International Civil Aviation Organization

Twelfth Meeting of the Air Traffic Management Sub-Group (ATM/SG/12) of APANPIRG

Bangkok, Thailand, 23 – 27 September 2024

Agenda Item 6: ATM Coordination (Meetings, Route Development, Contingency Planning)

OFFSET CLIMB/DESCENT PROCEDURES IN OCEANIC AIRSPACE OF FUKUOKA FIR

(Presented by Japan)

SUMMARY

This paper presents the implementation process and increasing the operational efficiency of offset climb/descent procedures and the 12 NM lateral separation minimum using ATS data link services applicable while one aircraft climbs/descends through the level of another aircraft in the oceanic airspace of the Fukuoka Flight Information Region (FIR).

1. INTRODUCTION

1.1 Japan Civil Aviation Bureau (JCAB) has introduced various reduced separation minima in oceanic airspace, where is provided non radar services. Currently, 30 NM longitudinal separation at cruising level, 15 NM longitudinal separation during climb or descent, and 23 NM lateral separation are available as minimum separation standards.

1.2 Even though the separation minimums have been reduced, there are still cases where an aircraft is not at requested altitude due to another aircraft flying on the same route 1000 feet different when making altitude changes of 2000 feet or more.

1.3 As a solution for the aircraft to fly at the optimum altitude, JCAB has introduced the offset climb/descent procedure in oceanic airspace of Fukuoka FIR. Additionally, in order to minimize offset distance, JCAB started a trial operation of the12 NM lateral separation minimum using ATS data link services on June 13, 2024.

2. DISCUSSION

Offset climb/descent procedure.

2.1 The offset climb/descent procedure allows aircraft to access to the requesting altitude by offsetting from original cleared route. The instruction to offset from the original cleared route and to rejoin the cleared route will be issued by controller.

2.2 Pilots can request offset climb/descent, for example, when the altitude change request of 2000ft or more was rejected by controller. Furthermore, controller may suggest offset climb/descent to the pilot.

2.3 The offset climb/descent procedure in Fukuoka is applicable not only to CPDLC but also to HF voice communication.

2.4 The controller instructs the aircraft to offset from the original cleared route in order to establish lateral separation from blocking aircraft. The offset distance varies depending on the required lateral separation. Although the FANS 1/A CPDLC support the clearance message to offset, there is no downlink message set to indicate that the aircraft has established on offset route. Therefore, the request for reporting establishment on offset route will be composed by free text in case of clearance by CPDLC.

2.5 After the controller confirmed that the aircraft established on offset route, the clearance to climb or descend will be issued. The pilot should keep on offset route, unless the controller issues the instruction to be back on route.

2.6 Once the controller confirmed the aircraft reached assigned altitude and established vertical separation from blocking aircraft, the instruction to be back on route is issued. In order to confirm that the aircraft established on original cleared route, “REPORT BACK ON ROUTE” message is concatenated with the instruction.

2.7 When the aircraft established on original cleared route, the pilot shall send “BACK ON ROUTE” message.

12 NM lateral separation minimum

2.8 The offset distance in offset climb/descent procedure varies depending on the required lateral separation minimum. In order to minimize offset distance, JCAB will introduce 12 NM lateral separation minimum applicable while one aircraft climbs/descends through the level of another aircraft.

2.9 The 12 NM lateral separation minimum had been incorporated into PANS-ATM in 2020. The Excerpt of PANS-ATM related to 12NM lateral separation is shown in the **Attachment A**. The separation minimum is also applicable in the airspace where Strategic Lateral Offset Procedure (SLOP) up to 2 NM is authorized. The separation is applicable when one aircraft climbs/descends through the level of another aircraft, and both aircraft should required RNP 4, RCP 240 and RSP 180 approvals.

