International Civil Aviation Organization

The Eleventh Meeting of the FANS Implementation Team for South-East Asia (FIT-SEA/11) and the Eighteenth Meeting of the South-East Asia ATM Coordination Group (SEACG/18)

Bangkok, Thailand, 3 – 6 May 2011

Agenda Item 2: Review of ADS / CPDLC Implementation

ADS/CPDLC OPERATIONAL IMPLEMENTATION WITHIN UJUNG PANDANG FIR AND PROPOSAL THE UJUNG PANDANG FIR TO JOINT FIT-SEA

(Presented by Indonesia)

SUMMARY

This working paper describes implementation of datalink service and the system performance data of ADS-C/CPDLC operation within the Ujung Pandang FIR and the proposal Ujung pandang FIR to joint the FIT-SEA by the readyness of the datalink system and the major traffic flows within the Ujung pandang FIR.

1. INTRODUCTION

1.1 In accordance with the requirements in the Asia/Pacific Air Navigation Plan (Doc 9673) and the Asia/Pacific Regional Plan for CNS/ATM Systems, both of which were in line with the ICAO Global Air Navigation Plan for CNS/ATM Systems, Ujung Pandang Flight Information Region (FIR) has been facilitated with the data link services, such as automatic dependent surveillance (ADS) and controller pilot data link communications (CPDLC) in the non-radar airspace and since 2006, 2 Flight Information Region within Indonesian Airspace are joining with the FIT-BOB.

1.2 The usage of datalink services was began with the trial operation of ADS-C/CPDLC on 3 July 2008 on particular ATS routes A461, B462, B472, B473, B583, B584 and R340/R590, international flights operating on these routes shall use CPDLC for main communication and VHF voice communication as back up.

1.3 The ADS-C/CPDLC problems had been evaluated and solved by upgraded the ATS Erocat-X version 3.18 at the end of 2009, and the trial operation was extended to 3 June 2010 to made the system satisfaction and confidence.

1.4 In order to demonstrate of the Air Traffic Services (ATS) data link function by selected exchanges of messages which reflect normal ATS operations, Ujung Pandang has done the interoperability of the airborne system with a real data link network and Air Traffic Control system interoperability test procedure by Boeing Company as CRA for FIT-BOB. The test

was done twice, first on 4 April 2010 and the 2nd on the 29 September 2010. The result shown that the system is satisfaction and confidence.

1.5 Once the system is confidence and satisfaction, the Ujung Pandang ACC undergoing the ADSC/CPDLC operational procedure within the Ujung Pandang FIR since the publication of AIP Supp No. 10/10 concerning the ADS-C/CPDLC Procedure within Ujung Pandang FIR dated 29 July 2010.

2. DISCUSSION

2.1 ADS-C/CPDLC Operation Monitoring

The System Performance data that is shown on the attachment are satisfaction and meet the FANS 1-A Document and the standard of the contract as follows:

a. **Performances** for End-to-end round trip time for uplinks per delivery media (VHF, SATCOM, or HFDL). The Values is:

i. Round trip time of 2 minutes, 95% of the messages
ii. Round trip time of 6 minutes, 99% of the message

b. Performances for End-to-end one way time for downlinks per delivery media (VHF, SATCOM, or HFDL). The value is:

i. One way time of 1 minute, 95% of the messages
ii. One way time of 3 minutes, 99% of the messages

c. Uplink messages only for un-delivered messages determined by Message assurance failure are received. The values is Less than 1% of all attempted messages undelivered.

d. **Availability** for the ability of the network data link service to perform a required function under given conditions at a given time is 99.9%.

2.2 AIDC/CPDLC

a. An update on the AIDC trial between Brisbane and Ujung Pandang which was restarted in July 2010. Normal voice coordination will be maintained during the trial period. The trial includes the following messages: Transfer of Coordination (TOC), Acceptance of Coordination (AOC), Advance Boundary Information (ABI), Coordination Estimate (EST) and Preactivation (PAC). When it is working well the AIDC messaging is providing benefits at both centres and Airservices would like to extend the trial for a further six months.

b. The Supplementary Letter of Agreement (SLOA) on transfer of ADS-C/CPDCL between Ujung Pandang ACC and Brisbane ACC has been revised and signed in May 2010 and carried on by signing the updated LOA between Makasar ACC and Brisbane ACC on AUSINDO/27 dated 26 October 2010 in Sydney.

c. The LOA agreed that the implementation of ADS-C/CPDLC between Ujung Pandang and Brisbane FIR from Ujung Pandang FIR to Brisbane FIR .

