

Status of KPS Plans

– Korea Positioning System

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Background

Necessity

- The application area of satellite navigation system is rapidly expanding to the life of individual people such as smart phone, navigation, geodesy, emergency rescue, etc.
- It is important to support the social infrastructure of the 4th Industrial Revolution as a major infrastructure of Korea that promotes individual benefits.
- Higher accuracy, more availability and more various services are required.
- To satisfy the demands, we need to develop a regional navigation satellite system called Korean Positioning System

Background

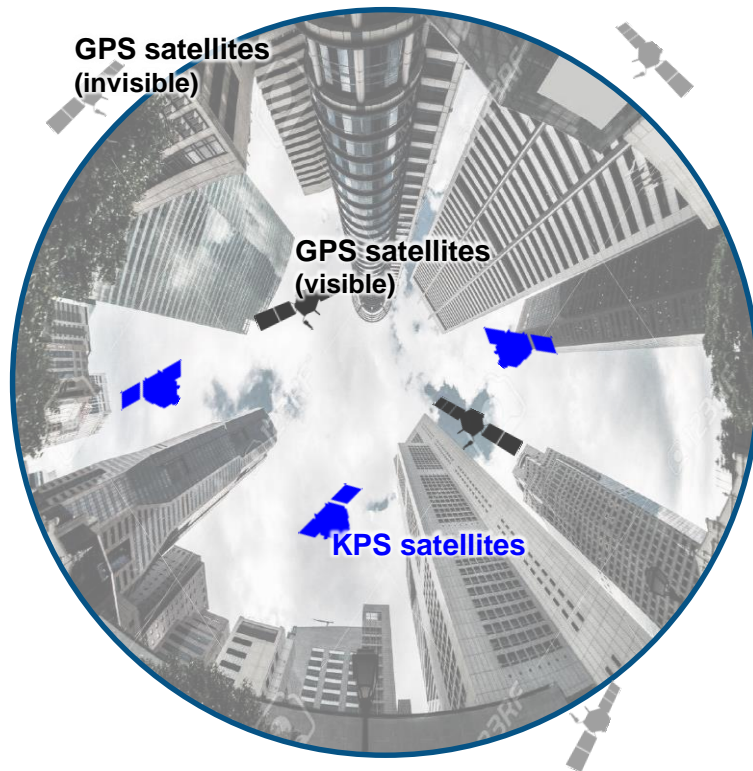
Status

- Mid and Long-term Plan of National Space Development was established in 2013**
- Ministry of Science and ICT finalized the third Space Development Promotion Plan at National Space Committee on Feb. 5 2018**
 - The plan includes the construction of the KPS, which provides services from 2035
- A preliminary steering committee for embarking the KPS project had been organized**
- A planning study for a preliminary feasibility study is on going**
 - Defining service and system requirements
 - Establishing a system development plan

KPS Overview : Concept

GPS Complementary

- ❑ KPS improves GPS service availability



GPS/KPS Augmentations

- ❑ KPS improves GPS/KPS accuracy and reliability
 - SBAS (KASS) for aircrafts
 - * SBAS : Satellite-Based Augmentation System
 - * KASS : Korea Augmentation Satellite System
 - Meter level & Centimeter level augmentations for general purposes (No integrity guaranteed)

Regional Navigation

- ❑ KPS provides regional PNT services
 - Open Service for general users
 - Public Safety Service for authorized users

KPS Overview

Services

❑ KPS should be **compatible** and **interoperable**

Service	Frequency Band	Remarks
Open Service (OS)	L1, L2, L5, L6, S	<ul style="list-style-type: none">• Providing navigation information for general users
Public Safety Service (PSS)	L6, S	<ul style="list-style-type: none">• For safety-conscious (authorized) users, including critical infrastructures
Meter Level Service (MLS)	L1	<ul style="list-style-type: none">• Meter level accuracy service (no integrity guaranteed)
Centimeter Level Service (CLS)	L6	<ul style="list-style-type: none">• For user applications demanding high-accuracy
KASS Service	L1, L5	<ul style="list-style-type: none">• Korea SBAS following ICAO standards• Relaying augmentation message of KASS
Search & Rescue Service (SAR)	L (1544MHz)	<ul style="list-style-type: none">• COSPAS-SARSAT standards

