International Civil Aviation Organization

AUTOMATIC DEPENDENT SURVEILLANCE – BROADCAST SEMINAR AND ELEVENTH MEETING OF AUTOMATIC DEPENDENT SURVEILLANCE – BROADCAST (ADS-B) STUDY AND IMPLEMENTATION TASK FORCE (ADS-B SITF/11)

Jeju, Republic of Korea, 24-27 April 2012

Agenda Item 6: Review States' activities and interregional issues on trials and implementation of ADS-B and multilateration

UPDATE SURVEILLANCE ACTIVITIES IN JAPAN

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SUMMARY

This paper provides a brief report on surveillance activities in Japan. Based on the CARATS roadmap, JCAB has discussed and established detailed surveillance implementation plans, which are covered specified airspace such as en-route, terminal and/or non-SSR airspaces.

As one of those detailed plans, this paper provides en-route surveillance implementation plan with data fusion function.

1. Introduction

1.1 As announced in the CARATS roadmap, JCAB has made a plan to install/implement WAM and ADS-B into some airspace with SSR coverage within Fukuoka FIR. In the other hand, JCAB has considered the target data fusion issue for several years. A lot of investigation works for this issue have been covered from en-route to aerodrome. At this moment, we have reached a very common result

on this issue, the target data fusion system at en-route surveillance facilities which has the function of such as SSR/SSR and SSR/WAM/ADS-B target data fusion is needed.

1.2 Therefore, JCAB will install/implement target data fusion equipment in parallel with installation of WAM/ADS-B. JCAB estimates that this programme would need one decade. (See Fig.1)

1.3 Since this programme focuses on the en-route surveillance system only at this time, the target data fusion system for terminal airspaces should be future issues. (Note: The process of the target data fusion equipment will cover/involve a few numbers of local airports as a test case for future activities, to expand airspace where will have the target data fusion function.)

2. One decade implementation programme

2.1 Based on the CARATS roadmap, Japanese stake holders have been tackling to establish a detailed plan on WAM and ADS-B implementation as a future surveillance application. As a results of the stake holders consideration, the target year is 2019 when the first commissioned en-route WAM with ADS-B capability will put into operation.

2.2 By the target year, 2019, it includes design phase, manufacturing phase, installation phase and evaluation (test operation) phase. And, it would be one decade implementation plan which includes WAM coverage expansion phase. (See Fig.1, simplified timeline.)

3. Design concept of the target data fusion system

3.1 Using the both calculation methods, weighted average method and selecting method flexibly, the target fusion function should be designed to have ability to produce accreted and accurate target track.

3.2 Using highly frequent position report data from WAM/ADS-B, the target fusion function should provide higher refresh rate than current Radar Data Processing (RDP) system which provides 1 (one) target report every 10 seconds for each target. (Note: We have not decided the data refresh rate for the target data fusion system yet. It is under consideration.)

3.3 Several surveillance applications, not only SSR but also WAM/ADS-B, can compensate coverage each other.

3.4 Estimated triple coverage through SSR/WAM/ADS-B will be achieved from a part of Hokkaido-island to Kyusyu-island. It means that most of congestion air space in Japan will be covered by double SSR and single WAM and ADS-B.

4. Developmental regime

4.1 Technical Management Centre (TMC) which was established last year is a newly technical section of JCAB and. TMC will take responsibility to design the target data fusion function and conduct investigation/evaluation works, especially safety assessment, on the function collaborating with ATC and some Japanese manufactures.

4.2 In the first few years of the new target data fusion function, JCAB recognizes that handling of the ADS-B target data should be under study or assessment. In the other words, JCAB will mainly use fused target data between SSR and WAM in the earliest years. Especially, Japan still have some concerns on ADS-B data use, such as mixture of ADS-B avionics version 0 and version 2, mixture of ADS-B aircraft and non-ADS-B aircraft and/or existence of unreliable/non-accurate ADS-B position data. After the safety assessment works and increase of ADS-B equipage, JCAB will shift to use fused target data between SSR/WAM and ADS-B.

4.3 Future progress items include new surveillance application for southern island area (Okinawa islands), terminal air spaces at low altitude, and detection of an aircraft with mode-A/C transponder such as military aircraft and so on. For resolving these issues, ENRI (Electronic Navigation Research Institute) and another research bodies are going to continue technology development activities.

