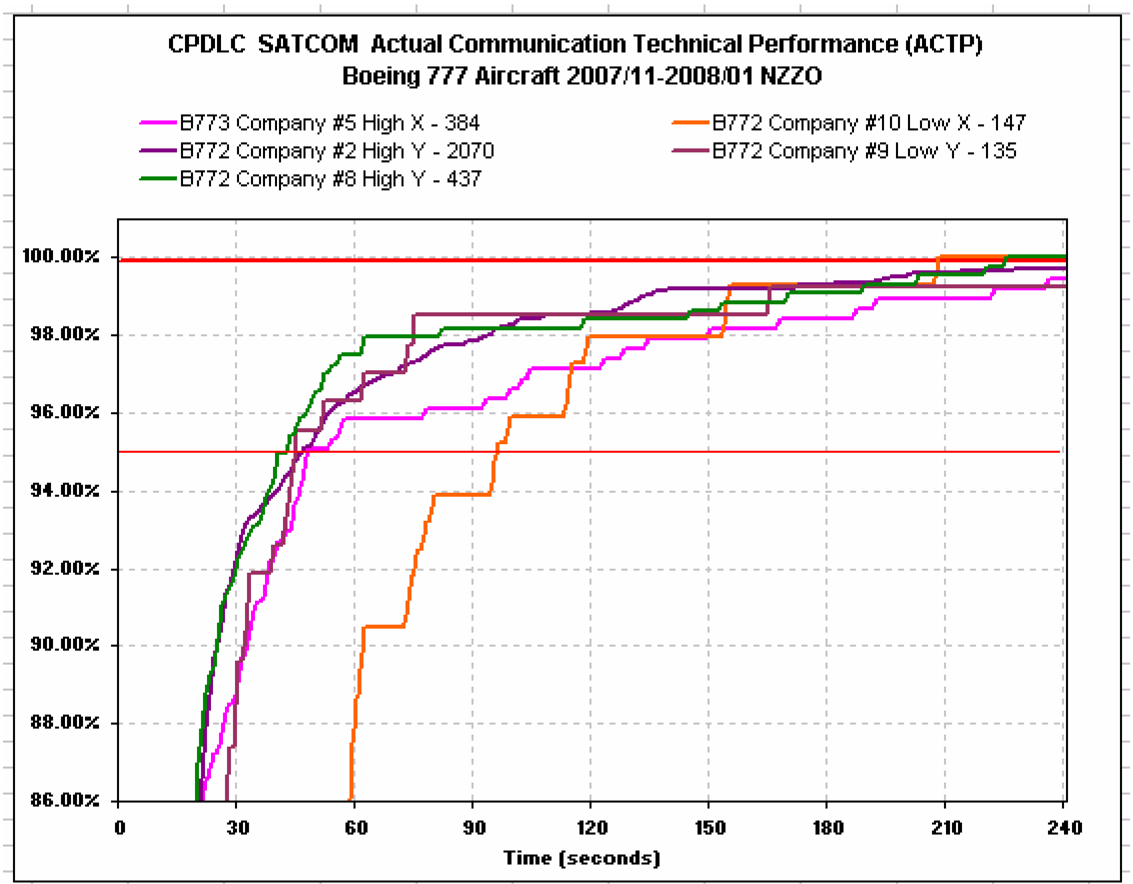
150
180
210
240
Time (seconds)