2.3 TRAFFIC FLOWS

a. The traffic flows of Ujung Pandang FIR is different with the traffic flows of Jakarta FIR. The traffic flows within the Ujung Pandang FIR are mostly serving the traffic from East Asia to Australia vice versa and Australia to East Asia vice versa. While traffic flows within Jakarta FIR are from East Asia to Middle East and South East Asia to East Asia.

b. There are 5 major ATS Routes serving the traffic flows, namely A461, B472, B473, R340 and G578 in connection with Manila FIR and 2 major ATS Routes in connection with Kota Kinabalu, namely B583 and B584.

c. It is also noted that on the report of the FIT-BOB/13 meeting that the traffic flows served by the Ujung pandang FIR should be within the FIT-SEA instead of FIT-BOB.

3. CONCLUSION

a. The system performances since the AIP Supp was published is satisfaction and confidence with refer to the Uplink and downlink messages time delivery performance as well as the network availablility in meet the designated standard time.

b. The Airservices (Australia) and AP1 (Indonesia) to extend the AIDC trial for a further six months and review progress at AUSINDO28.

c. The traffic flows on Ujung Pandang Flight Information Region (FIR) should be within the FIT-SEA instead of FIT-BOB. Therefor, the Ujung Pandang FIR proposed that to joint the FIT-SEA while the Jakarta FIR could remain with FIT-BOB.

4. ACTION BY THE MEETING

The meeting is invited to :

4.1 review and discuss the operational pocess of ADS-C/CPDLC within th Ujung Pandang FIR and take note of the information provided in this paper;

4.2 give comment concerning the proposal of Ujung Pandang FIR joint with the FIT-SEA

ATTACHMENT

System performance Data Analysis

Based on the data monitoring since September 2010 to December 2010, the System Performance Data including the uplink, down link and the success rate as follows:

1. SEPTEMBER 2010

a. Uplink Message Delivery Time

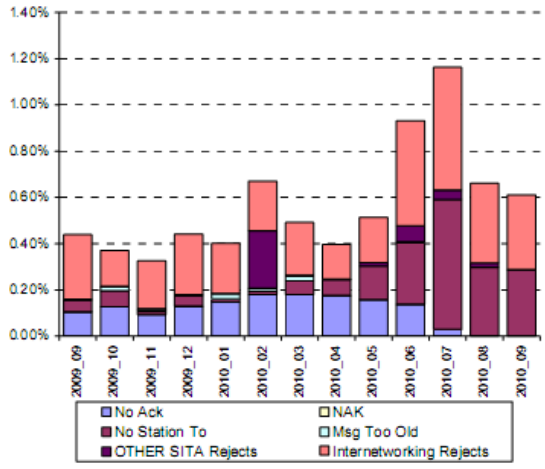
Uplink Message Delivery Time	10 s	20 s	30 s	40 s	60 s	120 s	180 s	360 s	>360 s
ATS Provider	59.41%	85.91%	91.47%	92.25%	94.81%	98.39%	99.57%	99.98%	100.00%
AFN (Log-on)	74.71%	87.75%	90.13%	91.04%	92.96%	98.64%	99.30%	99.91%	100.00%
CPDLC	67.31%	87.93%	91.13%	91.77%	93.75%	98.79%	99.82%	99.99%	100.00%
ADS	55.62%	85.11%	91.69%	92.51%	95.31%	98.23%	99.51%	99.98%	100.00%

