

China's BeiDou Navigation Satellite System in the New Era

新时代的中国北斗

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Preamble

The BeiDou Navigation Satellite System (BDS) is a project built and operated by China as a component of the country's national security and economic and social development strategy. After many years in development, it has become an important new element of China's infrastructure, providing high-accuracy, round-the-clock positioning, navigation and timing services to global users in all weathers.

From the 18th National Congress of the Communist Party of China (CPC) held in 2012, BDS entered a new era of rapid development. On July 31, 2020, President Xi Jinping announced to the world that BDS-3 was officially commissioned—a sign that BDS began to provide global services. From the launch of reform and opening up in 1978 to the beginning of the new era, from BDS-1 to BDS-3, from two-satellite positioning to a configuration covering the entire globe, from serving the Asia-Pacific to serving the whole world, BDS has progressed together with China's development and advanced the process of national rejuvenation.

In the new era, BDS benefits not only the Chinese people but also the people of other countries. A first-class navigation satellite system developed by China and dedicated to the world, it has been applied worldwide, integrated with global infrastructure, and introduced into mass markets, empowering industries and profoundly changing people's lives and the way they work. It provides an essential spatiotemporal reference for economic and social development, contributing Chinese wisdom and strength to making navigation satellite systems better serve the world and benefit humanity.

In the new era, BDS demonstrates China's resolve and confidence in striving for greater strength and self-reliance in science and technology. It embodies the Chinese people's spirit and commitment to independence and self-reliance in overcoming difficulties through hard work, showcases the strength of China's socialist system in pooling resources on major projects, and epitomizes China's global vision and its sense of responsibility in helping others to achieve common development.

The Chinese government is publishing this white paper to present China's achievements and vision in developing BDS, and to share its ideas and experience.

前言

北斗卫星导航系统（以下简称北斗系统）是中国着眼于国家安全和经济社会发展需要，自主建设、独立运行的卫星导航系统。经过多年发展，北斗系统已成为面向全球用户提供全天候、全天时、高精度定位、导航与授时服务的重要新型基础设施。

党的十八大以来，北斗系统进入快速发展的新时代。2020年7月31日，习近平总书记向世界宣布北斗三号全球卫星导航系统正式开通，标志着北斗系统进入全球化发展新阶段。从改革开放新时期到中国发展进入新时代，从北斗一号到北斗三号，从双星定位到全球组网，从覆盖亚太到服务全球，北斗系统与国家发展同频共振，与民族复兴同向同行。

新时代的中国北斗，既造福中国人民，也造福世界各国人民。北斗系统秉持“中国的北斗、世界的北斗、一流的北斗”发展理念，在全球范围内实现广泛应用，赋能各行各业，融入基础设施，进入大众应用领域，深刻改变着人们的生产生活方式，成为经济社会发展的时空基石，为卫星导航系统更好服务全球、造福人类贡献了中国智慧和力量。

新时代的中国北斗，展现了中国实现高水平科技自立自强的志气和骨气，展现了中国人民独立自主、自力更生、艰苦奋斗、攻坚克难的精神和意志，展现了中国特色社会主义集中力量办大

I. BeiDou in the New Era

As China makes historic progress and undergoes historic transformations in the new era, BDS has also entered a new period of high-quality development, making further breakthroughs and reaching higher levels in its mechanisms and in the speed and scale of its deployment. It is a miracle created by China in the vault of the sky.

1. A Path of Independent Development

China has relied on independent innovation and taken a phased approach in developing BDS. Starting from scratch, the system has undergone steady improvements and upgrades, providing both active and passive positioning and expanding from regional to global coverage.

The three-step BDS strategy. China began to develop its own navigation satellite system in 1994. BDS-1 entered service and began providing positioning services in China at the end of 2000. At this point, China became the third country in the world with a navigation satellite system. BDS-2 was completed in 2012, providing passive positioning services to the Asia-Pacific region. In 2020, BDS-3 was formally commissioned to provide satellite navigation services worldwide. This marked the successful conclusion of the three-step BDS strategy.