CPDLC SATCOM Actual Communication Technical Performance (ACTP)
Boeing 777 Aircraft 2007/11-2008/01 NZZO
B773 Company #5 High X - 384
B772 Company #2 High Y - 2070
B772 Company #8 High Y - 437
B772 Company #10 Low X - 147
B772 Company #9 Low Y - 135
100.00%
98.00%
96.00%
94.00%
92.00%
90.00%
88.00%
86.00%
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30
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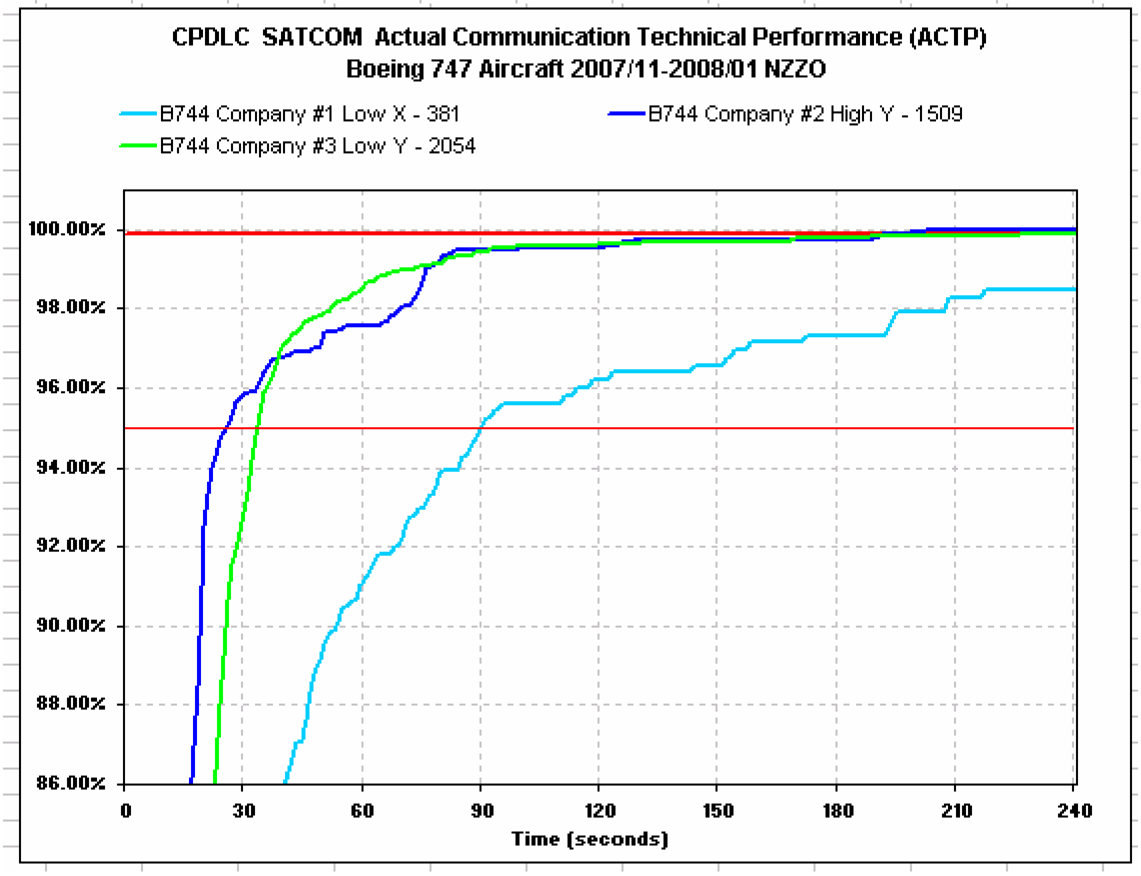
Time (seconds)


