International Civil Aviation Organization

Thirteenth Meeting of the FANS Interoperability Team – Asia (FIT–Asia/13)

Bangkok, Thailand, 06 – 09 June 2023

Agenda Item 4: Review of ADS/CPDLC Operations and Performance

DATA LINK PERFORMANCE REPORT FOR PHILIPPINES

(Presented by Philippines)

SUMMARY

This paper presents data link performance data for the year 2022 for Manila FIR and information on actions taken to identify and rectify the causes of performance issues

1. INTRODUCTION

1.1 **Tables Table 1 to Table 4B** summarizes Automatic Dependent Surveillance – Contract (ADS-C) and Controller-Pilot Data Link Communications (CPDLC) performance where the Required Surveillance Performance (RSP) and Required Communications Performance (RCP) criteria stipulated in ICAO Doc 4444 – Procedures for Air Navigation Services – Air Traffic Management (PANS-ATM) were not met. Actions taken to address performance not meeting the criteria are discussed.

1.2 The Philippines was using ADS-C/CPDLC for a long-time and it has become the primary means of communication in the category R airspace of Manila FIR. However, the distance-based lateral and longitudinal separations employed by Manila ACC are still monitored thru radar surveillance.

1.3 The use of ADS-C/CPDLC communication were being used over the South China sea and Central West Pacific airspace in Manila FIR but the distance-based lateral and longitudinal separation were not yet implemented. The used of HF voice communication in parallel with ADS-C/CPDLC were employed as some aircraft are not ADS-C/CPDLC equipped and some aircraft still contact HF voice even though they are already log on to the next data authority.

1.4 As such, continuous monitoring and extraction of data for performance analysis is being performed to evaluate if PBCS implementation could be considered in the near future

2. DISCUSSION

MANILA FIR ADS-C RSP180 Performance – Media Type, RGS and GES

2.1 **Table 1** summarizes overall ADS-C performance per media type, Remote Ground Station (RGS) and Ground Earth Station (GES) for downlinks sent within the MANILA FIR during year 2022, where performance did not meet the RSP180 performance criteria.

FIR		RPHI					
Criteria		RSP 180					
Period		January-June 2022			July-December 2022		
Colour Key Meets Criteria 99.0%-99.84% Under Criteria		Message counts	95% %<=90sec	99 .90% %<=180sec	Message counts	95% %<=90sec	99 .90% %<=180sec
By Media Type							
SATCOM		49885	98.46%	99.88%	134113	97.85%	99.78%
VHF		228283	99.41%	99.75%	210727	99.06%	99.56%
HF		164	71.95%	84.87%	115	67.97%	81.09%
ALL		27832	99.25%	99.76%	344955	98.89%	99.58%
By Remote Ground Station(RGS)/Ground Earth Station(GES)							
Designator	Type	(only RGS/GES with messages counts=>100 recorded)					
CXR	VHF	184	100.00%	100.00%	367	97.20%	97.35%
CXR1	VHF	114	97.19%	99.68%	449	92.77%	93.61%
DVO	VHF	2654	99.82%	99.89%	2960	99.77%	99.87%
H16	HF	113	78.60%	87.21%			
IG1	SAT	471	91.30%	96.87%	10148	92.93%	98.39%
MMY1	VHF	338	96.67%	100.00%	1931	95.52%	97.03%
MNL	VHF	20833	99.95%	99.97%	26671	98.61%	98.85%
SYX	VHF	2120	99.17%	99.65%	6317	96.22%	96.89%
TTE1					340	98.55%	98.85%

Table 1: MANILA FIR ADS-C Downlink Latency per Media Type, RGS and GES

2.2 In the over all performance summary, as expected HF medium totally failed in all criteria for the whole year. While in the RGS/GES monitoring there are two stations that failed in the 95% and 99.9% criteria, IG1 and H16, and in Jul-Dec there are stations that failed only under 99.90% criteria compared to the period Jan-June.

