THE FORTY-FIFTH MEETING OF THE INFORMAL PACIFIC ATC CO-ORDINATING GROUP (IPACG/46)

THE THIRTY-SECOND MEETING OF THE FANS INTEROPERABILITY TEAM (FIT/33)

(Virtual Meeting, 14-15 October 2020)

Agenda Item 3: REPORTS ON THE RELEVANT ACTIVITIES

PBCS Monitoring in Fukuoka FIR

(Presented by Civil Aviation Bureau, Japan)

SUMMARY

This paper provides observed performance for the data link operation in Fukuoka FIR for January through June 2020. This analysis includes performance of the CPDLC and ADS-C systems. The performance is measured against the criteria specified in PBCS Manual.

1. Introduction

1.1 This paper provides the observed performance for the data link operation in Fukuoka flight information region (FIR). The performance data extracted from the Controller Pilot Data Link Communication (CPDLC) and Automatic Dependent Surveillance-Contract (ADS-C) systems are measured against the appropriate Required Communication Performance (RCP) and Required Surveillance Performance (RSP) specifications detailed in the International Civil Aviation Organization (ICAO) Document 9869 Performance-based Communication and Surveillance (PBCS) Manual.

1.2 This paper presents a summary of the data link performance by media type, by station identifier, and by operator observed for the recent a-half-year period from January to June 2020 in Fukuoka FIR. The purpose is to demonstrate that safety objectives in the respective airspace, which rely on the surveillance and communication infrastructure, can be satisfied by the aircraft and ground system.

1.3 The supplementary presentation slide contains the additional charts and tables to support this paper regarding the PBCS performance in Fukuoka FIR.

2. Discussion

2.1 The PBCS Manual provides the guidance material for the analysis to assess the data link performance against the appropriate RSP and RCP requirements. In the guidance material, the data observation points in FANS 1/A aircraft communications addressing and reporting system (ACARS) transaction and the calculation process for actual communication performance (ACP), actual communication technical performance (ACTP), pilot operational response time (PORT) and actual surveillance performance (ASP) are described. The outputs from those processes are necessary in order to complete the post-implementation monitoring analysis. In March 29, 2018, PBCS framework was

implemented in Fukuoka FIR and all the flight are encouraged to file their PBCS capability (RCP/RSP) to the flight plan. Based on the filed information, the reduced separation (30NM/30NM) would be applied for the aircraft eligible to RCP240/RSP180. The communication/surveillance performance should also be continuously monitored by the post-implementation monitoring programmes, on a local and regional basis, with global exchange of information. JCAB will continue monitoring the communication/surveillance performance for PBCS in Fukuoka FIR and the results of monitoring have been published on JASMA[1] and FANS CRA[2] websites.

2.2 Availability

Table 1 presents the availability of individual paths against RCP240/RSP180 criteria for this 6 months. Due to Paumalu GES trouble, both APK1 and XXA have experienced some outages. The accumulated unplanned outage time resulted in over 300 minutes for the first half of 2020. Iridium GES (IG1/IGW1) has also experienced some degradation. The details of each outage are given in the presentation slide attached to this IP.

Table 1 Availability (January – June, 2020)

DSP	Location	Availability(%)	Number of Unplanned Outage	Number of Unplanned Outages > 10min	Accumulated Unplanned Outage Time (min)
SITA	Global	99.99	1	0	1
	MTS1	100.00	0	0	0
	APK1	99.86	1	1	352
	APK2	99.99	1	1	14
	IGW1	99.96	2	2	87
ARINC	Global	99.98	1	1	50
	XXP	100.00	0	0	0
	XXA	99.85	3	3	392
	IG1	99.99	2	2	12
	XXS	99.79	2	2	537
AVICOM	Global	100.00	0	0	0
RCP240/RSP180 Criteria					
Safety		99.90%	---	48	520
Efficiency		99.99%	---	4	52

2.3 Continuity

2.3.1 Observed Data Link Performance by Media Type

Table 2 presents a summary of the observed performance by media type for the ADS-C downlink messages and computable CPDLC transactions within the Fukuoka FIR, during the aggregate period from January to June 2020. The 95% criteria for RSP180 ASP and RCP240 ACTP, ACP and PORT were satisfied in the calculation where all the media types including SAT and VHF were combined. In addition, the performance at the levels specified by the 99.9% criteria is 99.0% or better for all performance measures.

