



CHINESE ASTROPOLITICS:
DRIVERS OF CHINA'S 21ST CENTURY SPACE STRATEGY

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Introduction

In just the past two decades, China has become one of the world's most advanced spacefaring nations. What can explain this meteoric rise and what is China's current strategy for space? This paper argues that China recognizes it has the unprecedented opportunity to dominate space and accordingly has and will continue to leverage the following three realities to develop its strategy for space: a) legal ambiguity and the absence of precedent, b) unprecedented potential for geostrategic and asymmetric dominance in warfare, and c) the suitability of China's hybrid model of political-economy for the development of long-term space goals. This paper will first provide a brief background of the Chinese space program for context, second explore each of three key drivers, and finally conclude by placing this paper in the broader context of space exploration.

Background of the Chinese Space Program

China's space program is structured differently than that of the American or Russian space programs and knowing who the key actors are along with who drives space policy is important in understanding the goals—the most important difference being that China does *not* separate its civilian-scientific and military space programs. It is split amongst three different jurisdictions: the government (the state), the party (CCP), and the military (Central Military Commission). In Figure 2, the Space Leading Group is the core liaison that coordinates the key stakeholders from the three domains. Several niche joint leading small groups have also formed between the State Council and the CMC for specific space programs. On the government side, the State Council formally adopts long-term science and technology priorities and approves programs and funding. The most important entities include the Chinese Academy of Sciences (CAS), which contributes academic research and feasibility studies, China Aerospace Science and Technology Corporation (CASC), the main state-owned contractor carrying out most space contracts, and China National Space Administration (CNSA) which is China's public-facing figurehead space agency designed to mobilize international cooperation. CASC also oversees a host of other subordinate and specialized units including China Great Wall Industry Corporation (CGWIC), China's only provider of commercial satellite and launch services for international customers, and China Academy of Launch Vehicle Technology (CALT), which manufactures the Long March family of rockets. On the military side, the PLA Strategic Support Force (SSF) is a new cyber-, space-, and electronic-warfare branch established in 2015. The SSF houses the Space Systems Department consolidating all space-based C4ISR systems (command, control, communications, computer,

intelligence, surveillance and reconnaissance), space launch facilities, astronaut corps, and space-related research programs. The SSF houses a second equal department called the Network Systems Department, which houses the cyber force responsible for information operations.

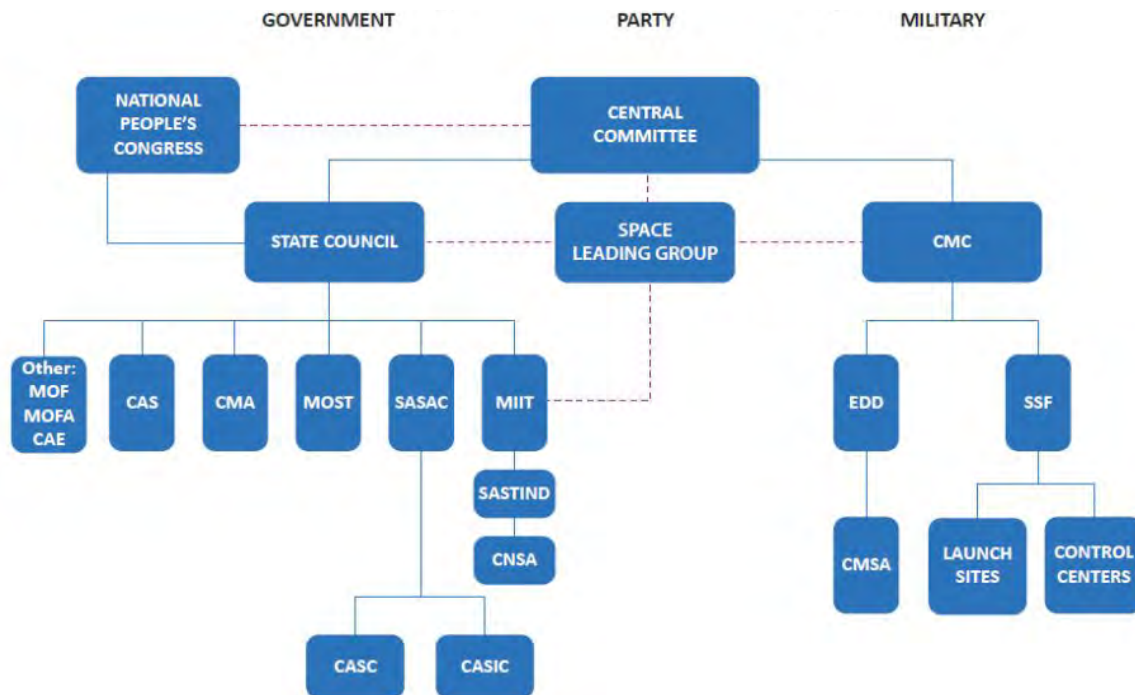


Figure 1: Organizational hierarchy of the Chinese national space program¹

This structure has enabled China to not only match many American and Russian space milestones in far less time, but in recent years, cemented several “firsts” of their own. China’s previous track record of successfully meeting its designated goals on time is a predictor of how likely China is to meet its future space goals. Its overall goal is to be the “lead actor” in outer space by 2045.² The following sections address China’s progress on a space station, the Moon, Mars, the military domain, the non-military domain, and rocketry.

Space Station

¹ Adapted from Marco Aliberti, *When China Goes to the Moon* (Springer International Publishing, 2015), 10.

² Khor Eng Lee, Aaron Khor, “China’s Long March of Modernization: Blueprint & Road Map for The Nation’s Full Development 2016-2049.”

China has previously used two temporary orbiting space stations (*Tiangong* 天宫) to initially test and master technologies in preparation to launch its first large modular space station or CSS (China Space Station) by 2022. It will be China's first long-term crewed station, and because the International Space Station (ISS) will be retired in 2025, will be the world's only crewed space station in operation. Establishing a permanent space station is the first step for more advanced missions.

