International Civil Aviation Organization

Twenty-Ninth Meeting of the Regional Airspace Safety Monitoring Advisory Group (RASMAG/29)

Bangkok, Thailand, 19 – 22 August 2024

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

JASMA SAFETY ASSESSMENT OF THE 12NM LATERAL SEPARATION MINIMA USING ATS DATA LINK SERVICES IN FUKUOKA FIR OCEANIC AIRSPACE

(Presented by JASMA)

SUMMARY

The paper presents the implementation process, including the safety assessment of offset climb/descent procedure 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 Pacific Ocean airspace of the Fukuoka Flight Information Region (FIR).

1. INTRODUCTION

1.1 Japan Civil Aviation Bureau (JCAB) has introduced various reduced separation minima in the past. Currently, 30 NM longitudinal separation in 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 minima were reduced, some cases where the aircraft cannot take their optimum altitude because blocking aircraft are still observed.

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

2.2 The pilots can request offset climb/descent, for example, when the altitude change request of 2000ft or more was rejected by controllers and controllers 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 controllers confirmed that the aircraft established on offset route, they will issue the clearance to climb or descend. 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. **(Figure 1)**.

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 applicable in the airspace where Strategic Lateral Offset Procedure (SLOP) up to 2 NM is authorized **(Figure 2)**. The separation is applicable when one aircraft climbs/descends through the level of another aircraft, and both aircraft are required RNP 4, RCP 240 and RSP 180 approved.

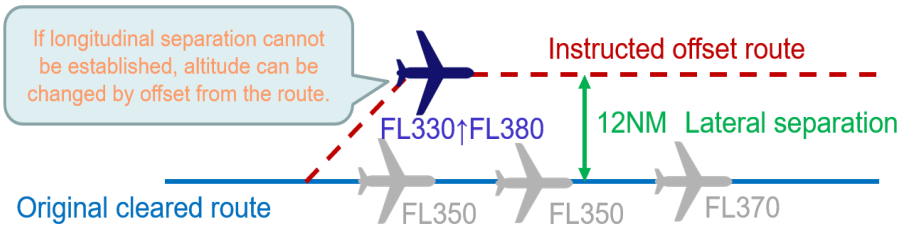

Figure 1: Offset climb/descent procedure with 12 NM lateral separation minimum

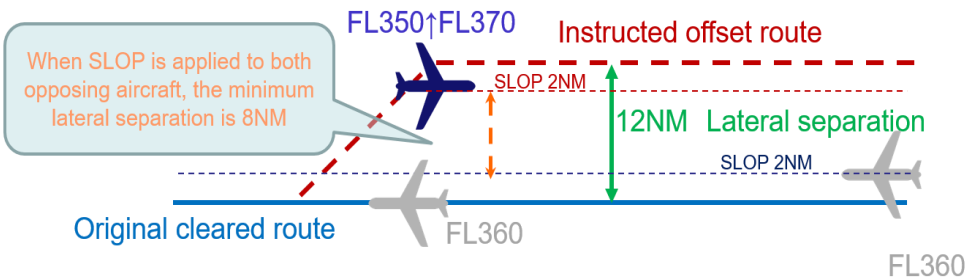

Figure 2: Offset climb/descent procedure with 12 NM lateral separation minimum in SLOP airspace

Safety Assessment for implementing the 12 NM lateral separation minimum

2.10 The Working Group (WG) for implementing the 12 NM lateral separation minimum using ATS data link services 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.

2.11 The objectives of the WG are to carry out safety management activities such as implementation planning, hazard identification, and safety risk analysis. Six hazards were identified and mitigation measures were established by WG. **Table 1** shows a summary of hazards and mitigation measures.

Identified Hazards	Causes	Result of Analysis	Mitigation Measures
Incorrect instructions by air traffic controllers	· Controller's error - Flying block altitudes/climbing/descending - Forgot to confirm established on offset route · Incorrect flight plan	Acceptable with mitigation	· The controller must check this before issuing a clearance. · Controllers should create a list of related aircraft and manage them as necessary.
Incorrect instructions by ATC	· Errors by air traffic controllers - Disregard of relevant aircraft - Oversight of restricted airspace · Input errors by ATC when issuing control instructions · Operational errors by unfamiliar ATC	Acceptable with mitigation	· The controller must check this before issuing a clearance. · Controllers should create a list of related aircraft and manage them as necessary.
Strategic Lateral Offset Procedure (SLOP), etc.	· Lack of pilot knowledge - Exceeds the SLOP criteria, the actual separation between the aircraft may be eroded · Misunderstandings due to the use of non-standard CPDLC procedures and CPDLC message elements	Acceptable	-
Incorrect flight plan	· Incorrect information submitted by the operator · Pilot loading incorrect flight route · Controller error - Failure to update/change flight plan information - Failure to reflect information received from aircraft in flight	Acceptable	-
Failure of aircraft equipment, etc.	· ATS data link service failure · GNSS failure · Failure of on-board equipment	Acceptable	-
Failure of ATC system	· ATS data link service failure · Hardware failure in ATC system · Software failure in ATC system	Acceptable	-

Table 1: Summary of hazards and mitigation measures

2.12 WG agreed to implement the12 NM lateral separation minimum using ATS data link services as a trial operation on 13 June 2024. 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**.