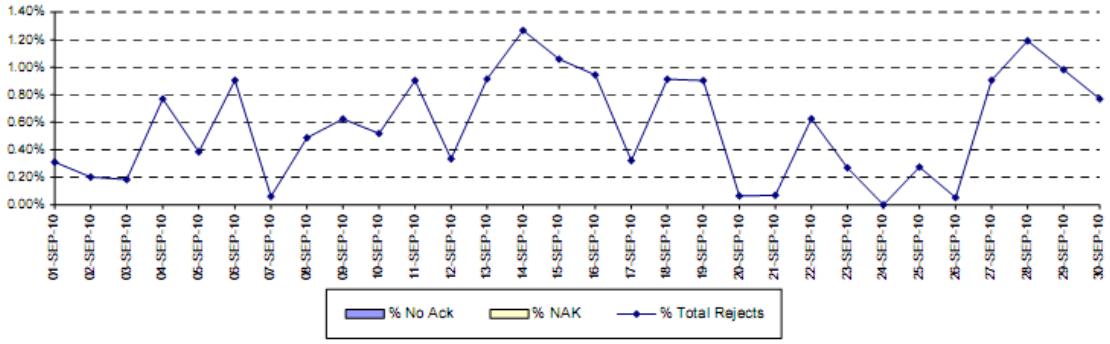
b. Down link Message Delivery Time

Downlink Message Delivery Time	10 s	20 s	30 s	40 s	60 s	120 s	180 s	360 s	>360 s
ATS Provider	47.18%	75.78%	86.86%	90.44%	95.04%	97.91%	98.58%	99.29%	100.00%
AFN (Log-on)	38.81%	72.11%	82.40%	89.33%	94.54%	98.07%	98.74%	99.40%	100.00%
CPDLC	54.92%	83.76%	90.55%	93.28%	96.81%	98.86%	99.23%	99.68%	100.00%
ADS	44.75%	72.57%	85.78%	89.27%	94.27%	97.44%	98.26%	99.09%	100.00%

c. Success rate

Uplink Performance	ATS Provider		
	Sep-10	Last 3 Month	Last 12 Month
Uplink Success Rate	99.39%	99.20%	99.41%
Total (No Ack + NAK) Reject Rate	0.00%	0.01%	0.11%
No Ack (VHF)	0.00%	0.00%	0.01%
NAK (VHF)	0.00%	0.00%	0.00%
No Ack (Satcom)	0.00%	0.02%	0.27%
NAK (Satcom)	0.00%	0.00%	0.00%
No Station to	0.29%	0.38%	0.16%
Not Logged On	0.00%	0.00%	0.00%
Msg Too Old	0.00%	0.00%	0.01%
Other SITA Rejects	0.00%	0.02%	0.03%
Internetworking Rejects	0.32%	0.40%	0.28%





2. OCTOBER 2010

a. Uplink Message Delivery Time

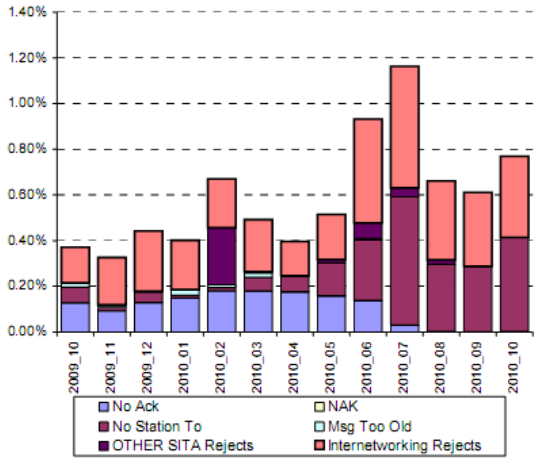
Uplink Message Delivery Time	10 s	20 s	30 s	40 s	60 s	120 s	180 s	360 s	>360 s
ATS Provider	56.86%	84.38%	90.39%	91.25%	94.25%	98.23%	99.54%	99.99%	100.00%
AFN (Log-on)	72.65%	87.04%	89.67%	90.49%	92.74%	98.72%	99.35%	100.00%	100.00%
CPDLC	64.54%	86.88%	90.42%	91.14%	93.43%	98.80%	99.78%	100.00%	100.00%
ADS	52.90%	83.31%	90.45%	91.36%	94.65%	98.00%	99.48%	99.99%	100.00%

