

China's Space Dream: No Limits, No End



Image Copyright: ADEK BERRY / AFP

1. Introduction

Mathieu Duchâtel

2. The Rise of Private Space Actors' Ambitions

Blaine Curcio

3. Let Me Play Among the Stars: The U.S. as the Benchmark

Pierre Pinhas and Raphaël Tavanti-Geuzimian

4. Space Warfare: From Hybrid Operations to a First Strike

Jyh-Shyang Sheu

About Institut Montaigne:

Institut Montaigne is a leading independent think tank based in Paris. Our pragmatic research and new ideas aim to help governments, industry and societies adapt to our complex world. Institut Montaigne's publications and events focus on major economic, societal, technological, environmental and geopolitical changes. We aim to serve the public interest through instructive analysis on French and European public policies and by providing an open and safe space for rigorous policy debates.

About China Trends:

China Trends seeks understanding of China from Chinese language sources. In an era where the international news cycle is often about China, having a reality check on Chinese expressions often provides for more in-depth analysis of the logic at work in policies, and needed information about policy debates where they exist. China Trends is a quarterly publication by Institut Montaigne's Asia Program, with each issue focusing on a single theme.



Mathieu Duchâtel

Resident Senior Fellow and Director of International Studies of Institut Montaigne

Mathieu Duchâtel is Director of International Studies at Institut Montaigne. He has previously held positions at the European Council of Foreign Relations, the Stockholm International Peace Research Institute and the Asia Centre. Dr. Duchâtel obtained a PhD in political science from the Institute of Political Studies (Sciences Po Paris).

Introduction

As global attention turned to DeepSeek, it was evident that China had yet to achieve its own “Sputnik moment” in the space sector. Some Chinese experts suggest that such a breakthrough could come with the Tianwen-3 mission (2028–2031), which aims to return rock samples from Mars, potentially placing China years ahead of the Euro-American Mars Sample Return mission. However, 2031 remains a distant milestone.

Meanwhile, the U.S.–China technological rivalry intensifies, and Chinese experts’ writings on space are obsessed with the United States, seeing it as the only benchmark deserving attention—the efforts of Europe, India, and Japan in this area are not even seen as worth mentioning. Looking at China’s space sector in early 2025, a clear pattern emerges: **a methodical, long-term strategy shaped by military ambitions, aspirations for technological dominance, ubiquitous commercial considerations**, and the familiar guiding hand of the state in industrial policy. This is a vision, as Xi Jinping has suggested, of space exploration with “no end.”¹

Over the past quarter century, China has transformed from a minor player in the global space industry into a major power. Two decades ago, China’s space industry was still describing itself modestly as learning through trial and error.² Today, Chinese analysts describe it with positive terms often applied to other industrial sectors: “big but not strong,” “playing catch-up,” sometimes “running with the pack,” and, in certain areas, “leading the pack.”³ The notion of “big but not strong” is drawn from the Made in China 2025 initiative—in which aerospace was listed as one of the ten strategic sectors. According to that vision, **while Chinese companies benefit from market scale and production capacity, they must climb the innovation ladder to achieve global leadership**—and the key word here is leadership. This applies not just to space but also to China’s digital infrastructure, commercial ports, and high-tech industries such as advanced materials and new energy vehicles.

China’s space strategy is driven by the state but seeks to draw lessons from private-sector innovation.

¹ “Xi hails nation’s landmark space efforts,” Xinhua, September 24, 2024, <http://en.people.cn/n3/2024/0924/c90000-20222255.html>.

² Chen Lan, “美国登月, 怎么不行了?” [Why did the United States fail to land on the moon?], Guancha, January 20, 2024, https://www.guancha.cn/ChenLan/2024_01_20_722815.shtml.

³ Zhang Xuhui, “以发展新质生产力为着力点推动航天高质量发展” [Focusing on developing new productivity to promote high-quality development of aerospace], Chinese Academy of Social Sciences, April 2024, https://www.cssn.cn/skgz/bwyc/202404/t20240430_5748828.shtml.

Although Beijing maintains strict financial, regulatory, and institutional oversight, it has encouraged a new wave of commercial space firms that are pushing the boundaries of engineering and market-driven applications. **While China's space sector has not yet reached parity with the United States, its commercial space industry is rapidly evolving in a highly competitive environment**, creating the possibility of a national champion emerging within the next decade. These firms view SpaceX and its Starlink network as the benchmark for innovation, emphasizing rapid iteration, cost reduction, and adaptability to market needs.

China's private space companies are key to understanding its broader ambitions. Unlike their Western counterparts, which often rely on government contracts, **Chinese commercial space firms tend to focus on consumer-driven commercialization**. They take more risks, embrace more flexible business models, and integrate satellite technology into everyday applications. Companies such as Huawei, Xiaomi, and BYD are incorporating satellite communication into smartphones and electric vehicles, reflecting China's push to merge space technology with consumer markets. A critical element of China's strategy is securing access to limited space resources, particularly the satellite frequency spectrum for communication. As companies like SpaceX's Starlink claim more of the non-geostationary orbit (NGSO) spectrum, Chinese firms are aggressively pursuing their own allocations.

Beyond its economic ambitions, China's space exploration efforts serve as both a showcase of its technological advancements and a reflection of its broader geopolitical aspirations. Under Xi Jinping's leadership, China has achieved major milestones, including the Chang'e-5 lunar mission, the completion of the Tiangong space station, and the Tianwen

missions to Mars. These successes illustrate China's growing autonomy in space and its determination to rival the United States as a global space leader.

For Beijing, space exploration is deeply tied to national pride and serves as one of many engines for the Communist Party to cultivate its political legitimacy—as is true of any large-scale achievement capable of inspiring collective enthusiasm and pride in Chinese society. The **government portrays these successes as part of China's "great rejuvenation,"**⁴ reinforcing its image as a technologically advanced power. While a leading Chinese official may describe the space program as "a magnificent poem of mankind from the earth to the vast universe,"⁵ it is also a political statement, showcasing China's ability to compete at the highest levels of innovation.

However, China's space ambitions extend beyond prestige—they are, perhaps more importantly, **central to its military strategy and evolving views on the nature of warfare and the military balance**. In April 2024, China undertook a major reorganization of the People's Liberation Army (PLA), dissolving the Strategic Support Force (SSF), which was established as part of Xi Jinping's military reforms in 2016. As a replacement, three new entities were created under the direct command of the Central Military Commission: the Military Aerospace Force (ASF), the Cyberspace Force, and the Information Support Force.

The ASF is now one of only two independent space forces worldwide, inheriting the responsibilities of the former SSF's Space Systems Department (SSD). This reform underscores China's commitment to enhancing its space warfare capabilities—a modernization effort that began in the 1990s and aims to reduce Chinese military vulnerabilities to U.S. dominance. As space-based assets have long been critical for intelligence, communication, and military operations, and

⁴“习近平代表党中央、国务院和中央军委祝贺探月工程嫦娥五号任务取得圆满成功” [Xi Jinping sent a congratulatory message on behalf of the CPC Central Committee, the State Council and the Central Military Commission to congratulate the successful completion of the Chang'e-5 lunar exploration mission], Xinhua, December 17, 2020, http://www.xinhuanet.com/politics/leaders/2020-12/17/c_1126869887.htm.

⁵Bao Weimin, “中国航天: 星空浩瀚 探索不止” [China's spaceflight: The starry sky is vast and exploration never stops], Qiushi, July 16, 2024, http://www.qstheory.cn/dukan/qs/2024-07/16/c_1130179405.htm.

are thus described as “critical infrastructure” within its “space security,” **China views space as both a domain for “first strike” operations in armed conflicts and a theater for hybrid warfare during peacetime.**

Alongside its focus on military power, space is also integrated into China’s foreign policy. While competition with the United States remains the center of gravity of the program, “China is willing to work with all nations to explore the mysteries of the universe, promote the peaceful use of outer space, and advance space technology for the benefit of all humanity,” according to Xi Jinping.⁵ The International Lunar Research Station (ILRS), developed in partnership with Russia, highlights **China’s ambition to lead an alternative global space alliance.** While the war in Ukraine has complicated Russia’s involvement, China continues to build partnerships through initiatives

such as the Tiangong space station and international satellite programs. So far, Venezuela (providing access to ground stations), South Africa, Azerbaijan, Pakistan, Belarus, Egypt, Thailand, Nicaragua, Serbia, Kazakhstan, and Senegal have joined the ILRS. Argentina, which hosts a Chinese deep-space station in Patagonia, is also a key node in this Chinese international strategy.

Therefore, both the available facts and the writings of Chinese experts demonstrate how Beijing’s space program now reflects a broader pattern of its industrial development: methodical, state-guided, and aimed at achieving long-term strategic advantages by eyeing scale and cost reduction. **China may not have yet achieved a defining “Sputnik moment,” but it is certainly working hard to create the conditions for a strategic breakthrough.**

⁵“向着航天强国目标勇毅前行——以习近平同志为核心的党中央关心引领探月工程纪实” [Moving forward courageously toward the goal of becoming a space power——Record of the Party Central Committee with Comrade Xi Jinping as the core caring about and leading the lunar exploration project], *People’s Daily*, September 23, 2024, https://www.cssn.cn/yw/202409/t20240923_5786200.shtml.