CPDLC SATCOM Actual Communication Technical Performance (ACTP)
Boeing 747 Aircraft 2007/11-2008/01 NZZO
B744 Company #1 Low X - 381
B744 Company #3 Low Y - 2054
B744 Company #2 High Y - 1509
100.00%
98.00%
96.00%
94.00%
92.00%
90.00%
88.00%
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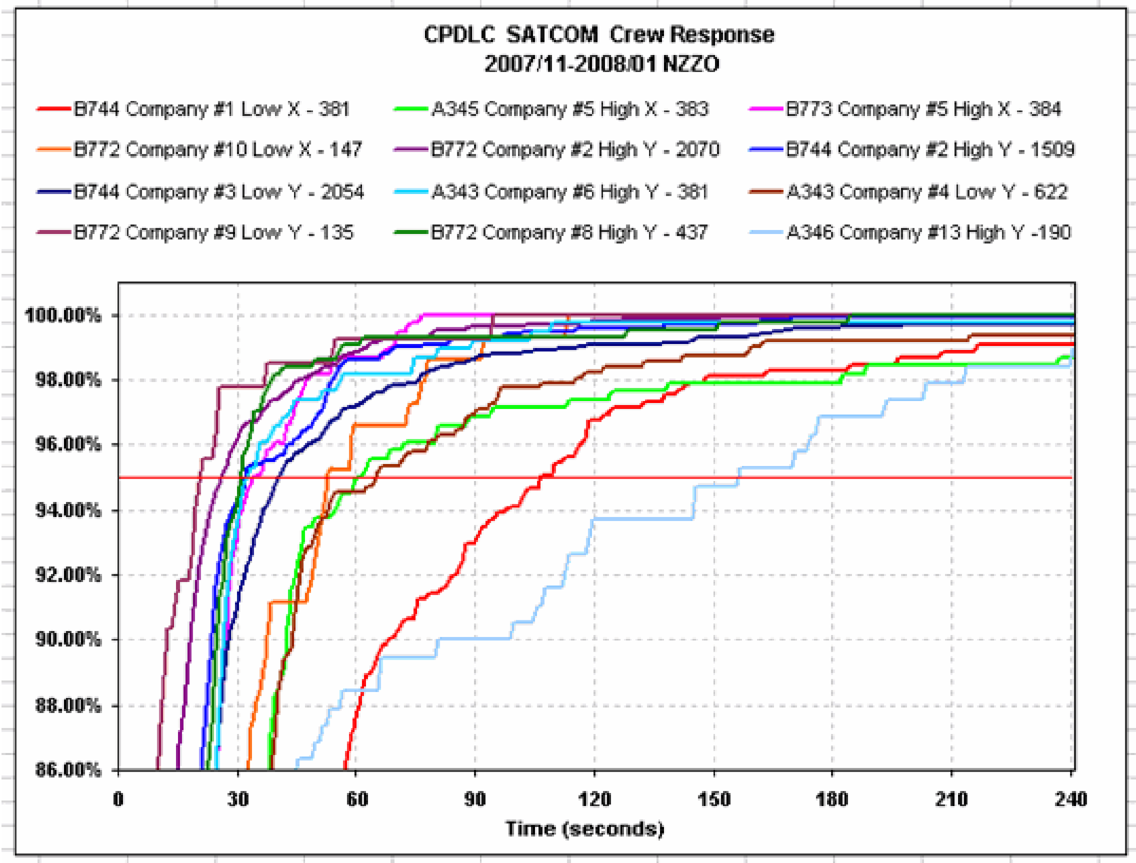
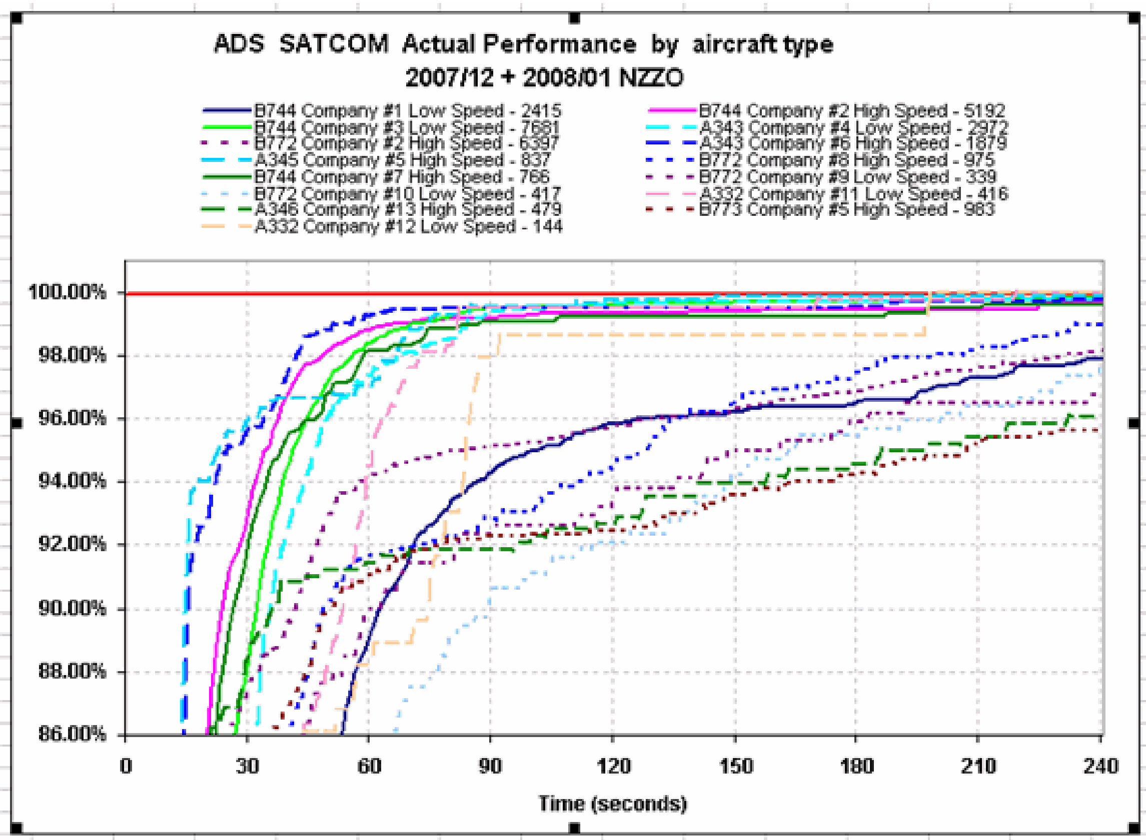
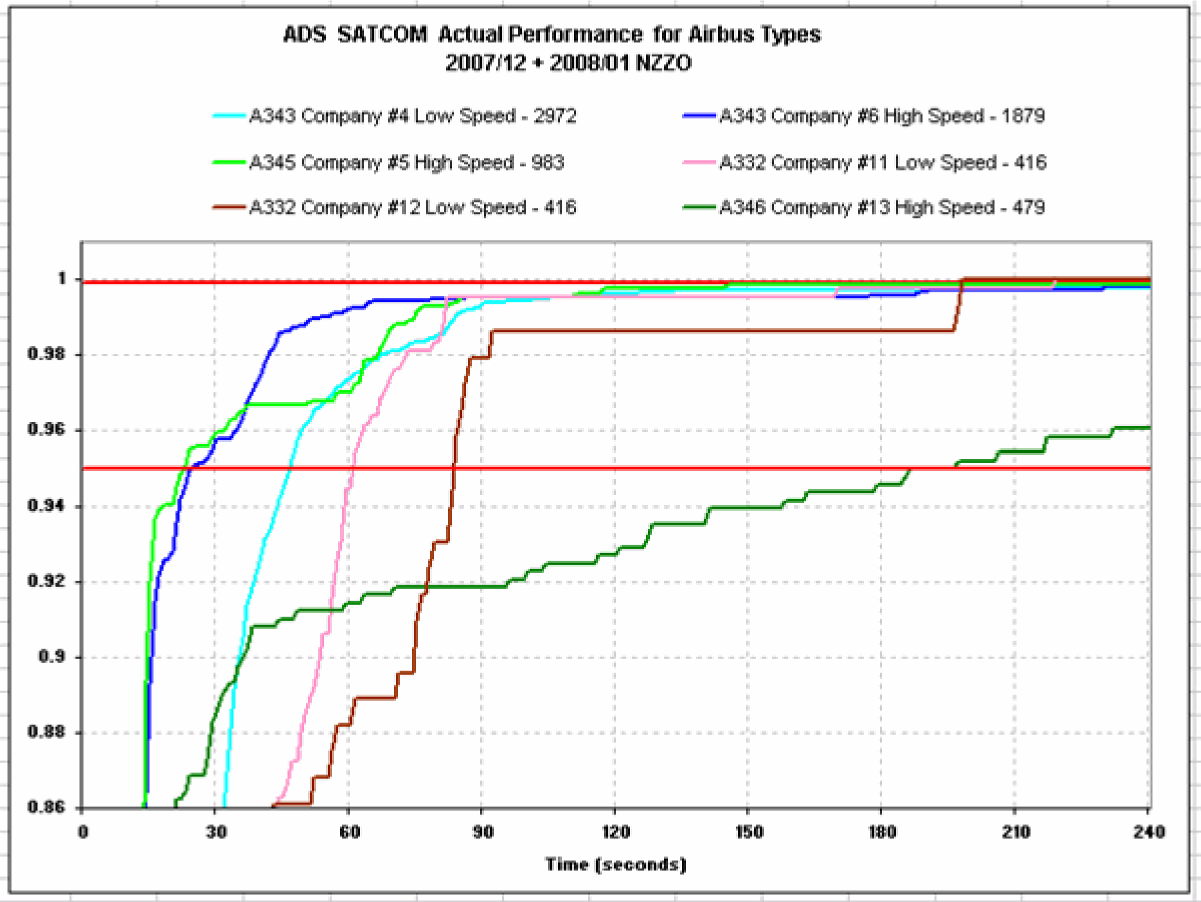
Time (seconds)



