From Sea to Land?
The Geopolitics of Communications Infrastructure[1]
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Introduction: Data Access Capabilities and Communications Infrastructure

Competition over data, the "oil of the 21st century," is one of the fronts of today's U.S.-China confrontation. Vast amounts of data and the ability to access them are a source of industrial, military, and intelligence advantages.

How does the state access data? Cyberattacks are one method, but they are not efficient in terms of accessing large amounts of information and data. In terms of bulk collection of information and data, so-called "government access," in which governments use coercive force to access data held by private companies, may be an effective means. Above all, the ability to physically access key communications infrastructure, such as data centers and submarine cable landing stations, under the jurisdiction and influence of sovereignty states will be critical.

This report discusses one aspect of the U.S.-China conflict over hard telecommunications infrastructure: China's construction of telecommunications infrastructure inside Eurasia. When it comes to conflicts over the construction and operation of telecommunications infrastructure, many people probably think of submarine cables. In other words, the story goes that the U.S., as a "sea power," is exerting its influence over plans to lay and operate submarine cables to exclude Chinese capital and gain the upper hand in the competition over telecommunications infrastructure. At the same time, however, China is also trying to use its influence through the construction of telecommunications infrastructure on sea and land. In the interior of Eurasia, where it is difficult for the U.S. and its allies to exert influence, China is building hard telecommunications infrastructure.

U.S.-China Conflict over Submarine Cables

The main paths for interstate communication are submarine cables and satellites. However, submarine cables have advantages over satellites in terms of service life, latency (delay in communication), and installation cost. As a result, submarine cables accounted for 97% of international communications in 2008, up from 50% in 1995.[2]

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[1] This article is based on Kawaguchi Takahisa, "The U.S.-China Conflict over Telecommunications Infrastructure and Geopolitics," in Den Motohiro, *If It's a Conflict, It's Hatta*, Vol. 7 (in Japanese; provisional translation of title) (Kodansha, September 2021), pp.184-185, and the author's report and discussion at Nakasone Peace Institute for the U.S.-China Relations Study Group (November 25, 2021).

[2] Alison Lawlor Russell, *Strategic A2/AD in* Cyberspace (Cambridge: Cambridge University Press, 2017), p.

In light of this current situation, it has been pointed out that submarine cables are strategic assets and critical infrastructure for national security and cybersecurity. Many governments, in cooperation with telecommunications carriers, should be considered as intercepting packet data at the landing sites of submarine cables.[3]

The United States, along with its allies and like-minded countries, has blocked China's involvement in plans to lay and operate submarine cables in the Pacific Ocean. For example, in 2020, Google LLC and Facebook, Inc. (currently Meta Platforms) decided to change their plans to lay the Pacific Light Cable Network (PLCN), undersea cables that were to connect Los Angeles and Hong Kong, switching the west-end connection to the Philippines and Taiwan.[4] In addition, Chinese capital was expected to win the bid to lay the "Eastern Micronesia Cable" system connecting the Federated States of Micronesia, Kiribati, and Nauru, but the bid was nullified. The U.S. and Australia reportedly intervened citing security concerns.[5]

Construction of "Cross-Border Optical Cable" in the interior of Eurasia

China also increases its involvement in laying and operating submarine cables, while at the same time focusing on building a network of terrestrial fiber-optic cables ("cross-border optical cables" discussed below) in the Eurasian interior. These Beijing's attempts for investment in telecommunications infrastructure are called the "Digital Silk Road" and "Information Silk Road" under the "One Belt, One Road" initiative.[6] Whether it's "One Belt, One Road" or "Digital Silk Road," it is an ambiguous concept and is actually the aggregation of numerous projects.

The "Vision and Actions on Jointly Building Silk Road Economic Belt and 21st Century Maritime Silk Road" (March 2015) presents three priority areas for the construction of telecommunications

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32. However, the relative advantage of submarine cables over satellites may decline in the future due to the spread of low earth orbit satellites.