The Moon

Just last year in 2019, China landed a lunar rover on the far side of the Moon, a feat that no other country has been able to accomplish. The rover uses a revolutionary quantum relay satellite positioned in L2 (Lagrangian Point 2) that enables communication (see Figures 2 and 3). Lagrangian points are stable “parking spots” where the gravitational forces of three celestial bodies effectively cancel each other out. Spacecraft require little to no energy to remain in “halo orbit” around these points and defense planners have proposed positioning military-intelligence satellites or even space colonies at these points. The rover is part of China's ongoing *Chang'e* (嫦娥) series of robotic lunar orbiters, landers, rovers, and return vehicles—all intended to lay the groundwork for the construction of a robotic research outpost on the far side south polar region in 2030 with completion around 2035. A crewed mission is a goal in the late 2020s or mid-2030s depending on progress in rocketry. China envisions the Moon will be critical for resources and assembly of more complex components of its space program including building space-based solar arrays.

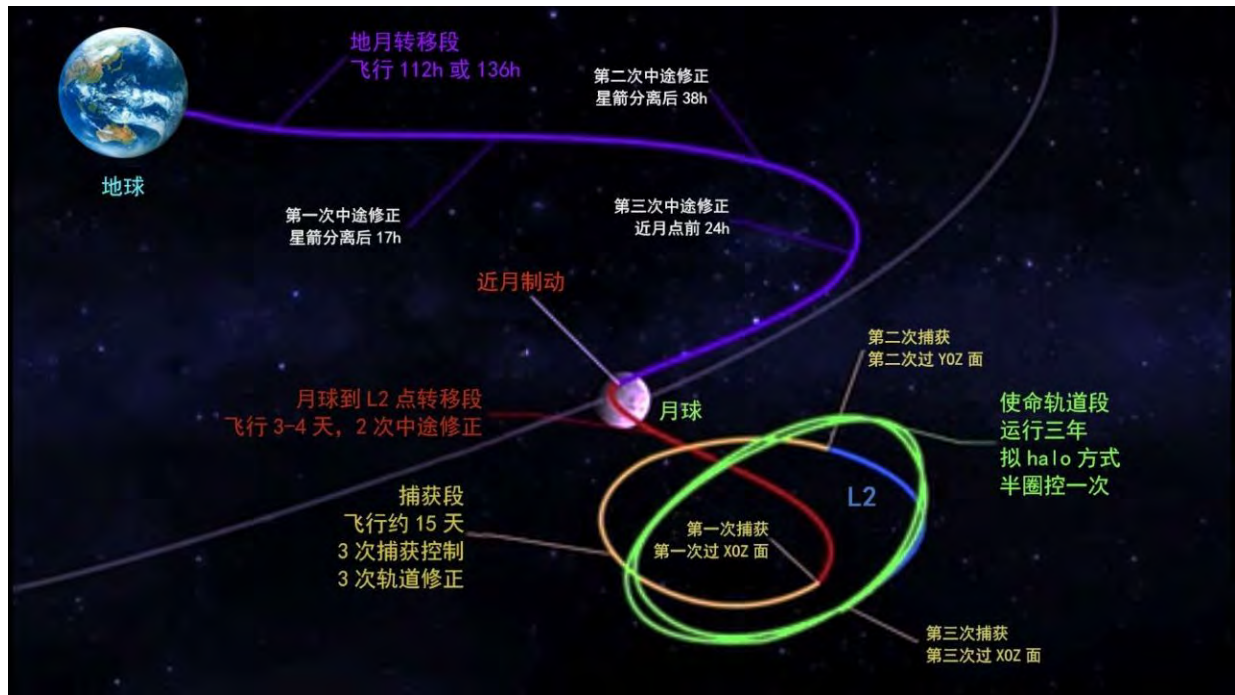


Figure 2: Placement of quantum relay satellite 'Queqiao' in Earth-Moon L2 halo orbit (green)³

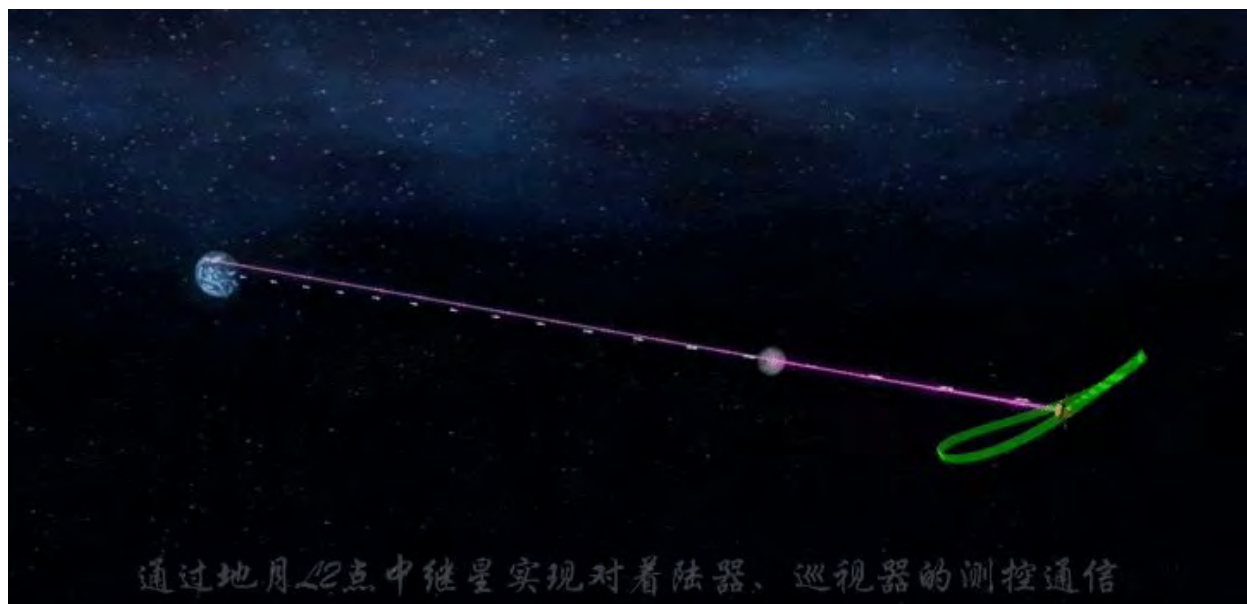


Figure 3: Demonstration of 'Queqiao' communications link⁴

*This 3-second animation is viewable on the cloud through this public link: <https://bit.ly/3b5rWv0>

³ "Queqiao update: Chang'e-4 lunar relay satellite establishing halo orbit after approaching Lagrange p," *Pakistan Defense*, June 1, 2018.