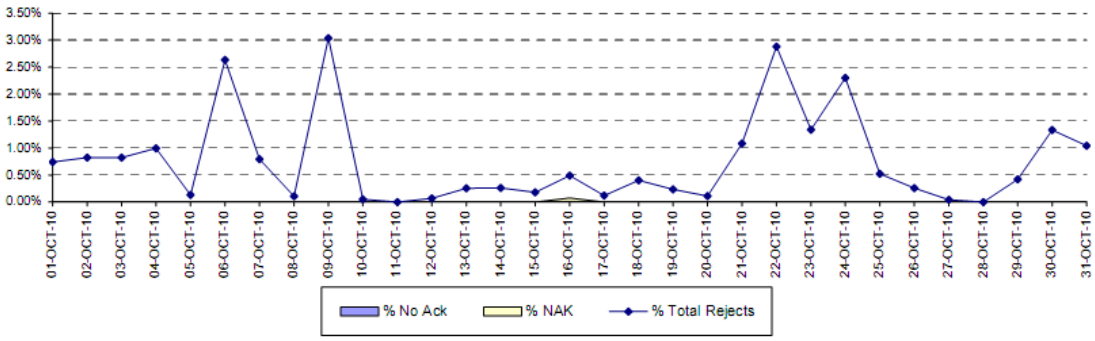
b. Down link Message Delivery Time

Downlink Message Delivery Time	10 s	20 s	30 s	40 s	60 s	120 s	180 s	360 s	>360 s
ATS Provider	45.04%	74.11%	85.45%	89.73%	94.68%	97.73%	98.42%	99.22%	100.00%
AFN (Log-on)	40.07%	72.50%	81.52%	88.26%	94.27%	97.87%	98.62%	99.49%	100.00%
CPDLC	52.33%	82.35%	89.40%	93.09%	96.37%	98.70%	99.08%	99.54%	100.00%
ADS	42.20%	70.28%	84.11%	88.31%	93.75%	97.23%	98.06%	99.02%	100.00%

c. Success Rate

Uplink Performance	ATS Provider		
	Oct-10	Last 3 Month	Last 12 Month
Uplink Success Rate	99.23%	99.32%	99.38%
Total (No Ack + NAK) Reject Rate	0.00%	0.00%	0.10%
No Ack (VHF)	0.00%	0.00%	0.00%
NAK (VHF)	0.00%	0.00%	0.00%
No Ack (Satcom)	0.00%	0.00%	0.24%
NAK (Satcom)	0.00%	0.00%	0.00%
No Station to	0.41%	0.33%	0.19%
Not Logged On	0.00%	0.00%	0.00%
Msg Too Old	0.00%	0.00%	0.01%
Other SITA Rejects	0.00%	0.01%	0.03%
Internetworking Rejects	0.36%	0.34%	0.29%





3. NOVEMBER 2010

a. Uplink Message Delivery Time

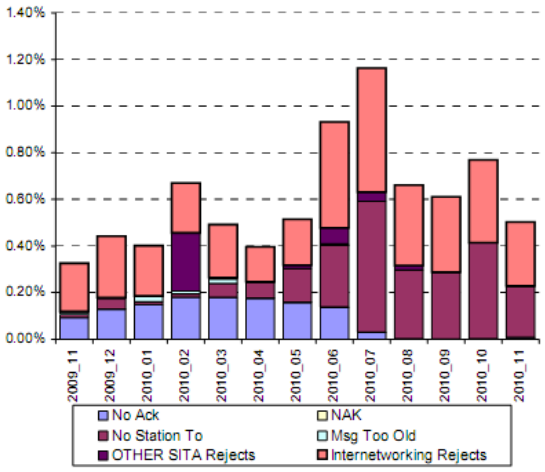
Uplink Message Delivery Time	10 s	20 s	30 s	40 s	60 s	120 s	180 s	360 s	>360 s
ATS Provider	56.92%	84.10%	90.25%	91.07%	94.10%	98.19%	99.52%	99.99%	100.00%
AFN (Log-on)	73.39%	88.07%	90.59%	91.39%	93.55%	98.81%	99.51%	99.98%	100.00%
CPDLC	66.13%	87.37%	90.88%	91.66%	93.61%	98.77%	99.79%	100.00%	100.00%
ADS	52.06%	82.56%	89.99%	90.84%	94.33%	97.92%	99.42%	99.98%	100.00%