2. ADS PERFORMANCE




ADS SATCOM Actual Performance for Airbus Types
2007/12 + 2008/01 NZZO
A343 Company #4 Low Speed - 2972
A343 Company #6 High Speed - 1879
A345 Company #5 High Speed - 983
A332 Company #11 Low Speed - 416
A332 Company #12 Low Speed - 416
A346 Company #13 High Speed - 479
1
0.98
0.96
0.94
0.92
0.9
0.88
0.86
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120
150
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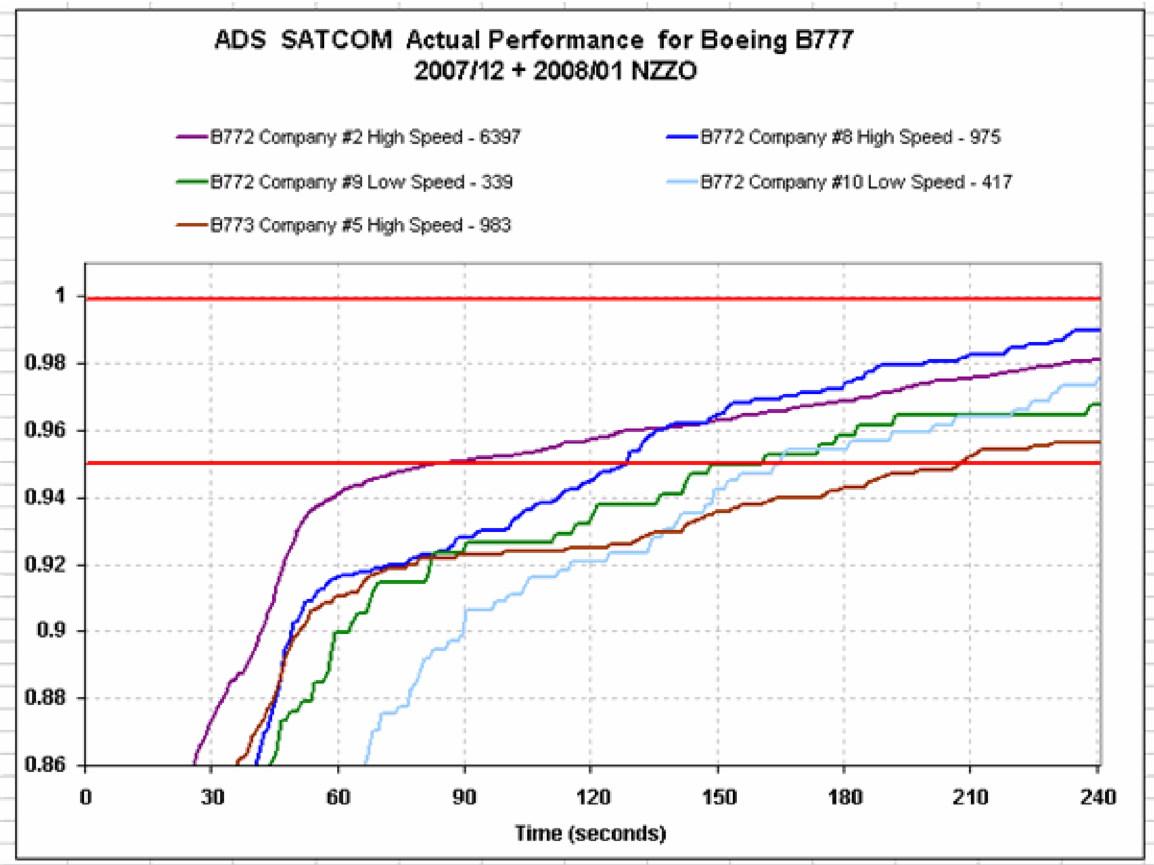
210
240
Time (seconds)