Blaine Curcio

Founder of Orbital Gateway Consulting

Blaine Curcio is a consultant based in Hong Kong and specializing in the space and satcom industry, with a focus on China, since 2010. As Founder of Orbital Gateway Consulting, he coordinates the efforts of our network of China space industry experts, while also managing projects for a variety of clients related to China space industry research and intelligence.

The Rise of Private Space Actors' Ambitions

China has risen from a discreet space industry player at the turn of the century to a global space power today. Over this quarter century, **China has built out, with a certain time lag, infrastructure that rivals all major Western satellite systems.** China's response to GPS and Galileo is BeiDou, its response to Landsat and Copernicus is the Gaofen and Yaogan series of satellites, Tiantong is a "Chinese version of Iridium." All of these systems, however, were largely deployed before China's commercial space boom.

Over the past ten years, China's commercial space sector has evolved from an almost negligible presence to one of the most dynamic in the world. As China's space program has grown its presence on the world stage, the **private sector has become an important conduit for understanding China's broader space ambitions.** Such a trend has been heavily discussed by both Chinese space experts and the more generalist commentariat, both to review the technicalities and the geostrategic challenges.

Staking Claim to Finite Space Resources

With space in a new "Age of Discovery" and with realpolitik as the order of the day in Beijing, Chinese

policymakers, and by extension commercial space companies, have therefore made their ambitions clear: China is to be a rule-maker, not a rule-taker, in this new global setting. By extension, China will stake its legitimate claims to finite space resources, most notably non-geostationary spectrum, but also physical space and other areas where ownership or rule-setting is a question.

Satellite internet is included in the "new infrastructure" (新基建) concept and recognized as a national priority.

In April 2020, satellite internet was first included in the "new infrastructure" (新基建) concept and thereafter recognized as a national priority.¹ **China's commercial space firms** have followed suit, making **their goals of acquiring choice spectrum**, among other things, abundantly clear. Guowang, the presumed national champion and the result of a consolidation from various initiatives, was thus created in 2021 and placed under the indirect supervision of the State-owned Assets Supervision and Administration Commission (SASTIND), where it sits at the same

¹"China's new mega-constellation marks milestone in satellite internet," Government of the People's Republic of China, August 9, 2024, https://english.www.gov.cn/news/202408/09/content_WS66b55ad9c6d0868f4e8e9cf8.html#:~:text=The%20satellite%20internet%20is%20recognized,the%20country%27s%20top%20economic%20planner.

level as approximately 100 other large state-owned enterprises (SOEs) including the big three telecommunications operators, oil & gas majors, and others.

Radio spectrum, especially for non-geostationary orbit (NGSO) communications satellites, is a precious resource. During the initial mid-2010s “gold rush” where much prime NGSO spectrum was claimed, Chinese companies were largely absent, with spectrum taken by SpaceX, OneWeb, Thales Alenia Space, and other Western companies. **Some of these early constellation initiatives emerged and utilized their claimed spectrum, but most did not.** There remains, in consequence, a race against time—and in some instances, against the legal system²—for some companies and countries to claim advantageous slices of spectrum. Chinese commercial companies have, for several years, been attempting with good reason to secure such spectrum, even taking their case in front of a German court (and through a governmental review) in one occurrence.³

The economic and technical case for China to secure a good spectrum is by itself justified: there is a finite amount of spectrum for NGSO communications constellations, China wants such a constellation and thus needs access to good spectrum. **Layered on top of the practical need for spectrum is the desire by Chinese leadership to have a “seat at the table”** during this new Age of Discovery in space, often portrayed in Chinese media in contrast with the country’s position in the previous Age of Discovery.

Across several areas of international cooperation, China has been more aggressively asserting itself as a key player, and space is no different.

MIIT takes pride in its
“strengthening of guidance
and forward coordination”
(加强指导, 靠前协调).

This is further evidenced by official announcements from the Ministry of Industry and Information Technology (MIIT) outlining the support they provided for spectrum acquisition following each batch launch of Thousand Sails (千帆) and SatNet (星网) NGSO communications satellite in October and December of last year. Official declarations with MIIT self-praise describing its “strengthening of guidance and forward coordination” (加强指导, 靠前协调) and its contributions to “innovative means of managing satellite frequency orbit resources” (创新卫星频率轨道资源管理手段) are indeed mainstream.^{4, 5, 6}

China’s **commercial space players have been just as clear about their visions for the sector.** During an interview in December 2024, Cao Meng, Vice President and Chief Engineer of leading TT&C company Emposat, noted that “space resources are very limited, and the subsequent competition for this area will become increasingly fierce. If we don’t launch our satellite as soon as possible, it is very likely that others will launch theirs.”⁷

² Janosch Wiesenthal, “Lessons learned from the ‘Kleo Connect’ Case,” CELIS, December 15, 2023, <https://www.celis.institute/celis-blog/lessons-learned-from-the-kleo-connect-case/>.

³ “Press Release of September 26, 2023,” KLEO, <https://kleo-connect.com/>.

⁴ “工信部协调保障频轨资源 助力‘千帆星座’第三批卫星成功发射” [The Ministry of Industry and Information Technology coordinated to ensure frequency and orbital resources to help the third batch of satellites of the “Qianfan Constellation” be successfully launched], Chinese Radio Amateurs Club, December 5, 2024, https://mp.weixin.qq.com/s/oXw7a_nRiPI7SshBURQN0g.

⁵ “工业和信息化部创新卫星频率轨道资源管理方式 助力我国卫星互联网低轨01组卫星发射成功” [The Ministry of Industry and Information Technology innovates the satellite frequency orbit resource management method to help my country’s satellite internet low-orbit 01 satellite group successfully launched], Ministry of Information and Technology of the People’s Republic of China, December 17, 2024, https://www.miit.gov.cn/jgsj/wgj/gzdt/art/2024/art_e81a2a287ad043a18b0c21c10d6468dd.html?ref=srfiu.org.cn.

⁶ “千帆星座02组卫星成功发射！工信部提供频轨资源支撑” [The 2nd group of ‘Qianfan Constellation’ satellites was successfully launched! The Ministry of Industry and Information Technology provides frequency and orbit resource support], Chinese Radio Amateurs Club, October 16, 2024, <https://mp.weixin.qq.com/s/j54dtFaEBw8CR53yV-7NSQ>.

⁷ “一线调研 | 首战告捷后 我国商业航天有哪些新目标？” [Frontline Research | After the first victory, what are the new goals of my country’s commercial space industry?], CCTV News, December 8, 2024, <https://baijiahao.baidu.com/s?id=1817857812920255162&rcptid=2804907398100328420>.

In the same interview, Xia Dongkun, CEO of the orbital rockets launcher and developer company Galactic Energy, also insisted on these resources and financial challenges explaining that “cost reduction may be a question we think about even in our dreams every day (是我们每天连做梦都在想的一个问题) (...) whether it is reusability or optimization of rocket carrying efficiency, the purpose is to improve rocket production efficiency as much as possible, thereby ultimately reducing costs.”

China’s quest to secure prime NGSO spectrum has also been visible in the country’s push forward in laser communications. Most NGSO communications today use radio spectrum, the use of which has advantages and disadvantages. Disadvantages include the fact that radio spectrum is finite, and constellations such as Starlink have already begun using some of the most optimal pieces of spectrum. **One way around the limitations of radio spectrum is to use laser communications.** China has, unsurprisingly, been emphasizing laser communications as a technology. Companies engaged in that sector have been clear in their language: they are developing the technology to reduce China’s reliance on radio spectrum.

Laser communications are seen as a technology to reduce China’s reliance on radio spectrum.

Moving forward, both Western and Chinese experts expect China to go to great lengths to ensure it

controls its own destiny with regard to space. This includes staking claims to spectrum and pursuing technologies to best-utilize, or otherwise work around the issue of finite spectrum.

A Commercialization of Space with Chinese Characteristics

Chinese commercial space, which had already reached 580 billion euros in 2023⁸ and is expected to skyrocket to 6.6 trillion yuan (858 billion euros) in 2029 according to a Shenzhen-based consultancy,⁹ exhibits much of the same commercial pragmatism as the rest of China’s economy—often in stark contrast to Western commercial space companies. Many of the latter correctly see the government as their biggest customer, and consequently focus their efforts toward highly engineered solutions that are fit for government contracts. This can lead to great technology, but it can also inflate costs and delay schedules.

Chinese space companies, on the other hand, **do not typically expect government contracts or procurement**, since the majority of government space contracts are still being given to the China Aerospace Science and Technology Corporation (CASC) and other state-owned enterprises (SOEs).¹⁰ As a result, commercial companies tend to be more pragmatic with their business model, including failing more quickly, trying different commercialization methods, and focusing more directly on consumer markets. The earliest such example was in June 2019, when WEY, a subsidiary of Great Wall Motors, sponsored the launch of a LM-11 rocket.¹¹ This has been repeated several times since, with Baixiang (White

⁸Tao Mingyang and Wang Yi, “China’s commercial aerospace companies speed up launch schedule following clear goal,” *Global Times*, April 20, 2024, <https://www.globaltimes.cn/page/202404/1311504.shtml>.

