



BeiDou Navigation Satellite System Status and Development

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China Satellite Navigation
Office
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System Status **01**



01 System

BDS Constellation Status

Status

No.	PRN	Sat Type	Sat Status	No.	PRN	Sat Type	Sat Status
1	1	BDS-2 GEO	Healthy	24	27	BDS-3 MEO	Healthy
2	2	BDS-2 GEO	Healthy	25	28	BDS-3 MEO	Healthy
3	3	BDS-2 GEO	Healthy	26	29	BDS-3 MEO	Healthy
4	4	BDS-2 GEO	Healthy	27	30	BDS-3 MEO	Healthy
5	5	BDS-2 GEO	Healthy	28	32	BDS-3 MEO	Healthy
6	6	BDS-2 IGSO	Healthy	29	33	BDS-3 MEO	Healthy
7	7	BDS-2 IGSO	Healthy	30	34	BDS-3 MEO	Healthy
8	8	BDS-2 IGSO	Healthy	31	35	BDS-3 MEO	Healthy
9	9	BDS-2 IGSO	Healthy	32	36	BDS-3 MEO	Healthy
10	10	BDS-2 IGSO	Healthy	33	37	BDS-3 MEO	Healthy
11	11	BDS-2 MEO	Healthy	34	38	BDS-3 IGSO	Healthy
12	12	BDS-2 MEO	Healthy	35	39	BDS-3 IGSO	Healthy
13	13	BDS-2 IGSO	Healthy	36	40	BDS-3 IGSO	Healthy
14	14	BDS-2 MEO	Healthy	37	41	BDS-3 MEO	Healthy
15	16	BDS-2 IGSO	Healthy	38	42	BDS-3 MEO	Healthy
16	19	BDS-3 MEO	Healthy	39	43	BDS-3 MEO	Healthy
17	20	BDS-3 MEO	Healthy	40	44	BDS-3 MEO	Healthy
18	21	BDS-3 MEO	Healthy	41	45	BDS-3 MEO	Healthy
19	22	BDS-3 MEO	Healthy	42	46	BDS-3 MEO	Healthy
20	23	BDS-3 MEO	Healthy	43	59	BDS-3 GEO	Healthy
21	24	BDS-3 MEO	Healthy	44	60	BDS-3 GEO	Healthy
22	25	BDS-3 MEO	Healthy	45	61	BDS-3 GEO	Healthy
23	26	BDS-3 MEO	Healthy				

A total of 45 satellites on orbit

Including:

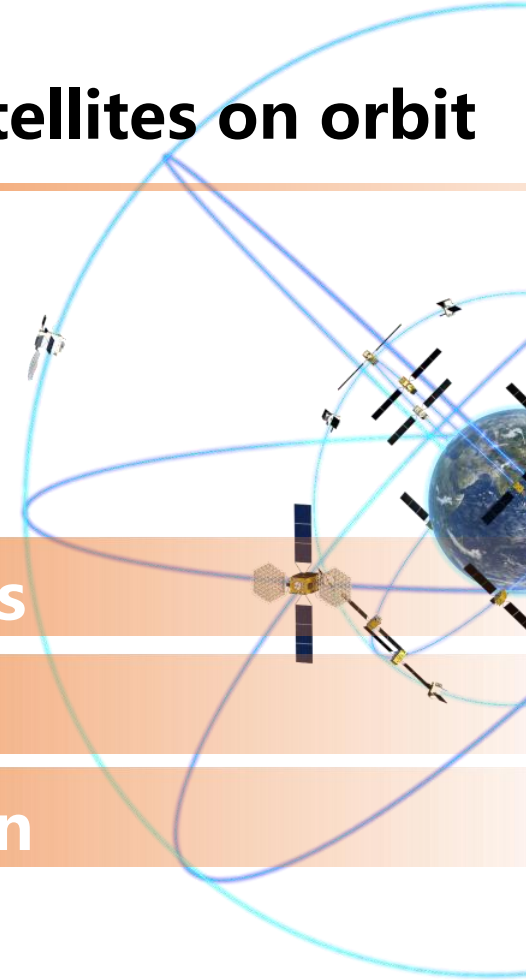
15 BDS-2 Satellites

30 BDS-3 Satellites

Reliable Services

Healthy State

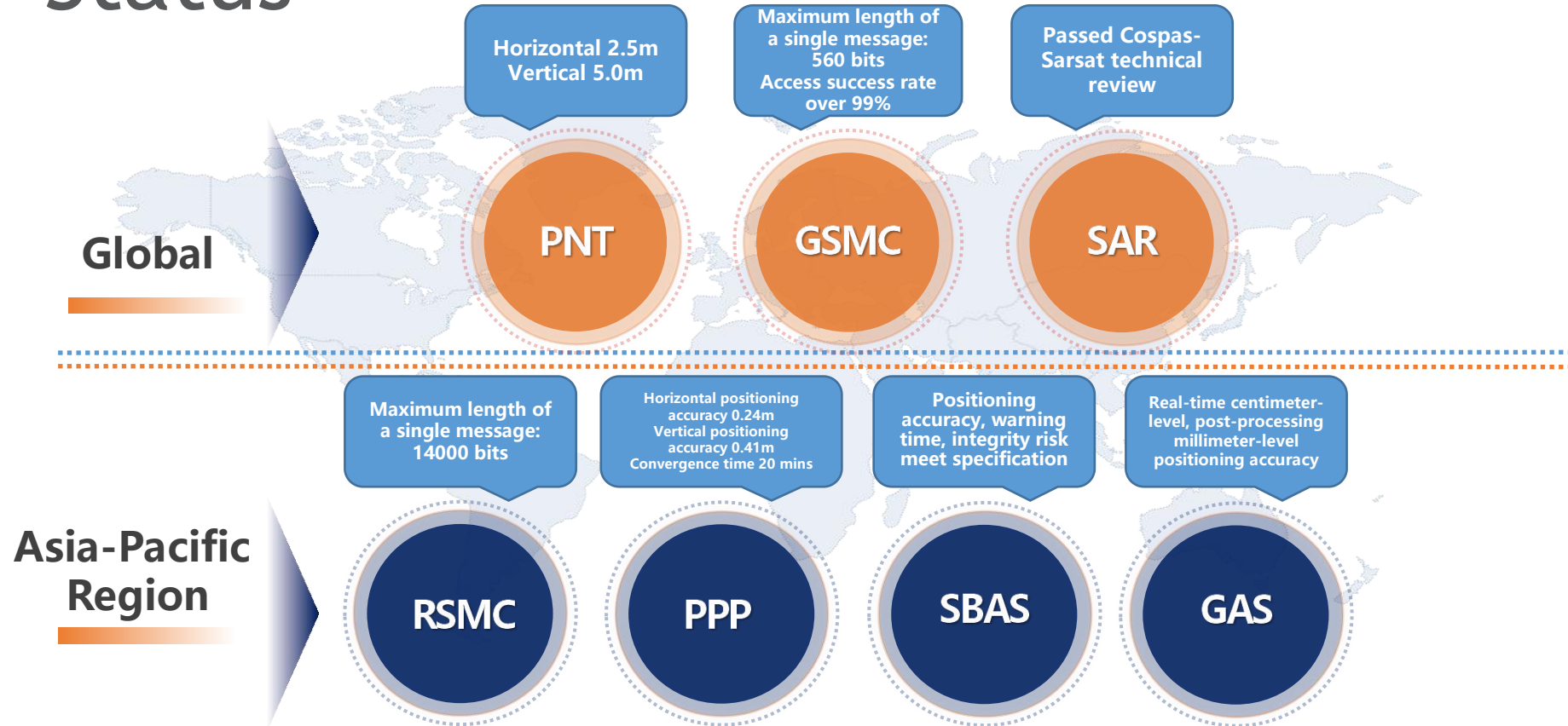
Stable Operation





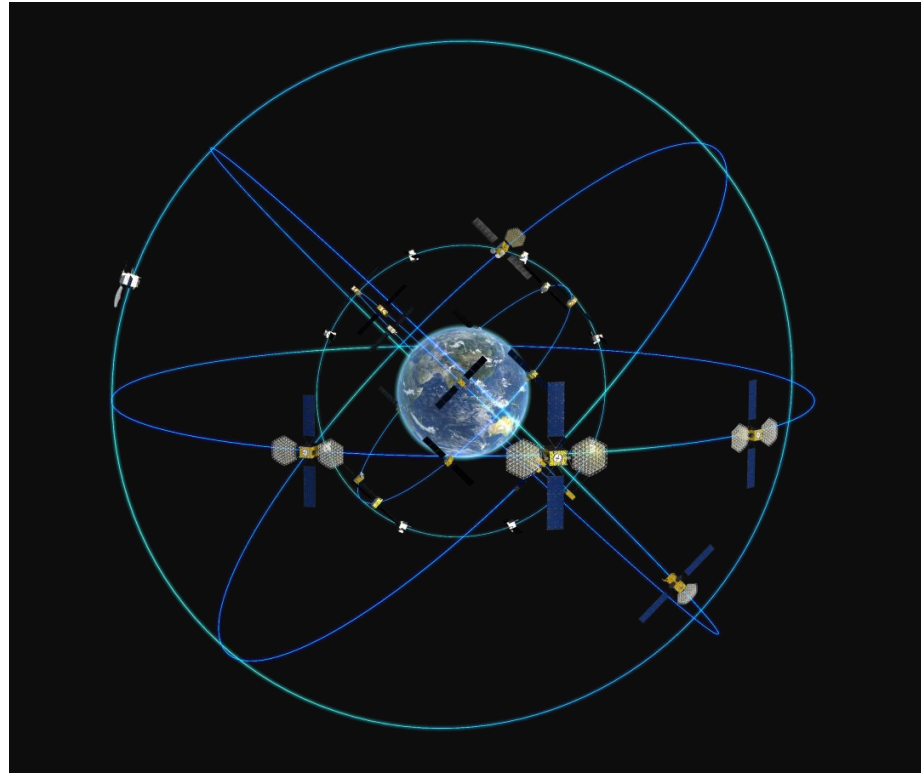
01 System Status

System Services



01 System

Positioning, Navigation and Timing Status



International GNSS Monitoring & Assessment System (iGMAS) Test Results and Comparison with Specification