3 For a detailed discussion of the strategic importance of submarine cables and the U.S.-China confrontation, see Tsuchiya Motohiro, "U.S.-China Network Competition and Submarine Cables," (in Japanese; provisional translation of title) in Miyamoto Yuji, Ijuin Atsushi, and the Japan Center for Economic Research (eds.), *The Reality and Hype of the U.S.-China Divide: A Political and Economic Analysis of Decoupling and Supply Chains* (in Japanese; provisional translation of title) (*Nihon Keizai Shimbun Publications*, 2021), pp.59-77.

4 "Google and Facebook Withdraw Cable Connection Plan with Hong Kong, Fearing China's Information Gathering," (in Japanese; provisional translation of title) BBC News Japan (September 1, 2020). < https://www.bbc.com/japanese/53980674>

5 "Pacific Ocean Optical Cable, Chinese Firm's Bid Invalid Due to Japan-U.S.-Australia Concerns," (in Japanese; provisional translation of the title) *Nihon Keizai Shimbun* (March 18, 2021). < https://www.nikkei.com/article/DGXZQODF021U30S1A300C2000000/>

6 For earlier studies on the Digital Silk Road from the perspective of international political economy and security, see Mochinaga Dai, *The Digital Silk Road: The Geopolitics of Information and Communications* (Nihon Keizai Shinbun Press, 2022); Osawa Jun, "China and the Dream of Digital Techno-Hegemony," *Mita Hyoron*, No.1258 (July/August 2021), pp.37-42 ; Ito Asei, "Chapter 9: China's 'Digital Silk Road' Concept: Background, Related Documents, and Corporate Behavior," in The Japan Institute of International Affairs (ed.), *China's Foreign Policy and Other Countries' Foreign and Security Policies toward China*, The Ministry of Foreign Affairs of Japan, Research and Study Project for Foreign Affairs and Security (March 2020), pp.119-133. (All in Japanese; provisional translation of titles); Jonathan E. Hillman, *The Digital Silk Road: China's Quest to Wire the World and Win the Future* (London: Profile Books, 2021).

infrastructure.[7]

> We should jointly advance the construction of cross-border optical cables and other communications trunk line networks, improve international communications connectivity, and create an Information Silk Road. We should **build bilateral cross-border optical cable** networks at a quicker pace, plan t**ranscontinental submarine optical cable** projects, and improve **spatial (satellite) information passageways** to expand information exchanges and cooperation. (Bold emphasis added for this article.)