⁹Frank Chen “What’s the state of China’s ‘space economy’ as commercial launches intensify?,” *South China Morning Post*, December 4, 2024, <https://www.scmp.com/economy/global-economy/article/3289184/whats-state-chinas-space-economy-commercial-launches-intensify>.

¹⁰It is only in November 2014, with the Document 60, that private capital and companies was first allowed to participate in civilian space infrastructure: “国务院关于创新重点领域投融资机制 鼓励社会投资的指导意见” [Guiding Opinions of the State Council on innovating investment and financing mechanisms in key areas and encouraging social investment], Government of the People’s Republic of China, November 26, 2014, https://www.gov.cn/jzhengce/content/2014-11/26/content_9260.htm.

¹¹Echo Huang, “China’s carmakers are now sponsoring rocket launches,” *Quartz*, June 9, 2019, <https://qz.com/1636667/chinas-carmakers-are-now-sponsoring-rocket-launches/>; “CGWIC successfully launches the first batch of satellites of Spacesail constellation with LM-6A launch vehicle,” *China Great Wall Industry Corporation*, August 4, 2024, <https://web.archive.org/web/20241217205805/https://www.cgwic.com/news/2024/20240807.html>.

Elephant) Foods,¹² and baby food & supplement company Inne having sponsored launches in 2024.¹³

However, rocket sponsorship is far from reflecting the only quirky characteristic of Chinese space commercialization. In a country with more than 4 million 5G base stations,¹⁴ it may seem unusual that satellite would be a popular offering for remote connectivity for consumers. And yet, **in China's intensely competitive mobile phone and electric vehicle industries, satellite connectivity is being adopted as a selling point.** In just the past 12 months, we have seen the debuts of the Huawei Mate 60 Pro,¹⁵ Xiaomi Mi 15 Ultra,¹⁶ and Oppo X7,¹⁷ three smartphones that all have satellite connectivity through BeiDou and/or Tiantong, and, more importantly, all visibly market satellite connectivity as a major new feature.

Rocket sponsorship is far from reflecting the only quirky characteristic of Chinese space commercialization.

In addition to mobile phones, **multiple Chinese automakers have begun marketing cars with satellite connectivity**, also typically BeiDou or Tiantong. In April 2024, China's largest electric vehicles manufacturer, BYD, announced a deal with China Telecom

to jointly develop Tiantong services for vehicles. BYD stated at the time that "in places where ground mobile networks and fixed networks cannot cover, satellite communications can provide reliable two-way voice calls and two-way SMS communications, ensuring that vehicles can access satellite networks on demand, improving vehicle active safety capabilities and providing car owners with guaranteed communications."¹⁸

An Eye Toward World Leaders

Chinese commercial space companies want, above all, to be world leaders, and while no single company is the only driver of this, the clear pacemaker in the West is SpaceX-Starlink. To be sure, every SpaceX launch and every Starlink market entry are closely watched by Chinese commercial (and governmental) space industry actors, as the number of simultaneous Chinese commentaries or op-eds testify. While most U.S. executives are, at best, portrayed neutrally in China, **Elon Musk remains a lionized figure, rightly or wrongly, for his entrepreneurial prowess and technological achievements.**¹⁹

Commercial space companies see what works for SpaceX-Starlink—without ignoring others' successes—and incorporate the technology quickly, wanting to bring such innovations to the Chinese

¹² "[跨界震撼] 白象中国面联袂中国火箭, 美食与星空的奇妙邂逅! ["Cross-border shock" White Elephant Chinese noodles team up with Chinese rockets, a wonderful encounter between food and the starry sky!], Sohu, August 21, 2024, https://www.sohu.com/a/802536162_122006510.

¹³ "梦幻联动, '快舟-inne号'火箭成功发射, '一箭四星'引央视关注" [Dream linkage, the "Kuaizhou Inne" rocket was successfully launched, and 'four satellites in one rocket' attracted the attention of CCTV], Qianlong, September 25, 2024, <https://baijiahao.baidu.com/s?id=1811131363312698736&wfr=spider&for=pc>.

¹⁴ "China home to 4 million 5G base stations," Government of the People's Republic of China, September 25, 2024, https://english.www.gov.cn/archive/statistics/202409/25/content_WS66f40117c6d0868f4e8eb416.html.

¹⁵ "HUAWEI Mate 60 Pro," <https://consumer.huawei.com/cn/phones/mate60-pro/>.

¹⁶ "小米15 Ultra手机官方消息确认: 卫星通信与超强影像双重亮点" [Xiaomi Mi 15 Ultra official news confirmed: Satellite communication and super imaging dual highlights], Sohu, January 6, 2025, https://www.sohu.com/a/845896624_121798711.

¹⁷ Yun Peng, "OPPO首个卫星通信手机! Find X7系列软硬件'黑科技'首次揭秘" [OPPO's first satellite communication phone! Find X7 series software and hardware "black technology" revealed for the first time], Baidu, December 29, 2023, <https://baijiahao.baidu.com/s?id=1786420068737117167&wfr=spider&for=pc>.

¹⁸ Wen Zhou, "依托于'天通一号'; 比亚迪与中国电信联合推出汽车直连卫星业务" [Relying on Tiantong-1, BYD and China Telecom jointly launched the car direct satellite service], IT Home, April 26, 2024, <https://www.ithome.com/0/764/499.htm>.

¹⁹ Gao Tianwei, "马斯克豪赌上位, 中国商业航天必须正视问题'上强度'了!" [Musk gambled his way to the top, and China's commercial space industry must face up to the problems and "step up its efforts"!], GuanCha, November 16, 2024, https://www.guancha.cn/gaotianwei/2024_11_16_755567.shtml.

market for financial, political, or intrinsic gain. A piece written at the time of the fourth Starship test launch by the GuanCha space blogger going by the nickname of Gao Tianwei, took notice that “for the Chinese national team (国家队) [read SOEs] and many commercial peers, this project has already brought enough experience for reference” (该项目目前已经带来了足够多的经验借).^{20, 21}

Even SOEs compare themselves unfavorably to Musk's companies, with CASC famously writing in December 2023 that, “compared with SpaceX, **[CASC] has obvious gaps and deficiencies in its development philosophy** (...) On the whole, it is big but not strong, and big but not excellent (大而不强, 大而不优) (...) We are still far from achieving the goal of becoming a powerful nation. Every astronaut must have a deep sense of crisis in this regard (每个航天人对此要怀有深深的危机感), resolutely overcome pride and complacency, resolutely abandon the mentality of blind arrogance, and never be complacent or arrogant”²²—a rare but lucid self-criticism of its current state of play.

The China Aerospace Science and Technology Corporation has obvious gaps and deficiencies in its development philosophy.

China's private space sector strives, in some sense, **to do what China's SOEs may not be able to do: build an innovative, iterative, fast-failing company** like SpaceX. Chinese space industry watchers have taken note, with various articles questioning whether commercial efforts such as Thousand Sails can surpass Starlink, while also acknowledging the need for China to develop reusable SpaceX-like rockets in the process.²³ In the case of Thousand Sails and its operator, Spacesail, the project is also progressing in international markets, having announced a Memorandum of Understanding with Brazilian telecoms company Telebrás during a summit of Presidents Xi Jinping and Lula da Silva,²⁴ and later establishing a subsidiary in Kazakhstan.²⁵

Another piece written by the aerospace expert Bai Yujing at the first launch of state-backed SatNet constellation explains that “standing at the starting point of this SatNet against Starlink, we cannot help but ask: can the belated China SatNet reverse the situation in this race? (...) If the Chinese version of Starlink wants to overtake it, it needs to walk on two legs. **Both the civilian team and the national (state-owned) team are indispensable**” (中国版星链要实现反超, 需要两条腿走路, 民商队和国家队并重, 缺一不可).²⁶ One of the guiding lights for Chinese commercial space companies is therefore the activities of SpaceX and Starlink. However, it would be wrong

²⁰ Gao Tianwei, “星舰第四飞终于成功: 关乎SpaceX的两条生命线, 对中国有哪些借?” [The fourth flight of Starship is finally successful: What lessons can China learn from the two lifelines of SpaceX?], GuanCha, June 7, 2024, https://www.guancha.cn/gaotianwei/2024_06_07_737297.shtml.

²¹ The Commercial Space Industry Technology Alliance, initiated by the Harbin Institute of Technology in May 2024 and regrouping universities, rocket makers and semiconductor companies to benefit from the “new growth engine” that is the space industry is also a good incarnation of this “national team” concept: Coco Feng, “Chinese chip makers, rocket developers form alliance to boost commercial space industry,” South China Morning Post, May 10, 2024, <https://www.scmp.com/tech/tech-trends/article/3262198/chinese-chip-makers-rocket-developers-form-alliance-boost-commercial-space-industry>.