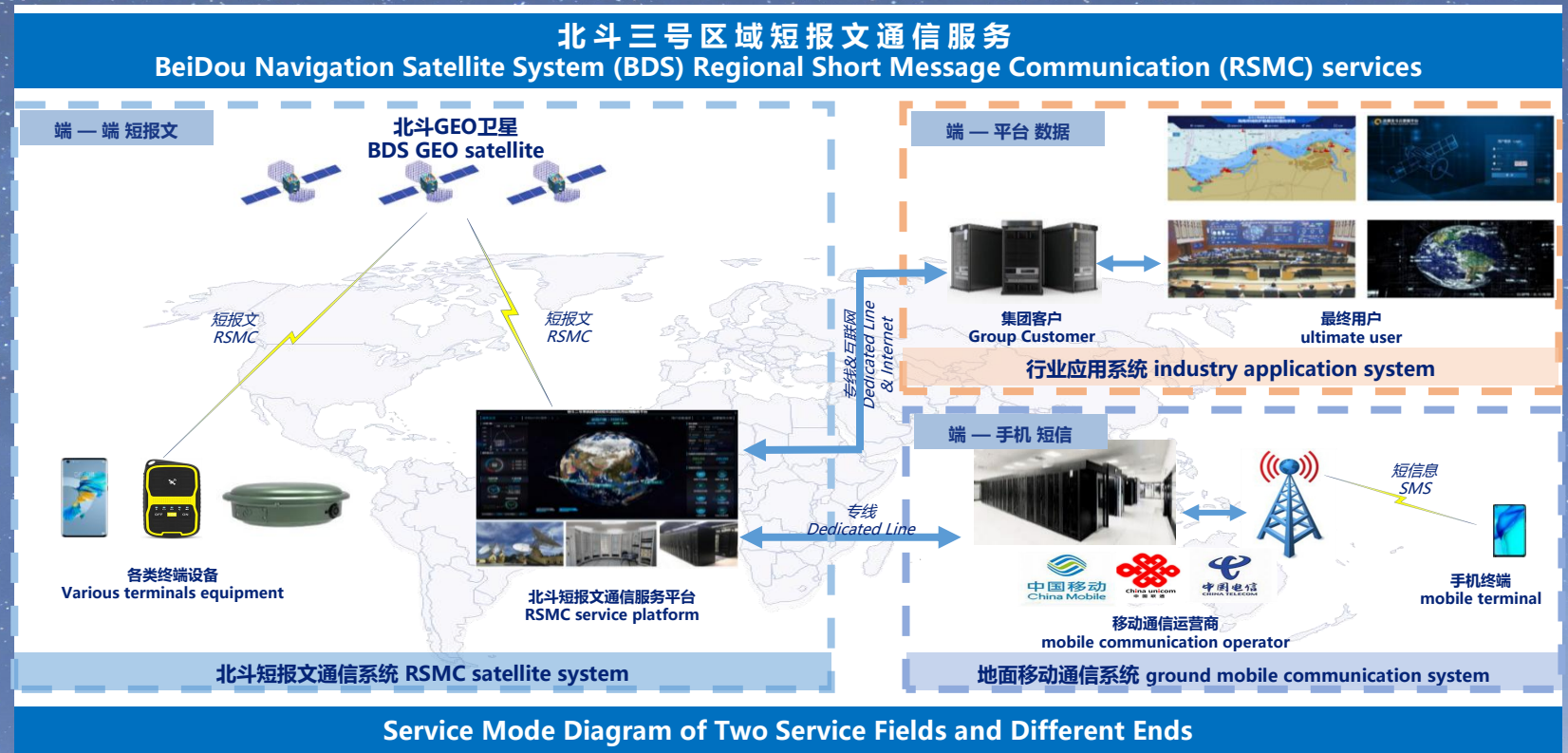
Items	Test Results	Specification
Global Positioning Accuracy (95%)	horizontal 2.5m vertical 5.0m	horizontal 9m vertical 10m
Global Velocity Measurement Accuracy (95%)	better than 0.1m/s	better than 0.2m/s
Global Timing Accuracy (95%)	better than 20ns	better than 20ns
Space Signal Continuity	99.996%	better than 99.8%
Space Signal Availability	99%	better than 98%

June, 2022



01 System Status

Four Service Platforms for Civil Use—BDS Short Message Communication Civil Use Service Platform



BDS short message communication civil use service platform consists of wide aperture antenna, signal processing system, information processing system and information platform, and realizes the interconnection with ground-based mobile communication system and network. Based on "Terminal to Application Platform to Mobile Phones" service mode, the platform realizes the combination of BDS short message communication into smart phone, without changing SIM card, without switching mobile phone numbers, and without adding external equipment.

01 System Status

Four Service Platforms for Civil Use—BDS Satellite-based Augmentation System Civil Use Service Platform



Consists of 27 domestic and 3 foreign monitoring stations and 2 data processing centers. Broadcasts BDSBAS B1C and B2a signals via GEO satellites for APV-1 and CAT-I requirements

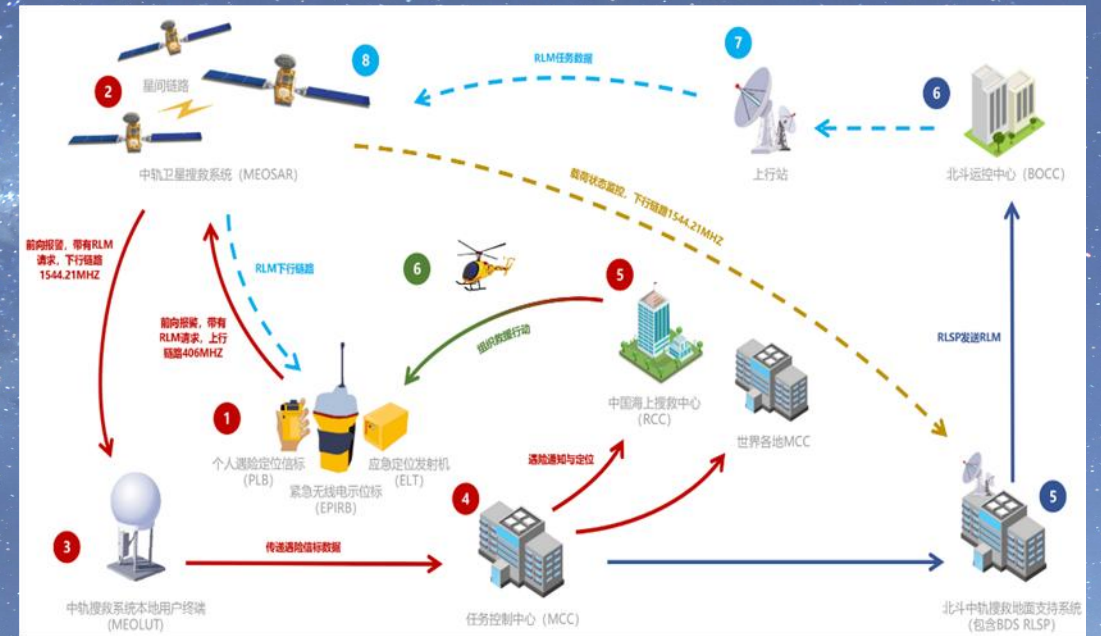
As an outside window of BDS SBAS, the Platform is to be used to carry out **airworthiness authentication, international standard promotion, systematic performance assessment, service and application promotion, etc.**



