



*International civil aviation organization*

**TWENTY FIRST MEETING OF THE COMMUNICATIONS/NAVIGATION  
AND SURVEILLANCE SUB-GROUP (CNS SG/21) OF APANPIRG**

Bangkok, Thailand, 17 - 21 July 2017

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**Agenda Item 5: Navigation**

5.3 Other navigation related issues

**THE DEVELOPMENT PLAN OF THE BEIDOU SATELLITE-BASED  
AUGMENTATION SYSTEM (BDSBAS)**

(Presented by China)

**SUMMARY**

This paper describes the development plan of the BeiDou Satellite-Based Augmentation System (BDSBAS), including the composition, construction, service planning, and future test plans.

**1. INTRODUCTION**

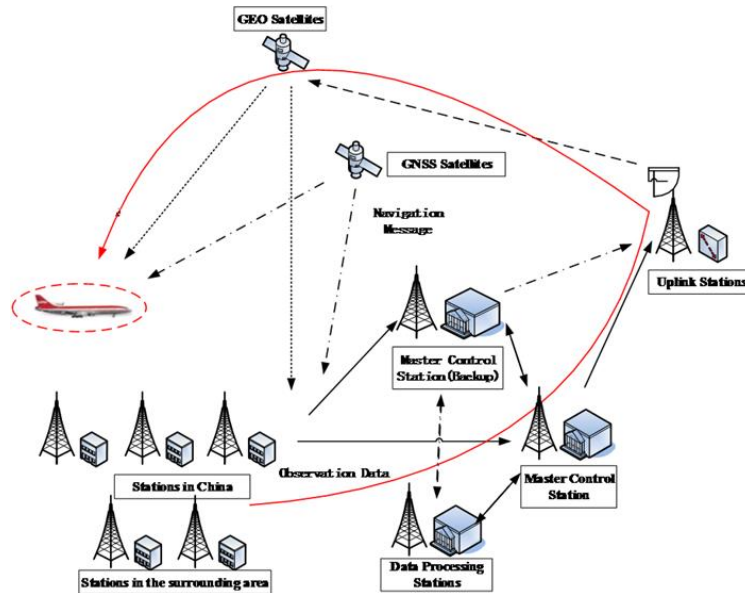
1.1 The BeiDou Navigation Satellite System (BDS) is a satellite navigation system independently developed and operated by China. On June 16, 2016, a whitepaper on the BDS development was published by the State Council of People's Republic of China. It describes the BDS development concepts and propositions. It is noted that, as an important part of BDS, the BeiDou Satellite-Based Augmentation System (BDSBAS) is scheduled to be deployed in a timely fashion.

1.2 China Satellite Navigation Office (CSNO), Civil Aviation Administration of China (CAAC), and China Satellite Navigation Project Center are in a coordinated effort in pushing forward the construction and application process of BDSBAS.

**2. DISCUSSION**

2.1 BDSBAS Architecture

As an important part of BDS, BDSBAS will provide services in accordance with the International Civil Aviation Organization (ICAO) Standards and Recommended Practices (SARPs) to users in China and its surrounding areas.



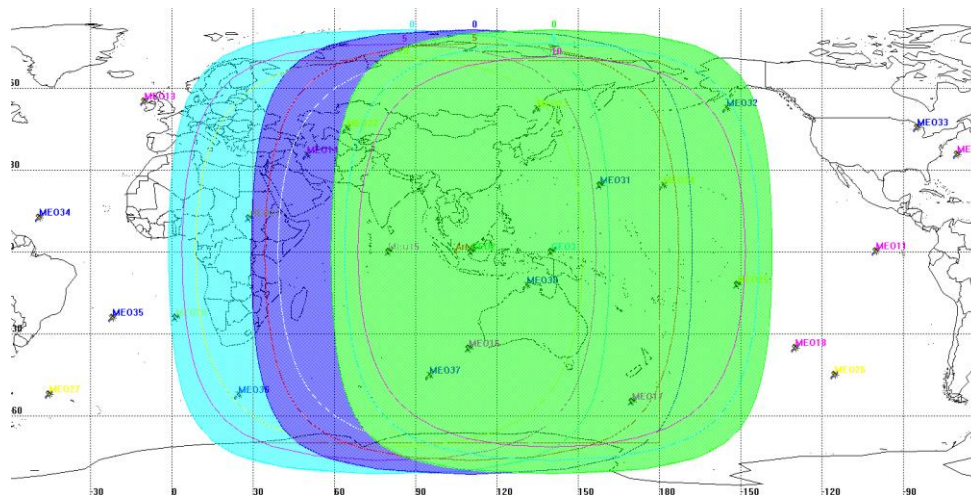
**Diagram 1 System Architecture of BDSBAS**