²² China Aerospace Science and Technology Corporation, “对标SpaceX集团公司存在明显差距和不足, 与率先实现航天强国目标相去甚” [There is a clear gap and shortcomings compared with SpaceX Group, and it is far from the goal of becoming a space power], GuanCha, December 7, 2023, https://www.guancha.cn/international/2023_12_07_718179.shtml.

²³ Chen Lan, “千帆星座 出历史一步, 中国商业航天有机会超越SpaceX吗?” [The Qianfan constellation has taken a historic step. Does China's commercial space industry have a chance to surpass SpaceX?], GuanCha, August 8, 2024, https://www.guancha.cn/ChenLan/2024_08_08_744145.shtml.

²⁴ “China's commercial satellite constellation to provide Brazil with Internet services,” Xinhua, November 20, 2024, <https://english.news.cn/20241120/551db69890c044c68d882d54c837589d/c.html>.

²⁵ “China's satellite internet provider Spacesail sets up in Kazakhstan,” Samena Council, January 25, 2025, https://www.samencouncil.org/samena_daily_news?news=104093.

²⁶ Bai Yujing, “星网对决星链: 比卫星更迫切的可能是火箭” [“StarNet vs. Starlink”: Rockets may be more urgent than satellites], GuanCha, December 17, 2024, https://www.guancha.cn/baiyujing/2024_12_17_759101_s.shtml.

to mistake this for simple admiration, with many Chinese commercial space companies, and the industry at large, focusing on becoming their country's own response to Starlink.

The absence of an open government space sector has caused China's commercial space companies to evolve differently.

The development of China's commercial space sector has taken a very different path from the West. With

the country having been absent when certain space assets were divided among space powers, Chinese analysts and commentators insist on the urgency for China's space sector to stake a claim to space while they can and to secure a seat at any negotiating table. **The absence of an open government space sector has caused China's commercial space companies to evolve differently from their Western counterparts, while not neglecting their capacity in becoming credible competitors:** in some ways they are nimbler, more willing to try new things, and more in-touch with actual commercial market realities. How this competition evolves, only time will tell, but China will continue to move at its own pace and in its own way, as it builds a commercial space sector with Chinese characteristics.



Pierre Pinhas

Project Officer within Institut Montaigne's Asia Program

Pierre Pinhas joined Institut Montaigne in 2023, where he is in charge of China Trends. Whether on economic, environmental, or geopolitical issues, his work also consists of enriching the various publications of the Asia Program with Chinese sources. In addition, he supports Institut Montaigne in organizing its European and international dialogues.



Raphaël Tavanti-Geuzimian

Project Officer on Economic Issues at Institut Montaigne

Raphaël Tavanti-Geuzimian joined Institut Montaigne in 2023, after several experiences within the French public administration and abroad. He then specialized in macroeconomic and industrial policy issues, with a strong interest in competitiveness and strategic autonomy issues. Raphaël graduated from Sciences Po Paris' School of Management and Innovation.

Let Me Play Among the Stars: The U.S. as the Benchmark

"There is no limit to the pace of space exploration by humans. I hope you will vigorously carry on the spirit of lunar exploration of pursuing dreams, dare to explore, work together to overcome difficulties, cooperate for win-win results, and start a new journey of interstellar exploration step-by-step, [in order] to make new contributions in the establishment of a space power and realize the great rejuvenation of the Chinese nation."¹ In a flight of poetry typical of China's leadership, Xi Jinping's words spoke for themselves when he congratulated the team in charge of Chang'e-5 lunar mission upon its successful return in December 2020.

For China, **space exploration is a matter of symbols aimed at illustrating the viability of its development model and its contribution to global challenges.** Bao Weimin, Director of China Aerospace Science and Technology's Science and Technology Committee, is also not stingy with metaphors when describing China's contribution to the sector: "in the history of civilization and progress, [Chinese] aerospace technology has written a magnificent poem of mankind from the Earth to the vast universe."²

¹"习近平代表党中央、国务院和中央军委祝贺探月工程嫦娥五号任务取得圆满成功" [Xi Jinping sent a congratulatory message on behalf of the CPC Central Committee, the State Council and the Central Military Commission to congratulate the successful completion of the Chang'e-5 lunar exploration mission], Xinhua, December 17, 2020, http://www.xinhuanet.com/politics/leaders/2020-12/17/c_1126869887.htm.

²Bao Weimin, "中国航天: 星空浩瀚 探索不止" [China's spaceflight: The starry sky is vast and exploration never stops], Qiushi, July 16, 2024, http://www.qstheory.cn/dukan/qs/2024-07/16/c_1130179405.htm.

In the space domain, **exploration programs are indeed the vector and symbol of power**, acting as showcases for the rest of the world, an opportunity China has no intention to miss. Beijing has therefore gradually established itself as a leading power. In 2003, it autonomously sent its first astronaut into orbit, breaking the dual leadership established until then by the United States and Russia. Progressively, the rise of its Chang'e lunar program, with its cohorts of landers, probes and rovers, added more consistency to its space adventure.

Last but not least, the crewed Tiangong space station, which was launched in 2021, has further established China as a space power in its own right, with complete autonomy over construction, assembly, and operation. **Operating a space station is not within the grasp of all countries as it also entails the question of its profitability.**³ But Tiangong is all the more strategic as the Chinese Communist Party has simultaneously described space infrastructure as a “critical component” of its legitimacy.⁴

The Tiangong space station is strategic as the Chinese Communist Party has described space infrastructure as a “critical component” of its legitimacy.

Space Exploration: A Showcase of Chinese Ambitions

Historically, the rise of China's space industry was initially driven by military objectives, and only later did exploration become a catalyst for its progress on the international stage. **China's powerful achievements in low-Earth orbit, on the Moon and on Mars are highly symbolic, and directly act as a manifestation of the Party's success**—the statements made ahead of the 100th anniversary of the Chinese Communist Party are such evidence.⁵ The Party and space exploration's close relationship is illustrated first and foremost through the omnipresence of the public sector, which finances and oversees the space industry.

Following the footsteps of the Soviet Union, the China National Space Administration (CNAS)⁶ is the major state-owned operator for the civilian side of space activities and is headed by Party members—one aspect of an otherwise very intricate relation with the political power. Beyond that, the numerous companies that compose the so-called Chinese private sector mosaic remain closely linked to the Central Committee, and are often conceived as affiliates or outgrowths of major public laboratories.

The **undeniable strategic guidance and leadership of the Party over the private sector does not, however, prevent China from taking an interest in the cultural changes brought about by private companies elsewhere** in the world. In this regard, lessons retrieved from the SpaceX experience in terms of industrial risk-bearing are a case in point for many countries, including China. As such, Chen

³ Bai Yujing, “国际空间站丧钟已响, 天宫空间站路在何方” [The death knell of the International Space Station has resounded, Where does the Tiangong space station go from here?], *Guancha*, November 19, 2024, https://www.guancha.cn/baiyujing/2024_11_19_755969.shtml.

⁴ “高举中国特色社会主义伟大旗帜为全面建设社会主义现代化国家而团结奋斗——习近平同志代表第十九届中央委员会向大会作的报告摘要” [Hold high the great banner of socialism with Chinese characteristics and work together to build a modern socialist country in an all-round way—Excerpts from the report delivered by Comrade Xi Jinping to the Congress on behalf of the 19th Central Committee], *People's Daily*, October 17, 2022, <http://cpc.people.com.cn/20th/n1/2022/1017/c448334-32546343.html>.

⁵ “Red planet: Mars landing marks major milestone for China's space program,” *MERICs*, May 20, 2021, <https://merics.org/en/comment/red-planet-mars-landing-marks-major-milestone-chinas-space-program>.

⁶ The CNAS is a subordinate of the State Council's State Administration for Science, Technology, and Industry for National (SASTIND), the primary civilian organization that coordinates and manages the PRC's space activities.

Lan, a regular commentator in *Guancha*, the popular Shanghai-based nationalist platform, describes the American approach as an instructive “rapid trial and error iterative development method” (试错迭代原来), although he still estimates that, in the future, “private enterprises will [only] take up half of the market, but the national team will still occupy a dominant position” in China.⁷

The advent of the private sector is not always portrayed as the go-to solution.

The possible emergence of a private sector is therefore only one part of the future equation. When it comes to space exploration, the **advent of the private sector is not always portrayed as the go-to solution** and may even appear as a burden sometimes, including for the United States. Citing the Artemis program as an example, Chen Lan concedes that, even if NASA is a “professional at missing timelines,” all delays are not the organization’s sole fault and Boeing could easily be blamed.

