International Civil Aviation Organization

Twenty-Eighth Meeting of the Regional Airspace Safety Monitoring Advisory Group (RASMAG/28)

Bangkok, Thailand, 21 – 24 August 2023

Agenda Item 5: Airspace Safety Monitoring Activities/Requirements in the Asia/Pacific Region

JASMA PBCS CASE STUDY

(Presented by JASMA)

SUMMARY

This paper presents a case study of the B787-9 aircraft operated by some Japanese airline operator was identified that the aircraft did not meet the Performance Based Communications and Surveillance (PBCS) performance in the North Atlantic Ocean airspace.

1. INTRODUCTION

1.1 The Japan Airspace Safety Monitoring Agency (JASMA) provides the Regional Monitoring Agency (RMA) and the En-route Monitoring Agency (EMA) responsibilities for the Pacific Ocean airspace of Fukuoka Flight Information Region (FIR).

1.2 The Central Reporting Agency Japan (CRA Japan), which is established in the Civil Aviation Bureau (JCAB) and has responsibility for the CRA function in the Pacific Ocean Airspace of Fukuoka Flight Information Region (FIR), has started to introduce the Performance Based Communications and Surveillance (PBCS) framework since April 2015.

1.3 The Network Performance Assessment Center (NPAC) in JCAB monitors performance data for the Automatic Dependent Surveillance － Contract (ADS-C) and the Controller Pilot Data Link Communications (CPDLC) in Fukuoka FIR. The data is provided to CRA Japan and shared with JASMA on a monthly basis.

1.4 **Figure 1** shows the framework for operational and performance assessment of PBCS in Japan as of July 2023.

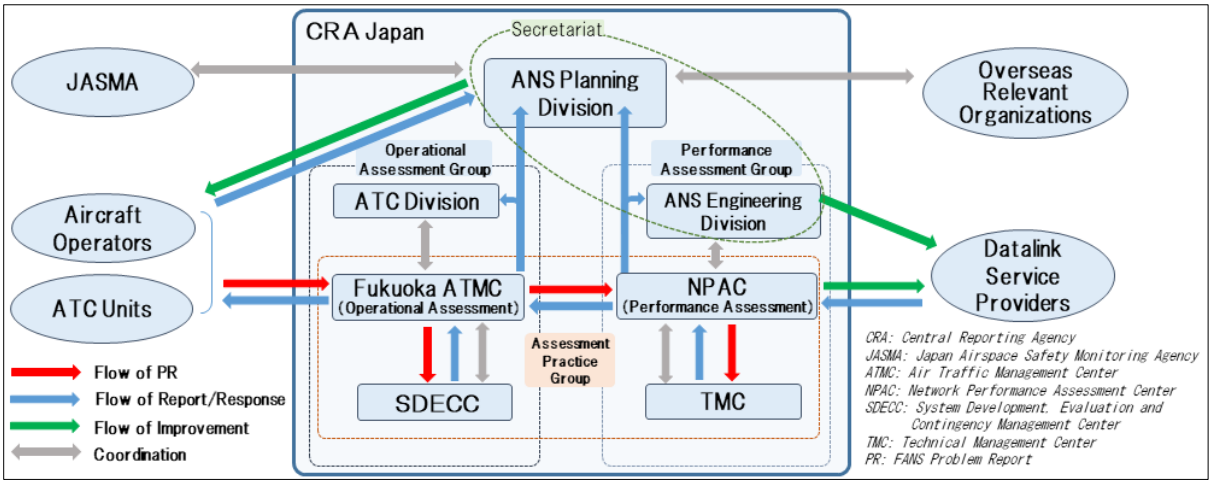

Figure 1: PBCS operational/performance assessment framework in Japan

2. DISCUSSION

PBCS Non-Compliance Report Form

2.1 At the Twenty-Fifth Meeting of the Regional Airspace Safety Monitoring Advisory Group (RASMAG/25), it was agreed to use the revised PBCS Non-Compliance Report Form Template as Conclusion RASMAG/25-1. **Figure 2** presents a part of the final report of the RASMAG/25 meeting.

2.15 PBCS non-compliance report templates were intended for ANSPs to inform the relevant Regional Monitoring Agency (RMA) of aircraft/aircraft operators where data link performance did not comply with specifications. A revised non-compliance report form template was proposed to FIT-Asia/10 in order to include additional information, to harmonize with the template already adopted in the North Atlantic (NAT) Region, and to use MS Excel format to facilitate data handling by the RMA. RASMAG/25 agreed to the following Conclusion developed by the FIT-Asia/10:

Conclusion RASMAG/25-1: Revised PBCS Non-Compliance Report Form Template

That, the PBCS Non-Compliance Report Form Template at **Appendix C to the Report** be uploaded to the Asia/Pacific Regional Office website, to replace the previous template.

Figure 2: Excerpt of final report of RASMAG/25

2.2 It was also mentioned at the meeting that the PBCS Non-Compliance Report templates were intended for ANSPs to inform the relevant Monitoring Agency of aircraft/aircraft operators where data link performance did not comply with specifications.

