International Civil Aviation Organization

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Bangkok, Thailand, 06 – 09 June 2023

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

DATA LINK PERFORMANCE REPORT FOR UJUNG PANDANG FIR

(Presented by Indonesia)

SUMMARY

This paper presents data link performance data for 2022 for the Ujung Pandang FIR, and information on actions taken to identify and rectify the causes of performance issues.

1. INTRODUCTION

1.1 **Tables 1 to 4B** summarize 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, together with the outcomes of such actions.

1.2 In addition, Indonesia also submits the survey of the status of current and planned implementation of performance-based horizontal separation minima in Ujung Pandang FIR.

2. DISCUSSION

Ujung Pandang 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 Ujung Pandang FIR during 2022, where performance did not meet the RSP180 performance criteria.

Criteria			RSP180					
Period			Jan-June 2022			July-Des 2022		
			Message Counts	95% % <=90sec	99,90% % <=180sec	Message Counts	95% % <=90sec	99,90% % <=180sec
FIR	By Media Type							
WAAF	SATCOM		14423	98,95%	99,88%	14991	98,93%	99,84%
	HF		103	66,26%	89,24%	55	85,70%	89,68%
	VHF		76314	99,56%	99,79%	106316	99,46%	99,74%
	ALL		90840	99,42%	99,80%	121362	99,39%	99,75%
By Remote Ground Station (RGS) Ground Earth Station (GES)								
FIR	Designator	Type	(only RGS/GES with message counts >100 reacorded)					
	AMQ1	VHF	2393	98,59%	99,00%	1554	97,59%	98,35%
	BDJ1	VHF	2806	92,80%	97,51%	2545	99,28%	99,74%
	BIK1	VHF	301	90,52%	94,42%	297	96,58%	98,92%
	BME1	VHF	525	98,96%	99,16%	965	97,71%	98,00%
	DRB1	VHF	634	98,34%	98,59%	778	99,84%	99,92%
	IG1	SAT	1447	96,27%	99,43%	3263	94,67%	98,38%
	SBW	VHF				131	98,06%	98,66%
	UPG1	VHF	521	89,73%	95,97%	177	99,45%	99,67%

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

2.2 In summary, ADS-C performance by SATCOM and VHF were able to meet the 95 % criterion but failed for 99,90% criterion for both January – June period and July – December period, as shown in Table 1 above. However, ADS-C performance by HF failed to meet the 95% and 99% criterion. For ADS-C differentiated by RGS/GES, 8 stations had failed to meet 95% (BDJ1, BIK1, IG1 and UPG1) and 99,9% (AMQ1, BDJ1, BIK1, BME1, DRB1, IG1, SBW and UPG1)

2.3 The assessment for ADS-C performance by HF could not be statistically significant due to the low number of data points.

2.4 To recognize the causes of the issue, ANSP has monitored RGS/GES performance since 2021 until the latest 2022 period.

2.5 Based on the monitoring action, there was no improvement on the performances recorded. CSP expected to identify the issues of poor performance of RGS/GES (AMQ1, BDJ1, BIK1, BME1, DRB1, IG1, SBW and UPG1).

Ujung Pandang 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 Ujung Pandang FIR during 2022, where performance did not meet the RSP180 performance criteria.

FIR	WAAF					
Criteria	RSP180					
Period	Jan-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 Aircraft Operator / Type (only message counts >100 recorded)						
AIC/B788	1802	98.95%	99.14%	2990	98.17%	98.54%
CPA/B77W	283	96.11%	99.36%	1931	94.82%	98.71%
PAL/A21N	2232	96.77%	98.90%	2987	96.37%	98.49%
PAL/A321				165	96.08%	97.12%
TAX/A333				425	93.96%	94.96%

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

2.7 ADS-C performance by aircraft operator/type able to meet the 95% criteria in Jan-June Period, but unable to meet the 99,9% criteria. Whereas, the ADS-C differentiated by aircraft operator/type, there are 5 aircraft operator/types that were unable to meet the 99,9% criteria in 2022 period

2.8 The aircraft captured with low performance shows that there was a data link connection problem.

2.9 ANSP will check whether this appears to be a problem with this flight or is an ongoing problem. If this problem is not observed on later periods, the issue might have been addressed.

2.10 The ANSP will continue the monitoring to determine the problem, if it is still occurred the ANSP will take action to notify the aircraft operator.

Ujung Pandang 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 Ujung Pandang FIR during 2022, where performance did not meet the RCP240 performance criteria.

