International Civil Aviation Organization

AUTOMATIC DEPENDENT SURVEILLANCE –BROADCAST SEMINAR AND FOURTEENTHMEETING OF AUTOMATIC DEPENDENTSURVEILLANCE – BROADCAST (ADS-B) STUDYAND IMPLEMENTATION TASK FORCE(ADS-B SITF/14)

Christchurch, New Zealand, 14 – 17 April 2015

Agenda Item 5: Development of Asia/Pacific Regional ADS-B implementation plan and sub-regional ADS-B implementation plan

ADS-B OPERATION STATUS AND FUTURE PLAN IN INCHEON INTERNATIONAL AIRPORT, REPUBLIC OF KOREA

(Presented by Republic of Korea/IIAC)

SUMMARY

This paper presents information on ADS-B system status and future MLAT operation plan of Incheon International Airport in Republic of Korea

1. Introduction

1.1 Incheon International Airport(IIA) has wide air traffic network, connecting 184 cities of 54 countries by 88 airlines, dealing with 45.5 million passengers(9.7% growth from 2013), 2.5 million tons of air freight(3.8% growth from 2013) and 800 aircrafts per day with 3 runways(6.9% growth from 2013) based on 2014.

1.2 To prepare for increasing air transport demand and improve ground and airport surveillance, 2 Surface Movement Radar(SMR) is installed for ground surveillance, Air-traffic management(ATM) and 3 ASR/SSR(2 at Incheon Airport, 1 at Gimpo Airport) for airport surveillance, ADS-B for ground and approach monitoring since 2008(appended picture 1 is ground surveillance fusion system).

1.3 ADS-B target information collected from aircrafts is interfaced to CWP display of ATC system and target position information is serviced, and utilizefor final-approach-monitoringfor simultaneous take-off and landing by set-up of NTZ(Non Transgression Zone)between 1st and 3rd runway or between 2nd and 3rd runway.

2. ADS-B Operation Status

2.1 Below is the ratio of ADS-B data reception from flights collected for 24 hours on IIA.

These numbers are collected for aircrafts before landing and after take-off.

Observed date	Number of Flights checked for 24hrs	ADS-B Information received Flights	Others	% of ADS-B received
March 27, 2013	751	602	149	80.2%
March 8, 2015	837	702	135	83.9%

2.2 ADS-B received ratio has increased over 80% based on 2015 data. Most received data were NUC=7 or 6, but about 10% of the received data were under NUC 5 which results in difficulty to verify position error and ADS-B transponder equipment.

2.3 In IIA, ADS-B is installed and being operated for restricted area of airport ground surveillance and runway approach monitoring. ADS-B data is optionally selectable on the CWP(controller working position) display because a small number of aircraftsequippedADS-B present position error on the ground.

2.4 The number of aircrafts with ADS-B capable transponder is increasing, but it is necessary to implement revised regulation which requires that all aircrafts are equipped with qualified ADS-B transponder and transmit ADS-B data on the defined area to fully utilize benefits of ADS-B(refer to ICAO Doc7030/5 MID/ASIA SUPPs).

3. Future Plan

3.1 In preparation for increasing air traffic, IIA is installing Multilateration system (MLAT) to supplement and enhance current ground surveillance system and ADS-B. MLAT system is planned to be operated from 2017 after completion of T2 passenger terminal.

3.2 MLAT installation is considered with following several aspects.

- ✓ Considered as auxiliary system of SMR, replacement for main ground surveillance system in case of SMR failure.
- ✓ Supplement for ADS-B limit as ground surveillance with enhanced accuracy.
- ✓ Smooth handling of increasing air traffic with airport expansion.
- ✓ Effectiveness on airport ground movement and approach monitoring.
- ✓ Minimize uncovered/shadow area by buildings and topographic interference (36 remote ground stations).
- ✓ Supplement for surveillance performance deterioration by weather(current system performance is deteriorated rapidly over 16mm/h heavy rain)
- ✓ Data provision to other air navigation system.
- ✓ Operation technique enhancement for future CNS/ATM.
- ✓

3.3 MLAT is capable of receiving ADS-B data from aircrafts, and could be conjugated as ADS-B system in the future if the accuracy and reliability of received ADS-B data is more ensured(appended picture is 36 remote ground stations on IIA)

4. Conclusion

4.1 For air navigation safety, qualified ADS-B capable transponder should be equipped on aircrafts and surveillance system on airports be installed with proper equipment. IIA will install MLAT for ground and airport surveillance within 20NM of Incheon Airport for more efficient surveillance system and operate ADS-B system according to government ADS-B operation plan.

4.2 IIA wish aircrafts are equipped with ADS-B for safety and will advance with them.

5. Action by the meeting

5.1 The meeting is invited to note the information

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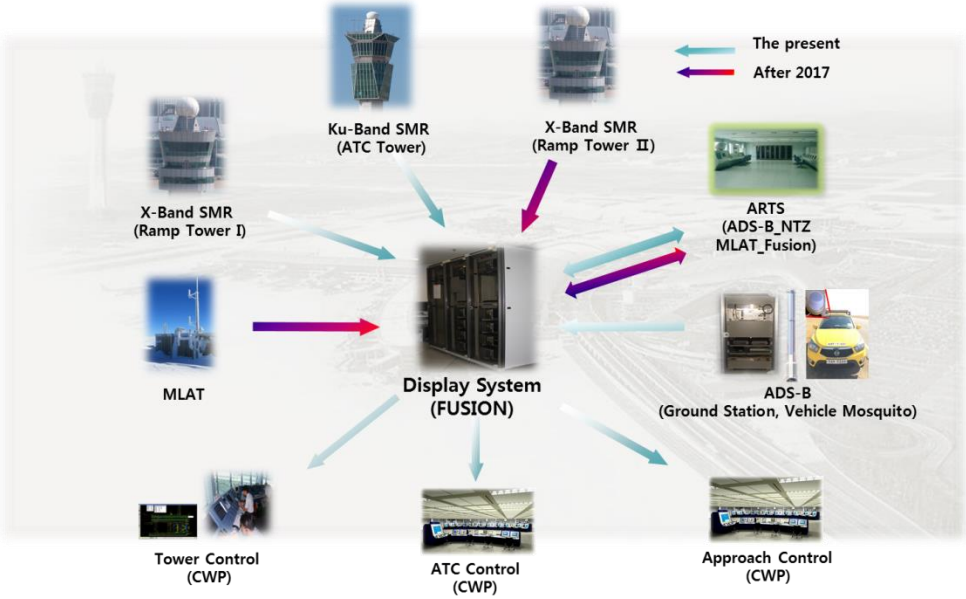
Appendix1.IIA ASDE system

Currently, 2 SMR and ADS-B is being operated for ground surveillance and 1 SMR and MLAT shall be installed and operated from 2017 after the completion of T2 passenger terminal.



< Figure1. ASDE System Configuration>

Appendix2. MLAT ground stations

36 Remote Ground Station positon is depicted below to minimize shadow area. 28GS is for receiving only, 8 GS is for transmitting and receiving. Because main goal is for ground surveillance and runway approach monitoring, MLAT is designed as LAM(Local Area Multilateration). Remote ground stations are connected to CPS by fiber optic cable.

<Figure2.Multilateration(MLAT) Ground Station Installation Plan>