[1] http://www.jasma.jp/PBCS/
[2] http://www.fans-cra.com/

Table 2 Observed Data Link Performance by Media Type

Media Type	RSP180			RCP240					
	Count of ADS-C	ASP		Count of CPDLC	ACTP		ACP		PORT
		95%	99.9%		95%	99.9%	95%	99.9%	95%
Aggregate	***1,682,198***	***98.61%***	***99.64%***	***34,547***	***99.65%***	***99.75%***	***99.57%***	***99.78%***	***99.26%***
SAT	1,299,118	98.47%	99.61%	31,300	99.67%	99.75%	99.59%	99.79%	99.29%
VHF	383,080	99.09%	99.73%	3,036	99.77%	99.90%	99.74%	99.87%	99.28%
SAT/VHF	---	---	---	118	96.61%	97.46%	94.92%	96.61%	94.62%
VHF/SAT	---	---	---	93	91.40%	96.77%	94.62%	96.77%	99.28%

Legend:
- Meets criteria
- Under criteria but above 99.0%
- Under criteria

2.3.2 Observed Data Link Performance by Station Identifier

Table 3 provides a complete combination of the station/gateway identifier, the associated location and the service providers which have been observed in the combined data from the Data Link Center Sortation equipment (DLCS) at Network Performance Assessment Center (NPAC).

Table 3 Station/Gateway Identifier

Satellite	GES Location	Region	SITA	ARINC
Inmarsat I-3	Perth, Australia	POR	APK2	XXP
Inmarsat I-4	Paumalu, Hawaii	Asia-Pac	APK1	XXA
		Asia-Pac (SBB)	*PAC9*	*XXS*
Iridium	Phoenix, Arizona	Global	IGW1	IG1
MTSAT	Kobe and Hitachiota	Japan	MTS1	-

1)XXA was operated as XXQ (Perth, Australia) from 17th Jun to 24th Aug.
2)MTSAT has ended service on 31st Jan.