FIR	UJUNG PANDANG FIR					
Criteria	RCP240					
Period	Jan - Jun 2022					
Colour Key: Meets Criteria / 99.0%-99.84% / Under Criteria	Message Counts	95% benchmark		99.9% Benchmark		95%
		ACP % < = 180sec	ACTP % <= 120sec	ACP % < = 210sec	ACTP % <= 150sec	PORT
By Media Type						
SATCOM	3.470	99,45%	99,98%	99,56%	100,00%	96,92%
SV	357	97,92%	100,00%	98,09%	100,00%	95,26%
VHF	13.561	99,28%	99,79%	99,43%	99,82%	97,45%
ALL	17388	99,29%	99,83%	99,42%	99,86%	97,30%
By Remote Ground Station (RGS) Ground Earth Station (GES)						
Designator / **Type**	(RGS/GES with message counts >100)					
APK2 / VHF	722	99,24%	100,00%	99,47%	100,00%	95,01%
BDJ1 / VHF	663	99,57%	100,00%	99,75%	100,00%	97,94%
BIK1 / VHF	141	98,15%	100,00%	98,77%	100,00%	94,26%
DPS / VHF	304	98,17%	97,96%	98,22%	98,07%	97,37%
IG1 / SAT	317	98,70%	99,58%	98,80%	99,74%	92,11%
MDC1 / VHF	994	98,57%	99,92%	98,79%	99,96%	97,91%
SOC1 / SV	357	97,92%	100,00%	98,09%	100,00%	95,26%
SRG / VHF	214	99,62%	98,79%	99,66%	98,87%	98,48%
SUB / VHF	310	98,56%	98,04%	98,61%	98,14%	98,06%

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

FIR	UJUNG PANDANG FIR					
Criteria	RCP240					
Period	Jul - Dec 2022					
Colour Key: Meets Criteria / 99.0%-99.84% / Under Criteria	Message Counts	95% benchmark		99.9% Benchmark		95%
		ACP % < =180sec	ACTP % <= 120sec	ACP % < = 210sec	ACTP % <= 150sec	PORT
By Media Type						
SATCOM	3490	99,37%	100,00%	99,61%	100,00%	97,48%
SV	291	99,36%	100,00%	99,66%	100,00%	97,17%
VHF	16634	99,46%	99,85%	99,60%	99,88%	97,42%
ALL	20415	99,43%	99,77%	99,60%	99,85%	97,42%
By Remote Ground Station (RGS) Ground Earth Station (GES)						
Designator / **Type**						
IG1 / SAT	688	98,08%	99,87%	98,79%	100,00%	92,44%

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

2.12 The Actual Communications Performance (ACP) measurement for CPDLC messages sent within Ujung Pandang FIR for the period from 1 January 2022 to 31 December 2022 are categorized by data link media type, RGS/GES and Aircraft Operator/Type. The ACP for messages sent via Satellite and VHF meet the 95% criteria but marginally fall below the 99,9% criteria. As for CPDLC differentiated by RGS and GES, 9 stations had failed to meet 99,9% criteria as follows APK2, BDJ1, BIK1, DPS, IG1, MDC1, SOC1, SRG, SUB (from period of January to June 2022) and IG1 (from period of July to December 2022).

2.13 The CPDLC differentiations from both of RGS/GES stations were caused by the delay related to specific VHF stations, it happened when the delayed CPDLC messages are observed via specific VHF ground station.

2.14 Indonesia has identified the differentiation based on the observation during the period of 2022, the result showed the ACP which did not meet the criteria is caused by the low percentages from pilot operational response time (PORT).

2.15 According to the result, ANSP expecting CSP to identify the issues of RGS/GES delay.

Ujung Pandang FIR CPDLC RCP240 Performance – Aircraft Operator/Type

2.16 **Tables 4A and 4B** summarize overall CPDLC performance per Aircraft Operator/Type for messages sent within the Ujung Pandang FIR during 2021, where performance did not meet the RCP240 performance criteria.

FIR	WAAF					
Criteria	RCP240					
Period	Jan - Jun 2022					
Colour Key: Meets Criteria / 99.0%-99.84% / Under Criteria	Message Counts	95% benchmark		99.9% Benchmark		95%
		ACP % < = 180sec	ACTP % <= 120sec	ACP % < = 210sec	ACTP % <= 150sec	PORT %<60secs
By Aircraft Operator / Type (only message counts >100 recorded)						
CCA/A332	158	98,78%	100,00%	98,88%	100,00%	97,05%
CCA/A333	487	97,99%	100,00%	98,25%	100,00%	95,59%
CHH/A333	138	98,66%	99,51%	98,70%	99,60%	97,88%
CRK/A333	213	98,62%	100,00%	98,67%	100,00%	95,49%
FDX/B77L	213	97,60%	99,02%	98,25%	99,61%	89,97%
PAL/A21N	312	98,36%	99,57%	98,47%	99,73%	92,31%
PAL/A333	216	98,37%	100,00%	98,48%	100,00%	96,93%
QFA/A333	1393	98,61%	100,00%	98,68%	100,00%	95,12%
SIA/A359	1994	98,14%	98,13%	98,59%	98,45%	97,12%