- **Civil Aviation:** Air Route Navigation, Approach and Landing, ADS-B Location
- **Maritime Affairs:** Navigation in port and inland river
- **Railway:** Control and Timing for Trains, Route Monitoring, Resource Management
- **Public Transportation:** Route Selection, Vehicle Recognition, Emergency Rescue
- **Electric Power:** Safe Timing, Unmanned Powerline Inspection

01 System Status

Four Service Platforms for Civil Use—China COSPAS SARSAT Civil Use Service Platform



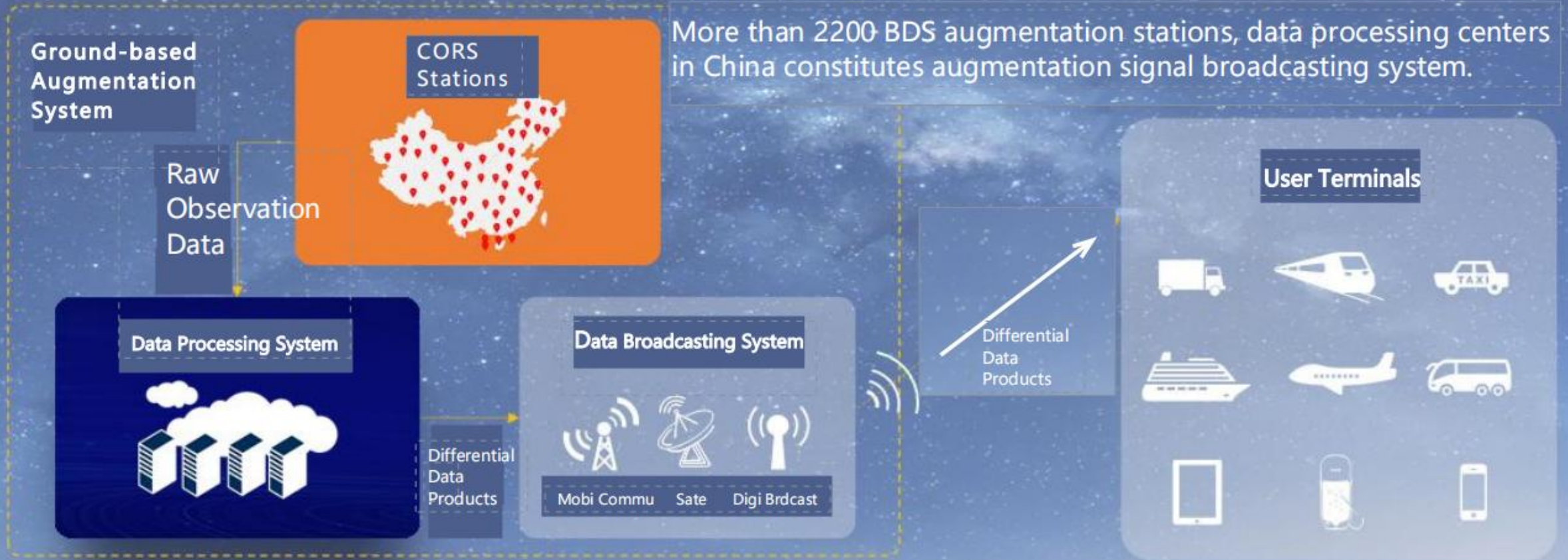
SAR Return Link broadcast at B2b frequency point
Supported by 24 MEO Satellites and 3 IGSO satellites

- 增强遇险人员信心**
Increase Confidence of people in emergency
- 协助救援行动**
Facilitate Search and Rescue Movement
- 降低误警率**
Lower Spurious Alarming Rate



01 System Status

Four Service Platforms for Civil Use—Ground-based Augmentation System Civil Use Service Platform





01 System Status

Information Dissemination--White Paper "China's BeiDou Navigation Satellite System in the New Era" Published



- The State Council Information Office of the People's Republic of China published a white paper titled "China's BeiDou Navigation Satellite System in the New Era" on Nov. 4th, 2022.

- Innovative System Configuration, Quality and Diverse Services
- Improving BDS Operation Management
- Promoting Sustainable Development of the BDS Applications Industry
- Upgrading BDS Governance
- Contributing to Building a Global Community of Shared Future

For more information:

<http://www.scio.gov.cn/zfbps/32832/Document/1732795/1732795.htm>



01 System Status

Information Dissemination—Practice Cases of Jointly Building a Community with a Shared Future in Cyberspace



- From 9th to 11th Nov. 2022, the 2022 World Internet Conference Wuzhen Summit was held. BeiDou Navigation Satellite System was selected as the practice cases of Jointly Building a Community with a Shared Future in Cyberspace.



