54th CONFERENCE OF DIRECTORS GENERAL OF CIVIL AVIATION ASIA AND PACIFIC REGIONS

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AGENDA ITEM 3: AVIATION SAFETY AND AIR NAVIGATION

KOREAN SBAS (KASS) IMPLEMENTATION STATUS IN REPUBLIC OF KOREA

(Presented by Republic of Korea)

INFORMATION PAPER

SUMMARY

Republic of Korea is in progress on developing Korean SBAS (i.e. KASS, Korea Augmentation Satellite System) led by the Government (MOLIT, the Ministry of Land, Infrastructure and Transport). This paper presents the SBAS implementation status in Republic of Korea.

Korean SBAS (KASS) IMPLEMENTATION STATUS IN REPUBLIC OF KOREA

1. INTRODUCTION

1.1 The Korean SBAS (Satellite Based Augmentation System) development, implementation and establishment program (i.e. Korea Augmentation Satellite System Program) has initiated in October, 2014. Korea Augmentation Satellite System (KASS, hereafter) will be national navaid system to be owned and operated by the Ministry Of Land, Infrastructure and Transport (MOLIT) in Republic of Korea.

1.2 The KASS Program Office (KPO, hereafter) in the Korea Aerospace Research Institute (KARI) selected an overseas partner (TASF, Thales Alenia Space France) in October 2016 for joint development.

2. KOREAN SBAS (KASS) DEVELOPMENT PROGRESS IN REPUBLIC OF KOREA

2.1 Overview

2.1.1 Republic of Korea is developing an SBAS implementation, named KASS, which will provide navigation services for the benefit of various users in Korea—including aviation, transportation, survey, timing, and others. The development of the KASS will also benefit the technological advancement of Korean industry. The procurement of KASS is managed by the KPO hosted within the Korea Aerospace Research Institute (KARI). Thales Alenia Space has been selected as the prime contractor for the development and implementation of the KASS system, and local Korean contractors will supply the several sub-components of the KASS system. KASS will comply with the SBAS requirements from the International Civil Aviation Organization (ICAO) published in Annex 10. The KASS signal-in-space will also comply with the corresponding requirements in the SBAS Minimum Operational Performance Standards (MOPS) published by RTCA, Inc.

2.1.2 KASS will be certified by the Korean Ministry of Land, Infrastructure and Transportation (MOLIT) under an agreement with the European Aviation Safety Agency (EASA).

2.2 KASS System Configuration

2.2.1 The KASS system has four Subsystems except for GEO satellites. The configuration of KASS comprises of KRS, KPS, KCS, KUS and two GEO satellite.

2.2.2 Seven KASS Reference Stations (KRSs) collect measurement data and broadcast messages from all GPS and GEO satellites in view and forward to KASS Processing Stations (KPSs). Two KASS Processing Stations (KPSs) receive the data from reference stations and perform correction processing, safety processing, and SBAS message processing, etc. Two KASS Control Stations (KCSs) include system operation and maintenance, system status and performance monitoring, performance analysis, anomaly investigation, support to users, etc. Baselined three KASS Uplink Stations(KUSs) generate “GPS-like” ranging signals combined with the SBAS messages from the KASS Processing Stations and transmit them to the GEO satellites in C-band (TBC : To Be Confirmed). They also provide and steer frequency standards for the signal generation to synchronize with GPS time, and control the signal code-carrier coherence by monitoring the SBAS signal-in-space. Two GEO satellites receive navigation signal in C-band (TBC) and transmit GPS L1/L5 compatible navigation signal and they shall be consisted by leasing satellites.