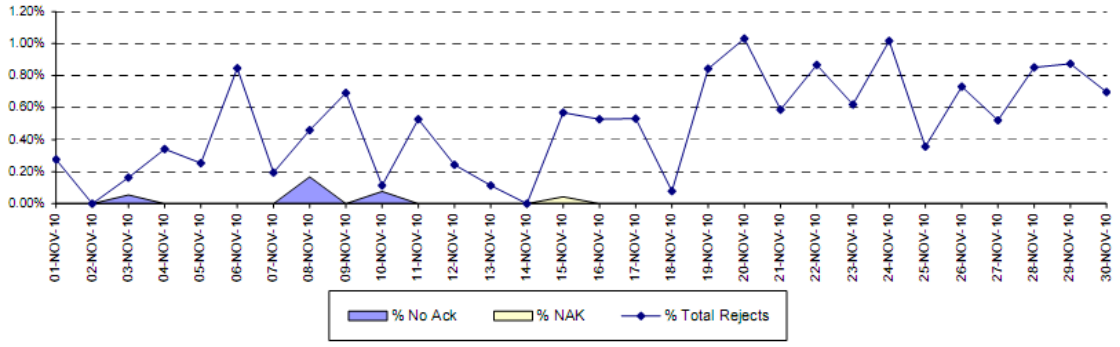
b. Down link Message Delivery Time

Downlink Message Delivery Time	10 s	20 s	30 s	40 s	60 s	120 s	180 s	360 s	>360 s
ATS Provider	45.21%	74.11%	85.20%	89.63%	94.58%	97.82%	98.55%	99.39%	100.00%
AFN (Log-on)	37.98%	70.60%	80.81%	88.29%	94.11%	98.03%	98.75%	99.54%	100.00%
CPDLC	52.50%	82.21%	89.55%	93.01%	96.56%	98.66%	99.16%	99.66%	100.00%
ADS	42.86%	70.74%	83.81%	88.20%	93.70%	97.38%	98.21%	99.24%	100.00%

c. Success Rate

Uplink Performance	ATS Provider Nov-10	Last 3 Month	Last 12 Month
Uplink Success Rate	99.50%	99.37%	99.37%
Total (No Ack + NAK) Reject Rate	0.01%	0.00%	0.09%
No Ack (VHF)	0.00%	0.00%	0.00%
NAK (VHF)	0.00%	0.00%	0.00%
No Ack (Satcom)	0.02%	0.01%	0.21%
NAK (Satcom)	0.00%	0.00%	0.00%
No Station to	0.22%	0.31%	0.20%
Not Logged On	0.00%	0.00%	0.00%
Msg Too Old	0.00%	0.00%	0.01%
Other SITA Rejects	0.00%	0.00%	0.03%
Internetworking Rejects	0.27%	0.32%	0.30%





4. DECEMBER 2010

a. Uplink Message Delivery Time

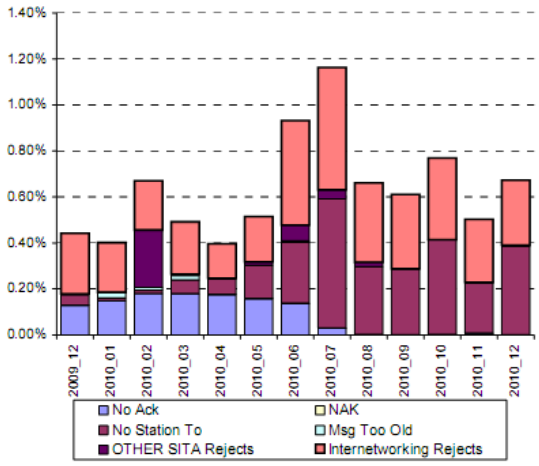
Uplink Message Delivery Time	10 s	20 s	30 s	40 s	60 s	120 s	180 s	360 s	>360 s
ATS Provider	55.65%	83.29%	89.67%	90.59%	93.68%	97.94%	99.37%	99.99%	100.00%
AFN (Log-on)	71.56%	86.38%	89.35%	90.19%	92.24%	98.59%	99.33%	99.93%	100.00%
CPDLC	65.28%	86.73%	90.26%	91.01%	93.27%	98.44%	99.61%	99.99%	100.00%
ADS	50.71%	81.77%	89.49%	90.48%	93.96%	97.70%	99.29%	99.99%	100.00%