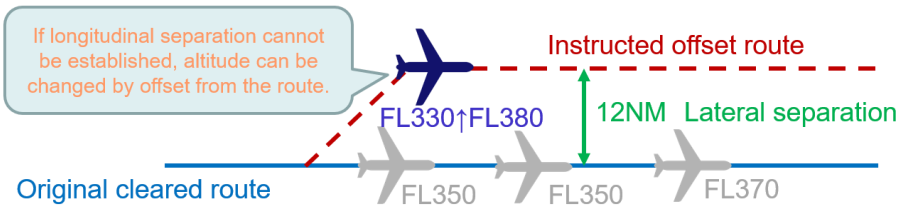

Figure 1: Offset climb/descent procedure with 12 NM lateral separation minimum.

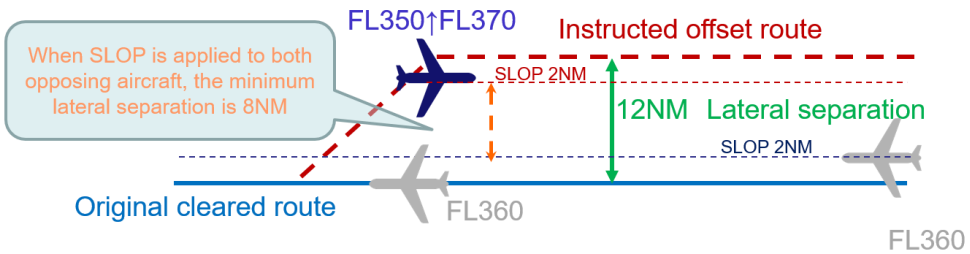

Figure 2: Offset climb/descent procedure with 12 NM lateral separation minimum in SLOP airspace.

Trial operation of Offset climb/descent procedures

2.10 JCAB deployed the 12 NM lateral separation minimum using ATS data link services as a trial operation on June 13th. This article explains how many offset climbs and descents were approved during the trial and why some were not approved. The detail of the trial operation was published by the Aeronautical Information Publication Supplement (AIP SUP). The AIP SUP is shown in the **Attachment B**.

2.11 **Figure 3** shows the number of times the 12 NM lateral separation minimum using ATS data link services have been implemented since the start of a trial operation. The number of times it was conducted varied from day to day due to changing conditions caused by weather, restricted airspace, and other factors, but altitude changes applying the 12NM separation were implemented 54 times.

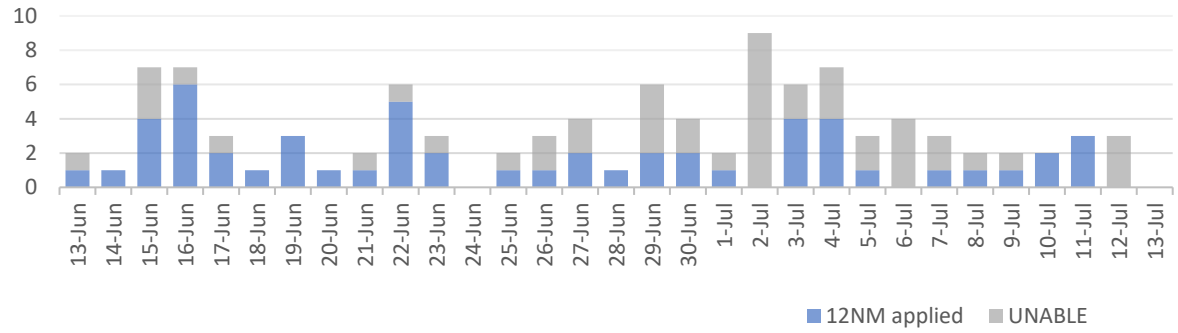

Figure 3: The number of Altitude change requests and approvals applied at 12NM lateral separation.

2.12 Numbers of the offset climb/descent applied at 12NM separation requests and their results in Figure 3, and reason of UNABLE are shown in **Figure 4**. “Pilot's intentions” include pilot's disagreement with the offset direction or distance proposed by ATC, such as when an offset of more than 12 NM is required in relation to traffic or cancel of an altitude change request. “Distance to FIR BDY” was not approved because the offset climb/descent should be completed by the FIR boundary.