BDS/GNSS
Applications

02

02 BDS/GNSS Applications

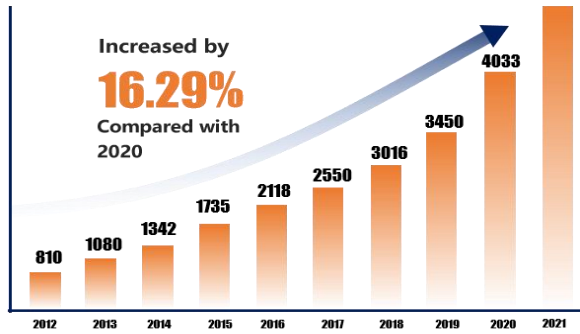
New High of Output Value

- The overall output value of China's satellite navigation and location-based service industry increased to 469 Billion RMB in 2021

2021

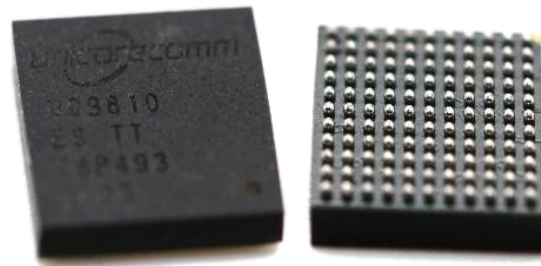
Domestic output value of satellite navigation and location-based service industries:

469 Billion RMB



Healthy Development of Industry

- A full spectrum chain of basic products established, shipment amount of domestic chip over 100 million, intellectual property protection protected.



Mass Market Application

- Making breakthrough in mass market with smart phone as representative products
- More than 130 million, also 98.5% shipments of smart phones in China supported BDS positioning function in the first half year of 2022



02 BDS/GNSS Applications

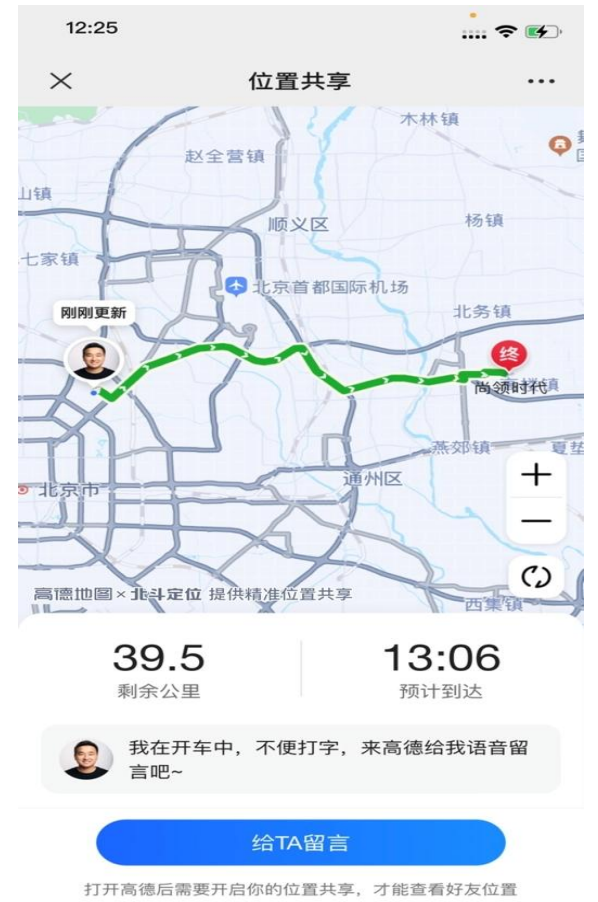
Mobile Navigation



Detailed Information of BDS satellites shown in interface



Lane-Level Navi/Traffic Light Reminder

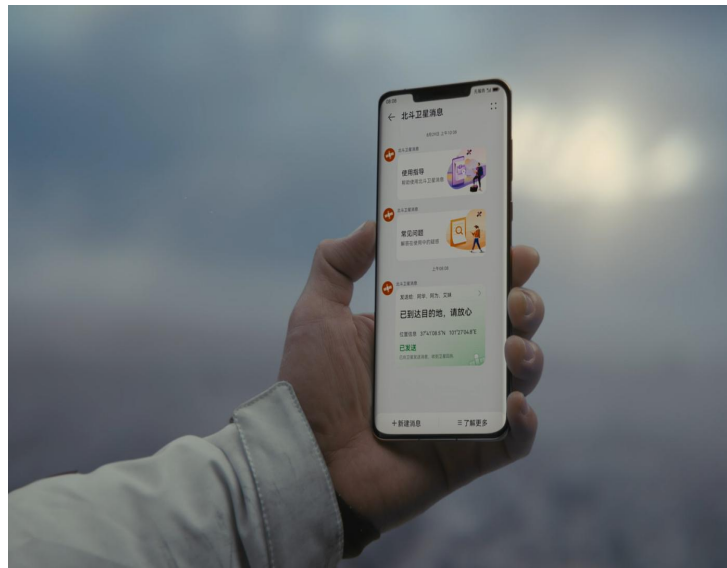


Real-time Location Sharing

02 BDS/GNSS Applications

Availability of SMC for Mobiles

- BDS Short Message Communication applied to Smart phones without changing devices in July
- BDS Short Message Communication entering Actual Test phase



Sender

Receiver





02 BDS/GNSS Applications

Electric Power Industry

BeiDou Services including PNT, Timing and Frequency, and Short Message Communication all fully applied in the field, with more than 380000 devices and terminals



Digitalization Construction of Power Grid Infrastructure



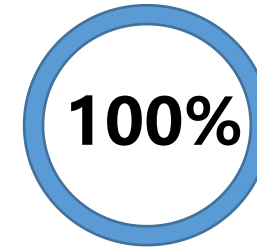
High Precision Unmanned Powerline Inspection



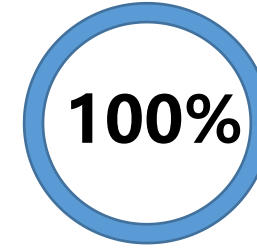
Safety Management of Employees



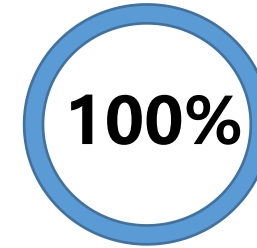
Real-time Monitoring of Power Grid Operation