ADS SATCOM Actual Performance for Boeing B777
2007/12 + 2008/01 NZZO
B772 Company #2 High Speed - 6397
B772 Company #8 High Speed - 975
B772 Company #9 Low Speed - 339
B772 Company #10 Low Speed - 417
B773 Company #5 High Speed - 983
1
0.98
0.96
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0.9
0.88
0.86
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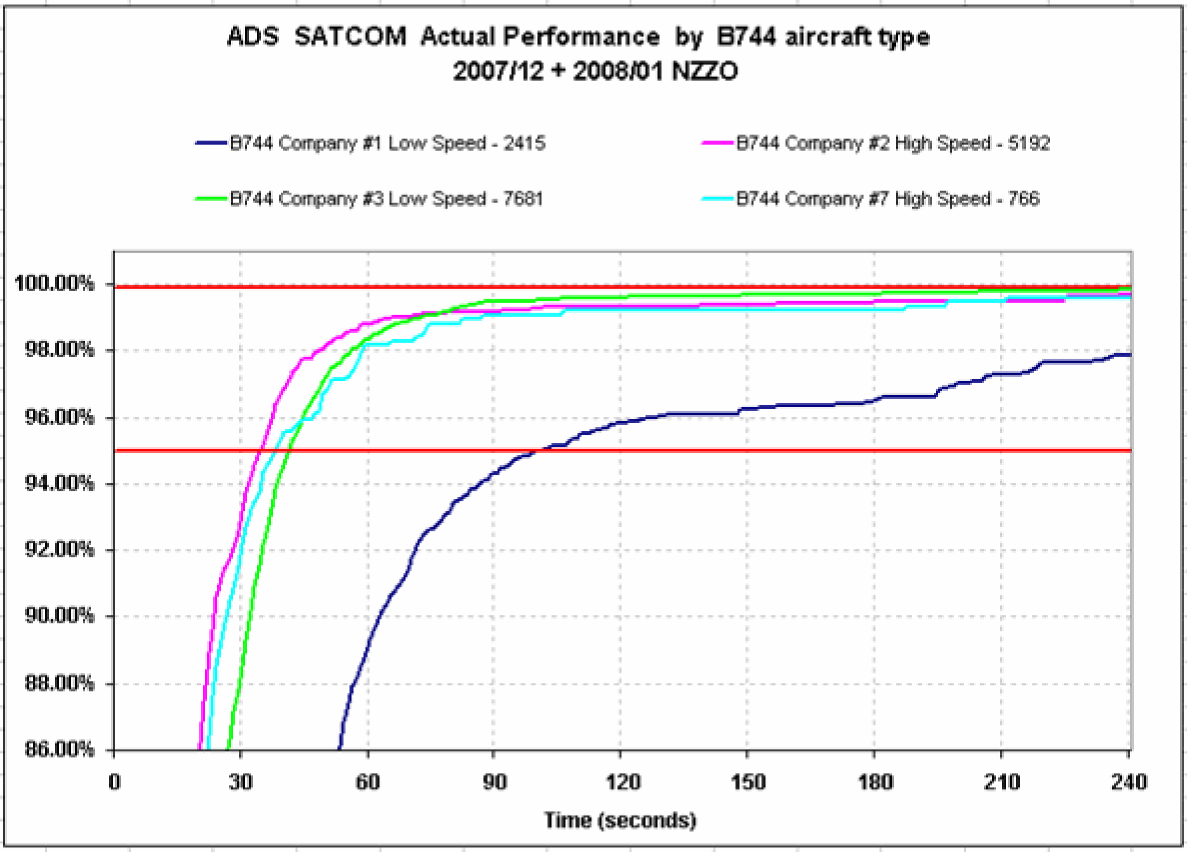
210
240
Time (seconds)