2.3 Under HF medium it is expected to have lower performance compared to the other media and for the other station especially IG1, a possible weak transmission performance which affects also other station in the 99.9% criteria in Jul-Dec period.

2.4 Manila will continue to monitor these stations at the same time coordinate with the communication service provider in conjunction with the local telco as to the performance of their network connectivity.

2.5 Manila has to follow up to the communication service provider

MANILA FIR ADS-C RSP180 Performance – Aircraft Operator/Type

2.6 **Table 2** summarizes overall ADS-C performance per Aircraft Operator/Type for downlinks sent within the MANILA FIR during the year 2022, where performance did not meet the RSP180 performance criteria.

FIR	RPHI					
Criteria	RSP 180					
Period	January-June 2022			July-December 2022		
Colour Key Meets Criteria 99.0%-99.84% Under Criteria	Message count	95% %<=90sec	99.90% %<=180sec	Message count	95% %<=90sec	99.90% %<=180sec
By Aircraft Operator/Type	(only messages counts >100 recorded)					
ABL/A21N				517	95.16%	97.02%
CPA/B77W	2345	96.08%	98.49%	6624	93.83%	98.38%
GIA/B77W	418	95.69%	97.57%	254	99.18%	99.64%
HFM/A333	251	97.88%	98.56%			
MLT/A332	470	98.26%	98.77%			
OAE/B772	149	94.63%	99.04%			
PAL/A21N	14285	98.52%	99.42%	19048	97.30%	98.70%
PAL/A321	2626	88.37%	90.31%	9527	90.61%	92.27%
RBA/B788	356	98.50%	98.70%			
TGW/A20N	175	96.94%	98.49%	100	97.54%	99.02%
XAX/A333	229	88.10%	89.07%	967	99.78%	99.81%

Table 2: Manila FIR ADS-C Downlink Latency per Aircraft Operator/Type

2.7 On table 2 under the ADS-C differentiated by Aircraft Operator/Type, only PAL/A321 has consistently failed in all criteria from Jan-Dec monitoring. Other Aircraft Operator/Type significantly failed in the 99.9% criteria

2.8 In addition to the possible reasons mentioned in the previous table, system maintenance occasionally able to monitor switching of AGP servers which is responsible for our Air to Ground Datalink Communication for no precise reason.

2.9 Manila is in the direction to upgrade for the later Topsky version from the current version(R_1.14.8.1_1_0) from Thales which might help improve in particular ADSC/CPDLC latency communication issue.

2.10 Manila has no clear knowledge of the status between DOTR and Thales with regards to the above-mentioned upgrade.

MANILA FIR CPDLC RCP240 Performance – Media Type, RGS and GES

2.11 **Tables 3A and 3B** summarize overall CPDLC performance per Media Type, RGS and GES for messages sent within the MANILA FIR during the year 2022, where performance did not meet the RCP240 performance criteria.

FIR		RPHI					
Criteria		RCP240					
Period		January-June 2022					
Colour Key Meets Criteria 99.0%-99.84% Under Criteria		Message counts	95% Benchmark		99.90% Benchmark		95%
			ACP %<=180sec	ACTP %<=120sec	ACP %<=210sec	ACTP %<=150sec	PORT %<60sec
By Media Type							
SATCOM		4539	98.64%	99.99%	98.78%	100.00%	94.30%
VHF		4446	98.81%	99.38%	98.94%	99.44%	96.66%
SV		510	99.53%	100.00%	99.57%	100.00%	98.86%
HV		287	85.06%	81.98%	87.46%	87.11%	77.70%
ALL		9782	98.40%	98.98%	98.59%	99.19%	95.83%
By Remote Ground Station(RGS) / Ground Earth Station(GES)							
Designator	Type	(RGS/GES with messaging counts=>100 recorded)					
APK1	SAT	2471	98.41%	99.13%	98.61%	99.21%	95.14%
APK2	SAT	251	99.24%	100.00%	99.27%	100.00%	94.82%
H16	HV	191	83.80%	82.35%	83.34%	87.43%	77.49%
IG1	SAT	221	99.37%	100.00%	99.56%	100.00%	92.01%
LAO	VHF	206	97.52%	97.86%	98.24%	99.71%	95.48%
MNL	VHF	372	99.83%	99.85%	99.85%	99.89%	99.46%
PPS	VHF	124	97.65%	97.15%	97.80%	97.26%	96.24%
SYX	VHF	176	93.73%	94.31%	93.98%	95.18%	90.77%
XXA	SAT	1298	98.41%	99.98%	98.50%	100.00%	94.11%

