



ICAO

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Monitoring Advisory Group (RASMAG/26)

Video Teleconference, 20 – 23 September 2021

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

JASMA SAFETY ASSESSMENT OF ADS-C CDP

(Presented by JASMA)

SUMMARY

This paper presents the implementation process, including safety assessment for the Automatic Dependent Surveillance-Contract (ADS-C) Climb Descend Procedure (CDP) in the Pacific Ocean airspace of the Fukuoka Flight Information Region (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 Controller (ATC) 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.

1.2 **Figure 1** presents an example of adopting ADS-C CDP.

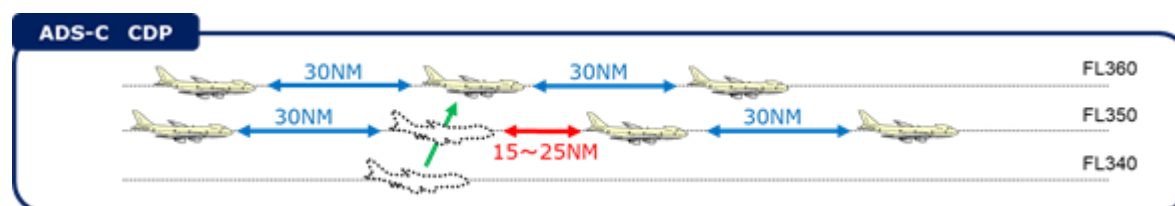


Figure 1: Example of adopting ADS-C CDP

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

1.4 JCAB also decided to implement ADS-C CDP after starting the Trajectorized Oceanic Traffic Data Processing System (TOPS), a new Oceanic ATC system, instead of the Oceanic Data Processing (ODP) which was a legacy Oceanic ATC system. TOPS has started its operations on 3 February 2019.

1.5 Although the traffic volume in the Pacific Ocean airspace is still low due to the impact of COVID-19, JCAB decided to introduce and implement ADS-C CDP in the Pacific Ocean airspace of Fukuoka FIR on 9 September 2021 as a trial phase, in March 2021.

2. DISCUSSION

2.1 The Working Group (WG) for implementing ADS-C CDP was established by the ATC Division of JCAB Headquarters and JASMA. Members of WG are Japanese aircraft operators such as All Nippon Airways (ANA), Japan Airlines (JAL) and Nippon Cargo Airlines (NCA), Electronic Navigation Research Institute (ENRI), Fukuoka Air Traffic Management Center (ATMC), which is the ATC facility of the Pacific Ocean airspace and the Air Navigation Services Safety Office which was one of the regulator organizations of JCAB.

2.2 The objectives of WG are to undertake safety management activities, including an implementation plan, formal hazard and consequence identification, and safety risk analysis in accordance with ICAO Circular 342, ADS-C CDP. Besides, documents and information regarding ADS-C CDP in the Federal Aviation Administration (FAA) provided from the Pacific Approvals Registry and Monitoring Organization (PARMO) to JASMA significantly contribute to the activities as well.

2.3 Seven hazards were identified and nine mitigation measures were established by WG. **Table 1** shows a summary of hazards and mitigation measures.

ID No	Identified Hazards	Causes	Result of Analysis	Mitigation Measures
CDP-01	Unexpected speed change of aircraft	- Turbulence - Pilot manoeuvre	Acceptable with mitigation	a. ATC should use the supporting tool of the ATC system. b. ATC should obtain and confirm the latest ADS-C report. c. ATC should use Mach number technic if needed.
CDP-02	Manoeuvring aircraft flying the same altitude as the blocking aircraft	- ATC system loop error - Avoiding bad weather areas or turbulence	Acceptable with mitigation	d. Pilots should inform ATC as soon as possible if they need to maintain a different altitude from what is assigned by ATC. e. ATC should monitor altitude and track of climbing/descending aircraft.
CDP-03	Aircraft Deviation from ATC approved route	- Difference between flight planned route and flight route in FMS - Avoiding bad weather areas or turbulence	Acceptable with mitigation	a. ATC should use the supporting tool of the ATC system. b. ATC should obtain and confirm the latest ADS-C report. e. ATC should monitor altitude and track of climbing/descending aircraft.
CDP-11	ATC applying ADS-C CDP in inappropriate situation	- Lack of situational awareness by ATC - ATC misunderstanding	Acceptable with mitigation	a. ATC should use the supporting tool of the ATC system. b. ATC should obtain and confirm the latest ADS-C report.
CDP-21	Failure or malfunction of airborne equipment	- Failure of ATS data link services - Failure or malfunction of GNSS (including RAIM hole) - Failure of airborne equipment	Acceptable with mitigation	f. Pilots should inform ATC of data link disconnection as soon as possible. g. ATC should standardize action in case of failure or malfunction of ATS data link services, airborne equipment, GNSS or ATC system during aircraft climbing /descending.

