



International Civil Aviation Organization

THE FIFTH MEETING OF THE ASIA/PACIFIC GBAS/SBAS IMPLEMENTATION TASK FORCE (APAC GBAS/SBAS ITF/5)

(Tokyo, Japan, 21- 23 June 2023)

Agenda Item 3: Updates from States/Administrations about GBAS/SBAS Implementation

KOREAN SBAS (KASS) DEVELOPMENT & IMPLEMENTATION STATUS

(Presented by Republic of Korea)

SUMMARY

The Republic of Korea is in progress on developing Korean SBAS (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.

1. INTRODUCTION

1.1 The Republic of Korean SBAS (Satellite Based Augmentation System) program has been initiated in October, 2014. Korea Augmentation Satellite System (KASS) will be a 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) opened under the Korea Aerospace Research Institute (KARI) and was selected a prime contractor in October, 2016, for the joint development of KASS, and the full-fledged development has been ongoing.

2. DISCUSSION

2.1 Overview

2.1.1 Republic of Korea is developing the SBAS, named KASS, which will provide navigation services to various users in republic of Korea - including aviation, transportation (road, rail, maritime), timing, and others. The development of KASS will also benefit for the evolution of the industries. The KASS R&D is managed by the KPO in KARI which has been selected for the joint development and implementation of KASS, and local Korean contractors have been selected for supplying the several sub-components of KASS. KASS will comply with the SBAS requirements defined by the SARPs in Annex 10, the International Civil Aviation Organization (ICAO) 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 (Radio Technical

Commission for Aeronautics). It will augment GPS L1 signal and will give the APV-I approach services at first in the Incheon FIR.

2.1.2 KASS will be certified by the MOLIT with supports from experts in certification, safety and software domain. The European Aviation Safety Agency (EASA) provides them with general technical advice in the certification process.

2.2 KASS Configuration

2.2.1 The KASS system comprises of seven KASS Reference Stations (KRSs), two KASS Processing Stations (KPSs), two KASS Control Stations (KCSs) and three KASS Uplink Stations (KUSs at 2 sites). The subsystems communicate each other over the Wide Area Network (WAN) with low latency and high availability, continuity and integrity performance.

2.2.2 The KRS collects measurement data and messages being broadcasted from all GPS and GEO satellites, and delivers the data and the messages to the KPS. The KPS performs correction processing, safety process, and SBAS message processing. The KUS generates “GPS-like” signals combined with the SBAS messages from the KPS and transmits them to the GEO satellites. The GEO satellites receive the signals from the KUS and transmit GPS compatible signals. The KCS controls and monitors whole KASS ground subsystems.