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

FIR	WAAF					
Criteria	RCP240					
Period	Jul - Dec 2022					
Colour Key: Meets Criteria / 99.0% - 99.84% / Under Criteria	Message Counts	95% benchmark		99.9% Benchmark		95%
		ACP % < =180sec	ACTP % <= 120sec	ACP % < = 210sec	ACTP % <= 150sec	PORT %<60secs
By Aircraft Operator / Type (only message counts >100 recorded)						
CES/B789	170	99,25%	100,00%	99,49%	100,00%	92,65%
CPA/B77W	404	97,49%	100,00%	98,21%	100,00%	91,83%
FDX/B77L	251	98,95%	100,00%	99,61%	100,00%	92,83%
SIA/A359	2200	98,58%	98,27%	98,74%	98,82%	97,18%

Table 4B: Ujung Pandang FIR CPDLC Performance Latency per Aircraft Operator/Type – July-December 2022

2.17 The Actual Communications Performance (ACP) measurement for CPDLC messages sent within Ujung Pandang FIR for the period from 1 January 2022 to 31 December 2022 are categorized by aircraft operator/type, there are 9 pairs of aircraft operator/type which failed 99,9% criteria for the period from January 2022 to June 2022 and 4 pairs of aircraft operator/type which failed 99,9% criteria for the period July to December 2022.

2.18 The CPDLC differentiations from both of aircraft operator/type were caused by the delay related to specific VHF stations, it happened when the delayed CPDLC messages are observed via specific VHF ground station. Therefore, the ACP which did not meet the criteria also caused by the low percentages from pilot operational response time (PORT)

2.19 Based on the performance monitoring, we analyzed that the delayed CPDLC transactions are caused by high large pilot operational response time (PORT).

2.20 ANSP will notify the airline operators, therefore they are expected to review procedures to reduce the pilot operational response time (PORT).

Additional Information

2.21 **Attachment A** shows the survey of the status of current and planned implementation of performance-based horizontal separation minima in Ujung Pandang FIR. It represents the actual condition in 2022.

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.

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ATTACHMENT A

SURVEY OF THE STATUS OF CURRENT AND PLANNED IMPLEMENTATION OF PERFORMANCE-BASED HORIZONTAL SEPARATION MINIMA

1. Has your State completed any of the following preparations for PBCS implementation?					
	Task Group	**Task ID**	**TASK descriptor**	**Y/N**	**If NO, Planned Date**
PBCS Implementation Task List	Group A	A-1	AIP (Prescription of an RCP/RSP specification. Also see B-3 below)	**Y**	
		A-2	PBCS policies, objectives supporting safety oversight of ANSP PBCS operations	**Y**	
		A-3	PBCS policies, objectives supporting safety oversight of Aircraft Operator and Aircraft System PBCS operations	**Y**	
		A-4	Proposal for Amendment to ICAO Doc 7030 - *Regional Supplementary Procedures* for PBCS operations, if applicable	**Y**	
	Group B	B-1	PBCS Implementation Plan	**Y**	
		B-2	Target dates for PBCS and relevant ATM operations	**Y**	
		B-3	RCP/RSP specifications	**Y**	
		B-4	PBCS awareness	**Y**	
	Group C	C-1	Operational concepts and procedures for PBCS operations	**Y**	
		C-2	ATM automation system changes to use flight plan RCP/RSP indicators	**Y**	
		C-3	ATM automation changes for PBCS monitoring	**Y**	
		C-4	Confirm initial ANSP compliance with RCP/RSP specifications	**Y**	
	Group D	D-1	Aircraft operator readiness	**Y**	
		D-2	Confirm initial operator and/or aircraft type/system compliance with RCP/RSP	**Y**	
	Group E	E-1	PBCS monitoring, analysis and reporting - post implementation	**Y**	

				Y/N	If NO, Planned Date
2. Does your State submit data link problem reports to a recognized Central Reporting Agency (CRA)				**Y**	
3. Does your State monitor and analyze data link performance in accordance with the following specifications and report the analysis to a recognized FANS Interoperability Team (FIT)?					
Communication Specifications & Interoperatability Standards	Normal	RCP240	FANS1/A CPDLC	**Y**	
	Alternate	RCP400	SATVOICE	**N**	
		RCP400	HF	**Y**	
Surveillance Specifications & Interoperatability Standards	Normal	RSP180	FANS1/A ADS-C	**Y**	
	Alternate	RSP400	SATVOICE	**N**	
		RSP400	HF	**Y**	
4. Has your State implemented or planned to implement the following performance-based horizontal separation minima?					
Navigation Specifications & Applicable ATM Operations	RNAV/RNP	RNAV/RNP 10, RNP 4, RNP 2	50 NM Lateral Separation *Communication other than direct controller-pilot voice*	**Y**	
		RNAV/RNP 10, RNP 4	50 NM Longitudinal Separation *RCP/240 and RSP/180*	**Y**	
		RNP 4 or RNP 2	30 NM Longitudinal Separation	**Y**	
			30 NM Lateral Separation *In cases where the ANSP has considered there is insufficient operational benefit to justify the investment in the change from 30 NM to 23 NM.*	**Y**	
			23 NM Lateral Separation	**Y**	
			Other planned or implemented separations dependent on RCP240/RSP180. Please also provide the DOC 4444 PANS-ATM reference.	**N**	