Power Regulation, Information Management
All applying BDS Timing Signals



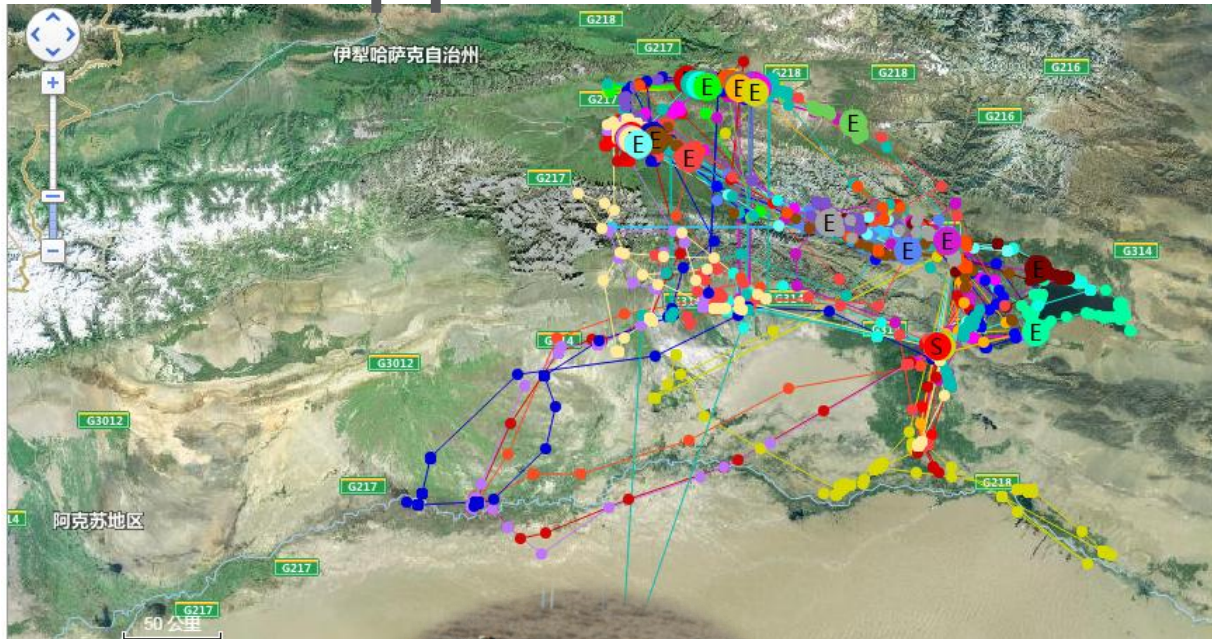
Frequency Synchronization Backbone Network
All receiving BDS Frequencies



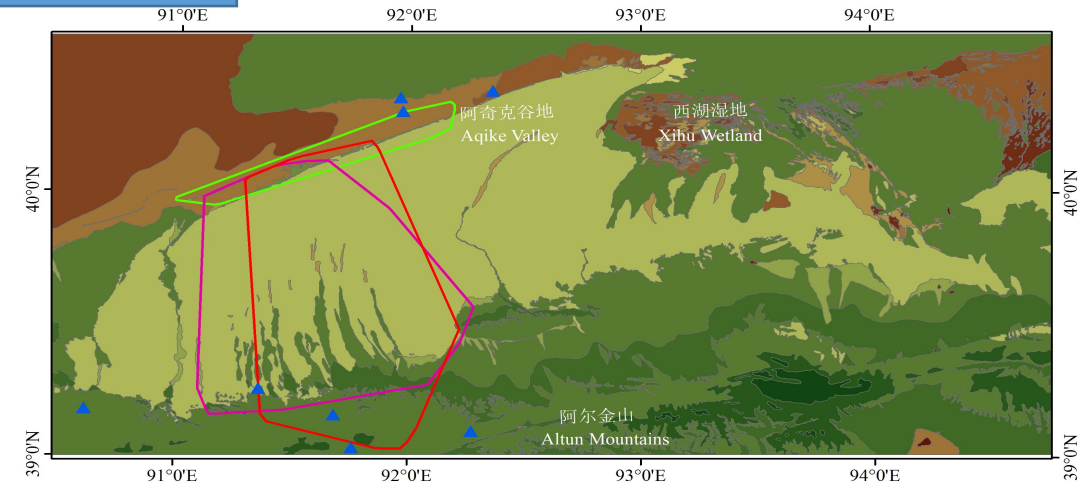
Vehicles in Power Industry
All equipped BDS Terminals

02 BDS/GNSS Applications

Wildlife Protection



BDS Based Studies on Bird Migration Activities



最小凸多边形活动范围 Minimum Convex Polygon home range



BDS Based Studies on Home Range of Wild Camel

02 BDS/GNSS

Applications

High Precision Deformation Monitoring

- BDS high-precision based early warning and monitoring system released landslide warning 7 minutes ahead, whose scale is as large as a hundred thousand cubic meters, and successfully prevented casualties.



- Confronted with the threat of potential natural disaster in Sarez Lake in Tajikistan, China and Tajikistan utilized BDS to undertake the deformation monitoring and disaster warning in surrounding area in millimeter-level accuracy, providing important scientific and technological reference for the safety of the dam.



02 BDS/GNSS Application

BDS International Applications

- BDS-based products have been exported to and used in more than half countries and regions in the world. BDS has been widely used in ASEAN, Southern Asia, Eastern Europe, Western Asia, Africa in land ownership confirmation, precision agriculture, intelligent port management, etc., promoting local economic and social development.





