International Civil Aviation Organization

Eleventh Meeting of the Air Traffic Management Sub-Group (ATM/SG/11) of APANPIRG

Singapore, 2 – 6 October 2023

Agenda Item 5: ATM Systems (Modernization, Seamless ATM, CNS, ATFM)

ADS-C CDP PROGRESS IN FUKUOKA FIR

(Presented by Japan)

SUMMARY

This paper presents the progress report for the Automatic Dependent Surveillance − Contract (ADS-C) Climb and Descend Procedure (CDP) in the Pacific Ocean airspace of Fukuoka FIR.

1. INTRODUCTION

1.1 The Automatic Dependent Surveillance − Contract (ADS-C) Climb Descend Procedure (CDP) is designed to improve Air Traffic Service (ATS) to properly equipped aircraft. ADS-C CDP allows Oceanic Air Traffic Control Officers (ATCOs) to approve an altitude change request when other standard separations (e.g., ADS-C distance-based 30 NM longitudinal separation minima) do not allow for a climb or descent through the altitude of a blocking aircraft.

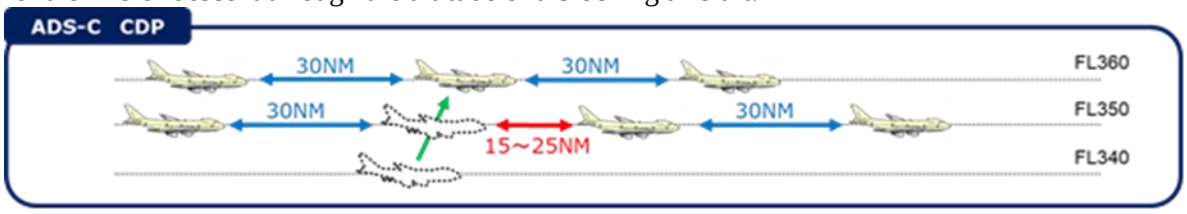

Figure 1: Example of adopting ADS-C CDP

1.2 In the long-term vision for the future air traffic systems of Japan, which is named "Collaborative Actions for Renovation of Air Traffic Systems (CARATS)," the Japan Civil Aviation Bureau (JCAB) established the implementation plan of the ADS-C CDP in accordance with the Global Air Navigation Plan (GANP) of the International Civil Aviation Organization (ICAO), in 2015.

1.3 ADS-C CDP has been implemented in the Pacific Ocean airspace of Fukuoka FIR since 9 September 2021 as a trial after starting the operation of the Trajectorized Oceanic Traffic Data Processing System (TOPS), the current Oceanic Air Traffic Control (ATC) system in JCAB.

1.4 Safety assessment was conducted by JCAB headquarters, including regulatory authority, the Air Traffic Management Center (ATMC), which has ATC responsibility for the Pacific Ocean airspace in Fukuoka FIR, aircraft operators and a research institution before the trial.

1.5 JCAB conducted the post-implementation review and safety assessment of the trial for ADS-C CDP with stakeholders from March to June 2023, and then ADS-C CDP was moved forward to the formal operation on 15 July 2023.

2. DISCUSSION

2.1 **Table 1** and **Figure 2** show a summary and trend of data that ATMC attempted to change an aircraft altitude by adopting ADS-C CDP from 9 September 2021 to 31 July 2023.

	2021				2022												2023							Total	
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Sum	%
Approved	22	44	35	23	25	24	47	38	26	46	28	28	27	31	22	23	29	31	31	40	42	39	39	740	92.4%
a. Unable due to less than 15NM	0	1	0	0	1	1	0	2	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	8	1.0%
b. Unalble due to faster follwoing aircraft	4	1	2	0	0	2	0	0	0	0	0	0	1	0	2	1	2	1	0	0	2	5	1	24	3.0%
c. Unable due to following aircraft Mach	3	1	1	1	1	0	0	1	0	0	1	0	0	0	2	0	0	0	0	1	0	0	2	14	1.7%
d. Unable due to same ALT of blocking aircraft	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.2%
e. Error due to outside of ATMC control area	0	1	1	0	1	0	1	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0.9%
f. Error due to non ADS-C report	2	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	6	0.7%
Total	32	48	40	25	28	28	48	43	26	47	30	28	28	32	26	24	31	32	31	41	46	45	42	801	100.0%