Table 3A: MANILA FIR CPDLC Performance Latency per per Media Type, RGS and GES – Jan-Jun 2022

FIR		RPHI					
Criteria		RCP240					
Period		July-December 2022					
Colour Key Meets Criteria 99.0%-99.84% Under Criteria		Message counts	95% Benchmark		99.90% Benchmark		95%
			ACP %<=180sec	ACTP %<=120sec	ACP %<=210sec	ACTP %<=150sec	PORT %<60sec
By Media Type							
SATCOM		9298	99.12%	99.98%	99.20%	99.99%	95.41%
VHF		6310	98.47%	98.93%	98.64%	99.05%	95.75%
SV		808	97.39%	100.00%	97.58%	100.00%	95.67%
HV		649	87.98%	85.05%	90.14%	89.68%	78.27%
ALL		17065	98.12%	98.63%	98.36%	98.89%	95.02%
By Remote Ground Station(RGS) / Ground Earth Station(GES)							
Designator	Type						
APK1	SAT	5121	98.30%	98.41%	98.50%	99.04%	95.03%

FIR		RPHI					
Criteria		RCP240					
Period		July-December 2022					
Colour Key Meets Criteria 99.0%-99.84% Under Criteria		Message counts	95% Benchmark		99.90% Benchmark		95%
			ACP %<=180sec	ACTP %<=120sec	ACP %<=210sec	ACTP %<=150sec	PORT %<60sec
APK2	SAT	432	98.12%	100.00%	98.40%	100.00%	94.68%
H06	HV	153	87.29%	81.59%	88.89%	87.58%	81.05%
H16	HV	376	91.22%	88.56%	93.35%	92.02%	80.55%
IG1	SAT	646	98.55%	99.93%	99.17%	99.99%	87.00%
IGW1	SAT	112	99.12%	100.00%	99.15%	100.00%	89.88%
KHH	VHF	126	97.25%	95.97%	97.39%	96.30%	97.65%
LAO	VHF	784	97.45%	97.58%	97.85%	97.67%	95.95%
MNL	VHF	489	99.10%	98.51%	99.15%	98.83%	98.16%
PPS	VHF	357	97.82%	99.10%	97.88%	99.21%	95.80%
SYX	VHF	290	90.69%	89.65%	91.14%	90.93%	86.90%
XXA	SV	704	97.29%	100.00%	97.50%	100.00%	95.88%
XXP	SV	104	98.18%	100.00%	98.22%	100.00%	95.10%

Table 3B: MANILA FIR CPDLC Performance Latency per Media Type, RGS and GES – Jul-Dec 2022

2.12 For CPDLC differentiated with media type, in the over all summary HF medium as expected significantly failed in all criteria from Jan-Dec period while other media marginally failed in the ACP 99.9% benchmark. In the RGS/GES designation, three stations failed totally for the whole year, one designator under VHF media and the other two designator is in HF media while some stations marginally failed in the 99.9% benchmark under ACP and ACTP.

2.13 Just as mentioned above, a possible weak transmission performance on the part of communication service provider. In addition, controller and pilot response time maybe a factor considering HF voice and CPDLC were being used in parallel. And for HF medium it is expected to have lower performance than the other media

2.14 To continue monitoring these stations at some point coordinate with the communication service provider as to the performance of the under criteria stations.

2.15 Manila has to follow up to the communication service provider

MANILA FIR CPDLC RCP240 Performance – Aircraft Operator/Type

2.16 **Tables 4A and 4B** summarizes overall CPDLC performance per Aircraft Operator/Type for messages sent within the MANILA FIR during the year 2022, where performance did not meet the RCP240 performance criteria.