International
Cooperation

03

03 International

Compatibility and Openness to Provide Better Service (Bilateral)

Cooperation

China-Russia



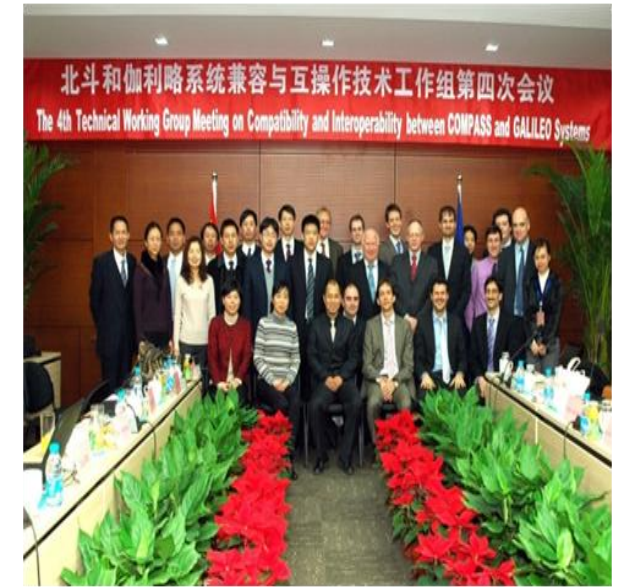
Comprehensively promote innovative and integrated development of BDS and GLONASS under the China-Russia Satellite Navigation Key Strategic Cooperation Project Committee framework

China-U.S.



Fostered the cooperation in compatibility and interoperability, SBAS, and civil use industries

China-EU



Coordinated with EU to foster a communication mechanism between Galileo and BeiDou, and frequency coordination communication was conducted

03 International Cooperation

Compatibility and Openness to Provide Better Service (Bilateral)

中国卫星导航系统管理办公室与阿根廷国家空间活动委员会合作谅解备忘录在线签署仪式
Ceremonia de firma virtual del MOU entre CONAE y CSNO



CSNO and CONAE has built a kind of normal cooperation mechanism in satellite and navigation, and will carry out cooperation in joint applications, test and assessment, education and training, etc., to accelerate economic and social development in Argentina.

中国—南非北斗/GNSS应用研讨会
Workshop on BDS/GNSS Applications in China and South Africa
2021年12月1日 December 1st, 2021



In order to promote national construction and social and economic development for both countries and enhance cooperation and communication in the satellite navigation field, CSNO and SANSA signed the MOU at the workshop on BDS/GNSS Applications in China and South Africa.

03 International Cooperation

Joint Discussion, Construction and Sharing with The Belt and Road countries (Multilateral)



3rd China-Arab States BDS Cooperation Forum
Dec. 8, 2021



2nd China-Central Asia BDS Cooperation Forum
Oct. 13, 2021



1st China-Africa BDS Cooperation Forum
Nov. 5, 2021



EXPO 2020 Dubai BeiDou Showcase
Oct. 2, 2021

03 International Cooperation

Chinese Wisdom and Contribution through Multilateral Exchanges (Multilateral)



Participated the ICG-16 in Abu Dhabi, UAE in Oct. 2022 to promote compatibility and mutual development with other systems and better serve the world



03 International Cooperation

Chinese Wisdom and Contribution through Multilateral Exchanges (Multilateral)



China actively participated in programs and activities under the UN framework to promote GNSS compatibility and interoperability, and held education and training activities in Asia-Pacific regions and Africa based on United Nation Education and Training Center.



03 International Cooperation

Host of China Satellite Navigation Conference and Extensive Exchanges



The 14th China Satellite Navigation Conference (CSNC) is going to be held in Ji'nan, Shandong Province in 2023.



03 International Cooperation

Participation by International Standards





03 International Cooperation

Ratification by International Standards



BeiDou has been adopted as the third operator to provide tracking systems for ships after being given a certificate by the International Maritime Organization (IMO).





03 International Ratification by International Standards Cooperation



- 参会者(173)
- CHINA-WENGYANYUN (我)
 - SEC - Kevin AMME (主持人)
 - SEC - Miriam (联席主持人)
 - SEC - Zuzana Rym (联席主持人)
 - CSC-67 Chair - Andrey Kuropyat
 - English Interpreter (传译员)
 - French Interpreter (传译员)
 - Russian Interpreter (传译员)
 - B85 1907 6060
 - ALGERIA-Mahmoud AMRI
 - ALGERIA-Yassine ZAHZOUH
 - ARGENTINA - Leonardo Maugere
 - Australia - Matt Dionne
 - Australia - Stuart Shepard
 - AUSTRALIA Kara Grey
 - BRAZIL - Alan Ruskin

DECLARATION OF INTENT BETWEEN THE CO-OPERATING AGENCIES OF THE INTERNATIONAL COSPAS-SARSAT PROGRAMME AND THE MARITIME SAFETY ADMINISTRATION OF THE PEOPLE'S REPUBLIC OF CHINA FOR CO-OPERATION ON THE COSPAS-SARSAT MEDIUM-ALTITUDE EARTH ORBIT SEARCH AND RESCUE (MEOSAR) SATELLITE SYSTEM

- 8 -

Signed in 6 (six) originals in each of the English, French and Russian languages, each version being equally valid.