KPS Overview

System Configurations

❑ Satellite constellation

- 3 GEO satellites
 - * GEO : Geosynchronous Equatorial Orbit
- 4 IGSO satellites
 - * IGSO : Inclined Geosynchronous Orbit

❑ Ground systems

- 2 Operation Centers
- 2 Satellite Control Centers
- 10 Antenna Stations
- 15 Monitoring Stations
 - ❑ 5 domestic, 10 overseas
- External Systems
 - ❑ Mission Control Stations for augmentation services



KPS Overview : Development Plan

Phase 1 (2022~2027)

- Preliminary/critical design of KPS system with respect to the mission and requirements
- Development and launch of the 1st satellite (IGSO)
- Development of the initial ground system
- International cooperation for orbits, frequencies, sites acquisition

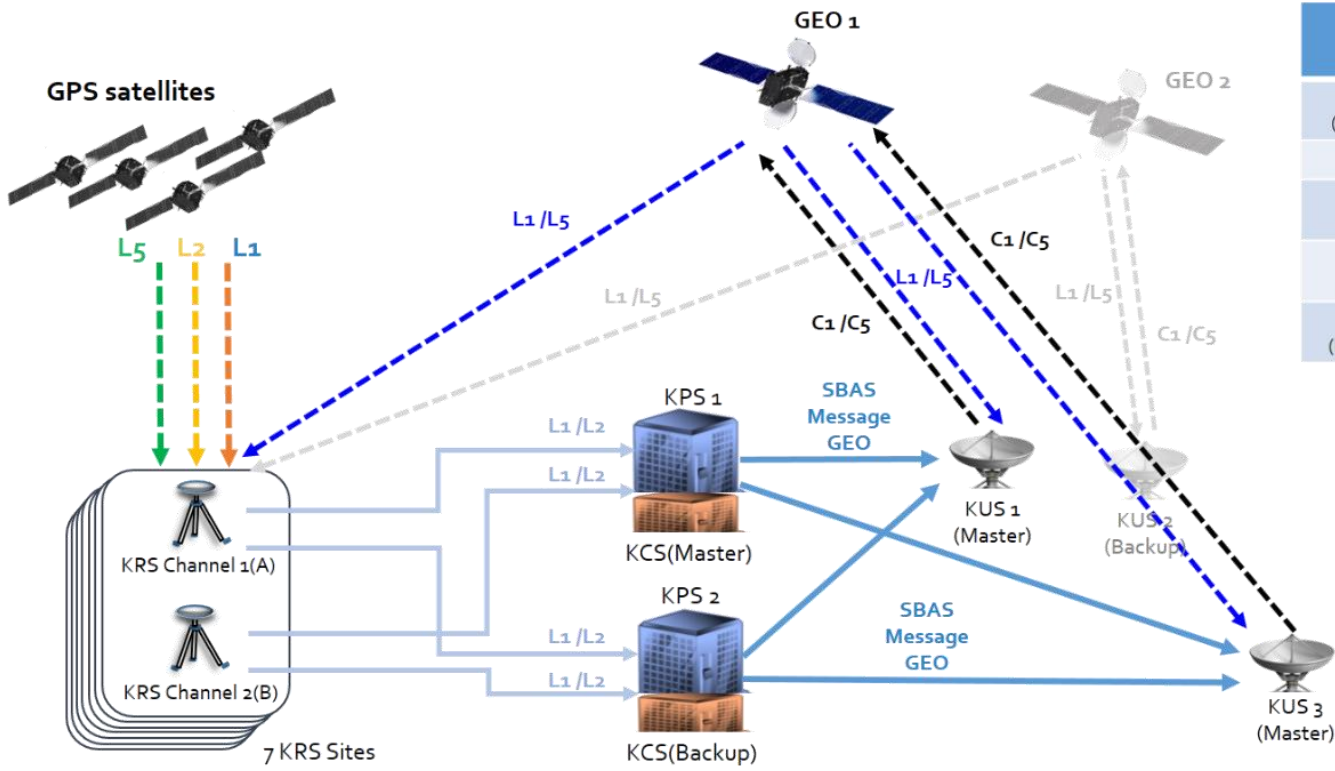
Phase 2 (2028~2034)