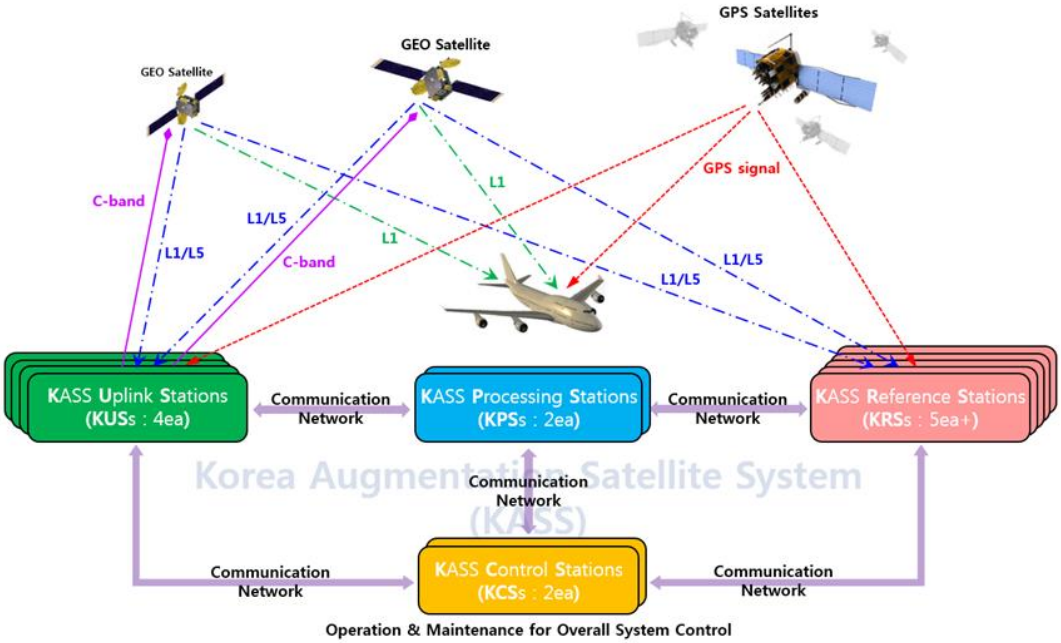

Fig 1. KASS System Architecture

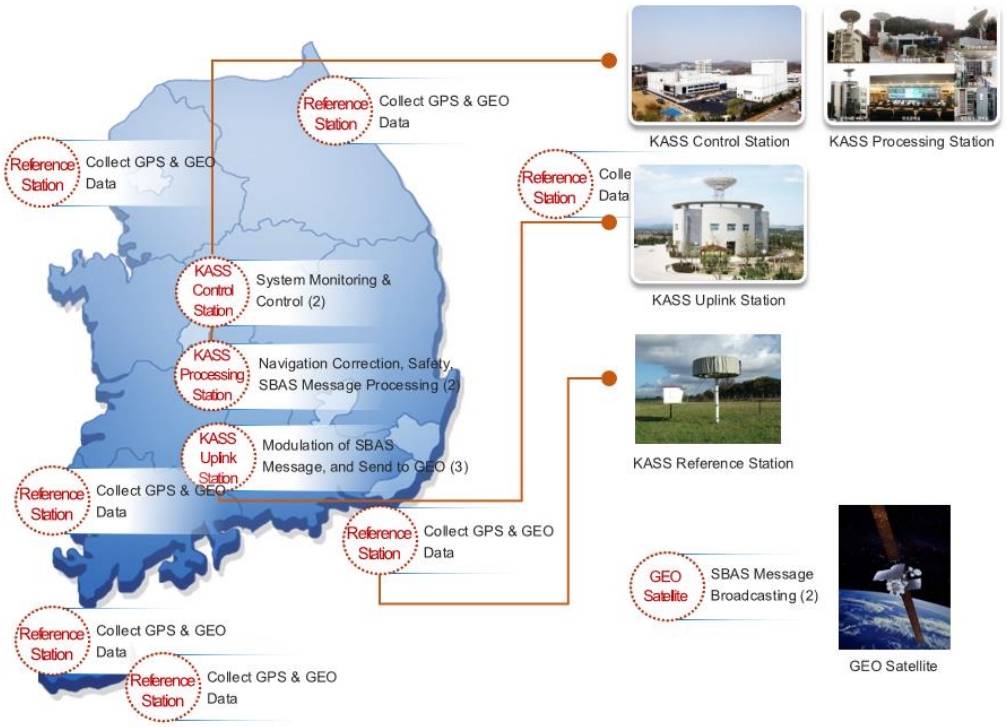

Fig 2. KASS System Location
(Locations of the Subsystems shown above are temporary.)

2.3 KASS Implementation Status

2.3.1 In August 2013, Government decided to launch the Korean SBAS (K-SBAS) Program. In October 2014, KARI was awarded as K-SBAS Program Office. In December 2014, KASS (K-SBAS) Program Office was officially established.

2.3.2 In October of last year (2016), KPO has signed a Contractual Document with the Thales Alenia Space France (TASF) for KASS development. And then KPO had a Kick-Off Meeting in December.

2.3.3 In January of this year (2017), KPO performed SDR (System Design Review). In March of this year (2017), KPO sent four people to Toulouse, France as the Joint Design Team. And KPO has carried out the PDR (Preliminary Design Review) in April of this year.

3. FUTURE PLANS OF KASS PROGRAM

3.1 For the joint Test Team, KPO will send four people to Toulouse by the first half of next year (2018).

3.2 Also, KPO will carry out CDR (Critical Design Review) in the first half of next year (2018). The FAT (Factory Acceptance Test) will be done at the end of 2019, and the SAT (Site Acceptance Test) will be done in February 2020. And then KPO will start Open Service in July 2020. SQR (System Qualification Review) will be performed in October 2020. Finally, KPO will commence Safety of Life (SoL) service after October 2022. In addition, currently Republic of Korea is considering applying the APV-I procedure to small airports (i.e. Heuksan Island and Ulleung Island).

4. ACTION BY THE CONFERENCE

4.1 The Conference is invited to note information contained in this Paper.

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