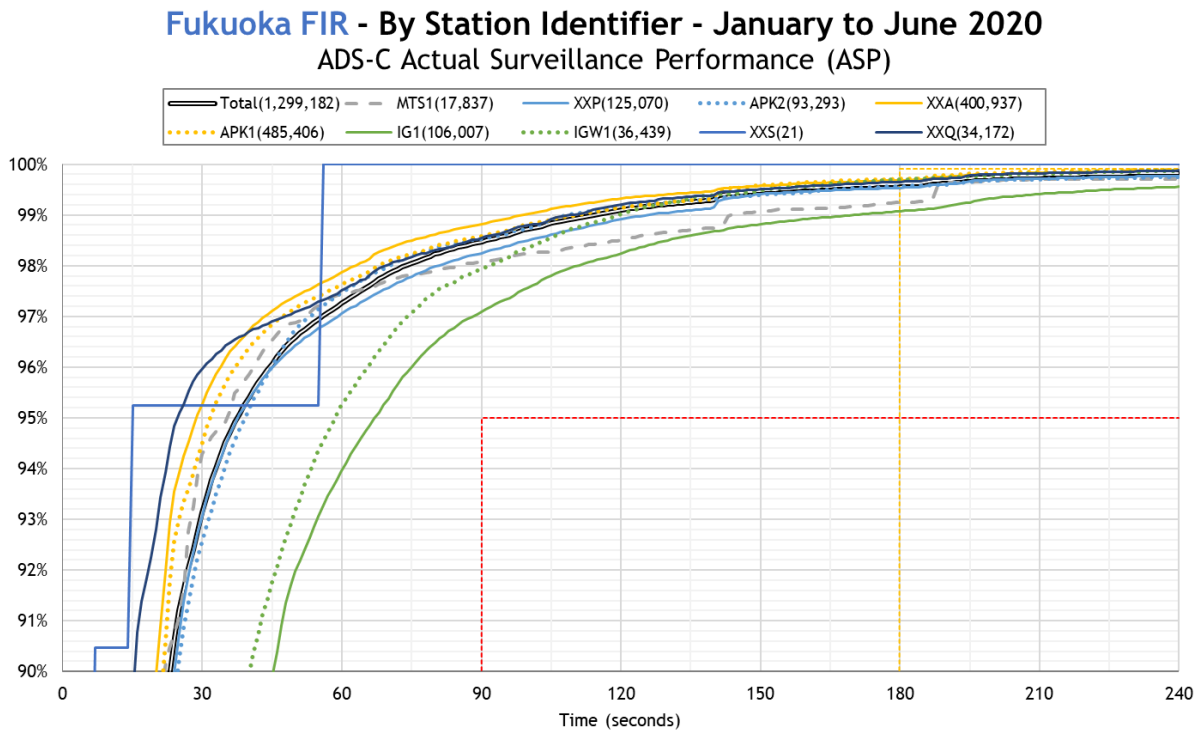

Figure 1 ADS-C (RSP180) – Data Link Performance by Station Identifier

Figure 1 shows the ASP by station/gateway identifier for all satellite operations observed for a-half-year period from January to June 2020 in Fukuoka FIR. It also shows that all the paths met the criteria for the 95% of RSP180 ASP in Fukuoka FIR. While SITA Iridium (IGW1) performance has been less than Inmarsat performance level in the same season, however it has improved slightly in the first half of 2020. XXS has also shown a little traffic when the Hawaiian B767 came to Fukuoka FIR only one time during this season, but the number of ADS-C downlink was less than 100 points (only 21 points).

2.3.3 Observed Data Link Performance by Operator

During a-half-year period from January to June 2020, 64 operators were observed with at least 100 ADS-C downlink reports and 34 operators were observed with at least 100 CPDLC transactions. **Table 3** provides a summary of the number of operators met the criteria for the PBCS Manual performance measures.

Table 4 Summary of Observed Data Link Performance by Operator

	RSP180		RCP240				
	ASP		ACTP		ACP		PORT
	95%	99.9%	95%	99.9%	95%	99.9%	95%
Meets Criteria	64	13	34	16	34	16	34
Under criteria but above 99.0%	---	49	---	18	---	18	---
Under criteria	1	3	0	0	0	0	0

2.3.4 Impact of COVID-19

The overall PBCS monitoring result at Fukuoka FIR has not changed significantly from the previous year. On the other hand, Data link traffic had been increasing for the last few years, however this year it has decreased significantly due to the impact of COVID-19 (Corona). **Figure-2** provides a summary of the counts of ADS-C and CPDLC tend.

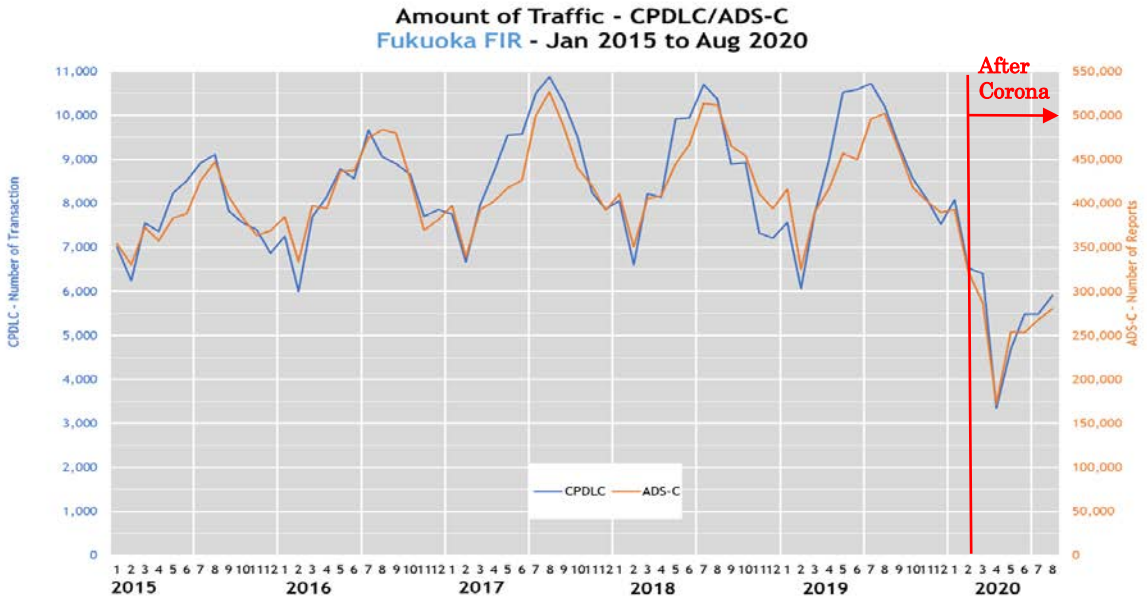

Figure 2 Traffic Volume of ADS-C/CPDLC

3. Conclusion

3.1 The meeting is invited to:

a) Note the information in the paper and the accompanying presentation slide; and

b) Review and comment on the observed performance.

END