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

MEASURES TO REDUCE LHD OCCURRENCE BETWEEN SHANGHAI AND INCHEON ACCS

(Presented by Republic of Korea)

SUMMARY

This paper aims to share the status of Large Height Deviation (LHD) occurrence between ONIKU-LAMEN of A593 and has been designated as "LHD Hotspot" within Incheon Flight Information Region (FIR), and to suggest measures to improve safety and reduce LHD in this area. LHDs have occurred continuously in this area since Incheon Area Control Center (ACC) began to provide air traffic control service in March 2021. To reduce LHDs, the Republic of Korea suggests to implement ATS Inter-facility Data Communication (AIDC) between Incheon ACC and Shanghai ACC, add more ATS routes through the implementation of the second phase of A593 normalization, reduce separation minima between Incheon and Shanghai ACC and share safety oversight information of the delegated airspace (SADLI-LAMEN) between the two States.

1. INTRODUCTION

1.1 Under the leadership of ICAO Council and with the agreement between ICAO, China, Japan and Republic of Korea, the phased implementation of A593 normalization has begun since 25 December 2015. In accordance with the Phase 1 implementation, Incheon ACC has been providing air traffic services to the 125°E of the corridor area where Fukuoka ACC had been responsible for the provision of air traffic services. In addition, Incheon ACC established the Y590 route parallel to the A593, and signed the Letter of Agreement (LOA) and established direct communication lines with Shanghai ACC. The Phase 2, which includes triple-tracking of A593, reduction of separation minima between Incheon ACC and Shanghai ACC and implementation of the AIDC between two ACCs, was scheduled to be implemented from 17 June 2021, but it has been delayed.

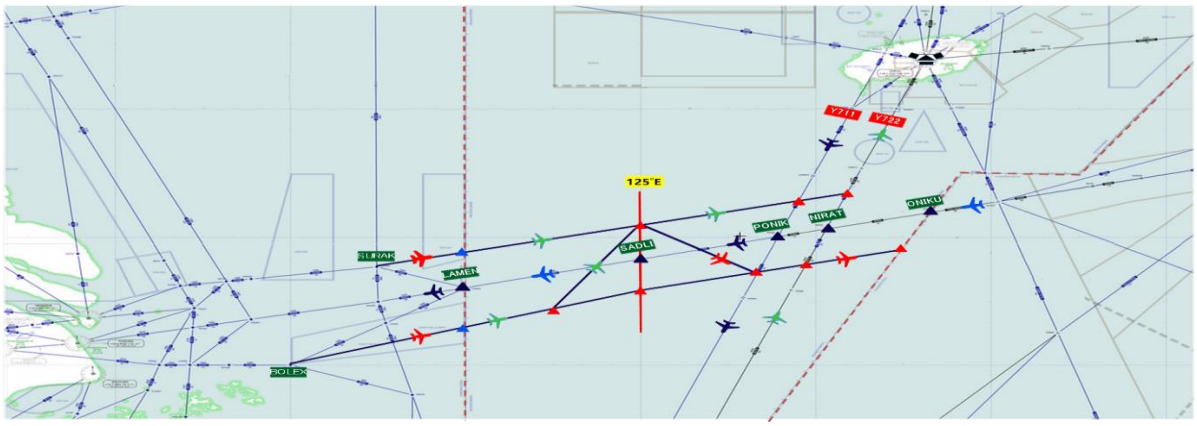

Figure 1. ATS route structure under Phase 2 of A593 normalization

1.2 Before the normalization, the 20th RASMAG meeting (Bangkok, Thailand, '26-29 May 2015) raised safety issues on the ONIKU-LAMEN segment of A593 and designated the area as a LHD Hotspot of the Asia and Pacific Region. However, the target level of safety (TLS, $5.0x10^{-9}$) of this segment has been satisfied since the normalization.

Table1. Safety assessment result of A593

Year	2020	2021	2022
Overall vertical collision risk	**$45.1x10^{-9}$**	**$0.21x10^{-9}$**	**$0.24x10^{-9}$**
Target Level of Safety ($5.0x10^{-9}$)	**Not Satisfactory**	**Satisfactory**	**Satisfactory**

1.3 This paper will look over the current status of LHD occurrences after the implementation of Phase 1 of the A593 normalization and propose measures to continuously satisfy the TLS within this segment and to reduce LHDs in relation to the implementation of Phase 2 items.