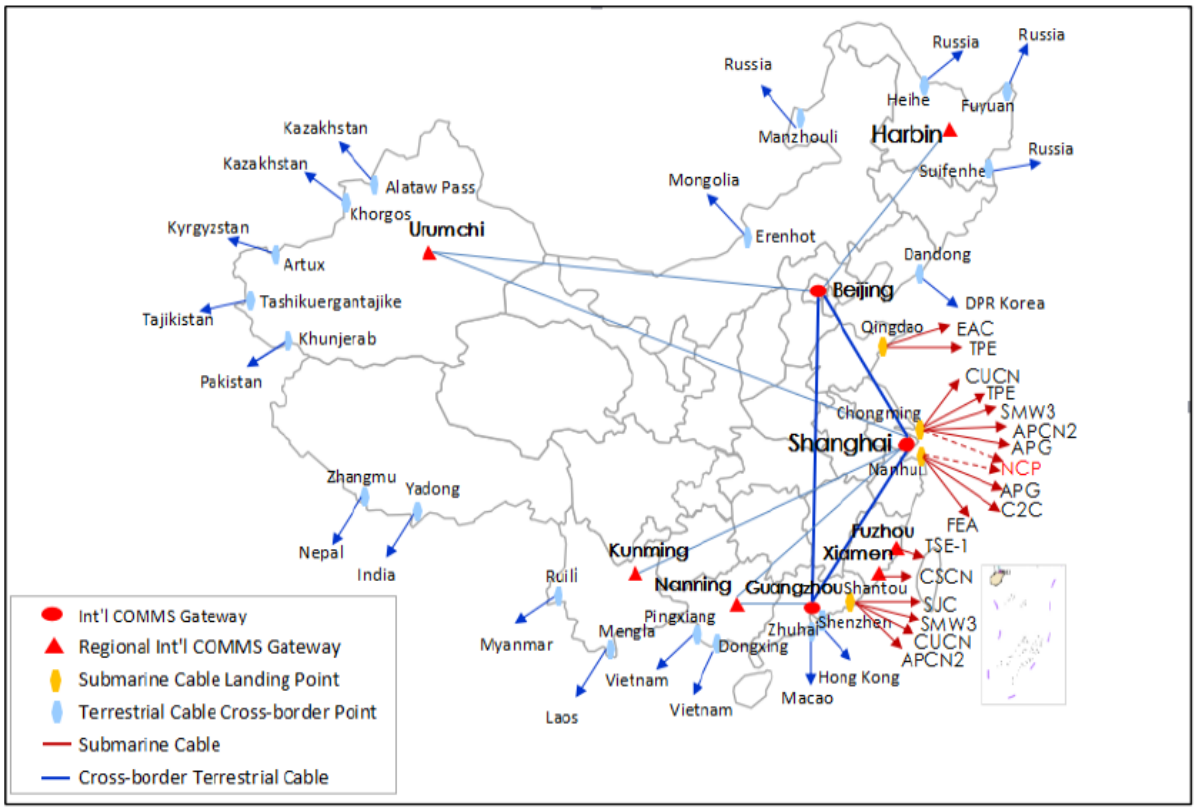
The term "bilateral cross-border optical cable network" in the "Vision and Actions" literally refers to a land-based fiber optic cable network. The context in which this is referred to may require some explanation.

When China crosses its "borders" on the Internet, it often physically passes through landing stations such as Shanghai, Hong Kong SAR, Qingdao in Shandong Province, and Shantou in Guangdong Province. Generally, these are considered the "gateways" to the international Internet. Similar to the "Malacca Dilemma" in maritime security and sea lanes, China can be said to have a "coastal dilemma" in the field of international telecommunications.

But at the same time, China also has "gateways" to international telecommunications on the inland side. According to the China Academy of Information and Communications Technology (CAICT), as of August 2018, there are nine "critical" submarine cables and four landing stations on the coast, while the inland side borders 12 countries and has 17 border crossing points/nodes (Figure 1).

[7] The National Development and Reform Commission, Ministry of Foreign Affairs, and Ministry of Commerce of the People's Republic of China, "Vision and Actions on Jointly Building the Silk Road Economic Belt and 21st-Century Maritime Silk Road," First Edition (March 2015). From the "Facilities connectivity" section in "IV. Cooperation Priorities." < https://www.fmprc.gov.cn/ce/cgvienna/eng/zt/ydyl/t1250141.htm>

Figure 1: China's International Telecommunications Gateways and Submarine Cable Landing Stations and Land Border Crossing Points



Source: Excerpted from Li Yanting, "Cross-Sector Co-deployment of ICT Infrastructure with other Sectors in China," China Academy of Information and Communications Technology: CAICT, November 2018.

The expansion of cross-border optical cables within China, neighboring countries, and Eurasia will bring Beijing a variety of benefits. As CAICT assesses, Beijing will be able to help "establish more information channels to the West" and "provide cable connections to countries such as Kazakhstan, Kyrgyzstan, and Mongolia" through the cable network deepening.[8] From Beijing's perspective, it also aims to avoid the "coastal dilemma" and ensure redundancy in international telecommunications, while at the same time strengthening economic ties with "countries along the Belt and Road."[9]

In the past, the U.S. and its allies have opposed the laying of submarine cables connected to China's coastal areas and the laying of Chinese capital submarine cables for cybersecurity and security concerns. Beijing's ambition to establish telecommunications infrastructure inside the continent is thought to be aimed at countering Washington's efforts. At the same time, it should be seen as possible to intercept communications at inland nodes as well as at the landing sites of submarine cables.