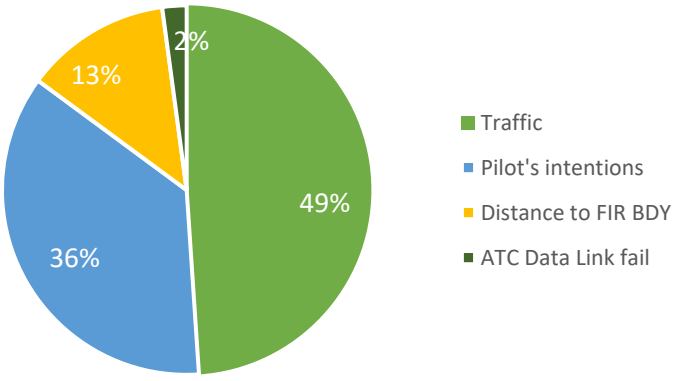

Figure 4: Percentage of the reason for “UNABLE to allied to 12NM lateral separation.”

2.13 **Figure 5** shows the range of altitude changes made from June 13 to June 30 and the average time required to make these changes. The most frequent altitude change was a 2000 FT climb, but as shown in the blue bar graph, relatively large changes of more than 6000 FT were also possible. The

green line graph indicates the average time from the time of the altitude change request from the pilot to the time of the 'BACK ON ROUTE' message was received after the altitude change. The average time required was approximately 31 minutes, although it took a little longer when the altitude change was larger. The gray line graph shows the time from when the 12NM offset clearance was issued to when the "Established" massage was received, which was approximately 6 minutes.

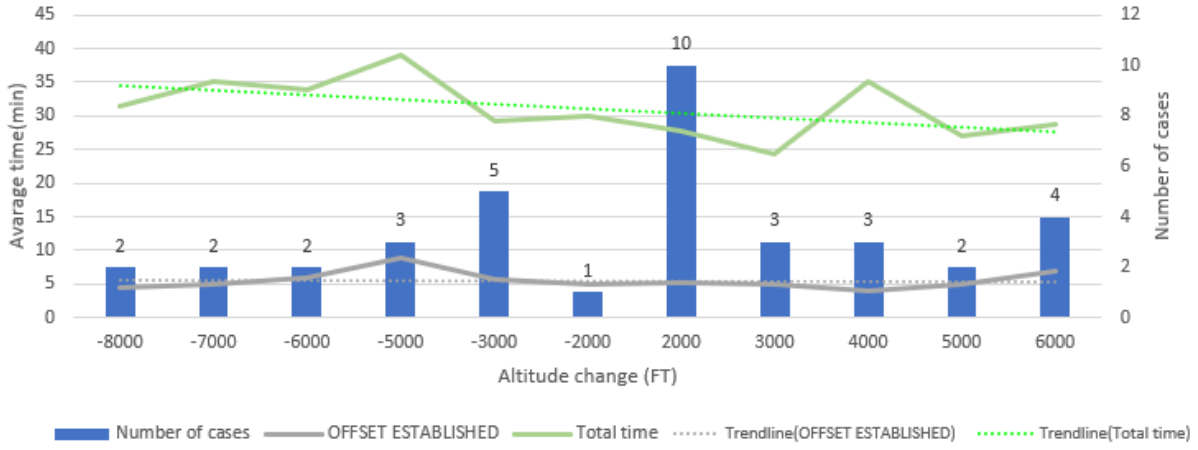

Figure 5: Altitude change ranges and average time required to change altitude.

2.14 The actual number of cases for the first month from June 13 was 54, which is still a small number, but no communication errors with pilots or other operational problems have occurred, and we judge that we are operating without any problems.

2.15 The trial operation period is scheduled to last approximately one year, and the transition from trial operation to official operation is expected to occur in the first quarter of 2025. However, if enough sample data is not obtained during the trial operation period, the transition may be delayed in order to conduct a safety assessment after implementation.