- Development and launch of the 3 IGSO and 3 GEO satellites
- Development and construction of the fully operational ground system
- Initial Operational Capability (IOC) start after system operational verification test and evaluation

KASS (Korea Augmentation Satellite System)

Main Goal

- ❑ Provide APV-I SoL Service to Airports located in South Korea
- ❑ Start APV-I SoL Service after 2023



S/S (Sub System)	Qty. (Baseline)
KRS (KASS Reference Station)	7
GEOs	2(1)
KUS (KASS Uplink Station)	3
KCS (KASS Control Station)	2
KPS (KASS Processing Station)	2

< KASS System Architecture >

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KASS (Korea Augmentation Satellite System)

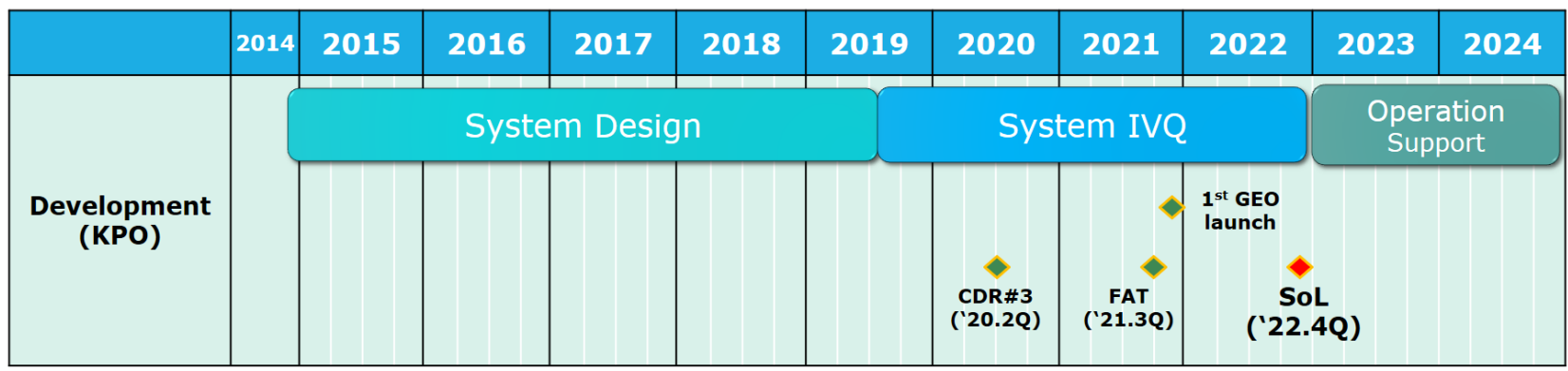
Status and Future Plan

□ Status

- '19.06., KASS Program Office member join TASF (Joint Test Team's activity)
- '19.09., Software Audit by Inspection Organization
- '19.11., KASS system 2nd Critical Design Review

□ Future Plan

- '20.06., KASS system 3rd Critical Design Review
- '21.09., FAT (Factory Acceptance Test)
- '22.12., SQR (System Qualification Review)



ICG Membership

South Korea's Interest in Membership Status

- ❑ ICG has become an important platform for communication and cooperation in the field of global satellite navigation.
- ❑ In connection with KPS and KASS, South Korea seeks to play an active role and contribution in promoting compatibility, interoperability and transparency between all the Global Navigation Satellite Systems (GNSS).
- ❑ Also, South Korea aims to enhance the capabilities of ICG member states in the use of GNSS and related applications at the regional and international levels.
- ❑ South Korea will uphold the principles of openness, cooperation, and resource sharing and cultivate talents in the field of GNSS to promote international GNSS education and training.
- ❑ The request for Membership will be submitted by 2020.

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