For the Maritime Safety Administration of the People's Republic of China

For the National SAR Secretariat (NSS), Co-operating Agency of Canada

For the Centre National d'Etudes Spatiales (CNES), Co-operating Agency of the French Republic

For Federal State Unitary Enterprise Morsviazputnik, Co-operating Agency of the Russian Federation

For the National Oceanic and Atmospheric Administration (NOAA), Co-operating Agency of the United States of America

The Co-operating Agencies of the International COSPAS-SARSAT Programme and the Maritime Safety Administration of the People's Republic of China, hereinafter referred to as the Signatories:

NOTING the successful implementation of the COSPAS-SARSAT search-and-rescue Satellite System currently operated under the terms of the International COSPAS-SARSAT Programme Agreement, done at Paris on 1 July 1988;

NOTING the continued operation of the COSPAS-SARSAT System and its significant international contribution to the saving of human lives for more than forty years through the use of search-and-rescue instruments on satellites in low-altitude Earth orbit (LEOSAR) and geostationary Earth orbit (GEOSAR);

NOTING the commitment of the COSPAS-SARSAT Parties to the Agreement to assure the long-term operation of the COSPAS-SARSAT System and access to this System to all States on a non-discriminatory basis, and free of charge to the end-user in distress;

RECOGNIZING that parallel efforts are being undertaken by the COSPAS-SARSAT Parties, the European Union, and the People's Republic of China in the investigation of enhancing global satellite-aided search and rescue by placing 406-MHz transponders on the satellites of Global Navigation Satellite Systems (GNSS) in medium-altitude Earth orbit, known as BDS, GALILEO, GLONASS and GPS;

NOTING the COSPAS-SARSAT Council decisions, reflected in document C/S R.012, "COSPAS-SARSAT 406 MHz MEOSAR Implementation Plan", to ensure that new MEOSAR satellite constellations would be compatible with the existing COSPAS-SARSAT System, and to the greatest extent possible, interoperable at the user level;

RECOGNIZING that it is desirable for the Russian Federation, the United States of America, the European Union and the People's Republic of China to coordinate planning and development of their MEOSAR satellite constellations (including GNSS elements related to COSPAS-SARSAT System) to ensure that their satellite constellations will be compatible with the existing COSPAS-SARSAT System, and to the greatest extent possible, interoperable at the user level;

NOTING the COSPAS-SARSAT Parties' desire to co-operate at relevant COSPAS-SARSAT fora on matters related to the use by global search-and-rescue services of the distress-location services developed using the BDS, GALILEO, GLONASS and GPS platforms;

NOTING that the People's Republic of China, through the implementation of a SAR/BDS programme (search-and-rescue distress alerting using its BDS spacecraft and compatible ground segment), aims to become one of the providers of space and ground segments of the COSPAS-SARSAT MEOSAR system;

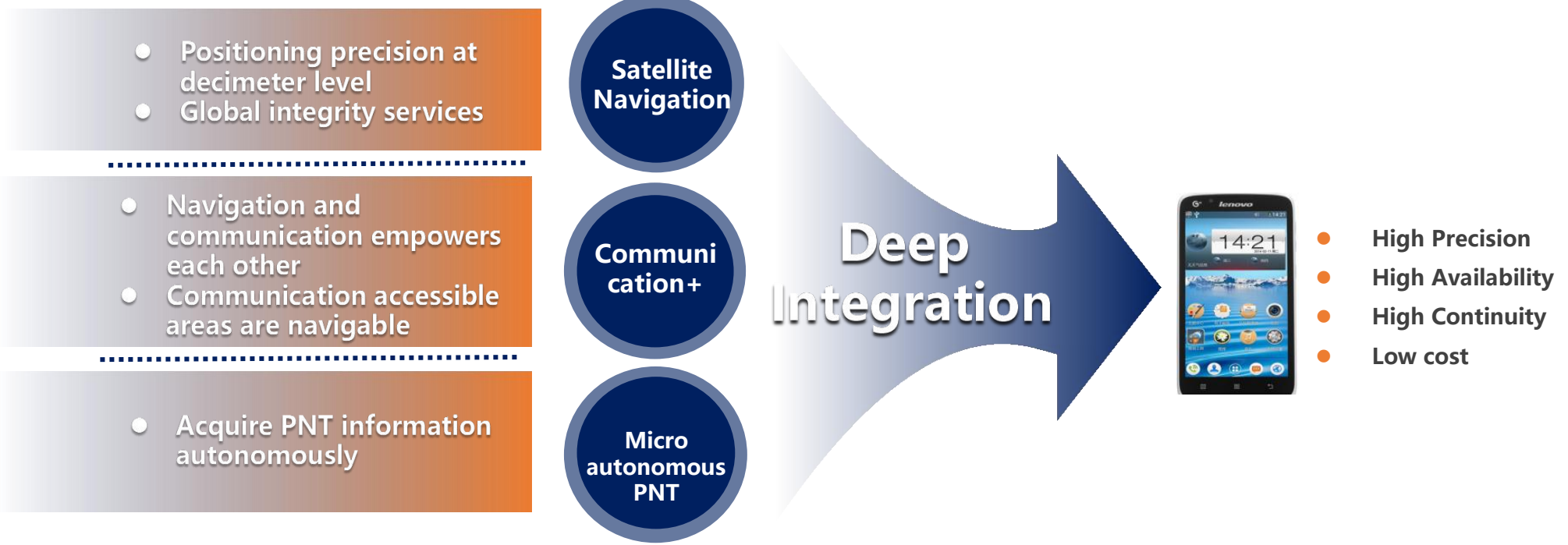




Future Visions 04

04 Future Visions

1. Development of Back-up Satellites, Optimize Production and Status to Ensure the Stable and continuous Operation
2. Acceleration of Integration with Newly-Emerging Technologies to Meet the Maximized Needs of PNT System
3. A Comprehensive PNT System will be Established with BDS as the Core



The background of the slide is a dark blue rectangle. In the center is a realistic image of the Earth. Surrounding the Earth are several concentric, light blue elliptical lines representing satellite orbits. Numerous small satellite icons are scattered across these orbits, some appearing to be in motion. The overall theme is space technology and satellite navigation.

**Thanks for your continuous attention and support to
the BDS development!**

<http://en.beidou.gov.cn>