Table 1: Summary of data ATMC attempted to adopt ADS-C CDP

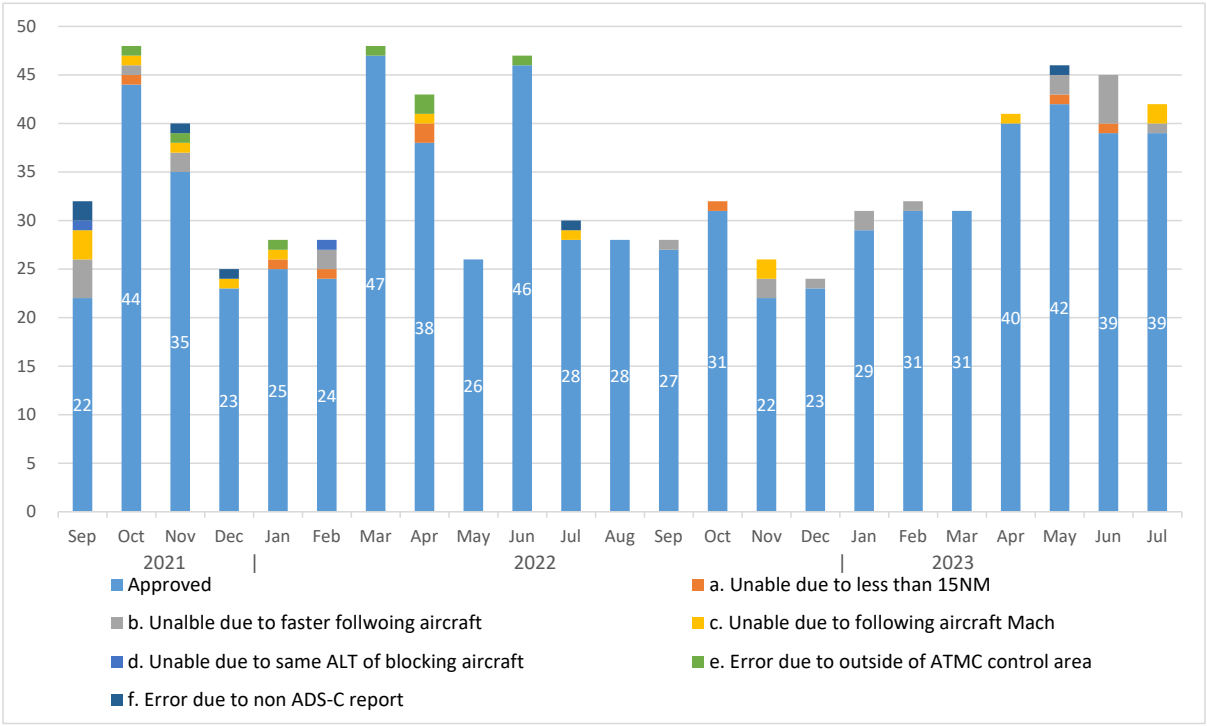

Figure 2: Monthly trend ATMC attempted to adopt ADS-C CDP

2.2 Oceanic ATCOs in ATMC had attempted to adopt ADS-C CDP in 801 cases during the period. A total of 740 cases, approximately 92.4 percent, were approved for altitude change by adopting ADS-C CDP. On the other hand, 48 cases were unable to change altitude due to four following reasons.

a) In eight cases, the distance between the preceding aircraft and the following aircraft did not meet the 15 NM longitudinal separation standard.

b) In twenty-four cases, the highest number of the reasons, the distance between the preceding aircraft and the following aircraft was 15 NM or greater and less than 25 NM, but the following aircraft was faster than the preceding aircraft.

c) Fourteen cases were unable because the Mach number of the following aircraft was more than Mach 0.02 faster than the preceding aircraft's Mach, though the distance between the preceding aircraft and the following aircraft was 25NM or greater.

d) The rest of the two cases were due to the requesting altitude being the same as the blocking aircraft's altitude.

