International Civil Aviation Organization

SIXTEENTH MEETING OF THE COMMUNICATIONS/NAVIGATION/SURVEILLANCE AND METEOROLOGY SUB-GROUP (CNS/MET SG/16) OF APANPIRG

Bangkok, Thailand, 23 – 27 July 2012

Agenda Item 6: Surveillance

3) Discuss other surveillance related issues

LOW ALTITUDE SURVEILLANCE NAVIGATION SAFETY SYSTEM IMPLEMENTATION PLAN

(Presented by the Republic of Korea)

SUMMARY

This paper introduces plans and activities concerning the Korean government's low altitude VFR aircraft surveillance system and the en-route radar substitute system, and proposes active implementation of the above in the Asia Pacific regions.

This paper relates to – **Strategic Objectives:**

A: **Safety** - *Enhance global civil aviation safety*
C: **Environmental Protection and Sustainable Development of Air Transport** *Foster harmonized and economically viable development of international civil aviation that does not unduly harm the environment*

Global Plan Initiatives:
GPI-7 Dynamic and flexible ATS route management
GPI-22 Communication infrastructure

1. Introduction

1.1 There has been a steady increase in VFR flights in the Republic of Korea such as light and ultra light aircrafts for various purposes including firefighting, leisure, and agriculture that fly low altitude. However, due to mountainous terrain of Korea, blind areas are found in the radar surveillance and VHF Radio communication.

1.2 Korea introduced the light aircrafts on September 10th 2009, and has replaced those aircrafts with more than 115 kilograms in weight or two-seater ultra aircraft with light aircrafts. Then approximately 236 aircrafts are expected to register and operate by September 2012, and accordingly the flight altitude of such light aircrafts will be increased from current 500ft to 5,000ft. In this context, Korea is implementing projects of flight surveillance and safety information service reinforcement in order to improve the safety of light aircrafts.

1.3 Basically, the VFR aircraft, unlike transport aircraft, fly at a relatively low altitude, and the pilots are expected to fly at his discretion, taking the weather and nearby obstacles into consideration. However, as such flights are increasing in frequency and recent technological advancements allow the enhancement of their safety in a cost efficient manner, Korea plans to actively establish a system that supports safe navigation. We believe that the surrounding nations in the Asia Pacific region may enter discussions to join this move.

2. Discussion

2.1 In order to achieve a secure operation of the VFR aircrafts, Korea has been establishing mid-and long-term plans to remove a blind zone for VHF Radio communications in the low altitude sections, and to build up a proper surveillance system.

2.2 First of all, we are expanding the VHF Radio to enable communications below 4000ft range where the VHF Radio communication blind zones are found due to the topographic characteristics. Also, the government plans to monitor both low and high altitude areas by connecting MLAT technology and SSR, in order to reinforce the surveillance of low altitude VFR aircrafts. In a long term, it will provide surveillance and broadcasting services by interlinking weather related radar data and ADS-B, TIS-B, and FIS-B technologies.

2.3 By doing so, it becomes possible to provide flight information such as weather data necessary for the safe navigation of low altitude operations. Also, emergency responses capacities will be greatly improved, and should a situation that adversely affects aircraft safety arises, such as bad weather, real-time operating flight location surveillance data obtained by using MLAT and ADS-B may be used to alert and prepare the aircraft. The recorded surveillance data will provide aircraft location details and enable swift rescue operations upon the occurrence of accidents, and be used for post-accident analyses for future improvements.

2.4 Phase I (2011~2013) : Investigate blind areas within the frequent visual operation sections from 2012, in order to secure facilities for VFR aircraft and communications, and complete the expansion of VHF Radio by 2013. The reception/transmission antennas will be installed at high altitude communication sites (used for other purposes), in order to save construction costs and environmental impacts.

2.5 Phase II (2013~2018) : All 14 Approach Control Area and routes in Korea are under radar surveillance, but MLAT will also be implemented in order to improve the surveillance capacity for low altitude aircraft.

2.5.1 MLAT refers to a technology that involves three on-ground antennas that receive the signals emitted from transponders that are mandatorily installed in aircraft and Light weight aircraft, calculate and display their locations. If respective aircraft or Light weight aircrafts utilize already-installed transponders, no additional devices are necessary, which makes the implementation of this system more convenient.

2.5.2 Multiple antennas are necessary for MLAT installation, but the cost may be minimized if we use pre-existing high altitude area facilities that are currently used for other purposes.

2.6 Phase III (2010~2020) : Promote to operate ADS-B, in order to improve the efficiency and preciseness of the aircraft surveillance systems in all airspace, implement a new ATM service, and enhance the low altitude aircraft surveillance performance. To this end, an ADS-B related on-ground and on-board device development project was initiated in 2010. Based on the results of this project (late 2014), light aircrafts will be equipped with ADS-Bs and on-ground ATM system established, followed by the provision of a comprehensive air transport information service by linking TIS-B to FIS-B.

2.7 Korea's low altitude aircraft communications and detection performance improvement programs, as shown above, are expected to greatly contribute to the improvement of safety and efficiency of VFR aircraft operation.

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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