⁴ Ibid.

Mars

In July 2020, China is on track to send its first ever mission to Mars (*Tianwen* 天文) attempting to complete orbiting, landing, and roving in one mission, something no nation has accomplished simultaneously before. Chinese scientists have proposed a manned Mars mission before 2050.

Military

China, to date, most likely possesses the most advanced space warfare capabilities. It is one of four nations (US, Russia, India) to have demonstrated a successful ASAT missile test (2007) but since then have been testing a wide array of “space-based interceptors to crash into satellites and complex space robots capable of grabbing/crushing satellites by maneuvering to be adjacent in the same orbit.”⁵ “Jammers, lasers, chemical sprayers, and microwave weapons” are also part of its growing arsenal.⁶ Its successful demonstration of space-based quantum communication has led many to claim that Beijing’s communications will be hardened against any kind of adversary’s jamming or attempts at interception. China has “integrated its space, cyber, and electronic warfare capabilities”—which reflects a “unique innovation in force structure and a paradigm shift” in warfighting that PLA strategists have designed to be superior to the US model, which they view as “hindered by a lack of coordination and certain redundancies.”⁷

Non-military Misc.

Among China’s other non-military space ambitions, commercial domination of the cislunar econosphere (see Figure 4) is driving its plans. China wants to make breakthroughs in building a nuclear spacefleet by 2040, which would “enable large-scale exploration and resource exploitation in space.”⁸ It has consistently discussed plans for full deployment of space-based solar power infrastructure in low-earth orbit (LEO) and geosynchronous orbit (GEO) by 2050, a futuristic power source that “may have the potential to beam virtually unlimited power to the whole world far more reliably and efficiently than terrestrial solar panels” (see Figure 4 for reference on orbits).⁹

⁵ Bill Gertz, “Pentagon: Chinese Military Units Training with ASAT missiles China, Russia militarizing space to challenge U.S.,” *Frontiers of Freedom*, January 25, 2019, <https://www.ff.org/pentagon-chinese-military-units-training-with-asat-missiles-china-russia-militarizing-space-to-challenge-u-s/>.

⁶ Ibid.

⁷ Elsa B. Kania, “China Has a ‘Space Force.’ What Are Its Lessons for the Pentagon.” *DefenseOne*, September 29, 2018. <https://www.defenseone.com/ideas/2018/09/china-has-space-force-what-are-its-lessons-pentagon/151665/>.

⁸ “China’s Pursuit of Space Power Status and Implications for the United States,” U.S.-China Economic and Security Review Commission, <https://www.uscc.gov/research/chinas-pursuit-space-power-status-and-implications-united-states>.

⁹ Ibid.

Beijing is determined to commercially dominate in the business of asteroid-mining—capturing near-earth asteroids to be mined back on Earth, aiming to land on asteroid 1996 FG3, and returning samples from 2016HO3 (469219 Kamo’oalwa). China has already published findings about how to nudge an asteroid into Earth’s orbit. Since 2014, when the Chinese government gave the green light to private enterprise in space, China’s private space sector has exploded. The number of private commercial space startups increased from 30 to 100 in 2019 alone.¹⁰ Government policy shifts have opened PLA launch facilities to startups while government venture funds have flooded the area with capital. i-Space (星际荣耀) became the first private Chinese space company to launch satellites into orbit in 2019. Less than a month later, China Rocket Co. Ltd. (中国长征火箭有限公司) repeated the feat of putting satellites into orbit using a commercial business model.

¹⁰ Abigail Beall, “China’s private space industry is rapidly gaining ground on SpaceX,” *WIRED*, August 28, 2019, <https://www.wired.co.uk/article/china-private-space-industry>.