Trigger of Case Study

2.3 The North Atlantic Central Monitoring Agency (NAT CMA) provided the PBCS Non-Compliance Report submitted by the Isavia ANS that provides air navigation services in the North Atlantic region known as the Reykjavik Control Area to JASMA in February 2023.

2.4 **Table 1** presents the PBCS Non-Compliance Report, and the report showed poor performance of several B787-9 (B789) aircraft operated by some Japanese aircraft airline operator in Reykjavik FIR (BIRD) from November 2022 to January 2023. The reason was “Delayed reports due to Inmarsat satellite to satellite transition (aircraft) or satellite problems (network).”

PBCS ATSP Non-Compliance Report Form	
Report Date	Feb2023
Period of observed non-compliance:	Nov2022-Jan2023
Reporting Air Traffic Service Provider (ATSP):	ISAVIA ANS (BIRD)
Contact email address(es) at Reporting ATSP:	****@******.**
Reporting to Regional Monitoring Agency (RMA):	NATCMA
ICAO CODE:	***
Airline Operator:	
State of Operator/Registry:	

PBCS Data

FIR	4-letter ICAO Aircraft Type	Registration	ADS-C downlink Message Counts	95% RSP180 Benchmark ASP <=90 sec	CPDLC Transaction Counts	95% RCP240 benchmark ACP <=180 sec	Issue code
BIRD	B789	JA****	157	93.63%	15	100.00%	(*3)
BIRD	B789	JA****	171	90.64%	12	91.67%	(*3)
BIRD	B789	JA****	141	92.91%	12	100.00%	(*3)
BIRD	B789	JA****	114	94.74%	17	100.00%	(*3)

Table 1: PBCS Non-Compliance Report from NAT CMA to JASMA

Action by JASMA and CRA Japan

2.5 JASMA forwarded the PBCS Non-Compliance Report to CRA Japan, then CRA Japan informed the status of PBCS Non-Compliance to the Japanese airline. JASMA responded to NAT CMA that the PBCS performance of the airline operator's airframes was compliant in Fukuoka FIR during the same period. JASMA also requested Isavia ANS to provide detailed data, including time stamps, position (Lat/Long), ground station ID, ASP, media type, FOM, etc., through NAT CMA.

2.6 After receiving the detailed data from Isavia ANS, JASMA shared the data with CRA Japan, then the CRA Japan secretariat asked NPAC to analyze the data. As a result of plotting and analysis by NPAC, as shown in **Figure 3**, it was identified that the points/locations confirmed poor PBCS performance of the Japanese operator were around 75°N to 82°N where the operator operated some flights, and the areas were the edge of coverage of Inmarsat.

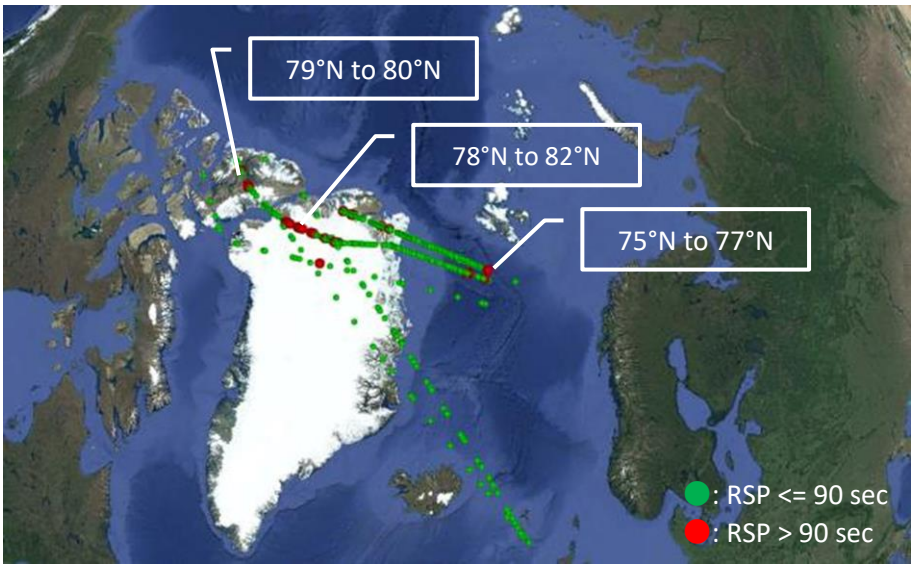

Figure 3: Result of plotting and analysis by NPAC

2.7 **Figure 4** shows an example of a flight route by the Japanese airline in the Cross-Polar route, and **Figure 5** describes the coverage of Inmarsat.