BDSBAS is mainly comprised of three parts:

- The BDSBAS space segment includes 3 Geostationary Earth Orbit (GEO) satellites. The first GEO satellite will be launched in 2018, and the other two will be in orbit no later than 2020. The BDSBAS L1/B1C signal will compliant to the ICAO SBAS L1 standards, while BDSBAS L5/B2a will compliant to DFMC SBAS ICD under developing.
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**Table 1 Locations and Frequencies of BDSBAS GEO Satellites**

Satellite Location	Down Link Frequencies	
	L1/B1C Frequency	L5/B2a Frequency
80°E	1575.42MHz	1176.45MHz
110.5°E	1575.42MHz	1176.45MHz
140°E	1575.42MHz	1176.45MHz



**Diagram 2 Signal Coverage of BDSBAS**

- The ground segment consists of Operation Control Centers (OCC), Data Processing Centers (DPC), Uplink Stations (US) and Monitoring Stations (MS) in China and overseas.
- The user segment refers to BDSBAS terminals used in all modes of transport, including civil aviation, maritime and railway.

### 2.2 BDSBAS System Performance

- Service Coverage: 10° N~55° N; 75° E~135° E;
- Augmentation Objects: BDS and GPS will be augmented initially. Galileo E1C/E5a and GLONASS L1/L3 will be considered if recommended by ICAO SARPs;
- Service modes: Single Frequency (SF) mode using GNSS L1 signals only with augmentation on SBAS L1 as identified by DO-229 (or equivalent); Dual-Frequency Multi-Constellation (DFMC) mode using GNSS L1 and GNSS L5 signals with augmentation on SBAS L5;
- Service Level: APV-I in the first place and then CAT-I.

### 2.3 Development Schedule

According to the BDSBAS construction plan, the BDSBAS development schedule is as follows:

- Started ground station construction and DFMC SBAS trials since 2015;
- Launch the first GEO satellite in 2018;
- Finish launching 3 GEO satellite no later than 2020, attain initial operating capability and start to provide SBAS service to users in China and its surrounding areas;
- Start upgrade and approval of BDSBAS by 2020;
- Reach full operational capability by 2022, and start to provide service to aviation equipment compliant to DO-229 (or equivalent).

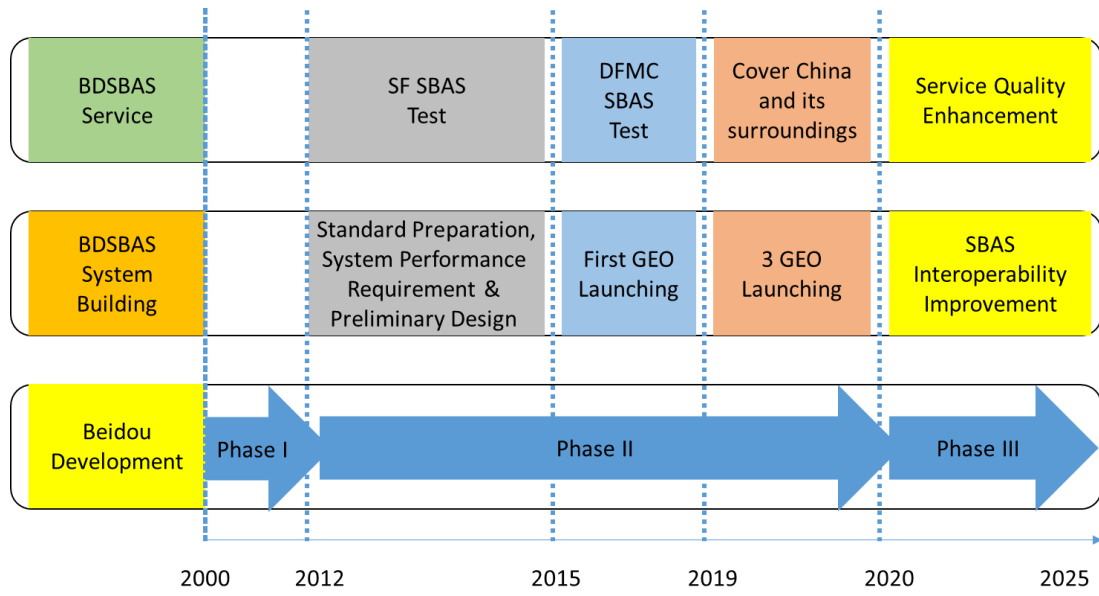


Diagram 3 Development Schedule of BDSBAS

2.4 Conclusion

BDSBAS system deployment is under schedule and will become an important part of the BDS.

**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 matter as appropriate.

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