[8] Li Yanting, "Chinese International Optical Cable Interconnection," China Academy of Information and Communications Technology: CAICT, August 2018, p. 8
[9] Mochinaga, *Op. Oit.*, pp.174-175.

Where will the "cross-border optical cable" be laid?

The main players in the construction of the Digital Silk Road inside Eurasia are three major Chinese telecommunications carriers: China Telecom, China Mobile, and China Unicom. These three companies manage and operate the 17 land-based "cross-border points" mentioned above.

Of course, laying optical cables on land is more costly than laying them on the seabed. Possible forms of laying cross-border optical cables include (1) direct burial, (2) pole (aerial), and (3) telecommunication pipeline. Laying onshore optical cables alone is difficult from a profitability standpoint, so they are mostly laid in the abovementioned (3) "telecommunication pipeline" in conjunction with railways, gas and oil pipelines, and trunk roads and highways.[10]

The "Six Major Economic Corridors" outlined in the aforementioned "Vision and Actions" will see enormous infrastructure investment, with roads, railroads, and cross-border optical cables to be developed and operated in an integrated manner.

In fact, China Unicom operates TransTeleCom (TTK), a wholly owned subsidiary of Russian Railways, and the Europe-Russia-Mongolia-China (ERMC) cable with Mongolian Railways. This is in line with the China-Mongolia-Russia Corridor (CMREC), one of the six major economic corridors.

China Telecom is constructing cross-border optical cables in four major projects: "China-Laos-Thailand direct connection line," "China-Myanmar-Bangla-India information corridor," "China-Pakistan information corridor," and "Silk Road optical cable" (some of them are already completed).

The China-Pakistan Information Corridor is a project connecting Urumqi, China, over the Khunjerab pass and south of Islamabad to Rawalpindi, completed in August 2018. It coincides with the China-Pakistan Economic Corridor (CPEC), one of the six major economic corridors. The latency between Beijing and Islamabad before the completion of this information corridor was 180 msec, which was compressed to 81.8 msec after the completion of the corridor. This difference is significant in the financial sector, for example. Although there may be some exaggeration, the Pakistani side called this information corridor "the Suez Canal in the history of telecommunications. [11]