ADS SATCOM Actual Performance by B744 aircraft type
2007/12 + 2008/01 NZZO
B744 Company #1 Low Speed - 2415
B744 Company #2 High Speed - 5192
B744 Company #3 Low Speed - 7681
B744 Company #7 High Speed - 766
100.00%
98.00%
96.00%
94.00%
92.00%
90.00%
88.00%
86.00%
0
30
60
90
120
150
180
210
240
Time (seconds)

Appendix C: Typical data extraction for RCP and surveillance analysis

CPDLC

Tail_no	Ac_type	Airline	Date	RGS MAS	RGS AT1	AT1 time	MAS time	AT1 MAS round	AT1 AC_time	AT1 OCS_time	AT1 round	AT1 downlink time	upmsgid	dnmsgid	ACTP	ACP	CREW
CC-CQA	A343	LAN	2007.12.27	POR1	POR1	08:22:42	08:22:58	16	08:22:56	08:23:08	26	12	"u30"	"d0"	20	26	6
CC-CQA	A343	LAN	2007.12.31	POR1	POR1	01:42:21	01:42:32	11	01:42:33	01:42:47	26	14	"u118"	"d0"	19.5	26	6.5
CC-CQA	A343	LAN	2007.12.30	POR1	POR1	13:55:39	13:55:50	11	13:55:54	13:56:06	27	12	"u74"	"d0"	17.5	27	9.5
CC-CQE	A343	LAN	2007.12.24	POR1	POR1	01:30:24	01:30:35	11	01:30:39	01:30:51	27	12	"u118"	"d0"	17.5	27	9.5
CC-CQF	A343	LAN	2007.12.09	POR1	POR1	12:50:05	12:50:18	13	12:50:20	12:50:33	28	13	"u30 u169"	"d0"	19.5	28	8.5
CC-CQG	A343	LAN	2007.11.25	POR1	POR1	17:38:58	17:39:10	12	17:39:13	17:39:26	28	13	"u121"	"d0"	19	28	9
CC-CQF	A343	LAN	2007.11.27	POR1	POR1	08:44:13	08:44:26	13	08:44:29	08:44:41	28	12	"u118"	"d0"	18.5	28	9.5
CC-CQG	A343	LAN	2007.11.04	POR1	POR1	10:43:33	10:43:44	11	10:43:48	10:44:01	28	13	"u30"	"d0"	18.5	28	9.5
CC-CQG	A343	LAN	2007.12.03	POR1	POR1	17:02:55	17:03:06	11	17:03:10	17:03:23	28	13	"u123"	"d0"	18.5	28	9.5
CC-CQF	A343	LAN	2007.12.29	POR1	POR1	10:03:30	10:03:42	12	10:03:46	10:03:58	28	12	"u30"	"d0"	18	28	10
CC-CQG	A343	LAN	2007.12.22	POR1	POR1	06:27:33	06:27:43	10	06:27:48	06:28:01	28	13	"u30"	"d0"	18	28	10
CC-CQG	A343	LAN	2007.12.07	POR1	POR1	12:13:33	12:13:42	9	12:13:49	12:14:01	28	12	"u30"	"d0"	16.5	28	11.5
CC-CQE	A343	LAN	2007.12.09	POR1	POR1	07:00:29	07:00:44	15	07:00:45	07:00:58	29	13	"u82 u127"	"d0"	20.5	29	8.5
CC-CQF	A343	LAN	2007.12.21	POR1	POR1	06:41:00	06:41:12	12	06:41:16	06:41:29	29	13	"u30"	"d0"	19	29	10
CC-CQG	A343	LAN	2007.11.18	POR1	POR1	09:20:36	09:20:48	12	09:20:52	09:21:05	29	13	"u118"	"d0"	19	29	10
CC-CQA	A343	LAN	2007.12.16	POR1	POR1	09:11:56	09:12:09	13	09:12:13	09:12:25	29	12	"u30"	"d0"	18.5	29	10.5
CC-CQC	A343	LAN	2007.12.06	POR1	POR1	13:53:56	13:54:09	13	13:54:13	13:54:25	29	12	"u123"	"d0"	18.5	29	10.5
CC-CQE	A343	LAN	2007.12.16	POR1	POR1	08:24:23	08:24:36	13	08:24:40	08:24:52	29	12	"u30"	"d0"	18.5	29	10.5
CC-CQA	A343	LAN	2007.11.06	POR1	POR1	06:53:06	06:53:16	10	06:53:22	06:53:35	29	13	"u23 u129"	"d0"	18	29	11
CC-CQA	A343	LAN	2007.12.30	POR1	POR1	13:09:18	13:09:30	12	13:09:35	13:09:47	29	12	"u30"	"d0"	18	29	11
CC-CQC	A343	LAN	2007.11.19	POR1	POR1	05:55:48	05:56:00	12	05:56:05	05:56:17	29	12	"u123"	"d0"	18	29	11
CC-CQE	A343	LAN	2007.11.13	POR1	POR1	01:43:42	01:43:54	12	01:43:59	01:44:11	29	12	"u118"	"d0"	18	29	11
CC-CQE	A343	LAN	2007.11.13	POR1	POR1	08:33:45	08:33:57	12	08:34:02	08:34:14	29	12	"u30"	"d0"	18	29	11
CC-CQE	A343	LAN	2007.11.17	POR1	POR1	09:06:12	09:06:24	12	09:06:29	09:06:41	29	12	"u118"	"d0"	18	29	11
CC-CQG	A343	LAN	2007.12.25	POR1	POR1	09:05:36	09:05:47	11	09:05:53	09:06:05	29	12	"u30"	"d0"	17.5	29	11.5
CC-CQG	A343	LAN	2007.11.30	POR1	POR1	09:11:40	09:11:50	10	09:11:57	09:12:09	29	12	"u30"	"d0"	17	29	12