2.3 Besides, 13 cases were not approved for altitude change as TOPS showed an error due to the following reasons.

a) In seven cases, TOPS calculated and estimated the altitude change would not be able to be completed within the airspace where ATMC has the controlling responsibility.

b) The rest of the six cases were that TOPS did not receive the latest ADS-C reports from requesting/blocking aircraft precisely.

2.4 **Figure 2** also shows that the number of cases in some months decreased, and two primary reasons were identified. The first is the existence of weather areas so that ADS-C CDP is not allowed when requesting or blocking aircraft is deviating.

2.5 The second reason is due to temporary airspace restrictions. If airspace restrictions are established and alternative routes are designed temporarily, ADS-C CDP will hardly be applied to the aircraft flying on the alternative routes because most alternative routes will have middle to high-angle turns.

2.6 **Table 2** shows monthly data of aircraft pairs of requesting aircraft and blocking aircraft for the period, and **Figure 3** shows a monthly trend of aircraft pairs of requesting aircraft and blocking aircraft. The percentage of the pair of aircraft that filed "P2" and "RSP180" on their flight plans (hereinafter "the Performance Based Communication and Surveillance (PBCS) aircraft") is approximately 54 %.

Requesting/ Blocking	2021				2022												2023							Total	
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Sum	%
PBCS/PBCS	10	14	5	7	9	8	22	25	17	22	14	10	13	16	10	16	20	20	25	34	34	26	22	399	53.9%
PBCS/Non-PBCS	6	11	14	7	7	6	13	8	6	10	4	11	7	9	7	5	5	5	2	1	5	5	13	167	22.6%
Non-PBCS/PBCS	5	15	11	8	5	7	10	4	2	10	9	7	5	6	5	1	3	4	3	5	1	6	2	134	18.1%
Non-PBCS/Non-PBCS	1	4	5	1	4	3	2	1	1	4	1	0	2	0	0	1	1	2	1	0	2	2	2	40	5.4%
Total	22	44	35	23	25	24	47	38	26	46	28	28	27	31	22	23	29	31	31	40	42	39	39	740	100.0%