Space Strategic Thinking: An Omnipresent Comparison with the United States

Conceptually, space exploration is a relatively pacified field of space activities, unlike the military and economic fields that see adversarial movements and predation. It sets, nevertheless, the stage for some of the fiercest competition between the actors, as it did during the Cold War. **Although China’s exploration programs cannot be reduced to competition with the United States, the reflex of seeing space**

dynamics through the Cold War lens is an easy one, one from which even Chinese discourse cannot escape when it labels the current “star race” as a “political struggle among major space powers.”⁸

Indeed, competition with the United States is on everyone’s mind, especially since the space sector was one of the precursors of technological decoupling between China and the United States, in the wake of the Cox report of the 90s’. This led to China’s exclusion from the International Space Station program in 2011, for example, which today includes all but Chinese modules (American, European, Japanese and Russian). For China, the **Chang’e lunar program is a function of the renewed competition between the two powers, and is fully in line with the techno-scientific struggle that governs their relations**. Within a constrained framework, the lunar program is further capable of supporting the country’s scientific and technological autonomy as recalled in a Beijing Daily article: “faced with the technical blockade of aerospace powers, [China’s] manned spaceflight industry has opened the road to ‘breakthrough’ on a blank sheet of paper.”⁹

One consequence of this is that the **Chinese space industry still sees itself in a long technological catch-up effort**, with a “tradition of starting from scratch” (归零), according to Chen Lan, that is more time consuming but less costly and risky than the American approach.¹⁰ And the **pinnacle of this catch-up effort is, of course, manned space flight**: “one of the most complex, technologically intensive and innovative scientific and technological projects,” and a “masterpiece” (集大成者) of national scientific and technological achievements in the words of Feng Hua and Liu Shiyao, two journalists from the

⁷ Chen Lan, “美国登月, 怎么不行了?” [Why did the United States fail to land on the moon?], *Guancha*, January 20, 2024, https://www.guancha.cn/ChenLan/2024_01_20_722815.shtml.

⁸ Liu Ying, “俄罗斯太空政策调整与中俄太空合作” [Russia’s space policy adjustment and Sino-Russian space cooperation], *China Institute of International Studies*, March 2024, <https://web.archive.org/web/20240329165951/https://www.ciis.org.cn/gjwtyj/dqqk/202403/P020240312354015010334.pdf>.

⁹ Gao Yuan, “21年前的今天, ‘由此起步、止于无穷’ [21 years ago today, ‘Starting from here, ending at infinity’], *Beijing Daily*, October 15, 2024, <https://news.bjd.com.cn/2024/10/15/10935319.shtml>.

¹⁰ Chen Lan, “日中美火箭相继失利, 归零、试错孰优孰劣” [Rockets from Japan, China and the United States have failed one after another. Which is better, starting from scratch or trial and error?], *Guancha*, March 18, 2024, https://www.guancha.cn/ChenLan/2024_03_18_728759.shtml.

People's Daily.¹¹ Yet, Chinese scientists, such as rocket designer Dai Zheng of Beijing-based Landscape, demonstrate strong optimism on Beijing's capacity to catch up: "we may be lagging behind but we are running at a faster speed."¹² Zheng's mindset very much represents the one of commercial companies willing to take greater risks than SOEs—on the development of a medium-lift liquid rocket in his case.

Manned space flight has been described as a "masterpiece" (集大成者) of national scientific and technological achievements.

The main challenge is to position China at the technological frontier along with the United States, despite decades of backwardness and a budget far from parity. But **through hardship and by taking advantage of the inconsistencies of American space policy, China has made up some of the lost ground.** According to an even more laudatory Zhang Xuhui, a researcher and the Party Secretary of the China Aerospace Science and Technology's Innovation Center, Beijing has gradually transformed its aerospace industry from "following' the pack to 'running side-by-side' with the pack, and sometimes [even] 'leading' the pack" (从 '跟跑' 向 '并跑' 转变, 部分领域已经实现 '领跑').¹³

Some observers, starting with Feng and Liu, even make a bitter reading of decades-long U.S. industrial underinvestments that led to declining "engineering capabilities, [making it] too early to predict who will win the [new] race to the Moon." They concede nevertheless that "the **United States [still] has the strongest basic science, higher education and innovation capabilities**, and [that] this situation may last for a long time". As for Chen Lan, he envisions a future setting where "the United States will be responsible for innovation, and China will be responsible for engineering and productization" (美国负责创, 中国负责工程化和产品化).

Through long-term efforts to catch up, China has reproduced American space achievements.

Through long-term efforts to catch up, China has meanwhile reproduced American space achievements. The ambition to outstrip them and to claim major scientific discoveries for itself is now just ever more visible. **China will not be satisfied to be the eternal second.** The list of "milestones" (里程碑) goes on and on and the first probe to the far side of the Moon was directly part of this effort and ambition. More recently, Chinese astronauts made headlines with a record-breaking nine-hour spacewalk.¹⁴ And, for the first time, China called the United States a "competitor" in the lunar race in June 2024—a notable change of discourse and a departure from its usually discreet posture.¹⁵

¹¹ Feng Hua and Liu Shiyao, "航天强国建设扎实推进——写在第九个“中国航天日” [The construction of a space power is steadily advancing—Written on the ninth "China Space Day"], *People's Daily*, April 24, 2024, http://paper.people.com.cn/rmrb/html/2024-04/24/nw.D110000renmrb_20240424_5-01.htm.

¹² "我国为何要大力发展商业航天？将如何影响你我生活？一文讲清" [Why does my country want to vigorously develop commercial space? How will it affect your life?], *CCTV*, April 3, 2024, https://content-static.cctvnews.cctv.com/snow-book/index.html?item_id=17717044763658191836.

¹³ Zhang Xuhui, "以发展新质生产力为着力点推动航天高质量发展" [Focusing on developing new productivity to promote high-quality development of aerospace], April 2024, https://www.cssn.cn/skgz/bwyc/202404/t20240430_5748828.shtml.

¹⁴ "中国太空行走破纪录, 世界从中看到什么" [China's record-breaking spacewalk: What the world sees from it], *Global Times*, December 19, 2024, <https://opinion.huanqiu.com/article/4Kj0hBTi8Lj>.

¹⁵ Stephen Chen, "China calls the US a 'competitor' in moon race for first time, from a position of strength," *South China Morning Post*, June 21, 2024, <https://www.scmp.com/news/china/science/article/3267371/china-calls-us-competitor-moon-race-first-time-position-strength>.

The return of **competition in space exploration finally extends to the Mars race**. China had already achieved a world first in this area with the Tianwen 1 mission that orbited Mars and then deployed a lander and a rover. It now seeks to be the first country to ever bring back rock samples. As underlined by Qi Qian, another Guancha contributor, this effort could represent a new "Sputnik moment" (斯普特尼克时刻) for the United States,¹⁶ with China benefiting from "a high starting point" in Martian exploration. **China's Tianwen 3 mission**, slated for launch in 2028 and with a sample return by 2031, **could thus place China several years ahead of the Euro-American Mars Sample Return mission if successful**—and thus "outperform the United States."

Space Exploration and Science: A Platform for Cooperation and Diplomacy

Space science has always been a pole of international cooperation. For China, the objective is twofold. First, to earn credibility; second, to make it a central player in global space diplomacy and governance. For **in space as anywhere else, the best way to influence the course of events is to be an active and visible actor**. For instance, the international lunar research station (ILRS), initiated in cooperation with Russia and that aims to link the "Global South" to the lunar adventure,¹⁷ fully embodies this desire to establish itself as an alternative pole of cooperation to the United States and the Artemis Accords.

However, the outbreak of the war in Ukraine, which made Russia a pariah for some countries, weakened the lunar program—politically at least. Chinese strategists and leaders are fully aware of this weakness

and, even if advantages of a "co-orbital space station" (共轨空间站) are still visible, they are also the ones leading moves to expand their ownership of the International Lunar Research Station. As Chen Lan suggests: "the Russian-Ukrainian war not only changed the political landscape, but also affected space (...). Russia has always had grand plans, but the scale and actual capabilities of its aerospace industry have been shrinking."¹⁸ **The creation of the ILRS has thus ensured that Russia is now relegated to the status of (junior) "partner."**

Besides, the Chinese press regularly refers to existing cooperation with developing countries on environmental protection and meteorological monitoring through satellites, but also in terms of scientific opportunities in the Tiangong space station. **Space science is indeed a field China has heavily invested** in as demonstrated in the October launch of the manned spacecraft Shenzhou 19 aimed, among others, at carrying out experiments and applications in the fields of microgravity basic physics, space material science, space life science, aerospace medicine, and aerospace technology.¹⁹

As China's ambitious exploration efforts are certainly carried out with a high degree of autonomy, they never overlook cooperation opportunities.

¹⁶ Qi Qian, "中国提前完成火星采样返回? '这将成为中国版斯普特尼克时刻'" [China completes Mars sample return ahead of schedule? 'This will become China's version of the Sputnik moment'], Guancha, November 1, 2024, https://www.guancha.cn/international/2024_11_01_753824.shtml.

¹⁷ Marc Julienne, "China in international space cooperation: Heading South," Institut Français des Relations Internationales, January 2024, <https://web.archive.org/web/20240123222922/https://www.ifri.org/en/publications/publications-ifri/chapitres-douvrages-ifri/china-international-space-cooperation>.