2.2.3 The first KASS GEO satellite is the Measat-3D (located at 91.5° E), which was launched on 23rd June 2022 (KST).

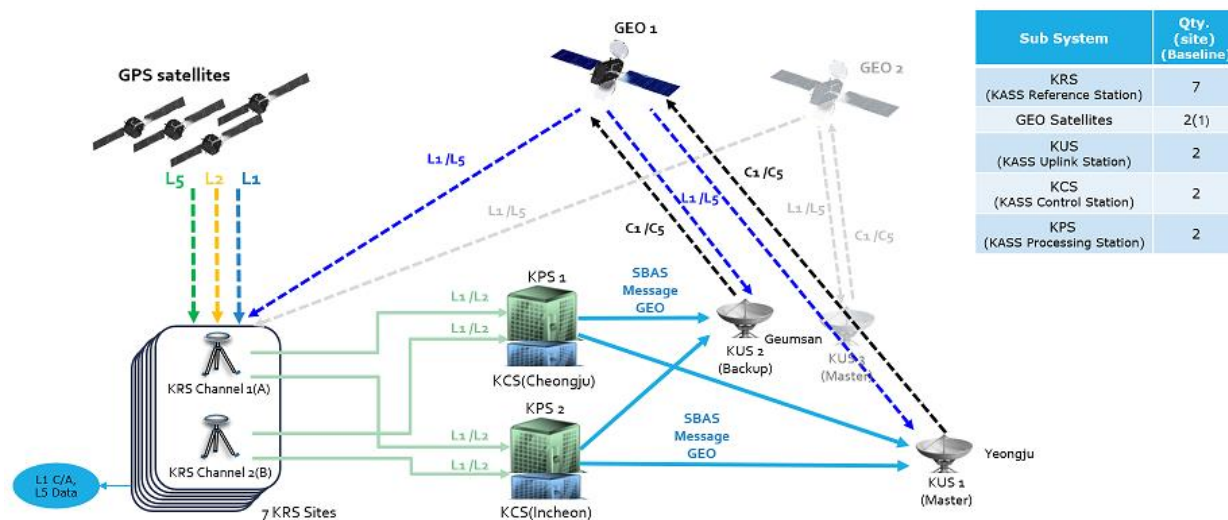


Figure 1. KASS system architecture

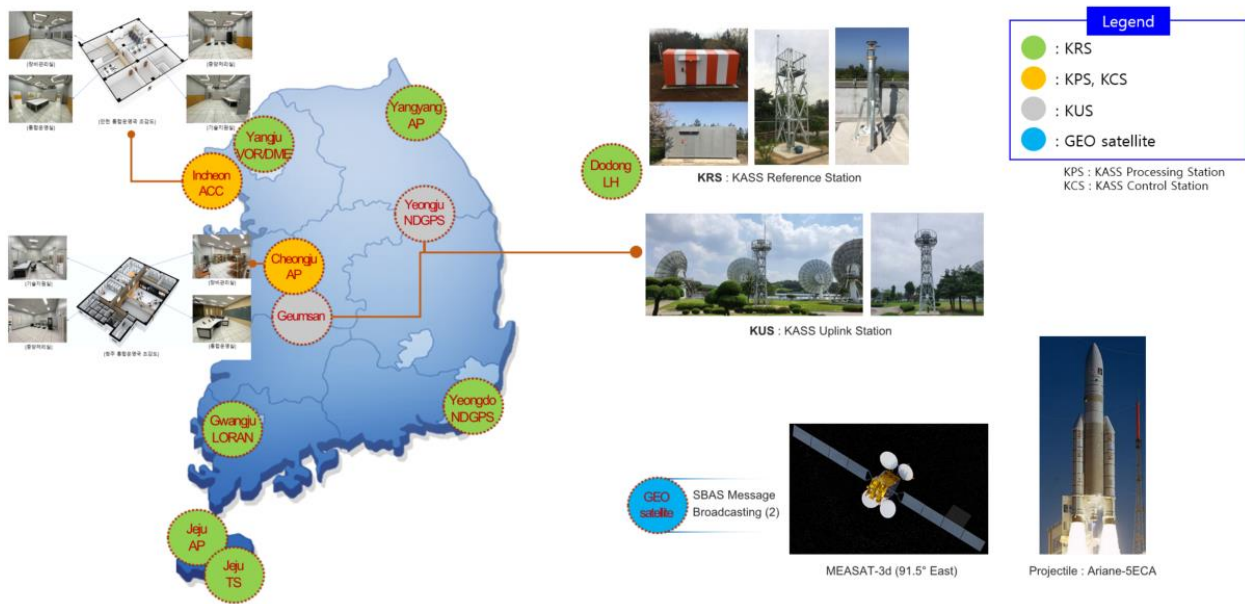


Figure 2. KASS system configuration.

2.3 KASS Implementation Status

2.3.1 In August 2013, Korean Government decided to launch the Korean SBAS Program. In October 2014, KARI was awarded as the management body for the program and the KASS Program Office (KPO) was officially established in December, 2014.

2.3.2 In June 2018, PRN 134 has been allocated to the first KASS GEO.

2.3.3 In July 2020, the amendment 92 to the ICAO SARPs Annex 10, Volume I has introduced a new SBAS service provider ID 6 allocated to KASS.

2.3.4 In December 2020, The KRS subsystem equipment deployment was completed with Site Acceptance Tests (SAT) and maintenance activities have been being performed periodically.

2.3.5 In February 2021, the Korea Air navigation Satellite Center (KANSC) as a KASS Service Provider was established under MOLIT and will manage the KASS service.

2.3.6 In April 2022, the Factory Test Readiness Review (TRR) was completed and Factory Acceptance Test (FAT) was finalized in July 2022.

2.3.7 In June 2022, the first KASS GEO satellite (Measat-3D with SBAS Payload, PRN number: 134) was launched. And it is in normal operation. The integration test between KUS and GEO satellite was completed in November and since 15th Dec, the KASS test messages (MT 0/0) is coming from 1# GEO (91.5E).

2.3.8 In February 2023, the KPO performed the last SAT (SAT#3) for the integration between the ground system and GEO satellite and then the Integration Readiness Review (IRR) was proceeded and Site-Test Readiness Review (S-TRR) was performed in May, 2023 and then, a more stable KASS signal has been broadcast using MT0/2 since 18th May, 2023.

3. FUTURE PLANS OF KASS PROGRAM

3.1 In July 2023, the KPO will conduct the TRB (Test Readiness Board) and ORR (Operational Readiness Review).

3.2 The KASS System Qualification Review (SQR) is planned in Nov., 2023, thereafter, the certification began in 2017 will be completed for the provision of the Safety of Life (SoL) service across the designated coverage (Incheon FIR). KASS Sol Service will be started Dec 2023.

3.3 In the first half of 2025, the second KASS GEO satellite (Koreasat-6A) will be launched. ROK will go through the current KASS's functional improvement for LPV-200 Service.

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