Conclusion

2.16 The expected benefits of introducing the 12 NM offset method to the oceanic sector are as follows:

a) This procedure can be operated in the oceanic sector even in areas with high air traffic density, such as the restructured NOPAC routes (minimum lateral separation of 25 NM), which will increase airspace capacity and improve operational efficiency at the same time.

b) The number of flights that were able to climb with an altitude difference of 3,000 feet or more increased to 12 (estimated 288 flights per year), which contributed to improved fuel efficiency.

c) The number of flights that were able to descend increased to 15 (estimated 360 flights per year), which contributed to improved safety.

d) It is expected that the number of flights will increase further as pilots become more aware of this trial operation.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper; and

b) encourage the States with oceanic airspace to consider the benefits of implementing 12NM lateral separation minimum to improve flight efficiency.

c) discuss any relevant matters as appropriate.

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Attachment A. Table 5-2 on ICAO Doc 4444, PANS-ATM

5.4.1.2.1.6 *Lateral separation of aircraft on parallel or non-intersecting tracks or ATS routes.* Within designated airspace or on designated routes, lateral separation between aircraft operating on parallel or non-intersecting tracks or ATS routes shall be established in accordance with Table 5-2:

Table 5-2. Lateral separation of aircraft on parallel or non-intersecting tracks or ATS routes

Minimum Spacing Between Tracks		*Performance Requirements*			*Additional Requirements*
Airspace where SLOP is not authorized, or is only authorized up to 0.5 NM	*Airspace where SLOP up to 2 NM is authorized*	*Navigation*	*Communication*	*Surveillance*	
93 km (50 NM)	93 km (50 NM)	RNAV 10 (RNP 10) RNP 4 RNP 2	Types of communication other than direct controller-pilot VHF voice		
37 km (20 NM)	42.6 km (23 NM)	RNP 4 RNP 2	RCP 240	RSP 180	Conformance monitoring shall be ensured by establishing an ADS-C event contract specifying a lateral deviation change event with a maximum of 5 NM threshold and a waypoint change event
37 km (20 NM)	42.6 km (23 NM)	RNP 2 or GNSS equipage	Types of communication other than direct controller-pilot VHF voice		While one aircraft climbs/descends through the level of another aircraft remaining in level flight
27.8 km (15 NM)	33.4 km (18 NM)	RNP 2 or GNSS equipage	Direct controller-pilot VHF voice communications		
16.7 km (9 NM)	22.3 km (12 NM)	RNP 4 RNP 2	RCP 240	RSP 180	While one aircraft climbs/descends through the level of another aircraft remaining in level flight
13 km (7 NM)	19 km (10 NM)	RNP 2 or GNSS equipage	Direct controller-pilot VHF voice communications		While one aircraft climbs/descends through the level of another aircraft remaining in level flight

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Attachment B. Effective AIP Supplement of Japan

AIP Supplement for Japan

AIP SUP
075/24
Effective from
Published on 16 MAY 2024

OPERATIONAL TRIAL OF THE 12NM LATERAL SEPARATION MINIMA USING ATS DATA LINK SERVICES

From 1500UTC 12 JUN 2024, operational trial of the 12NM lateral separation minima using ATS data link services will be conducted as follows.

1. Objectives of the trial;

The 12NM lateral separation minima using ATS data link services is evaluated whether it can be applied stably.

2. Applicable time;

24hours

3. Applicable airspace;

Oceanic data link airspace

4. Requirements;

Aircraft shall meet the following requirements;

(1) apply for ATS data link services using ADS-C and CPDLC;

(2) has an operational approval of RNP4 by the State of Registry or the State of the Operator;

(3) has an operational approval of RCP240 by the State of Registry or the State of the Operator; and

(4) has an operational approval of RSP180 by the State of Registry or the State of the Operator.

5. Separation minimum

Only when one aircraft climbs or descends through the altitude of another aircraft remaining in level flight, regardless of ENR3.5.3.11, the 12NM lateral separation minima will be applied between aircraft which meet the requirements specified above.

6. Contingency procedures

When aircraft cannot satisfy ATS data link services using ADS-C and CPDLC, pilot shall notify air traffic service unit as soon as practicable and follow the instructions provided by the air traffic controller.

7. Suspension of the operational trial

This trial will be suspended for a period when the shutdown of the ATS data link services is notified by NOTAM.

8. For further information

Air Traffic Control Division, Air Navigation Services Department, Civil Aviation Bureau, Ministry of Land, Infrastructure, Transport and Tourism.

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