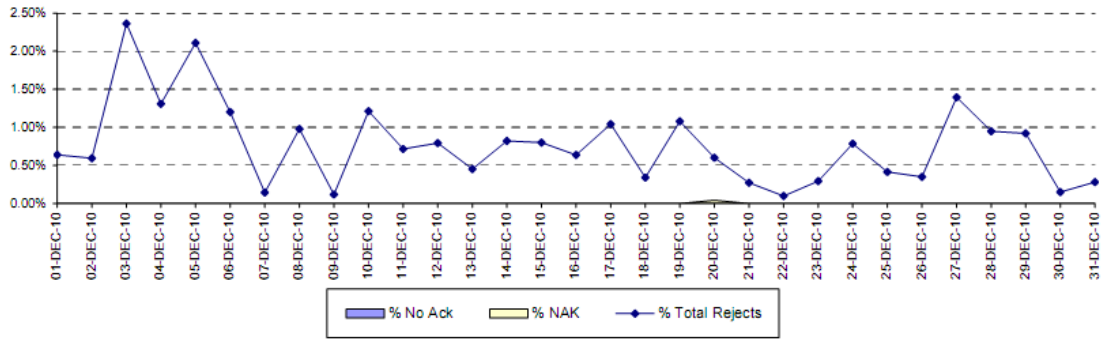
b. Down link Message Delivery Time

Downlink Message Delivery Time	10 s	20 s	30 s	40 s	60 s	120 s	180 s	360 s	>360 s
ATS Provider	45.21%	75.32%	85.94%	89.98%	94.49%	97.85%	98.54%	99.34%	100.00%
AFN (Log-on)	39.85%	74.35%	83.09%	88.93%	94.18%	97.92%	98.77%	99.61%	100.00%
CPDLC	53.36%	83.32%	89.96%	93.32%	96.53%	98.81%	99.21%	99.65%	100.00%
ADS	41.80%	71.31%	84.28%	88.40%	93.47%	97.35%	98.16%	99.14%	100.00%

c. Success Rate

	ATS Provider		
Uplink Performance	Dec-10	Last 3 Month	Last 12 Month
Uplink Success Rate	99.33%	99.35%	99.35%
Total (No Ack + NAK) Reject Rate	0.00%	0.00%	0.08%
No Ack (VHF)	0.00%	0.00%	0.00%
NAK (VHF)	0.00%	0.00%	0.00%
No Ack (Satcom)	0.00%	0.01%	0.19%
NAK (Satcom)	0.00%	0.00%	0.00%
No Station to	0.39%	0.34%	0.23%
Not Logged On	0.00%	0.00%	0.00%
Msg Too Old	0.00%	0.00%	0.00%
Other SITA Rejects	0.00%	0.00%	0.03%
Internetworking Rejects	0.28%	0.30%	0.30%





Overall System Performance Data 2010

a. AVAILIBILITY NETWORK

Availability network	Standard	2010 (%)											
		Jan	Feb	Mar	Apr	May	June	July	August	Sept	Oct	Nov	Des
vhf access	99.90%	99.99	98.70	99.53	94.96	96.57	98.30	98.71	94.11	99.99	99.74	99.60	99.24
SATCOM access	99.90%	100	99.98	100	100	100	99.98	100	100	100	100	100	100

b. DATALINK TRAFFIC (GROUND TRAFFIC, UPLINK-DOWNLINK)

Customer	2010											
	Jan	Feb	Mar	Apr	May	June	July	August	Sept	Oct	Nov	Des
LOG-ON	12,566	11,623	12,725	12,117	12,213	11,717	13,181	12.156	12.480	14,466	15,976	15,156
CPDLC	54,266	44,606	49,381	48,822	52,958	48,827	49,581	49.537	49.723	55,989	59,313	61,876
ADS	134,017	140,812	142,808	148,457	143,181	132,670	136,549	150.446	150.058	162,265	173,583	173,441

c. RELIABILITY PERFORMANCE

Success message delivery	2010 (%)											
	Jan	Feb	Mar	Apr	May	June	July	August	Sept	Oct	Nov	Des
LOG-ON	99.49	99.26	99.89	99.33	98.83	97.69	97.15	97.99	98.54	97.78	98.80	97.94
CPDLC	99.53	99.18	99.45	99.52	99.45	98.65	97.91	98.75	98.73	98.56	99.15	98.70
ADS	99.64	99.38	99.59	99.66	99.56	99.37	99.84	99.66	99.69	99.61	99.66	99.65
TOTAL	99,55	99,27	99,64	99,50	99,28	98,57	98,30	98,80	98,99	98,65	99,20	98,76

d. UPLINK TIME PERFORMANCE (VHF DL + SATCOM)

Uplink. End to end round trip	Stand	2010 (%)											
		Jan	Feb	Mar	Apr	May	June	July	August	Sept	Oct	Nov	Des
in 120 seconds	95%	98.18	97.64	97.42	97.50	97.98	98.01	98.31	98.31	98.39	98.23	98.19	97.74
in 360 seconds	99%	99.88	99.66	99.81	99.83	99.89	99.89	99.98	99.98	99.98	99.99	99.99	99.97

e. DOWNLINK TIME PERFORMANCE (VHF DL + SATCOM)

Downlink	Standard	2010 (%)											
		Jan	Feb	Mar	Apr	May	June	July	August	Sept	Oct	Nov	Des
in 60 seconds	95%	94.33	93.36	93.80	93.37	94.08	94.39	94.64	94.49	95.04	94.58	94.58	94.49
in 180 seconds	99%	98.14	97.67	97.91	97.60	98.02	98.12	98.28	98.29	98.58	98.42	98.55	98.54