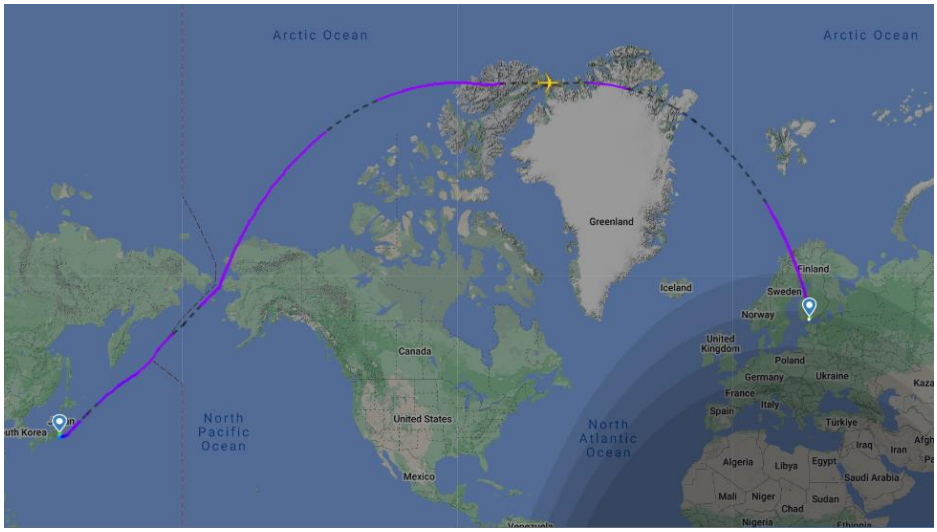

Figure 4: Example of flight route in Cross-Polar route

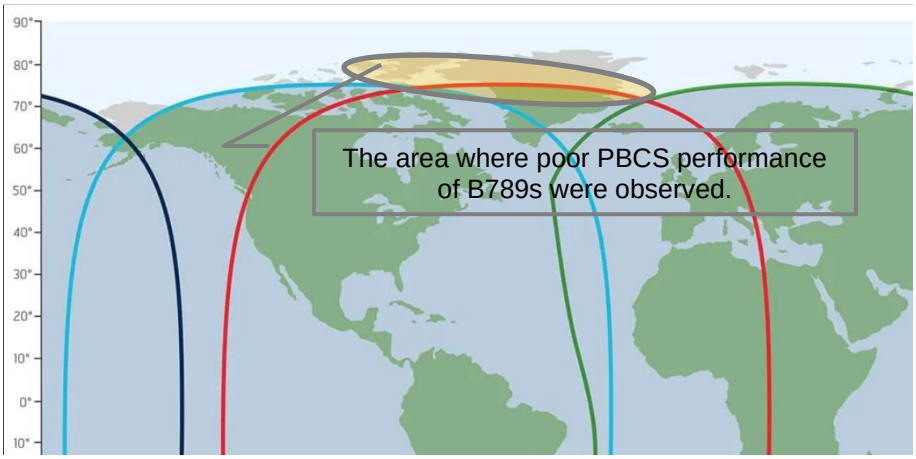

Figure 5: Inmarsat coverage

2.8 CRA Japan explained the result of the analysis to the Japanese operator and asked the operator whether they could file more southern routes. The operator responded that filing southern routes was unacceptable since current routes were the most rational and beneficial routes in the current situation where they had to choose the Cross-Polar route.

Consideration

2.9 JASMA and CRA Japan considered the best solution to resolve this issue.

2.10 The airframes only have a satellite capability of Inmarsat. If B789s were upgraded to use other satellite that covers the Polar route, such as Iridium, the poor performance of B789s would be improved with keeping the Cross-Polar route. However, equipping other satellite capabilities requires the airline to spend additional costs.

2.11 If the Japanese airline selected southern routes within Inmarsat coverage, additional costs and flight time would be required. Thus, the airline operator might have to consider fatigue management for flight crews.

2.12 JASMA would like to highlight that in the current situation where airline operators have to choose the Polar route, whose area is the edge of Inmarsat coverage, additional costs to comply with PBCS compliance would not be acceptable for the operators.

Next Action (Not implemented)

2.13 JASMA planned the following actions to confirm Isavia ANS.

- Whether similar cases of non-Japanese airline operators exist
- Whether seasonal characteristics or airframe differences exist

Conclusion

2.14 Before JASMA implements the above next actions, it was informed that there was an error in the PBCS under-performance processing for the Reykjavik control area by Isavia ANS. Detailed information on the error follows.

- FANS data link services to Inmarsat-equipped aircraft are applied south of 82N.
- PBCS-dependent separation to Inmarsat-equipped aircraft is applied at or south of 80N.
- PBCS under-performance data collection is being done for the airspace south of 82N, but it should only be done for the airspace at or south of 80N.
- Inmarsat-equipped aircraft do not need to meet PBCS performance requirements north of 80N because this airspace is too close to the limit of the Inmarsat satellite coverage and PBCS separation is not being applied to Inmarsat-equipped aircraft in this airspace.
- The lateral separation minima for Inmarsat-equipped aircraft are as follows:
    a) North of 80N: 50 NM (RNAV 10 or RNP 4 and HF voice communication).
    b) South of 80N:
        i) 15 NM target to target (PBCS, RNP 4 and ADS-B)
        ii) 23 NM lateral (PBCS and RNP4)

2.15 This case study shows that the PBCS Non-Compliance Report identifies not only poor PBCS performance aircraft but also an error in PBCS monitoring conducted by the Air Navigation Service Providers (ANSPs).

2.16 Additionally, it would be required for ANSPs to consider carefully lateral separation minima around the edge of satellites' coverage.

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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