2. DISCUSSION

LHD occurrences between ONIKU and LAMEN

2.1 Since Incheon ACC took over responsibilities in providing air traffic services on the A593 in March 2021, there have been 243 LHD cases that have occurred in this area, and all of them have occurred between Incheon ACC and Shanghai ACC. The main cause of LHDs appears to be human error (Category “E”), such as late or no transfer, incorrect flight level information, flight level changes without coordination, etc. On the other hand, no LHD occurs between Incheon ACC and Fukuoka ACC where AIDC has been implemented.

Table 2. LHD Occurrences within Incheon FIR (A593)

Interface	2021	2022	2023	2024 (Jan-Jun)	Total
Between Incheon ACC and Fukuoka ACC	0	0	0	0	0
Between Incheon ACC and Shanghai ACC	21	108	74	40	243

2.2 In addition, a significant LHD case (ACAS RA) occurred between two aircraft that were avoiding adverse weather near SADLI, which is the transfer of control point between Incheon ACC and Shanghai ACC in July 2024. At that time, target correlation for the aircraft coming from Shanghai ACC was not made even after it passed the transfer of control point, which resulted the ATC to be unaware

of the aircraft. At the same time, increasing workload including overloaded radio communication due to weather deviation requests caused delayed response of the ATC to the situation.

Measures to reduce LHDs

2.3 AIDC is an automated ATS data exchange mechanism between two ATS units during the transfer of aircraft that can help to improve efficiency, enhance safety and facilitate smoother hand-overs. Incheon ACC has implemented AIDC with Fukuoka ACC and receives aircraft information 15 minutes before the aircraft's FIR entry. And then, the system automatically generates aircraft target information on the controllers' radar screen, which helps ATC with situational awareness and establish tactical plan in advance. In the LHD case in paragraph 2.2, if AIDC had been implemented between two ACCs, the controller would have been able to assess the situation more quickly and take action. Therefore, AIDC needs to be implemented with the highest priority to reduce LHDs in the hotspot area between Shanghai ACC and Incheon ACC. Currently, Incheon ACC has completed the installation of the AIDC system with Shanghai ACC and it only remains for the operating procedures to be set up and implementation timing to be coordinated.