¹⁸ Chen Lan, "国际大变局如何催化中俄空间站合作" [How major international changes will catalyze China-Russia space station cooperation], Guancha, April 16, 2024, https://www.guancha.cn/ChenLan/2022_04_16_635181.shtml.

¹⁹ "神舟十九号3名航天员顺利进驻中国空间站" [Three astronauts of Shenzhou 19 successfully entered the Chinese space station], Government of the People's Republic of China, October 30, 2024, https://www.gov.cn/yaowen/liebiao/202410/content_6983861.htm.

As China's ambitious exploration efforts are certainly carried out with a high degree of autonomy, they never overlook cooperation opportunities that could establish it as an alternative in the new space setting.²⁰ The European Union and its Member States are still perceived as possible partners at a time when Europe's space initiatives are no longer capable of "independently determining [the Old continent's] own destiny."

An additional helping hand for Chinese space credibility surprisingly came from its arch-rivals. NASA scientists indeed expressed a desire to access and work on Chinese lunar samples, especially the ones from the far-side which could carry significant scientific importance. Such a collaboration would today contravene the 2011 Wolf Amendment and require its removal or revision.²¹ However, this request has prompted comparisons with the Apollo program, when the United States had set a precedent by sharing lunar soil samples with the international scientific community, including China.

“Sharing lunar soil is a thing that gets twice the result with only half the effort” (分享月壤就是这样一件事半功倍的事情).

This led to a debate amongst the Chinese space community as to whether it should “return the favor.” Chinese observers have strategically highlighted it to advocate for a similar approach,²² and, on this topic specifically, they further positively acknowledged the value of NASA's management and distribution of extraterrestrial samples. Indeed, “sharing lunar soil is a thing that gets twice the result with only half the effort (分享月壤就是这样一件事半功倍的事情);” subsequently emphasizing that their own purpose mirrors that of the United States: **leveraging scientific diplomacy and exploration in space to expand international influence.**

²⁰ As of July 2024, China's project for a lunar research station included twelve developing and partner countries (Azerbaijan, Belarus, China, Egypt, Kazakhstan, Nicaragua, Pakistan, Russia, Serbia, South Africa, Thailand, and Venezuela): “China sets to expand int'l cooperation in lunar exploration missions,” *The State Council of the People's Republic of China*, June 27, 2024, https://english.www.gov.cn/news/202406/27/content_WS667d4b75c6d0868f4e8e8a16.html#:~:text=BEIJING%2C%20June%2027%20%2D%20China,Chang'e%2D6%20mission.

²¹ *The Wolf Amendment prohibits NASA, the National Space Council, or the Office of Science and Technology in the White House from collaborating with Chinese state-funded space institutions.*

²² Chen Lan, “中国带回来的月壤, 要不要给NASA?” [Should China give the lunar soil it brought back to NASA?], *Guancha*, May 1, 2024, https://www.guancha.cn/ChenLan/2024_05_01_733408.shtml.



Jyh-Shyang Sheu

Assistant Research Fellow at the Institute for National Defense and Security Research

Dr. Jyh-Shyang Sheu obtained his PhD from the Eberhard Karls Universität Tübingen (Germany). Dr. Sheu's research interests encompass global advanced weapon systems and their implications for strategy, asymmetric warfare, developments of the global warfighting concept, and the Chinese and Western militaries.

Space Warfare: From Hybrid Operations to a First Strike

China embarked on a reorganization of the People's Liberation Army (PLA) in April 2024. The Strategic Support Force (SSF), which was initially established under Xi Jinping's military reform of 2016, was eliminated. The latest reorganization saw the formation of three subordinate units under the Central Military Commission (CMC): the Military Aerospace Force (军事航天部队, ASF), the Cyberspace Force (网络空间部队), and the Information Support Force (信息支援部队).¹ Following this reorganization, China is one of only two countries in the world to have an independent space force. The establishment of the ASF confirms China's continuous efforts to strengthen its space warfare capabilities since the initiation of its military modernization in the 1990s in an effort to overcome the U.S.'s advantage in modern warfare. It seems **likely that space will become both a "first strike" battlefield in an armed conflict² and an area of hybrid warfare operations during peacetime.**

A Historical Perspective on Space as a Strategic Tool for China's Military

There are two historical turning points that can be identified as crucial to the development of China's space ambitions: the first is the late 1950s, and the second is the two Gulf Wars of 1991 and 2003. During the former, China's space program was launched in line with its military strategic capability, while during the latter, space was elevated to one of the most important elements of China's military modernization.

The People's Republic of China launched its first space program in the 1950s, shortly after the Russian "Sputnik moment." This coincided with the **country's decision to develop nuclear weapons, with Mao Zedong announcing China's first space program in May 1958 as part of the "Two Bombs, One Satellite" (两弹一星) project.** From 1958 to 1970, China continued to build its own space capability, starting with the development of a sounding rocket.³ Like many other space powers, China's space program

¹“国防部举行信息支援部队成立专题新闻发布会” [The Ministry of National Defense holds a special press conference on the establishment of the Information Support Force], Ministry of Defense of the People's Republic of China, April 19, 2024, <https://www.mod.gov.cn/gfbw/xwfy/zjzh/16302133.html>.

²“Chinese documents speak of using 'surprise, swift, limited-scale, overawing strikes' in space—not as part of war, but to deter one or to force early capitulation”: “War in space is no longer science fiction,” *The Economist*, January 31, 2024, <https://www.economist.com/international/2024/01/31/america-china-and-russia-are-locked-in-a-new-struggle-over-space%20>.

³Li Qinggang, “中国必须发展自己的高科技—我国成功发射第一颗人造地球卫星追记” [“China must develop its own high technology”—Comment on China's successful launch of the first artificial earth satellite], *CPC News*, April 24, 2020, <http://dangshi.people.com.cn/n1/2020/0424/c85037-31686102.html>.

was deeply connected to the development of its strategic weaponry from the very beginning. Indeed, the “Dong Fang Hong 1” and the Long March-1 were parts of China’s “Two Bombs, One Satellite” project, while the latter was further based on the “Dong Feng-4” two-staged medium-range ballistic missile, which had its first flight in 1970.

As for the Gulf War in 1991, it became another “Sputnik moment” for China due to the growing importance of space technology in modern warfare. **The allied forces’ capacity to quickly overwhelm the Iraqi Armed Forces shocked the PLA**, prompting it to urgently consider the need to modernize its army in light of U.S. military space capabilities, with precision-guided munitions at the center of its reflections.⁴ Later, the Chinese military also took note of the increasing use of space operations and precision-guided munitions in the 2003 Iraqi War.⁵

Like many other space powers, China’s space program was historically deeply connected to the development of its strategic weaponry.

In fact, not long before the 1991 Gulf War, the announcement of Ronald Reagan’s Strategic Defense Initiative (SDI), also known as the “Star Wars” program, could already be seen as a warning that China needed to shift away from its traditional concept of “People’s War” toward modern high-tech warfare.

In response to the announcement of the SDI, leading Chinese military technology scientists, including nuclear and space experts, advised Deng Xiaoping in March 1986 to launch a reform to obtain modern technologies. This suggestion was accepted in a matter of days, indicating the Chinese leadership’s changing attitude toward enhancing its space warfare capabilities.⁶

Chinese military took note of the increasing use of space operations and precision-guided munitions.

From the perspective of the Chinese military, the most crucial lesson of the post–Cold War conflicts is the need to create advantage via the use of modern technologies. In the early 1990s, China launched its own military reform by introducing advanced technologies, with several slogans proposed during this reform period. In January 1993, Jiang Zemin, for instance, announced the new guideline of “winning local wars with modern technology, particularly under high-tech conditions” (打赢一场现代技术特别是高技术条件下的局部战争). Since then, **China’s successive changes to its “military strategic guidelines” have revealed the progress and developments made on military modernization.** During Hu Jintao’s mandate, the focus switched to “winning local wars under conditions of informatization” (打赢信息化条件下的局部战争), while in 2015, Xi Jinping announced a focus on “winning informationized local wars” (打赢信息化局部战争).⁷ In recent years, China has added

⁴ Liu Jiang, Li Xiaolong, and Liu Yidan, “为强国打造最“硬核”的力量支撑——怎么看加快推进国防和军队现代化” [Building the most “hardcore” force support for a strong country—How to accelerate the modernization of national defense and the military], China Military Online, August 3, 2020, http://www.81.cn/jfbmap/content/2020-08/03/content_267506.htm.

⁵ Zhu Zengquan, “看懂新一代战争” [Understanding the new generation of warfare], China Military Online, January 27, 2018, http://www.81.cn/jfbmap/content/2018-01/27/content_198053.htm.

⁶ Wang Guangrong, ““两弹一星”院士披露863计划出台始末(附图)” [Academician of “Two Bombs and One Satellite” reveals the story of the launch of the 863 Program (with photos)], Guangming Daily, August 20, 2004, <https://jcs.news.sina.com.cn/2004-08-20/1130219396.html>; Zhan Xin, “The U.S. ‘Star Wars’ program and the Transformation of China’s National Defense Strategy,” *Journal of Shanxi University, Philosophy and Social Science Edition*, 2024.