Accelerated progress towards a global era. In December 2012, BDS-2 entered into service, marking a new stage of development. In March 2015, China launched the first BDS-3 experimental satellite. In November 2017, the first two Medium Earth Orbit (MEO) satellites joined the BDS-3 system. The global deployment of the BDS configuration began to gather pace. In December 2018, China completed the primary deployment of 19 satellites. In June 2020, it completed the entire constellation deployment of 24 MEO satellites, three Geostationary Earth Orbit (GEO) satellites, and three Inclined Geosynchronous Orbit (IGSO) satellites. The next month, BDS-3 began to provide global services, upgrading BDS to a worldwide system.

2. Better Services for the Whole World

In the new era, BDS will provide better services around the globe for the benefit of all humanity. To this end, China will intensify integration of different technologies, improve its capacity for diversified and specialized services, promote industries engaged in BDS applications, and reinforce international cooperation and exchanges on all fronts. Through this process, we can promote economic and social development, meet the people's desire for a better life, and share the results and benefits of BDS throughout the world.

Open services and greater compatibility. BDS provides open, free satellite navigation services, and its ability to serve the public across the world is being constantly improved. Through active international cooperation and exchanges, China calls for and works towards greater compatibility and broader sharing among different navigation satellite systems.

Innovation and upgrading. Under the innovation-driven development strategy, China is building up its capacity for independent development based on innovation. BDS is consistently being upgraded by adopting new and emerging technologies such as the latest communication technologies and low earth orbiter navigation

事的制度优势，展现了胸怀天下、立己达人的中国担当。

为介绍新时代中国北斗发展成就和未来愿景，分享中国北斗发展理念和实践经验，特发布本白皮书。

一、北斗发展进入新时代

进入新时代，伴随着中国发展取得历史性成就、发生历史性变革，中国北斗走上高质量发展之路，机制体系、速度规模等不断实现新突破，迈上新台阶，创造了中国北斗耀苍穹的奇迹。

（一）走出自主发展的中国道路

中国立足国情国力，坚持自主创新、分步建设、渐进发展，不断完善北斗系统，走出一条从无到有、从有到优、从有源到无源、从区域到全球的特色卫星导航系统建设道路。

实施“三步走”发展战略。1994年，中国开始研制发展独立自主的卫星导航系统，至2000年底建成北斗一号系统，采用有源定位体制服务中国，成为世界上第三个拥有卫星导航系统的国家。2012年，建成北斗二号系统，面向亚太地区提供无源定位服务。2020年，北斗三号系统正式建成开通，面向全球提供卫星导航服务，标志着北斗系统“三步走”发展战略圆满完成。

向全球时代加速迈进。2012年12月，北斗二号系统建成并提供服务，这是北斗系统发展的新起点。2015年3月，首颗北斗三号系统试验卫星发射。2017年11月，完成北斗三号系统首批2颗中圆地球轨道卫星在轨部署，北斗系统全球组网按下快进键。2018年12月，完成19颗卫星基本星座部署。2020年6月，由24颗中圆地球轨道卫星、3颗地球静止轨道卫星和3颗倾斜地球同步轨道卫星组成的完整星座完成部署。2020年7月，北斗三号系统正式开通全球服务，“中国的北斗”真正成为“世界的北斗”。

（二）更好服务全球、造福人类

新时代的中国北斗，以更好服务全球、造福人类为宗旨，进一步提高多种技术手段融合水平，不断提升多样化、特色化服务能力，大力推

augmentation. Efforts are also under way to incorporate non-satellite navigation technologies into its scope.

Quality services. BDS ensures stable and uninterrupted operation, shows strength in specialized services, and delivers high-quality satellite navigation services to users worldwide. In order to foster a more enabling environment for BDS-related industries, China has improved relevant standards, policies and regulations, intellectual property rights protection, and dissemination and promotion.