CDP-22	Failure of ATC system	- Failure of ATS data link services - Hardware or software failure of the ATC system	Acceptable with mitigation	g. ATC should standardize action in case of failure or malfunction of ATS data link services, airborne equipment, GNSS or ATC system during aircraft climbing /descending. h. ATC should standardize operational requirements of the ATC tool and system for applying ADS-C CDP.
CDP-23	Malfunction of ATC system	- Software bug or inaccurate value of adaptation	Acceptable with mitigation	h. ATC should standardize operational requirements of the ATC tool and system for applying ADS-C CDP. i. ATC should standardize procedures to update software and setting of ATC tool and system.

Table 1: Summary of hazards and mitigation measures

2.4 After the five runs of WG, WG agreed to implement ADS-C CDP as a trial operation on 9 September 2021. The detail of the trial operation is noticed and published by the Aeronautical Information Publication Supplement (AIP SUP). The AIP SUP is shown in the **Attachment**.

2.5 The trial operation will be planned for approximately one and a half years, and the transition from trial operation to official operation will be estimated in March 2023. However, if enough sample data of aircraft adopted ADS-C CDP are not obtained during the period of trial operation, the transition will be delayed for safety assessment after implementation.

2.6 JASMA and JCAB wish to support the implementation of ADS-C CDP in other states of the Asia Pacific region, like PARMO supported JASMA.

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

AIP Supplement for Japan

AIP SUP
124/21
Effective from 09 SEP 2021
Published on 12 AUG 2021

**OPERATIONAL TRIAL OF LONGITUDINAL SEPARATION MINIMA
BASED ON DISTANCE USING ADS-C CLIMB AND DESCEND
PROCEDURE(CDP)**

From 1500UTC 8 SEP 2021, operational trial will be conducted as follows.

1. ADS-C CDP(Climb and Descend Procedure)
This procedure is that an aircraft on the same track is cleared to climb or descend through the level of another aircraft by air controller's decision. It is based upon ICAO PANS-ATM [Doc.4444] 5.4.2.8 and Circular342 ADS-C CDP.
2. Purpose of this operational trial;
Longitudinal separation minima based on distance using ADS-C CDP is evaluated whether it can be applied stably.
3. Applicable time;
24hours
4. Airspace of application;
Data link airspace over the Pacific Ocean within Fukuoka FIR.
5. Requirements;
Aircraft shall apply for ATS data link services using ADS-C and CPDLC; andThe following conditions of aircraft shall be confirmed by ATC at the time of application. (1)The last ADS-C reports contain position accuracy of 0.25 NM or better. (2)The altitude difference is not greater than 2000ft. (3) cruising at a single altitude. (4) not deviating from route. (5) It is possible to re-establish vertical separation within 15 minutes from demanding former ADS-C report.
6. Separation minimum
Regardless of ENR3.5.3.11, it is as follows that longitudinal separation minima applied between aircraft which meet the requirement specified above. ①15NM when the preceding aircraft is at the same speed or faster than the following aircraft. ②25NM when the following aircraft is not more than Mach 0.02 faster than the preceding aircraft.
7. Contingency procedures
When aircraft can not satisfy ATS data link services using ADS-C and CPDLC, pilot shall notify ATC as soon as practicable and follow the instructions provided by ATC.
8. Suspension of the operational trial
This trial will be suspended for a period when the system shutdown of the data link systems is notified by NOTAM.
9. For further information
Air Traffic Control Division, Air Navigation Services Department, Civil Aviation Bureau, Ministry of Land, Infrastructure, Transport and Tourism.TEL+81-3-5253-8749