2.13 **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 is conducted varies 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.

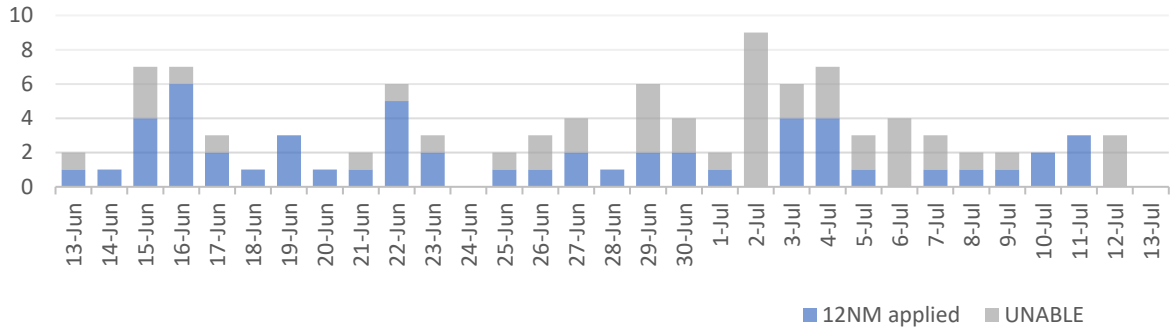

Figure 3: The number of Altitude change requests and approvals applied at 12NM lateral separation

2.14 Reasons for Unable in **Figure 3** 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 application of the 12 NM separation is not a seamless operation with other FIRs and the altitude change would not be completed by the FIR boundary. There was one “ATC Datalink” case that was not approved due to problems with the ATC datalink connection.

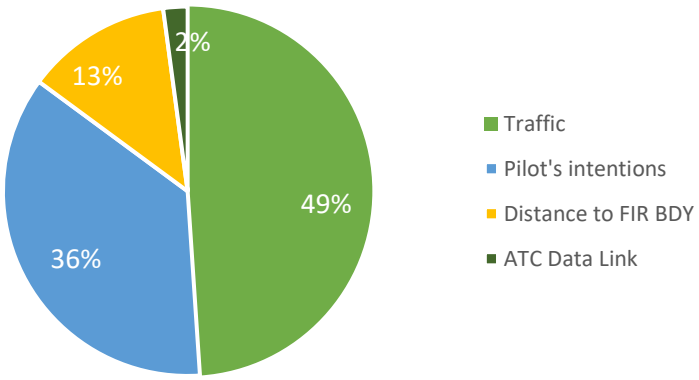

Figure 4: Percentage of the reason for “UNABLE to allied to 12NM lateral separation”

2.15 **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 frequently applied 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 shown as 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 is approximately 31 minutes, although it takes a little longer when the altitude change is 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.

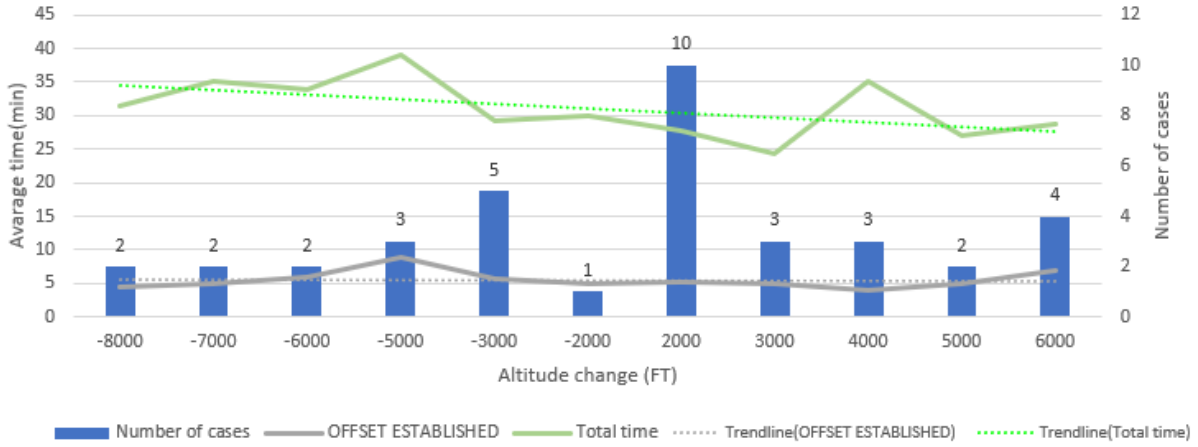

Figure 5: Altitude change ranges and average time required to change altitude.

2.16 The actual number of cases for the first month from June 13 is 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.

2.17 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 2024. 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.

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 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

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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