Current data extracted for analysis:

1. Tail number (Tail number)
2. Ac_type (Aircraft Type)
3. Airline
4. Date
5. RGS MAS (RGS that MAS received from)
6. RGS AT1 (RGS that operational response received from)
7. AT1 time (ATSP Time stamp on uplink)
8. MAS time (Time MAS received at ATSP)
9. AT1 MAS round (round trip time from AT1 time to MAS time)
10. AT1 AC_time (Aircraft time stamp on operational response)
11. AT1 OCS_time (Time of receipt of operational response at ATSP)
12. AT1 round (Round trip time from sending uplink to receipt of operational response)
13. AT1 downlink time (downlink transit time)
14. upmsgid (uplink message element numbers)
15. dnmsgid (downlink message element number)
16. ACTP (actual comm technical performance)
17. ACP (actual comm performance = uplink sent to response received)
18. CREW (crew response = ACP-ACTP)

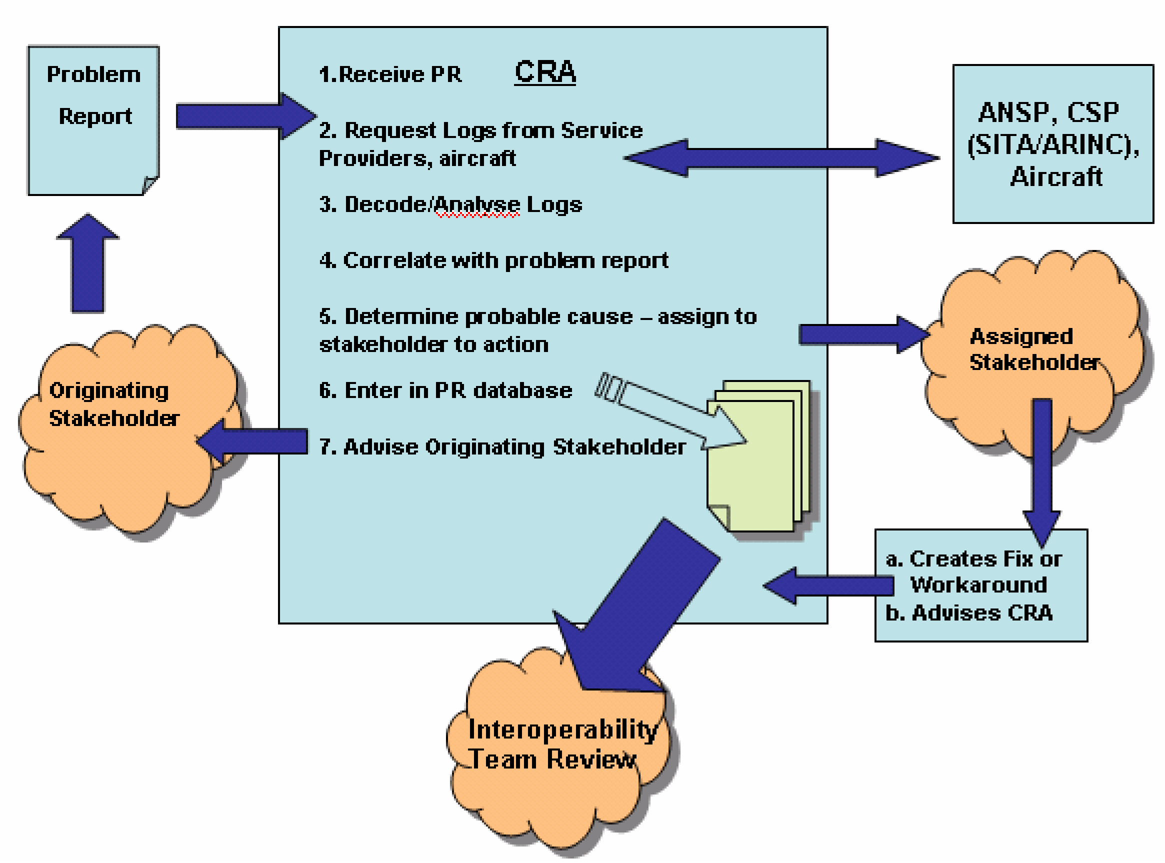
ADS

Tail_no	Ac type	Ac company	Date	RGS	AC time	OCS time	Downlink time Δ
ZK-OKH	B772	ANZ	2008.01.15	POR1	07:22:18	07:22:24	6
ZK-OKG	B772	ANZ	2008.01.15	POR1	14:44:06	14:44:12	6
ZK-OKF	B772	ANZ	2008.01.16	POR1	13:29:13	13:29:19	6
ZK-OKA	B772	ANZ	2008.01.17	POR1	15:39:29	15:39:35	6
ZK-OKG	B772	ANZ	2008.01.17	POR1	20:30:17	20:30:23	6
ZK-OKG	B772	ANZ	2008.01.18	POR1	09:46:48	09:46:54	6
ZK-OKD	B772	ANZ	2008.01.19	POR1	12:02:39	12:02:45	6
ZK-OKD	B772	ANZ	2008.01.20	POR1	09:38:20	09:38:26	6
ZK-OKB	B772	ANZ	2008.01.20	POR1	12:30:55	12:31:01	6
ZK-OKG	B772	ANZ	2008.01.22	POR1	14:50:10	14:50:16	6
ZK-OKG	B772	ANZ	2008.01.22	POR1	16:24:15	16:24:21	6
ZK-OKE	B772	ANZ	2008.01.23	POR1	11:10:34	11:10:40	6
ZK-OKB	B772	ANZ	2008.01.24	POR1	11:53:43	11:53:49	6
ZK-OKH	B772	ANZ	2008.01.28	POR1	07:42:34	07:42:40	6
ZK-OKA	B772	ANZ	2008.01.28	POR1	08:03:47	08:03:53	6
ZK-OKH	B772	ANZ	2008.01.28	POR1	10:22:24	10:22:30	6
ZK-OKH	B772	ANZ	2008.01.29	POR1	15:54:50	15:54:56	6
ZK-OKH	B772	ANZ	2008.01.29	POR1	16:56:15	16:56:21	6
ZK-OKH	B772	ANZ	2008.01.29	POR1	16:58:51	16:58:57	6
ZK-OKB	B772	ANZ	2008.01.01	POR1	03:07:03	03:07:10	7
ZK-OKF	B772	ANZ	2008.01.01	POR1	03:22:41	03:22:48	7
ZK-OKB	B772	ANZ	2008.01.01	POR1	03:49:44	03:49:51	7
ZK-OKA	B772	ANZ	2008.01.01	POR1	09:18:41	09:18:48	7
ZK-OKA	B772	ANZ	2008.01.01	POR1	09:20:03	09:20:10	7
ZK-OKD	B772	ANZ	2008.01.01	POR1	11:44:31	11:44:38	7
ZK-OKD	B772	ANZ	2008.01.01	POR1	12:35:53	12:36:00	7
ZK-OKD	B772	ANZ	2008.01.01	POR1	12:57:13	12:57:20	7

Appendix D: Changes proposed to ASIA/PAC guidance material for RCP monitoring.

The following amendments are proposed to align the Guidance Material for end-to-end safety and performance monitoring of Air Traffic Service (ATS) datalink systems in the ASIA/PACIFIC region Version 2.0 – June 2007 with the NAT guidance material.

1. Insert new diagram on page 5.



2. Insert three new paragraphs on page 7 after paragraph beginning " ADS and CPDLC success rates ……"

CPDLC Actual Communications Performance (ACP) used for monitoring the RCP TRN is determined by the difference between the time stamp on the CPDLC uplink from the ATSU requiring a Wilco/Unable response to reception of the associated downlink from the aircraft.

Note. When monitoring RCP only those transactions requiring a WILCO/UNABLE response are assessed in order to provide the best modeling of the performance of a CPDLC message used for intervention in a reduced separation scenario.

CPDLC Actual Communications Technical Performance (ACTP) used for monitoring RCTP is determined by the measurement of the difference between the time stamp on the CPDLC uplink and the reception of the corresponding MAS divided by two plus the associated CPDLC downlink time defined by the difference between the aircraft time stamp and the ATSU end-system reception time stamp.

CPDLC Crew Performance is determined by the difference between ACP and ACTP for the same transaction.