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Shaping a legal framework for China's BeiDou Navigation Satellite System

Dejian Kong

International Institute of Air and Space Law, Leiden University, The Netherlands

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ABSTRACT

As the service provision to Asia-Pacific region and the construction of global constellation are being pushed forward step by step, the lack of soft power on the governance and management over BDS, including institutional, policy and legal arrangements, is clipping the wings of the deployment, development, exploration and application of BDS, and constraining its further popularization at both the domestic and global level. Therefore, it is necessary to propose a comprehensive legal framework for BDS to keep the sustainable development of BDS and to balance the interests of all stakeholders in the value chain of BDS. Bearing that in mind, this paper offers the whole thinking of shaping that legal framework based on the specific analysis on the legal regimes on the supervision mechanism, certification system, mandatory application, ownership, operation, cost of recovery, sovereign rights, liability regime, data and privacy protection as well as other legal issues in the context of BDS.

1. Introduction

After decades of development, China's *BeiDou Navigation Satellite System* (BDS) has been recognized as one of four big players in the context of Global Navigation Satellite System (GNSS), with its partners, namely, the EU's *Galileo Satellite Navigation System* (Galileo), the U.S. *Global Positing System* (GPS), Russian *Globalnaya Navigazionnaya Sputnikovaya Sistema* (GLONASS). However, the above systems are not at the same stage, to wit, GPS and GLONASS have been of operation globally since last century, Galileo is still under fast catching-up deployments after a series of delay, and BDS has been providing Positioning, Navigation and Timing (PNT) service to the Asia-Pacific region since December 2012, and is supposed to offer global services by 2020.[1]

BDS is developed by the Chinese government, as one of Chinese key contributions to the mankind, with central considerations for China's national security, economic interests and social progress.[1] Technically speaking, BDS is composed of space satellites, ground facilities and user receivers, which has no difference with other GNSSs. Compared with its competitors, BDS has the same or even higher skill level with its unique function of short message communications and position reporting capability,[1] benefiting from the Chinese government's strong support; however, China's soft power on the governance and management over BDS has been left too far behind, which is clipping the wings of the deployment, development, exploration and application of BDS, and constraining its further popularization both at the domestic and global level.

2. State of play: what is the problem?

Although BDS has made great achievements on the research and development of system construction, it is facing serious challenges from the perspective of institutional, policy and legal arrangements, which are still in their infancy stage.

First of all, no clear governance structure has been worked out since the year of 1994 when China initiated the construction of BDS. This has resulted in some supervision conflicts between competent authorities. For example, there exist duplicate law enforcement and duty-overlap among *China Satellite Navigation Office* (CSNO), *China National Administration of GNSS and Applications* (CNAGA), *Ministry of Industry and Information Technology* (MIIT) and *Ministry of Transport* (MOT) regarding BDS application in transportation sector offered by mobile phone, and what's worse, there is no effective coordination mechanism yet among them.

Secondly, no operation model of BDS with enough consideration for civil interests has appeared, which makes increasing concerns by both domestic/foreign free users and commercial customers. Therefore, some commercial reforms on operation structure of BDS must be considered in particular on its pathway of globalization.

Thirdly, no feasible cost recovery mechanism has been proposed let alone profit plan even though the further deployment of BDS is facing financial pressure to some extent. BDS is going to provide open service on the one hand and authorized high-precision service on the other hand, and it is clear that the former is free of charge but whether the latter would charge user fees or not is still ambiguous according to current public information released. If the answer is yes the charging

[1] China Satellite Navigation Office, *Report on the Development of BeiDou Navigation Satellite System*, Version 2.2, December 2013.

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model must be designed and regulated in advance for publicity; if not, certain other solutions must be proposed for cost recovery, regardless of consideration for profits or not, for the sustainable development of BDS.

At last, the legal uncertainty of BDS is viewed as one of major barriers for the development of both China's upper-stream and lower-stream navigation industries, which includes but not limited to the following aspects:

1. China remains one of the few major space powers which lack national space legislation, and this makes the deployment and development of BDS, as one of critical space projects and infrastructure,[2] lack basic norm of law;
2. Only few space regulations and rules with lower legal effect have been enacted but they are focusing on other issues rather than satellite navigation matters such as registration of space objects, which could not be applied to BDS directly;
3. The State Council released certain national plans about satellite navigation industry such as *National Program for Medium and Long-term Satellite Navigation Industry Development*, and meanwhile several authorities, for example the CNAGA, issued several internal policy documents about the management of civil applications of BDS, but unfortunately most of them have no formal legal binding effect under current legal system of China;
4. It is not possible for the Chinese government to anchor any hope on international laws as no international convention regarding GNSS would be set down in the near future, because of unequal political power between GNSS providers and users which has been shown apparently in aviation community.[3]

3. The way forward for BDS legal framework

The main purpose to shape a legal framework for BDS (hereafter referred to as “Framework”) is to help keep its sustainable development according to short-term and long-term institutional, policy and legal arrangements. At the same time, the Framework should also respect the need to balance the interests of all stakeholders including the owner, operator, regulators, military & civil users, insurers and related third parties in the value chain of BDS. As for the constitution of this Framework, it should cover main elements to guarantee the well development and operation of BDS as well as the efficient management of applications and products based on BDS technology. With that in mind, the proposed Framework should address the following aspects particularly.

