International Civil Aviation Organization

Fifth Meeting of the Surveillance Implementation Coordination Group (SURICG/5)

Web-conference, 22 – 24 September 2020

Agenda Item 5: Update on surveillance activities and explore potential cooperation opportunities

UPDATE ON ADS-B IMPLEMENTATION PROJECT IN REPUBLIC OF KOREA

(Presented by Republic of Korea / Korea Airports Corporation)

SUMMARY

This information paper presents on progress of ADS-B system implementation project in Republic of Korea and ADS-B use case

1. INTRODUCTION

In accordance with mid and long term CNS system upgrade plan and APAC AIGD, The Republic of Korea has successfully completed an ADS-B installation project in May 2020. ADS-B ground stations are located in 11 sites and two operating stations are located in Incheon ACC and Daegu ACC. This ADS-B system give ACCs an enforced monitoring of Incheon FIR and a redundancy for a malfunction of existing enroute radars.

2. ADS-B SYSTEM IMPLEMENTATION UPDATE

Status of ADS-B system implementation

2.1 The Republic of Korea originally operated a total of 15 radars, 3 approach controls, and 2 area controls. To comply with APAC Seamless ATM and implement a mid and long-term CNS system upgrade plan, The Republic of Korea established an ADS-B OUT Service agreement in 2013. The installation project of 11 ADS-B ground stations and 2 operating stations was successfully completed. The site acceptance test and the flight inspection test is passed last December 2019.

ADS-B is put in the service for enroute air traffic control in May 2020. This ADS-B data and the current Radar data are initially integrated to the ATC system and then the processed data is transmitted to the controller situation displays can be shown whole Incheon FIR including southern part of the Jeju region (e.g. ATOTI) which has higher route crossing point density. Figure 2 below shows that ground stations coverages are overlapped in Incheon FIR.

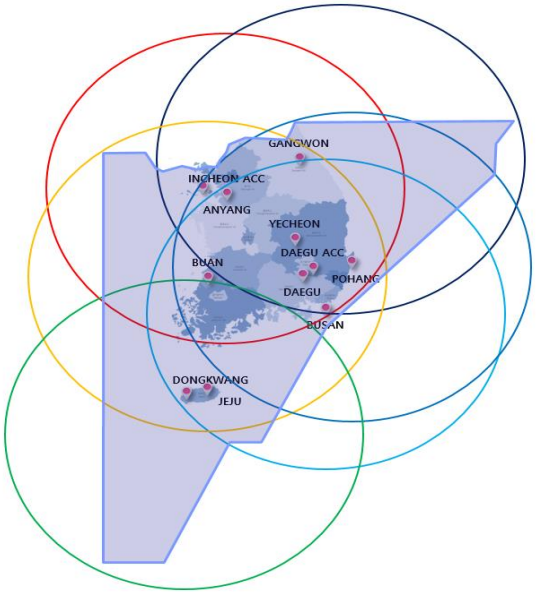

Figure 1. ADS-B coverage

2.2 ADS-B ground stations are designed to support DO260, DO260A and DO260B to provide basic ATC operational services. The Republic of Korea monitored status of ADS-B avionics versions in order to analyze ADS-B applicability in Domestic area in 2019. Figure 2 below shows the status and proportion of the aircraft ADS-B avionics. Republic of Korea will monitor and analyze the position error, ID and related any other issues from the received ADS-B data.

Total of aircraft	ADS-B avionics			proportion
	DO-260	DO-260B	Total	
397	268	123	391	98.48%

Table. Status of ADS-B avionics version

2.3 In terms of data flow, ADS-B uses a 1090MHz Extended Squitter data link for data exchange. ADS-B ground stations are designed to support DO260, DO260A and DO260B to provide basic ATC operational services. In terms of data flow, ADS-B data are broadcast in omnidirectional, random and periodic intervals from aircraft to ground stations. The data is transmitted to the processor, and it is converted to ASTERIX Category 21 messages. As a result, CAT 21 data is integrated with radar data (CAT 34,48) and the integrated data is finally provided to the ATC systems. Also, Incheon operating station can monitor station and control equipment by using the Remote Control Management System. Figure3 shows that air traffic information is displayed on TSD which is used to measure the position and distance of aircrafts.

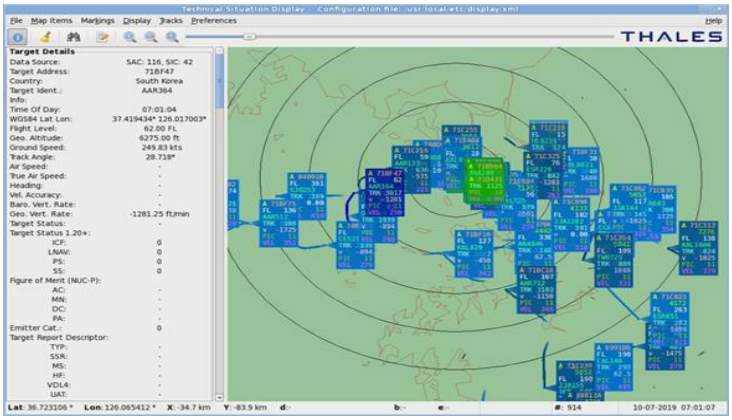

Figure 2. RCMS TSD

2.4 ADS-B is a cost-effective surveillance system that overcomes limitations of Mode A/C radars including false targets and split tracks which could cause aircraft display issues on radar screens for Air Traffic Management. The rate of update provided to the ATM system is real time (e.g. 1 seconds) compared to the existing radar. For these reasons, ADS-B as a surveillance system has many advantages compared to Radar. The Republic of Korea is will add the ADS-B receivers to monitor lower altitude airspace for air small aircrafts because Korean territory is mountainous.

Case of ADS-B operational use as alternative of radar

2.5 In The Republic of Korea, the ATC system normally incorporates surveillance data received from ADS-B and Radar. The optimal mix of data is displayed on the controller situation screen as shown in Figure 4. Recently, 7 radars shut down to prevent the system damages from the bad weather conditions As a result, those radars could not send out radar data to the ATC system and there was a possibility that Aircraft positions temporarily couldn't be displayed. However, controllers could use ADS-B data as a supplement to existing radar data and cross-check false target comparing data. As a result, radar shutdown issues were immediately resolved through improving the amount and utility of surveillance data.

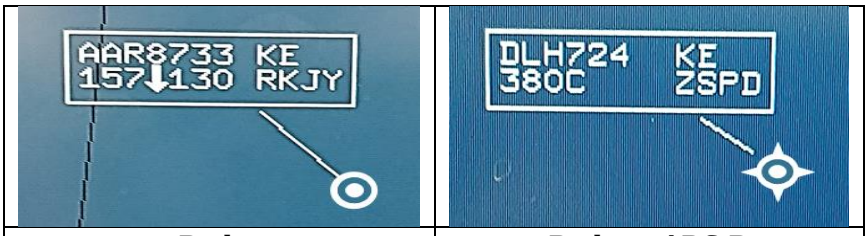

Figure 3. Radar and ADS-B combination data

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 matter as appropriate

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