⁷ “中国的军事战略” [China’s military strategy], Government of the People’s Republic of China, May 26, 2015, https://www.gov.cn/zhengce/2015-05/26/content_2868988.htm.

“intelligencization” (智能化) to its doctrine, a concept found in particular in Xi Jinping’s report to the 20th Party Congress of the Chinese Communist Party.⁸

It is evident that space has grown in importance over the course of these military reforms. The PLA sees satellite navigation as one of the “standard elements” of an “informationized” and “intelligencized” battlefield. In its warfighting concept, **China not only needs to strengthen the integration of space capability into its warfighting system but also to be able to counter its adversaries’ space capabilities.**⁹ Recently, the PLA stated that superiority in the space domain could allow it to dominate the intelligence, surveillance, and reconnaissance (ISR) field and contribute to strategic deterrence. This would not just be for traditional defense purposes. It would also be for more “proactive defense” and “counter-deterrence or coercion,” demonstrating China’s capacity to “fight back” and defend itself in the space domain.¹⁰

Space as a Means of Defeating the Adversary

Nowadays, China has established itself as the second-largest space power, with various space capabilities for both military and civilian uses already built. Besides the Beidou Navigation Satellite system and Earth observation satellites, **China is also testing different bleeding-edge technologies to support the upgrading of its guidance and**

satellite capabilities. The most significant examples are the Shijian-series satellites, which have already used dual-use robotic arms on targets in orbit such as debris or adversary satellites (Shijian-17) or to even tug satellites (Shijian-21).¹¹

With the deployment of these satellites, China has already demonstrated its space warfare potential and counterspace capacities. China’s brand-new remote-sensing satellites such as the “Yaogan” and “Gaofen” series also indicate its capacity to support military operations from space. These **satellites offer advanced supportive capabilities such as high-definition multi-spectrum images and SIGINT**, which could largely enhance warfighting capability through ISR or target acquisition. As a high-attitude optical remote-sensing satellite in geostationary orbit, the “Yaogan-41” is a good example of such high-end capabilities. It is potentially equipped with optical technology and could hypothetically have a 2.5-meter optical resolution, enough to track a fleet or even stealth warplanes.¹²

China’s brand-new remote-sensing satellites indicate its capacity to support military operations from space.

⁸ 习近平: 高举中国特色社会主义伟大旗帜 为全面建设社会主义现代化国家而团结奋斗——在中国共产党第二十次全国代表大会上的报告 [Xi Jinping: Hold high the great banner of socialism with Chinese characteristics and work together to build a modern socialist country in an all-round way—Report at the 20th National Congress of the Communist Party of China], Government of the People’s Republic of China, October 25, 2022, https://www.gov.cn/xinwen/2022-10/25/content_5721685.htm; Gong Xueli, “认真学习宣传贯彻党的二十大精神 | 加速科技向战斗力转化” [Seriously study, publicize and implement the spirit of the 20th CPC National Congress | Accelerate the transformation of science and technology into combat effectiveness], Ministry of Defense of the People’s Republic of China, December 24, 2022, <http://www.mod.gov.cn/gfbw/qwfb/4929086.html>.

⁹ Tan Shusen, “智能化战场的卫星导航” [Satellite navigation for intelligent battlefield], China Military Online, November 12, 2021, http://www.81.cn/jfbmap/content/2021-11/12/content_302917.htm.

¹⁰ Liang Min and Gao Fei, “太空制高点“高”在哪里” [Where is the commanding height of space?], China Military Online, July 19, 2022, http://www.81.cn/jfbmap/content/2022-07/19/content_320118.htm.

¹¹ The Central Military Commission has often insisted that it views on-orbit servicing, assembly, and manufacturing (OSAM) as an integral part of China’s space capacities. Therefore, since 2018, the PLA has been developing OSAM capabilities through computer simulation. See: Namrata Goswami, “China advances its space capabilities, enlarging its strategic advantage,” *The Diplomat*, August 16, 2024, <https://thediplomat.com/2024/08/china-advances-its-space-capabilities-enlarging-its-strategic-advantage>.

¹² Clayton Swope, “No place to hide: A look into China’s geosynchronous surveillance capabilities,” *Center for Strategic and International Studies*, January 19, 2024, <https://www.csis.org/analysis/no-place-hide-look-chinas-geosynchronous-surveillance-capabilities>.

The PLA has also built a strong “Anti-Access and Area-Denial” (A2/AD) capability with various kinds of stand-off weaponry (SOW), including ballistic missiles and cruise missiles. Given that it is still enhancing its capability for long-range naval and aerial operations, **Chinese space assets could be seen as the most important element for the A2/AD capability**—to extend and maintain the “kill chain” of the SOWs, for example. With strong dual-use characteristics, these technologies may, therefore, play a decisive role in China’s counterspace operations. In fact, China has also developed various counterspace systems to offset U.S. advantages in the space domain.

Consequently, China is developing its space capacities not only to modernize the PLA but also to defeat its adversaries’ advanced capabilities. Although Beijing keeps emphasizing its own (supposedly) peaceful use of space¹³ and criticizing the militarization of space by the United States and allied countries,¹⁴ **China has in reality already developed different types of counterspace weaponry with its long tradition of asymmetric warfare in mind.** Since the United States and its allies largely rely on space-based capabilities to support high-tech warfighting, counterspace capability may be the best approach to offset the Western advantage in return. China currently has two types of anti-satellite (ASAT) options: directed energy weapons (lasers, high-power microwaves, radio-frequency jammers, etc.) and anti-satellite missiles such as the SC-19 (first launched in 2007) and the Dong Neng series ASAT Interceptor.

It is worth mentioning here that although China adopted an “integrated air and space” (空天一体) strategy for the development of the PLA’s Air Force in 2004, China still created a separate Strategic Support Force for space warfare. The 2024 reorganization and the Space Force’s full independence under the CMC’s command—in other words, directly under Xi Jinping’s responsibility—is a further testimony to the strategic importance of space for the Chinese leadership.

Counterspace capability may be the best approach to offset the Western advantage.

The war in Ukraine was another wake-up call for the PLA, especially when SpaceX provided (geographically limited) support to Ukraine through Starlink’s low-orbit communication satellite constellation for Ukraine. As a result, discussions on the threats brought by Starlink, its impact on geopolitics, and how to counter these are also gaining ground in Chinese strategic circles and scientific research.¹⁵ To counter Starlink and similar communication systems, China might need to not only improve its own space surveillance, target identification, multi-space sensor integration, and abnormal space event analysis capacities but also elaborate additional countermeasures to confront satellite constellations that can be militarized.¹⁶

¹³ “为人类和平利用太空作出开拓性贡献” [Make pioneering contributions to the peaceful use of space by mankind], Qiushi, June 6, 2024, http://www.qstheory.cn/qshy/jx/2024-06/06/c_1130158786.htm; “国防部举行: 信息支援部队成立专题新闻发布会” [The Ministry of National Defense held a special press conference on the establishment of the Information Support Force], People’s Daily, April 20, 2024, <http://military.people.com.cn/BIG5/n1/2024/0420/c1011-40219744.html>; Jin Jiaxu, “习近平的“航天情” [Xi Jinping’s passion for spaceflight], People’s Daily, April 13, 2021, <http://politics.people.com.cn/BIG5/n1/2021/0413/c1001-32076901.html>.

¹⁴ “Foreign Ministry Spokesperson Lin Jian’s Regular Press Conference on October 28, 2024,” Ministry of Foreign Affairs of the People’s Republic of China, October 28, 2024, https://www.mfa.gov.cn/eng/xw/fyrbt/202410/t20241028_11517200.html; Sylvie Zhuang, “China Warns ‘Dangerous’ US Actions Are Raising Risk of Space Arms Race,” South China Morning Post, December 24, 2024, <https://www.scmp.com/news/china/military/article/3292360/china-warns-dangerous-us-actions-are-raising-risk-space-arms-race>; Wong Wan-tse and Lo Chen-yun, “英国太空军事化战略分析” [Analysis of the British space militarization strategy], Military Abstracts 2023, no. 8 (2023): 33–37; Xie Wenjun and Fan Jiawei, “日本加速推进太空战略军事化进程” [Japan accelerates the process of militarizing its space strategy], Military Abstracts 2023, no. 8 (2023): 38–42; Feng Songjiang, “欧洲推出新太空计划” [Europe launches new space program], People’s Daily, March 3, 2022, <http://military.people.com.cn/BIG5/n1/2022/0303/c1011-32364314.html>; Lin Yuan, “美国拉全球战略加速太空化” [The United States is pulling in allies to accelerate the militarization of space], People’s Daily, March 2, 2022, <http://military.people.com.cn/BIG5/n1/2022/0302/c1011-32363359.html>; “美国是太空军事化战场化的最大推手” [美国是太空军事化战场化的最大推手] [The United States is the biggest driver of the militarization and weaponization of space], Ministry of Defense of the People’s Republic of China, February 29, 2024, http://www.mod.gov.cn/gfbw/xwfy/lxjzhzt/2024njzh_247047/2024n2y/16289783.html.