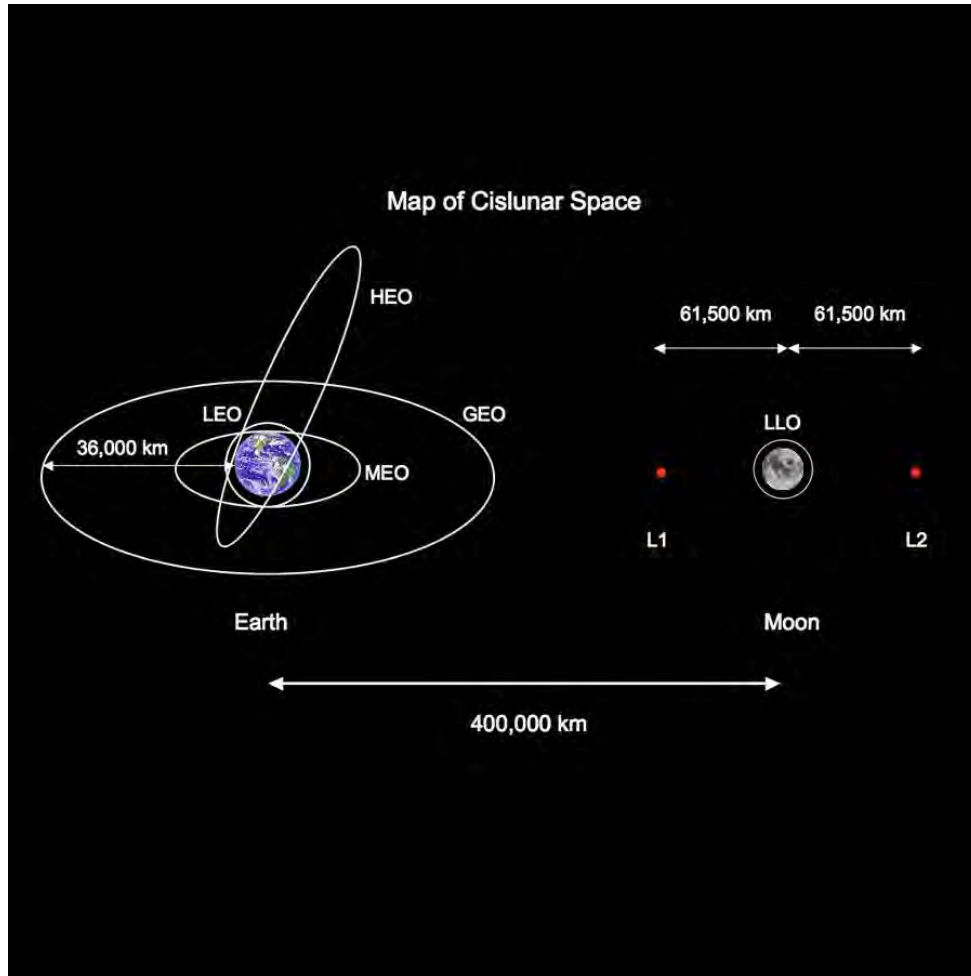


Figure 4: Map of cislunar space with orbits and L1, L2¹¹

Rocketry

The national Chinese space program exclusively relies on a family of expendable rockets called the Long March series, named after the Long March of Chinese communist history. At present, the *heavy-lift* LM-5 is the country's largest, heaviest, and most technically sophisticated rocket to date. "Unlike previous LM rockets that reused proven technology from prior generations," the LM-5 saw its first successful launch in 2016 but recent failures have "created significant delays in China's national space program."¹² The LM-7, smaller than the LM-5 is intended to be the workhorse of the fleet, eventually accounting for around 70% of all Chinese launches.¹³ The

¹¹ "Cislunar space," Space Wiki, https://space.fandom.com/wiki/Cislunar_space.

¹² "China's Pursuit of Space Power Status and Implications for the United States," U.S.-China Economic and Security Review Commission, <https://www.uscc.gov/research/chinas-pursuit-space-power-status-and-implications-united-states>.

¹³ Qin Tong, Xu Lijie, Li Pingqi, Liu Jiajia, "Development of China's New Generation Launch Vehicles," Beijing Institute of Astronautical Systems Engineering, <http://english.nssc.cas.cn/ns/NU/201809/W020180906583001107643.pdf>.

LM-8, currently in development, is notable for being China's first attempt at first stage reusability planning a debut in 2021. Finally, the *super-heavy-lift* LM-9 is China's most powerful rocket under development with a planned completion date of 2028 and test flight in 2030; 6x as powerful as the LM-5, the LM-9's first major mission is expected to be a single-launch Mars sample return mission. See figure 4 for relative size comparisons of the LM-7, LM-5, and LM-9.

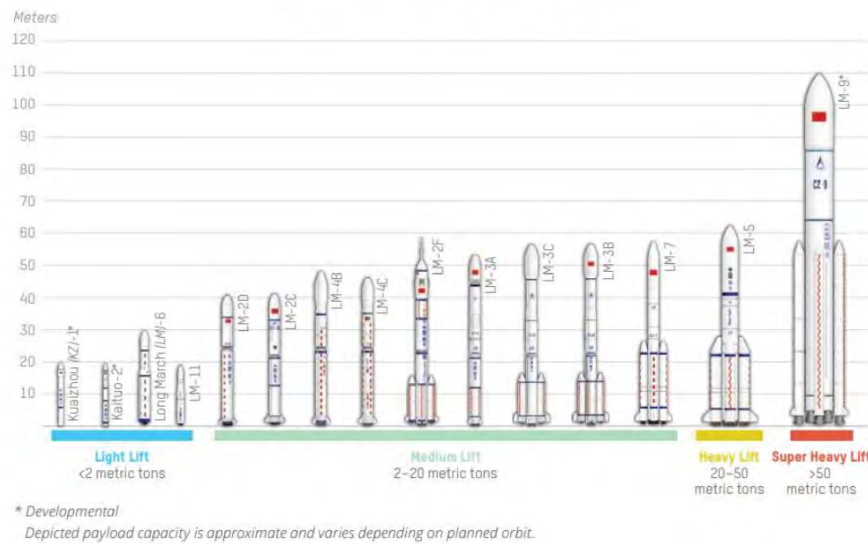


Figure 5: China's space launch vehicles as of April 2019¹⁴

Hypothesis

Three factors have and will continue to drive the Chinese space program to establish dominance in and create an alternative order for space: a) legal ambiguity and the absence of precedent, b) unprecedented potential for geostrategic and asymmetric dominance in warfare, and c) the suitability of China's hybrid model of political-economy for the development of long-term space goals. The following paragraphs explore these three factors in greater detail.

Legal ambiguity and the absence of precedent

¹⁴ "China's Pursuit of Space Power Status and Implications for the United States," U.S.-China Economic and Security Review Commission, <https://www.uscc.gov/research/chinas-pursuit-space-power-status-and-implications-united-states>.

The first and perhaps most important factor for the Chinese position has been taking advantage of the legal ambiguity of space. A lack of enforcement, unclear legal consensus on existing international treaties, and the absence of domestic Chinese space law have created a unique situation unlike anything on Earth where first movers wield an enormous advantage in establishing precedent in the “final frontier” and be justified in their actions.

International space treaties are by themselves, not self-executing, and require countries to adopt domestic measures for their effective implementation.¹⁵ Technically the 1967 Outer Space Treaty (OST), like all international law, is technically binding but there is no enforcer and on critical issues like sovereignty, military activity, and commercial enterprise, there is room for wide legal interpretation. The treaty stipulates that no nation may appropriate territory, but there has never been a legal consensus on whether or not the prohibition applies to private appropriation by individuals and corporate entities. On military activity, the guiding principle has been that space exploration should be a peaceful initiative, but the language doesn’t inherently prohibit military activity. On resources, the treaty is “vague on the legal status of resources extracted from space bodies” and there is “no legal mechanism to adjudicate ownership of space-based resources” like there is on Earth.¹⁶ In other words, commercialization is similar to maritime law: “if you’re the first one there, and you mine it, it’s yours to keep.”

“The universe is an ocean, the Moon is the Diaoyu Islands, Mars is Huangyan Island. If we don’t go there now even though we’re capable of doing so, then we’ll be blamed by our descendants. If others go there, then they will take over, and you won’t be able to go even if you want to. This is reason enough.”¹⁷ This 2017 quote from Ye Peijian, head of China’s lunar exploration program was the first recorded instance that China has explicitly linked its space ambitions to its sovereignty claims on Earth, referring to land forms currently under intense scrutiny and international dispute in the South China Sea and East China Sea. The area has become Beijing’s most visible example of defying international law under the UN Convention of the Law of the Sea (UNCLOS). China has worked to shape international opinion in favor of its preferred legal interpretation by transitioning national perspectives away from long-accepted norms of freedom of navigation through geoeconomic pressure toward neighboring states, building artificial islands, and invoking historical claims of the “nine dash line.” China has

¹⁵ Fabio Tronchetti, “Space Law and China,” *Oxford Research Encyclopedia of Planetary Science*, August 2017, <https://ui.adsabs.harvard.edu/abs/2017oeeps.book...66T/abstract>.