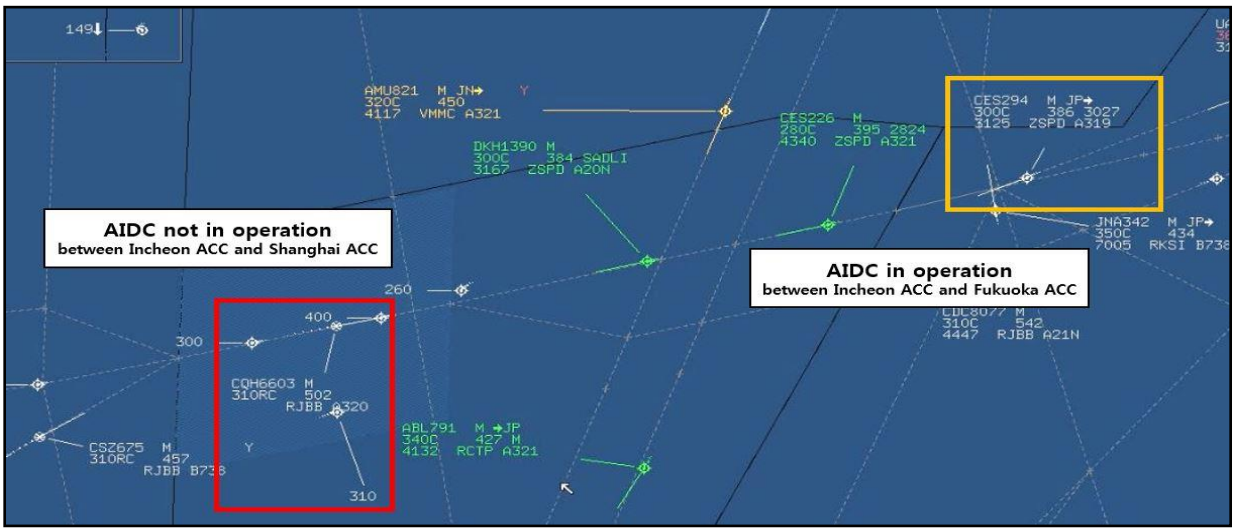

Figure 2. AIDC Status along A593

2.4 After the pandemic, air traffic within Incheon FIR is recovering rapidly, restoring to pre-pandemic level of 2019 in 2023. In addition, the average daily traffic volume in the first half of this year exceeded that of the same period in 2019. This surge in traffic volume may cause increased congestion on the A593, affecting safety risks of A593. Therefore, by extending the Y590, which is partially implemented in parallel with A593, to the Shanghai FIR and establishing a third ATS route agreed upon in the Phase 2 of A593 normalization (see **Figure 1**), the likelihood of LHDs that may occur due to increased traffic volume is expected to be reduced.

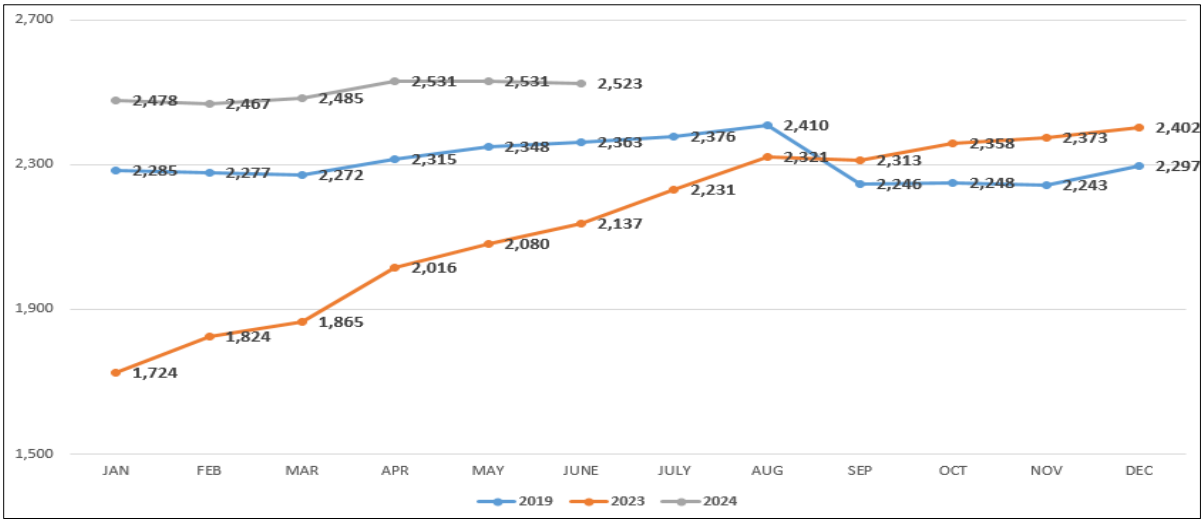

Figure 3. Monthly Traffic Volume in Incheon FIR

2.5 In addition, considering surveillance services are provided along the A593 and international air traffic in China is gradually recovering, a rapid increase in air traffic on the A593 is expected. To deal with the traffic increase proactively, separation minima needs to be reduced by applying surveillance-based separation criteria between Incheon and Shanghai ACC, which will be the same separation criteria between Shanghai ACC and Fukuoka ACC. Through this measure, unnecessary delays and ATC workloads can be reduced, enhancing ATC's monitoring efforts and preventing the occurrence of LHDs in hotspot area.

2.6 Lastly, in order to identify potential safety hazards and mitigate them in the delegated airspace of A593 (SADLI-LAMEN) where Shanghai ACC provides air traffic services, the air traffic safety oversight authorities of both the Republic of Korea and China need to share safety (oversight) information within the area. While this may not directly contribute to the reduction in LHD, close monitoring of safety sensitive areas by air traffic safety oversight authorities of both States can foster greater awareness of both ACCs on the LHD hotspot area, eventually leading to a decrease in the occurrence of LHDs during the transfer of control in the area. Currently, the Republic of Korea receives LHD information on the delegated area through the PARMO.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper;

b) encourage China and the Republic of Korea to consider the measures to reduce LHD between Shanghai ACC and Incheon ACC proposed in paragraph 2.3 through 2.6; and

c) discuss any relevant matters as appropriate.

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