Table 2: Monthly data of aircraft pairs of requesting and blocking aircraft

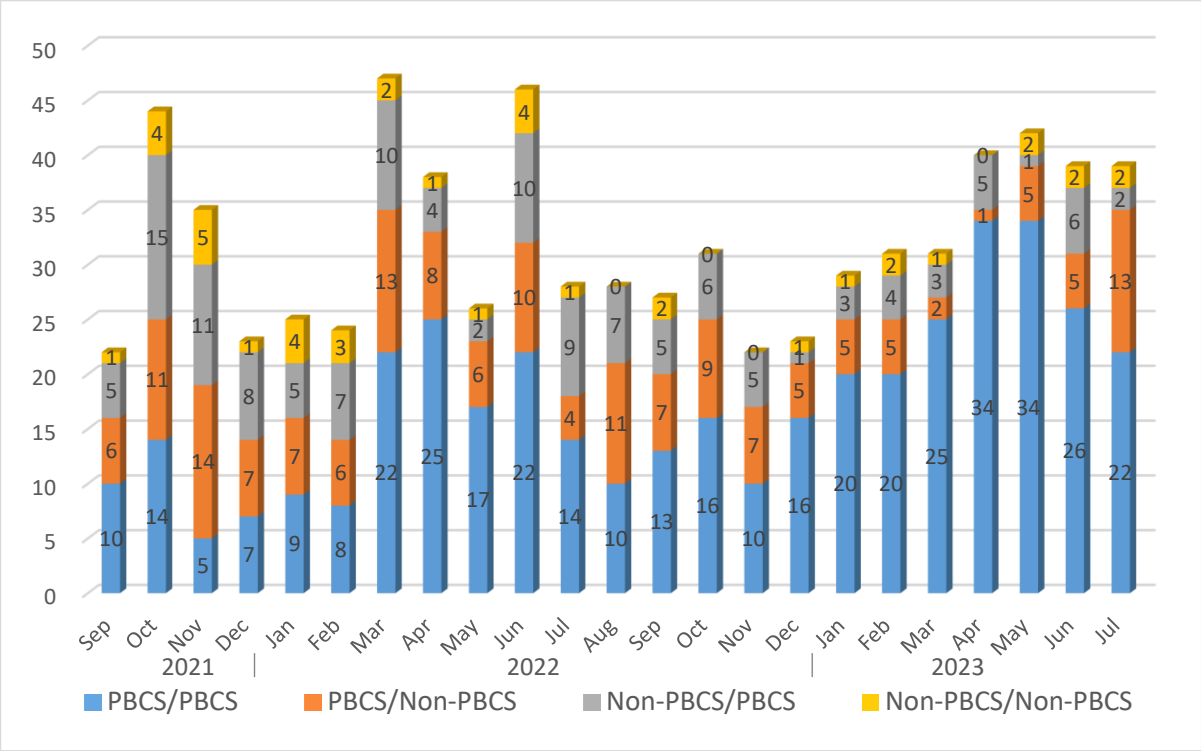

Figure 3: Monthly trend of aircraft pairs of requesting and blocking aircraft

2.7 According to **Table 2** and **Figure 3**, implementing ADS-C CDP allows not only PBCS aircraft but also non-PBCS aircraft to have more opportunities to fly at their preferred altitude since the percentage is over 23 % when requesting aircraft was non-PBCS aircraft. However, please note that aircraft operators flying in the Pacific Ocean airspace are strongly encouraged to obtain PBCS approval/authorization since the 23 NM lateral separation minima based on PBCS and the Required Navigation Performance (RNP) 4 has been implemented in the airspace of Fukuoka FIR.

2.8 **Figure 4** shows the area map describing the number of flights adopted by ADS-C CDP. The North Pacific (NOPAC) routes were the most applied area.

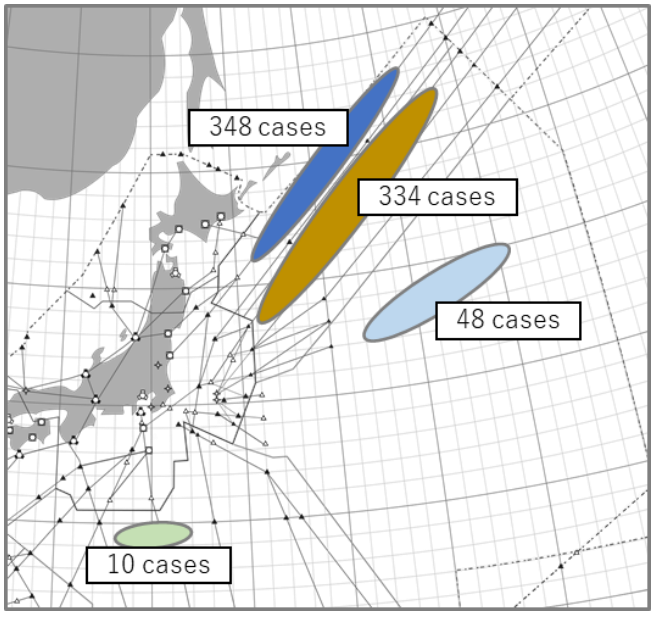

Figure 4: ADS-C CDP area map

2.9 Implementing ADS-C CDP has enhanced the airspace capacity in the Pacific Ocean airspace of Fukuoka FIR, and it has also provided more efficient operation to aircraft operators than before, especially in NOPAC.

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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