¹⁶ “China’s Pursuit of Space Power Status and Implications for the United States,” *U.S.-China Economic and Security Review Commission*, <https://www.uscc.gov/research/chinas-pursuit-space-power-status-and-implications-united-states>.

¹⁷ Bruno Macaes, *Belt and Road: A Chinese World Order*

committed to non-escalatory action while steadily advancing its territorial claims by force, suggesting that China has displayed a clear systematic pattern that it will try to replicate in the space domain to far greater consequences in extending its vision of governance and sovereignty to outer space. The analogy between the sea and space might seem to be an odd one to make at first given the emptiness of the cosmos—airspace might initially serve to be a better comparison. But “what appears at first a featureless void is in fact a rich vista of gravitational mountains and valleys, oceans and rivers of resources and energy alternately dispersed and concentrated... and precisely placed peculiarities of astrodynamics”—much like the sea.¹⁸ In the same way that certain commercial routes through the South China Sea can be dominated by a militarized artificial island, a strategically placed satellite around a Lagrangian point or the placement of certain warfighting satellites in particular orbits makes space very similar to the sea—“while it lacks physical terrain, it has its own kind of gravitational chokepoints, high ground, runways, thoroughfares, etc.”¹⁹ In China’s case, it’s difficult then considering that it’s clear they were historically not the first nation to land either robotic rovers or humans on any celestial body. Neither will it be the case that China will likely be the first to land humans on Mars per the development timelines of the US and China respectively. However, one unexplored area in the literature that could address this challenge is the *partial* claim of sovereignty of certain celestial bodies including the Moon. China becoming the first nation to land on the far side of the Moon may, in the future, be the basis for sovereignty rights in the development of a lunar outpost while effectively ceding the near side. In the same way, China could be deliberate in the specific regions that it lands robots or people on other celestial bodies, at least until its technology can catch up to that of the US to unequivocally claim sovereignty over other bodies by being the first to land on them. The strategic drivers behind landing on the far side are discussed later.

One issue possibly driving China to take advantage of ambiguous legal regimes is ironically, an American unwillingness to co-opt China in being a partner to build and define the legal regime for space. Returning to the example of UNCLOS—the US despite its insistence that China officially ratify the treaty, has not ratified itself, for doing so would render American claims on militarized landforms in the Pacific illegal under the new international legal definitions of what constitutes an “island.” The US has been in a unique position with regard to terrestrial law

¹⁸ Everett C. Dolman, *Astropolitik, Classic Geopolitics in the Space Age* (Routledge, 2001).

¹⁹ Alex Lockie, Trump’s Space Force is about beating China, as Beijing is talking as if it already owns space.
<https://www.insider.com/trump-space-force-china-beijing-2018-8>.

because it was at the table defining the resulting legal framework. Therefore this is one example where the US is delicately trying to balance securing its own interests and fulfilling its de facto role of chief enforcer. The undermining of its own legal legitimacy is furthered by a legal barrier to cooperation between the US and China known as the Wolf Amendment, which requires that American private and public space actors get Congress' prior approval to work with Chinese counterparts in space. While the Chinese have positive working relationships with the Europeans and the Russians, as long as the US ban remains in place on space cooperation, the US cannot argue about holding a moral high ground. Many of the partners on the ISS that include more than the European Space Agency and Roscosmos have expressed that they would like to draw China into collaboration rather than treat it like an adversary, but the US has remained steadfast in its alienation of China. Rather than fulfilling the amendment's intent of slowing China's rise as a space power, it has only strengthened China's legitimacy and incentive in building an alternative legal order alongside an alternative coalition for space exploration. Chinese experts have asserted in the past that prohibition from the ISS, while difficult to overcome at first, has had a net positive impact on China's space development by motivating them to invest more heavily in their space program while keeping in mind that in the future, "once China achieves high-end indigenous space technology, the US will have no other choice but to cooperate."²⁰

In a similar show of hypocrisy, the parent argument that the model of UNCLOS is useful for governance of other global commons has already been explicitly rejected, not by China *but by the US* via the most recent presidential executive order on the utilization of space resources. The latest space decision from the US since the creation of the Space Force (overt militarization) formally recognizes the rights of private interests to claim resources in space. The order encourages commercial mining of the Moon, Mars, asteroids, and "other celestial bodies." It explicitly states that the US does *not* consider resources in space to be the "public domain" or as a "global commons," putting an end to the ambiguity regarding commercial activities in space, which were not technically addressed in the OST.²¹ As the guardian and principal enforcer of the liberal rules-based world order, one might naturally expect the US to take the lead on extending this rules-based framework into space. But the US has

²⁰ Namrata Goswami, "China in Space: Ambitions and Possible Conflict," *Strategic Studies Quarterly* 12, no. 1 (Spring 2018): 74-97. https://www.jstor.org/stable/26333878?seq=1#metadata_info_tab_contents.

²¹ "Executive Order of April 6, 2020, Encouraging International Support for the Recovery and Use of Space Resources," *Code of Federal Regulations*, <https://www.whitehouse.gov/presidential-actions/executive-order-encouraging-international-support-recovery-use-space-resources/>.

been contradictory, trying to set itself up in a manner most beneficial to its own interests whilst also abiding by existing treaties. Russia was the only nation to vehemently voice opposition to the American decree, condemning the proclamation as a blatant attempt to seize the territory of other planets and likening this rejection of international cooperation to colonialism. Their dissenting view most likely stems from Russia's real lack of capacity to currently compete against the US. But noticeably absent from any dissent is China, however. Senior White House officials curiously told journalists that the administration has actually seen support for the American view from Beijing. A senior administration official said, "of course, there are other problems with China as you're well aware, but even on space resources, China has been open to discussing how to produce a more stable and predictable environment."²² Beijing's willingness to cooperate intrigues many as Chinese views have noticeably shifted over recent years from criticism of the American position to the view that space resource utilization is a permitted activity. This could be explained by a Deng Xiaoping-era adage—"hide your capacities and bide your time." At least in the space domain, China, while capable of deterrence against the US in space, would still like to quietly build its capabilities in peace. In Deng's case, this meant strengthening China's technological base and its economy while avoiding conflict. Thus in space, Beijing might be aiming to cooperate for the time being—first establishing the capacity to be present, then developing claims afterward to justify its presence. China's moves in the legal domain support this theory. As of May 2020, China is unusual in that it is the only space-faring country that still lacks its own comprehensive and uniform national space legislation despite it being in development since the 2010s.²³ Instead, China has partnered with Luxembourg, the only other country apart from the US to have developed space law on the exploitation of space resources.²⁴ Perhaps this delay of Chinese views on space are deliberate then and historical Chinese economic strategy can provide evidence for why China curiously has in recent years begun to support American positions for creating a legal regime.