China's Increasing Use of "Gray-Zone" Tactics in Space

By design, the "dual-use" nature of space technology may play in authoritarian regimes' favor. **Since Russia and China are more inclined to use gray-zone or hybrid warfare operations than democracies,¹⁷ it seems entirely possible that the space domain could become a future battlefield for these gray-zone activities.** In the meantime, several countries have come to realize the value of space assets as critical infrastructure. The 14th Five-Year Plan recognized the importance of protecting space assets, along with China's space program. They also form part of the "space security" (太空安全) concept, which is itself part of the core national security concept. Considering that China's space capabilities keep rising rapidly, gray-zone challenges in space would seem to be looming on the horizon.

By design, the "dual-use" nature of space technology may play in authoritarian regimes' favor.

Moreover, **China's potential gray-zone actions in the space domain are likely to expand through its global partnerships.** China's activities in Argentina are a good example. In 2014, China and Argentina reached a bilateral agreement to build the first overseas Chinese deep-space station, at Neuquén in Patagonia. The station is part of China's deep-space network, operated by the China Satellite Launch and Tracking Control General (CLTC). The CLTC is an organization responsible for satellite launch and tracking control services that is under the control of the Xi'an Satellite Control Center, an entity itself belonging to the former Strategic Support Force.

However, the connection with the Chinese military is not the only concern regarding the Neuquén station. In fact, there is a striking lack of oversight of the operations of this deep-space station, and the area surrounding the Neuquén station is also strictly controlled by the Chinese government. Thus, the **role of the Neuquén deep-space station and its potential telecommunications espionage threat have come under the spotlight.¹⁸**

¹⁵ Stephen Chen, "Chinese scientists simulate 'hunting' Starlink satellites in orbit," *South China Morning Post*, January 12, 2025, <https://www.scmp.com/news/china/science/article/3294047/chinese-scientists-simulate-hunting-starlink-satellites-orbit>; "星盾在现代国防中的战略优势" [The strategic advantages of Starlink in modern national defense] Chinese Institute of Command and Control, January 13, 2025, <http://www.c2.org.cn/h-nd-1578.html>; Zhang Huang and Du Yanyun, "星链军事化发展及其对全球战略稳定性的影响" [The militarization of Starlink and its impact on global strategic stability], *Journal of International Security Studies* no. 5 (2023), <https://www.aisixiang.com/data/150870.html>; Fan Bingjian and Li Shuangbo, "商业航天公司介入军事冲突将为太空军控带来新挑战" [Commercial space companies' involvement in military conflicts will bring new challenges to space arms control], *World Affairs*, October 2024, no. 20, <https://news.qq.com/rain/a/20241030A01MHP00>; Zhao Minghao, "地缘技术视角下的中美博弈" [The Sino-U.S. game from the perspective of geotechnology], *China-US Focus*, March 4, 2024, <http://zh.chinausfocus.com/foreign-policy/20240301/43142.html>; Pan Yuxiang and Ye Xingguo, "警惕披着民用外衣的'星链'" [Beware of Starlink, which is disguised as a civilian service], *China Military News*, February 5, 2025, http://www.81.cn/zt/2024nzt/zljckrzqfjssmms/xjzb_249587/16325158.html; Cheng Chengren, Ren Xianhai, and Xu Shuaiqi, "星链系统及其作战运用分析" [Analysis of the Starlink system and its combat application], *Command, Control and Simulation* 46, no. 1 (February 2024), <https://www.zhkyzfyfz.cn/CN/10.3969/j.issn.1673-3819.2024.01.020>.

¹⁶ Ren Yuanzhen, Jin Sheng, Lu Yao-bing, Gao Hong-wei, and Sun Shu-yan, "星链计划发展现状与对抗思考" [The current status of the Starlink project and countermeasures], *Modern Defence Technology* 50, no. 2 (February 2022): 11–17, <https://www.xdfyjs.cn/article/2022/1009-086X/1009-086X-2022-50-2-11.shtml>; Peng Zhongxin, Qi Zhenqiang, Zhong Sheng, Zhang Lu, and Li Qiting, "星链在俄乌冲突中的运用分析与思考启示" [Analysis and enlightenment of Starlink's application in the Russian-Ukrainian conflict], *Tactical Missile Technology* 2022, no. 6 (2022): 121–127, <https://zsd.cbpt.cnki.net/portal/journal/portal/client/paper/b3171c7bfa42aec2c9f54e26cc1a57ac>; Wang Peihao, "总体国家安全观视域下星链的挑战及应对" [Challenges and responses of "Starlink" under the overall national security concept], *Network Security Technology and Application*, Vol. 2023, Issue 12, pp. 169–171, 2023, <https://cnki.net/KCMS/detail/detail.aspx?dbcode=CJFD&dbname=CJFDLAST2024&filename=WLAQ202312080>; Wang Peiwen, Zhang Huang, and Zhang Kaiyue, "星链军事化发展对太空情报信息安全构成的挑战与应对" [The challenges and responses posed by the militarization of Starlink to the security of space intelligence information], *Journal of Intelligence*, no. 6 (2024): 22–30, <https://interpret.csis.org/translations/starlink-militarization-challenges-and-responses-to-space-intelligence-and-information-security>.

¹⁷ In May 2024, China and Russia announced that the expansion of their military cooperation would also include space programs. See: Lu Zhen, "Vladimir Putin, Xi Jinping agree to expand Russia-China military coordination," *South China Morning Post*, May 17, 2024, <https://www.scmp.com/news/china/diplomacy/article/3262975/vladimir-putin-xi-jinping-agree-expand-russia-china-military-coordination>.

¹⁸ Carlo J. V. Caro, "The Patagonian Enigma: China's Deep Space Station in Argentina," *The Diplomat*, January 8, 2024, <https://thediplomat.com/2024/01/the-patagonian-enigma-chinas-deep-space-station-in-argentina>.

With the rapid development of its space capacities, China has become one of the two most significant powers in this area. Given that space warfare has long been an area of keen interest to the Chinese leadership, it is likely to become the next crucial battlefield for both armed conflict and gray-zone operations. As a result, **space assets will increasingly appear as key elements for China's military projection** and, more generally, for the resilience of the country.

Space assets will increasingly appear as key elements for China's military projection.

Considering the importance of space assets as critical infrastructure, both arms control efforts and increased multinational security cooperation in the space domain could become higher priorities for

the international community. As such, **space arms control was emphasized early on by the Chinese government.**¹⁹ However, a consensus between the West on one side and China and Russia on the other is difficult to achieve. Russia's recent veto of the UN Security Council resolution on nuclear weapons in space is a good example.²⁰

In fact, as the power balance has shifted within the Sino-Russian space relationship, China has gradually become the leading space power among the authoritarian regimes and is likely to gain more key space technology from Russia to further enhance its capabilities in this area—although details of the cooperation are limited and lack transparency,²¹ as tends to be the case with military activities in general. Indeed, **activities and sabotage in space are difficult to detect, to say nothing of preventing them.** Therefore, awareness of the space domain is essential to ensuring resilience and responsiveness.

¹⁹ “促进外空安全和可持续性的中国视角” [China's perspective on promoting outer space security and sustainability], United Nations Office for Outer Space Affairs, 2016, https://www.unoosa.org/pdf/SLW2016/Roundable/1_Zhongjun_Statement_Chinese_edition.pdf; “中国代表团在联大一委和四委外空问题联席会议上的发言” [Statement by the Chinese delegation at the joint meeting of the First and Fourth Committees of the United Nations General Assembly on outer space issues], Permanent Mission of the People's Republic of China to the United Nations, October 30, 2024, http://un.china-mission.gov.cn/zgylhg/cjyjk/ldyw/202411/t20241104_11521015.htm.

²⁰ Jeff Foust, “Russia vetoes U.N. resolution on nuclear weapons in space,” *Space News*, April 25, 2024, <https://spacenews.com/russia-vetoes-u-n-resolution-on-nuclear-weapons-in-space>.

²¹ Kevin Pollpeter, Elizabeth Barrett, Jeffrey Edmonds, Amanda Kerrigan, and Andrew Taffer, “China-Russia space cooperation: The strategic, military, diplomatic, and economic implications of a growing relationship,” *China Aerospace Studies Institute*, May 2023, <https://www.airuniversity.af.edu/CASI/Articles/Article-Display/Article/3373101/china-russia-space-cooperation-the-strategic-military-diplomatic-and-economic-i>.

China Trends is a quarterly publication by Institut Montaigne's Asia Program which is composed of **Joseph Dellatte**, Research Fellow for Climate, Energy and Environment; **Mathieu Duchâtel**, Director of International Studies; **François Godement**, Special Advisor and Resident Senior Fellow - Asia and United States; **Claire Lemoine**, Project Manager and **Pierre Pinhas**, Project Officer & Editor of China Trends.