Sharing for the common good. China will expand BDS applications and promote higher quality in related industries, so that the system will be incorporated into every aspect of society and facilitate work and daily life. China shares the progress of its navigation satellite system with the rest of the world, with the goal of benefits for all.

3. BeiDou Spirit in the New Era

The BDS development team have worked hard through successive generations to surmount all difficulties in their research. In the new era, they have fostered a BeiDou spirit of independent innovation, openness and inclusiveness, unity of purpose, and pursuit of excellence. It is a telling example of China's national spirit centered on patriotism and defined by reform and innovation in the new era. It also makes a fine addition to the CPC's long line of inspiring principles.

Independent innovation as the core competitive advantage. China has maintained independence in the research, design, construction and operation of BDS, keeping core technologies in key fields firmly in our own hands. This is the approach we have taken in confronting challenges and overcoming difficulties in the development of BDS.

A global vision of openness and inclusiveness. The world is becoming increasingly open and integrated. By making BDS available worldwide, China honors its commitment to helping people of all countries share the opportunities and fruits of development. This clearly demonstrates China's farsighted vision and its will to share the best it has to offer.

Unity of purpose for success. BDS is the fruit of the cooperation and dedication of its developers, the support of the whole nation, and the collaboration among all parties concerned. It embodies China's great tradition of working together and the Chinese people's deep love for their country.

The constant pursuit of excellence. China is striving to make BDS one of the best navigation satellite systems in the world by achieving excellence in technology, construction, management and services. It is designed to become one of China's most recognizable brands in the new era.

4. Outlook for the Future

In the years to come, China will further upgrade BDS technologies, functions and services. The goal is to create a comprehensive spatiotemporal system that is more extensive, more integrated, and more intelligent, and that provides flexible, smart, precise and secure navigation, positioning and timing services. In doing so, China will help improve people's wellbeing and promote human progress.

In building a more powerful BDS, China will create its own smart and distinctive system for operation, maintenance and man-

agement北斗应用产业发展,全方位加强国际交流合作,更好满足经济社会发展和人民美好生活需要,更好实现共享共赢。

——**开放兼容。**免费提供公开的卫星导航服务,持续提升全球公共服务能力。积极开展国际合作与交流,倡导和加强多系统兼容共用。

——**创新超越。**坚持创新驱动发展战略,实现创新引领,提升自主发展能力。持续推动系统升级换代,融合新一代通信、低轨增强等新兴技术,推动与非卫星导航技术融合发展。

——**优质服务。**确保系统连续稳定运行,发挥特色服务优势,为全球用户提供优质的卫星导航服务。完善标准、政策法规、知识产权、宣传推广等体系环境建设,优化北斗产业生态。

——**共享共赢。**深化北斗系统应用推广,推进北斗产业高质量发展,融入千行百业,赋能生产生活。与世界共享中国卫星导航系统建设发展成果,实现互利共赢。

(三) 铸就新时代北斗精神

在面对未知的艰辛探索中,中国北斗建设者披荆斩棘、接续奋斗,培育了“自主创新、开放融合、万众一心、追求卓越”的新时代北斗精神,生动诠释了以爱国主义为核心的民族精神和以改革创新为核心的时代精神,丰富了中国共产党的精神谱系。

自主创新是中国北斗的核心竞争力。北斗系统始终坚持自主创新、自主设计、自主建造、自主可控,把关键核心技术牢牢掌握在自己手中,这是中国北斗应对各种挑战、战胜各种困难的主动选择。

开放融合是中国北斗的世界胸襟。北斗系统顺应开放的时代大势和融合的发展潮流,践行“让各国人民共享发展机遇和成果”的承诺,展现了登高望远的格局和美美与共的胸襟。

万众一心是中国北斗的成功密码。北斗系统是全体北斗建设者同舟共济、合作奉献的结果,是全国上下支持、各方力量协作的结果,生动诠释了中华民族团结拼搏的优良传统和中国人民深沉的家国情怀。