FIR	RPHI					
Criteria	RCP240					
Period	January-June 2022					
Colour Key Meets Criteria 99.0%-99.84% Under Criteria	Message counts	95% Benchmark		99.90% Benchmark		95%
		ACP %<=180sec	ACTP %<=120sec	ACP %<=210sec	ACTP %<=150sec	PORT %<60sec
By Aircraft Operator/Type (only message counts => 100 recorded)						
AAR/A333	127	87.26%	92.49%	89.19%	92.89%	79.42%
CAL/A359	331	97.62%	97.60%	97.78%	97.75%	93.76%
CSN/A333	632	97.66%	97.18%	97.78%	98.10%	95.57%
CSN/B789	458	97.17%	97.19%	97.32%	97.71%	96.18%
PAL/A21N	160	97.82%	98.30%	98.19%	98.56%	89.00%
PAL/A333	151	95.25%	100.00%	95.45%	100.00%	92.99%
SIA/A359	863	97.60%	97.14%	98.03%	97.68%	96.52%
SIA/B78X	282	94.70%	94.98%	95.43%	96.29%	91.73%
UAE/B77W	176	100.00%	100.00%	100.00%	100.00%	94.32%

Table 4A: MANILA FIR CPDLC Performance Latency per Aircraft Operator/Type Jan-Jun 2022

FIR	RPHI					
Criteria	RCP 240					
Period	July-December 2022					
Colour Key Meets Criteria 99.0%-99.84% Under Criteria	Message counts	95% Benchmark		99.90% Benchmark		95%
		ACP %<=180sec	ACTP %<=120sec	ACP %<=210sec	ACTP %<=150sec	PORT %<60sec
By Aircraft Operator/Type (only message counts => 100 recorded)						
AAR/A21N	118	99.90%	100.00%	100.00%	100.00%	88.70%
AAR/A333	304	83.22%	86.84%	84.87%	89.01%	76.97%
ANA/B789	447	98.26%	97.43%	98.40%	97.93%	96.87%
CEB/A339	142	98.66%	100.00%	98.69%	100.00%	98.17%
CPA/A359	209	85.36%	99.64%	85.54%	100.00%	81.74%
CPA/B77W	143	99.83%	100.00%	100.00%	100.00%	84.48%
CSN/A333	606	98.18%	97.56%	98.68%	98.02%	94.77%
CSN/B789	1080	97.31%	96.91%	97.69%	97.68%	94.44%
SIA/A359	1777	96.74%	97.07%	96.98%	97.74%	94.65%
SIA/B78X	778	97.02%	96.08%	97.57%	96.50%	96.02%
SJX/A21N	146	96.65%	100.00%	97.11%	100.00%	84.25%

Table 4B: MANILA FIR CPDLC Performance Latency per Aircraft Operator/Type – Jan-Jun 2022

2.17 Under the ADS-C differentiated by Aircraft Operator/Type table only AAR/A333 that completely failed in the 95% and 99.9% benchmark. While other Aircraft Operator/Type marginally failed in the ACP and ACTP 99.9% criteria. And also notice that in PORT column majority exhibits under criteria which also contribute to the actual communication performance values.

2.18 In addition to the previous mentioned possible causes, the ATCs in Manila encountered issues such as maximum CPDLC window has been created, unresponsive tabs in the ASD and sluggishness of workstation performance.

2.19 Aside from the push for upgrade to later version of Topsky from the current version for possible long-term solution, the immediate action taken by the maintenance was to relaunch the application and installing higher memory graphics processing unit.

2.20 As earlier mention, CAAP has no clear knowledge on the progress of the proposed upgrade. Thales and DOTR still in the framework of negotiation.

Additional Information

2.21 In Manila the physical setup of SITA is that they have two routers facing our AGP servers but the WAN side is handled by PLDT on a common single line.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper; and

b) discuss any relevant matters as appropriate.

……