A final often-invoked sentiment from China targets the underlying legitimacy of international law as a whole in the first place. With more than 5,000 years of continuous civilizational history far longer than that of any of the Western powers, and with the vast majority of those 5 millennia spent as the world's preeminent economic and

²² Theresa Hitchens, "WH Woos Potential Allies, Including China, For Space Mining," *BreakingDefense*, April 6, 2020, <https://breakingdefense.com/2020/04/wh-woos-potential-allies-including-china-for-space-mining/>.

²³ Fabio Tronchetti, "Space Law and China," *Oxford Research Encyclopedia of Planetary Science*, (August 2017): <https://ui.adsabs.harvard.edu/abs/2017oepr.book...66T/abstract>.

²⁴ Sarah Scoles, "China Wants to Make a Mark in Space—But It'll Need a Little Help," *WIRED*, February 14, 2018, <https://www.wired.com/story/china-wants-to-make-a-mark-in-space-but-itll-need-a-little-help/>.

technological power, China did not “have a seat at the table” when creating the framework of the current international legal system which is traced back 400 years at most, while UNCLOS was only brought into force in 1994. From an ancient historical perspective, and especially when juxtaposed to the vast cosmos of space, the Chinese could cite such sentiment to justify its historical right in not being bound by nascent concepts of international law decided without input from now, arguably one of its principal actors.

Unprecedented potential for geostrategic and asymmetric dominance in warfare

In the warfighting domain, China sees an opportunity to become the world’s most dominant military power with space offering China unique advantages not found in the terrestrial and conventional war domains: the capacity to effectively exploit the dual-use paradox of plausible deniability, the opportunity to seize a geopolitical domain not yet dominated by adversaries, and the ability to asymmetrically defeat more conventionally powerful adversaries such as the US military.

China benefits from the fact that space is inherently a dual-use domain—everything in space irrespective of whether it is for a civilian-scientific purpose or militaristic purpose will be viewed by adversaries as the same and thus there is no disadvantage to militarization and no benefit to exclusively pursuing scientific aims. For example, anything that can closely approach another space object i.e. a repair satellite with robotic arms, will be viewed with the potential that it could be used as a weapon (grabbing and destroying orbiting satellites). Monitoring space threats then becomes difficult for intelligence to differentiate between the two and it also lessens the time to respond to a threat. This covert militarization strategy coupled with an emphasis on civilian-military integration fits with China’s terrestrial activities in the South China Sea through its maritime militia or paramilitary fishing fleet where the Chinese military has armed fishermen with weapons, linked them into the military-intelligence communications network, and enlisted them in patrolling/defending Chinese sovereignty claims. The same pattern exists in China’s development of dual-use naval logistics facilities and airstrips around the world in support of its Belt and Road Initiative—airstrips in the Cambodian jungle, ports in Pakistan, and intelligence outposts on Burmese islands have a plausibly deniable component to them as they have a dual capability to adequately accommodate warships and fighter jets if required. China’s civilian-military campaign has also required that all new shipping vessels are to be built to military specification in an attempt to augment its blue-water navy capabilities. China might have begun to double down on this plausible deniability strategy after China came under intense international criticism for its 2007

ASAT test that created an immense amount of space debris. Afterward, it noticeably began conducting its anti-satellite missile program under the cover of its missile defense system program. Space is after all, inherently a military domain, with the same rockets (Long March series) used to launch ICBMs being configured to launch payloads into space. Satellite ISR (intelligence, surveillance, and reconnaissance) of space assets is also unlike space-based ISR of terrestrial activity in some ways. Other nations that are not as technologically advanced in space have no capacity to challenge claims and even peer rivals in space have far less visibility into any kind of military testing that is done. The Chinese space program on its own is the most secretive of any in the world which often doesn't announce launches until the vibrations have already woken civilians nearby who then run outside to record the launch on their smartphones—how many Western journalists get news of a launch. Even on the far side of the Moon, where China is the only nation to currently operate a rover, the US only has visibility twice per year.²⁵ Further, space is still seen by many on Earth as an enterprise still too distant and unimportant for close scrutiny and criticism—at least for the average citizen at present.

China in modern times has also never been able to dominate any geopolitical “space,” but space in the 21st century could be understood as the next domain of geostrategy. In applying Alfred Thayer Mahan’s “The Influence of Sea Power Upon History” and Halford Mackinder’s ideas on geostrategy as two parallel theoretical frameworks, one could consider the appropriate similarities of sea power to the “ocean of space” and using Mackinder’s ideas about the heartland to think about the relative positioning of celestial bodies.^{26 27} China has always felt it was “left out” when first the British Empire and next the US achieved maritime dominance. Taking control of all commercial routes under the pretext of security, these two Western thalassocratic powers (primarily the US) have grown richer as it sustained a command of the sea, built an extensive logistical network of ports and bases to support a national security architecture, and invested in a force to patrol the global commons to enforce a legal framework that they designed i.e. the US Navy. No nation can currently say they dominate space as there is no permanent presence or a cislunar infrastructure i.e. there is no equivalent of a US Navy in space. China understands that nautical powers have commanded global hegemony by resting on its “instruments of war” which includes “military bases, maritime

²⁵ John Metcalfe, “A One-of-a-Kind Animation of the Moon’s ‘Dark Side,’” *CityLab*, August 6, 2015,

<https://www.citylab.com/environment/2015/08/a-one-of-a-kind-animation-of-the-moons-dark-side/400619/>.

²⁶ Alfred Thayer Mahan, *The Influence of Sea Power Upon History, 1660-1783* (United States: Little, Brown and Co., 1890).