5. Action by the meeting

5.1 The meeting is invited to note the information.

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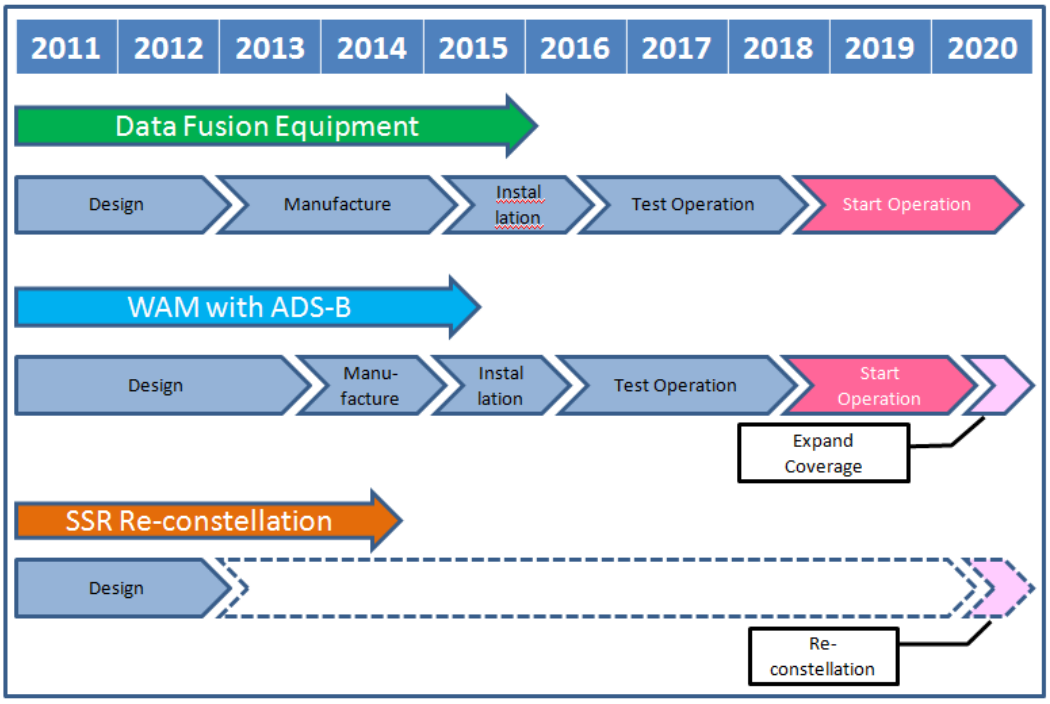
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
Data Fusion Equipment
Design
Manufacture
Instal lation
Test Operation
Start Operation
WAM with ADS-B
Design
Manu-facture
Instal lation
Test Operation
Start Operation
Expand Coverage
SSR Re-constellation
Design
Re-constellation

Fig. 1

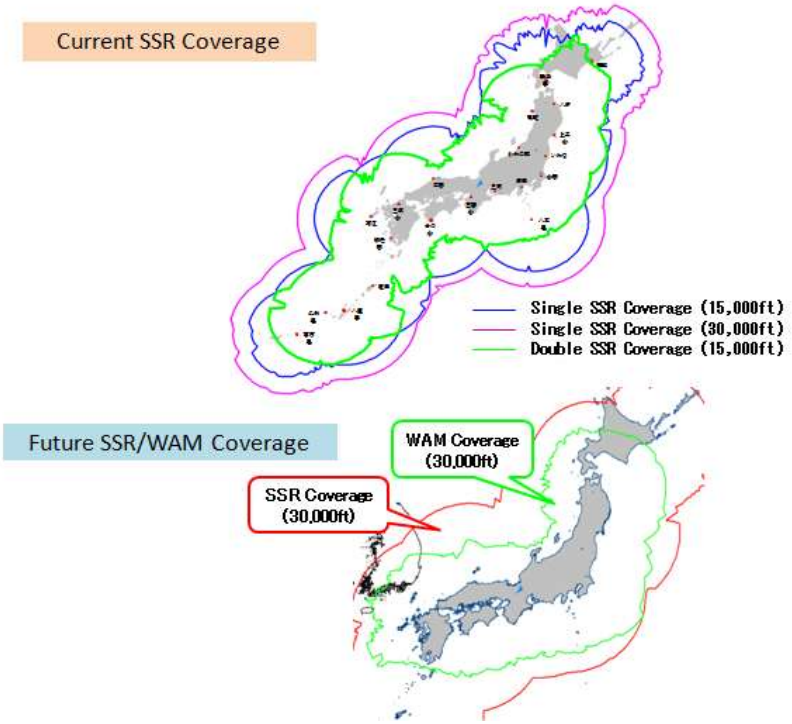
Current SSR Coverage
Single SSR Coverage (15,000ft)
Single SSR Coverage (30,000ft)
Double SSR Coverage (15,000ft)
Future SSR/WAM Coverage
WAM Coverage (30,000ft)
SSR Coverage (30,000ft)

Fig. 2