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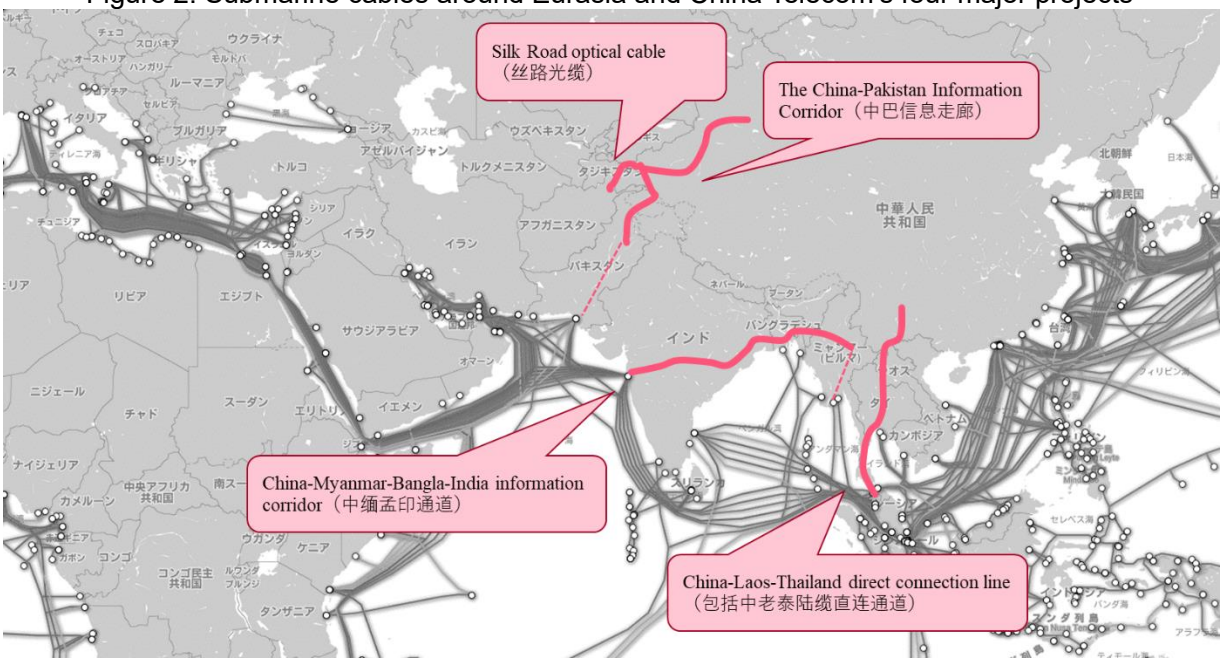
[10] Li Yanting, "Cross-Sector Co-deployment of ICT Infrastructure with other Sectors in China," p.10, 15. Specific examples include railroad development in Laos, Pakistan. For details, see Mochinaga, *Op. Cit.*, pp. 176-175.

[11] "China-Pakistan Economic Corridor Digital Information Gateway," Xinhua News Network (September 1, 2018). < http://www.gov.cn/xinwen/2018-09/01/content_5318385.htm>

Figure 2: Submarine cables around Eurasia and China Telecom's four major projects



Source: Pointe Bello, The Digital Silk Road Initiative: Wiring Global IT and Telecommunications to Advance Beijing's Global Ambitions, January 2019, pp. 45-46; based on China Telecom's Belt and Road Initiative work progress and achievements < http://www.chinatelecom.com.cn/news/06/ydyl/>, pp. 12, 17. The submarine cable map is taken from TeleGeography, Submarine Cable Map, Last updated August 11, 2021 < https://www.submarinecablemap.com/> (CC BY-NC-SA 3.0 license).
In the above figure, some of the already constructed cross-border fiber-optic cable sections are also shown in dotted lines for convenience. The "Silk Road Optical Cable" connects Kashgar in China and Faizabad in northern Afghanistan. In the future, it will connect Pakistan, Tajikistan, Uzbekistan, and Iran.

Conclusion

In fact, we do not know how much of an economic benefit the construction of telecommunications infrastructure inside Eurasia will have for China. Landing stations for submarine cables will continue to be important, given that data "consumption areas" within China are concentrated in coastal areas, and upkeep and maintenance of a high-speed, low-latency, stable onshore fiber-optic network will not be easy from a cost and operational perspective.

However, Beijing's ambition to build telecommunications networks inside Eurasia should be watched closely. The connection of southern China to Singapore and Mumbai, key nodes in the submarine cable network, as well as the connection of western China to Gwadar, Central Asia and the Middle East, and beyond to Europe, should not be overlooked. This makes sense from an intelligence perspective, in addition to ensuring redundancy in China's information and communications and strengthening economic relations with "countries along the Belt and Road." If China can place its hard telecommunications infrastructure under its jurisdiction or influence, it will be easier to intercept communications.

And infrastructure, not just telecommunications, cannot be replaced overnight. Once hard infrastructure with strong Beijing's influence is locked in to the littoral states of Southeast Asia and Central Asia, the effects will be long-lasting.

In this sense, Tokyo should pay attention not only to the sea, but also to the developments surrounding the construction of telecommunications infrastructure on land.

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