²⁷ Everett C. Dolman, *Astropolitik, Classic Geopolitics in the Space Age* (Routledge, 2001)

commerce, and colonial territories,” just as these same concepts can be extrapolated to outer space.²⁸ China specifically envisions the “cislunar domain as the foundation for its long-term presence in space and jumping-off point for deep space exploration missions”—which will “include a transport hub orbiting Earth with permanently docked nuclear shuttles, accessible from Earth via reusable rockets.”²⁹ “The Earth-Moon space will be strategically important for the great rejuvenation of the Chinese nation” because most theorists agree that the cislunar economy will dominate the beginning eras of space exploration.³⁰ Some Western theorists also agree that “cislunar space is the heartland of the 21st century.”³¹ In more specific terms, “who controls low-earth orbit controls near-Earth space. Who controls near-Earth space dominates Terra. Who dominates Terra determines the destiny of humankind.”³² Chinese thinking is in an interesting position though, considering that according to current development timelines they will *not* be the first nation to establish a presence on either the Moon or Mars, but their rhetoric, strategy, and ambition, on the surface at least, doesn’t seem to take this critical fact into account. This paper theorizes that Chinese strategists have compensated creatively by placing a huge priority on being the first nation to the far side of the Moon. The Moon, and more specifically, the far side of the Moon (the side that constantly faces away from Earth and toward deep space) is the most defensively sound position for a militarized base. In the future, history will look back upon this face as we might today envision to be a hybrid combination of the Strait of Hormuz and the Hawaiian Islands. The far side of the Moon will serve in the future as a terminus for both outward-bound explorers and returning spacecraft, filled with mined resources on faraway planets and asteroids and ultimately destined for Earth or orbiting manufacturing centers. Because the Moon has low gravity, it will inevitably become the most critical staging area for receiving and launching space vehicles with far greater ease and cost than on Earth; launches from Earth after all require 22 more times energy than launches from the Moon.³³ The Moon’s location and resources makes it a “logical construction site for the interplanetary ships of the future,” and once built, these vessels will return from deep space and immediately to the Moon at its closest point *at the far side* for repair at large

²⁸ Michelle Shevin-Coetzee and Jerry Hendrix, “From Blue to Black: Applying the Concepts of Sea Power to the Ocean of Space,” *Center for a New American Security*, November 18, 2016, <https://www.cnas.org/publications/reports/from-blue-to-black>.

²⁹ Doug Messier, “China’s Ambitious Plans to Dominate Cislunar Space,” *ParabolicArc*, December 26, 2019, <http://www.parabolicarc.com/2019/12/26/chinas-ambitious-plans-to-dominate-cislunar-space/>.

³⁰ Namrata Goswami, “Waking Up to China’s Space Dream,” *The Diplomat*, October 15, 2018, <https://thediplomat.com/2018/10/waking-up-to-chinas-space-dream/>.

³¹ Wendell Mendell, *Lunar Bases and Space Activities of the 21st Century* (Houston: The Lunar and Planetary Institute, 1984), <http://ads.harvard.edu/books/lbsa/>.

³² Everett C. Dolman, *Astropolitik, Classic Geopolitics in the Space Age* (Routledge, 2001)

³³ Namrata Goswami, “China’s Get-Rich Space Program,” *The Diplomat*, February 28, 2019, <https://thediplomat.com/2019/02/chinas-get-rich-space-program/>.

docking facilities constructed for them just as the Hawaiian Islands initially served as a critical terminus for the US Naval ships transiting back and forth between the US and Asia.³⁴ The far side of the Moon also acts as the perfect place to position defensive measures to prevent unwanted vessels from entering into the cislunar domain just as military infrastructure perched atop Gibraltar has been an effective “gatekeeper” commanding power over transit between the Mediterranean Sea (inner Earth-Moon system) and the wider Atlantic Ocean and High Seas (vast expanses of interplanetary space). One could imagine a positioning of more military and intelligence assets in Lagrangian points (L2) to complete this “far side network.” This control of the Moon, and specifically the far side, will be the *determining* factor for a decisive control of space, and “once an adversary is entrenched upon its surface, the natural defensive strengths will render their removal, difficult, if not impossible.”³⁵ Aside from defensive value, most space theorists believe that those countries which develop the skills to master the lunar surface will be the best equipped to embark upon more complex spacefaring missions to other celestial bodies—a lone training ground of sorts. Testing key technologies like 3D printing in microgravity, in-situ resource utilization, space manufacturing with space-based resources, and ensuring the feasibility of agriculture are all difficult but necessary tasks. Examining space as strategists would through a familiar lens of sea power theory and geopolitical theory demonstrates how we are, indeed, upon a new era of geopolitics with similar themes from the past.

China finally views space as *the* key domain which enables it with asymmetric superiority against its conventionally more powerful adversaries. Authoritative writings by the PLA Academy of Military Science and other quotes from Chinese military analysts shed insight into how China views space as its critical warfighting domain in the 21st century. Many PLA strategists anticipate the first blow in any future war (especially with the US) will likely be struck in space. They realized very quickly after the First Gulf War (1990-1991) that the US military was undefeatable in conventional terms. The war was a first in demonstrating to the world the importance of space-based systems in modern warfare. The Chinese carefully observed how integral satellites of all types were in US military operations and critical to US success in battle. For example, “surveillance satellites provided Schwarzkopf’s strategic planners with a bird’s eye view of the enemy’s position, communication satellites relayed necessary orders to coalition ground commanders, and the then-nascent global positioning system (GPS) guided

³⁴ Michelle Shevin-Coetzee and Jerry Hendrix, “From Blue to Black: Applying the Concepts of Sea Power to the Ocean of Space,” *Center for a New American Security*, November 18, 2016, <https://www.cnas.org/publications/reports/from-blue-to-black>.

³⁵ Ibid.

both missiles to their targets and commanders across the featureless desert terrain of Iraq.”³⁶ Beijing, thus is well aware of the extent to which US terrestrial operations “rely on space-based assets for communication, navigation, and precision fires and have concluded it to be much more feasible to cripple these assets in space rather than the terrestrial capabilities they enable.”³⁷ Beijing’s planners have stated that its first priority in modern conflict would be to seize dominance in the “information domain” and thus the “new commanding heights of strategic competition”—specifically space and cyber—categorizing this type of weaponry as its “Assassin’s Mace” program.