3.1. Supervision mechanism

First of all, an Inter-Ministerial Joint Meeting System for BDS is better to be established, which should be designed to balance all the interests involved in the management and utilization of BDS. In structuring this organization reference could be made to the U.S. *National Executive Committee for Space-based PNT*, a joint civil and military body established by the U.S. President for the management of GPS.[4] Secondly, a special supervisory authority could be selected or designed to undertake the comprehensive role of supervising the operation of BDS regarding its program funds, development and/or operation plan, security of both BDS intangible PNT data and tangible assets, and at the same time work as an independent agency to disclosure BDS public information, issue timely warning of BDS malfunction, and hear claims from BDS users.[5] Thirdly, the supervisory framework is advised to connect the cooperation between the above supervisory authority and spectrum management organization so as to jointly protect BDS from harmful interference. At last, in order to secure the continuity of BDS, the sustainable development of BDS should be addressed inside the supervision framework.

3.2. Certification system

In the context of BDS, certification refers to the confirmation by internal or external review body that BDS complies with the required performance parameters in terms of accuracy, integrity, continuity, and availability.[6] As BDS is now increasingly used in safety critical filed globally, an independent certification is required. Although a certification cannot guarantee any feature or functionality of the certified system, signal, service or product, it does help reduce risks in operation and increases the probability that all factors work as intended and planned.[7] Therefore, the establishment of BDS certification system including both institutes and regulations is essential for the safety of BDS service in the Framework. The scope of certification should be designed to cover each element of BDS including its signals in space, safety-critical applications and the user equipment, and each domain relying on BDS in particular in critical infrastructure area. As different domains are based on different certification requirements for authentication, and this makes the biggest challenge for BDS certification authority to grant approval, following different sets of rules, guidelines, and interests.[8] Fortunately, recently the first version of BDS standard framework has been released, but many specific standards are still uncertain, so the Framework shall pay certain attention on the feasible way to quicken the progress of completing standard system.[9] In addition, the international cooperation framework with foreign certification regime of BDS or GNSS in general, and the internationalization of BDS standards should also be addressed, where *Annex 10-Aeronautical Telecommunications* by ICAO and recommendations by ITU thereof could be taken as reference.[10]

3.3. Mandatory application

Now China is facing important strategic decisions regarding the utilization of BDS, because that the critical infrastructure sectors, including transportation, communication, banking, and electricity systems, are now too much relying on PNT services provided by the U.S. GPS rather than its own BDS, which is detrimental to China's national security, economic growth, business opportunities and strategic policies at national, regional and international levels.[11] In this regard, the Framework should make an appropriate response to the worries of key

[2] National Development and Reform Commission et al., *National Program for Medium and Long-term Civil Space Infrastructure*, October 26, 2015, in Chinese.

[3] *Legal Aspects of GNSS*, AN-Conf/11-WP/143, 18/9/13, presented by African States to Eleventh Air Navigation Conference, Montreal, 22 September to 3 October 2003.

[4] *National Executive Committee for Space-Based Positioning, Navigation, and Timing (PNT)*, available at < http://www.gps.gov/governance/excom/ > , last visited on November 05, 2016.

[5] For example, for GPS, the above role is now performing by the U.S. Coast Guard Navigation Center for land-based or maritime PNT signal problems, and the U.S. FAA for aviation (domestic or international) usage thereof. See *GPS PROBLEM REPORTING*, available at < http://www.navcen.uscg.gov/?pageName=gpsUserInput > , last visited on November 12, 2016; *GPS Anomaly Reporting Form*, available at < http://www.faa.gov/air_traffic/nas/gps_reports/ > , last visited on November 12, 2016.

[6] CSNO has released its Performance Parameters for BDS open service. See CSNO, *BeiDou Navigation Satellite System Open Service Performance Standard*, Version 1.0, December 2013.

[7] Martin Grzebellus, *Is certification of Galileo a bureaucratic overhead?*, 4 Coordinates 2008, pp. 11–12.

[8] *International Symposium on Certification of GNSS Systems & Services*, available at < http://www.dgon-cergal.org/index.php?id=23 > , last visited on October 25, 2016.

[9] National Standardization Technology Committee of BeiDou Navigation Satellite System, *Standard System of BeiDou Navigation Satellite System*, version 1.0, November 2016, in Chinese.

[10] ICAO, *Global Navigation Satellite System (GNSS) Manual*, Doc 9849, AN/457, Second Edition-2013, p. 5–1.

[11] Bearing in mind the “Milky Way incident” in 1993 and missile malfunction incident in 1996 Taiwan Strait Crisis, GPS is not a trusted and friendly partner of Chinese critical sectors in potential tension between the U.S. and China.