³⁸ ³⁹ The aforementioned SSF, which centralized PLA space, cyber, electronic, and psychological warfare capabilities in 2015 is intended to do just that. China regards this advantage as so crucial that this paper argues it is the *only* domain in which it would ever consider launching a preemptive strike against an adversary’s space assets “early in a conflict to deter an opponent from decisively intervening in or continuing a military intervention.”⁴⁰ This conclusion is supported by three factors. First, articles published by the PLA Academy of Military Science argue that “the only way for China to achieve parity with the US is to threaten to degrade or destroy its crucial systems and this may be enough to force the US to stand down in a conflict.”⁴¹ Second, the emergence of a mutually-assured destruction (MAD) doctrine analogous to nuclear weapons during the Cold War is far less destructive in space. This is because simply there isn’t much kinetic means to create massive destruction in space and any satellite attack would most likely be non-kinetic to avoid generating debris detrimental to one’s own operational ability. In the case that catastrophic debris was created (possibly as extreme as the Kessler syndrome), both the US and China have the ability to relatively quickly reconstitute lost capabilities by launching more satellites to various orbits while in nuclear war, regeneration isn’t an option. Third, China’s space warfare capabilities in both defense and attack are judged to be at par or greater than the US at present. China has actively been testing a broad range of aforementioned kinetic and non-kinetic ASAT weaponry while its landmark breakthrough in space-based quantum

³⁶ Ibid.

³⁷ “Section 3: China’s Ambitions in Space: Contesting the Final Frontier,” *U.S.-China Economic and Security Review Commission*, <https://www.uscc.gov/sites/default/files/2019-11/Chapter%204%20Section%203%20-%20China%E2%80%99s%20Ambitions%20in%20Space%20-%20Contesting%20the%20Final%20Frontier.pdf>.

³⁸ Getting to Where the PLA Needs to Be: Testimony before U.S.-China Economic and Security Review Commission, (June 20, 2019) (Dean Cheng, The Heritage Foundation).

³⁹ “China’s secret plan to topple the US as the world’s superpower,” *BlackOps Partners*, August 20, 2017, <https://blackopspartners.com/chinas-secret-plan-topple-us-worlds-superpower/>.

⁴⁰ Doug Messier, “China Aims to Knock Out U.S. Space Systems in Conflict,” *Parabolic Arc*, December 4, 2019, <http://www.parabolicarc.com/2019/12/04/china-aims-knock-out-us-space-systems-conflict/>.

⁴¹ “China’s Pursuit of Space Power Status and Implications for the United States,” *U.S.-China Economic and Security Review Commission*, <https://www.uscc.gov/research/chinas-pursuit-space-power-status-and-implications-united-states>.

communications provides a better defense than what the US currently uses to encrypt its satellite communications, which are more vulnerable to hacks.

A less important but still critical factor is the fact the US has never been able to test its military capabilities in space in real combat unlike all of its terrestrial systems. Should US and allied space-based C4ISR satellites be rendered useless and terrestrial forces left deaf, dumb, and blind—this situation is one the US military would be dangerously unprepared to face.

The suitability of China's hybrid model of political-economy for the development of long-term space goals

China's hybrid model of state-led capitalism uniquely endows Beijing's space ambitions with certain advantages that the US and other spacefaring nations cannot match. Many are derivative of the fact that all goals in space are long term and Beijing's model of political economy excels at orienting state resources (funding and talent) toward long-term strategic goals with delayed return on investment. Space is unique in that it has a tremendously high barrier to entry for private business and thus while in countries like the US where liquidity is a constant concern, Chinese public-private venture funds and massive state subsidies distort the market and ensure that funding is in no short supply. China gave private enterprise the green light in space in 2014, after observing how it was possible with SpaceX. Beijing also helps its commercial sector through the direction of large-scale, pseudo-state sponsored industrial espionage toward foreign aerospace firms (see Turbine Panda) then gifting this intellectual property to its state-owned space sector and private space companies.⁴² There have also been recorded instances of China using front companies to invest in US space companies (oftentimes exploiting legal loopholes through Hong Kong) and gaining vertical control of supply chains through predatory pricing (see refined germanium wafers).⁴³ Recently China has begun to aggressively subsidize launches by CGWIC, offering as much as 70% of the financing to seize market share from other global launch providers, providing experience and building relationships with the developing world, largely, who can't afford pricier Western launch services. US commercial space industry executives have recently remarked that they can no longer bid against such competitive margins.⁴⁴ Further, the explicit civilian-military integration called for under Xi Jinping sees the direct integration of state-owned entities

⁴² Ibid.

⁴³ Ibid.

⁴⁴ Ibid.

and their technology with commercial startups to a) develop cutting-edge tech, but b) also “produce existing tech that meets most customers’ needs at lower cost and at greater commercial scale and efficiency.”⁴⁵

On the political side, space fits conveniently into the schedule of five-year plans. A reliable, stable source of funding and a clear strategic direction from the state have ensured consistent progress and ideological linearity. The Central Committee, the most elite 204-member body at the apex of the Chinese Communist Party contains a high number of former scientists and management previously involved in China’s aerospace sector. This “cluster” as it’s observed in [this](#) 3D social network visualization wields extraordinary power and influence in providing sufficient support to the program. This theme of technocracy is representative of the Chinese government as a whole, which, over the past 20 years has seen a rise in technocrats dominate elite politics at the highest levels (more so under Xi Jinping’s predecessors Hu Jintao and Jiang Zemin). It is also no surprise, then, that China has made extraordinary investments in scientific/STEM education domestically, now boasting the largest number of engineers in the world, but also taking advantage of returning overseas talent (海归). In the US, a lack of ideological linearity and consistent support has been detrimental to funding toward space initiatives. Nixon ended manned lunar explorations partly to diminish the legacy of his predecessors and the Obama administration cancelled the development of all space-based military systems out of an ideological opposition to the militarization of space. Such repeated restarting, at least in the national program is tremendously unproductive in achieving space goals.

China also benefits from the fact that space is inaccessible to the majority of countries on Earth. Therefore smaller nations are forced to “pick a patron” considering that for most countries, it doesn’t make economic sense to develop indigenous space capabilities. This singular and exclusive dependence phenomenon has been of benefit to the Chinese in building its own space coalition through multiple tools—its Beidou satellite system (which now boasts more users than GPS), opening up its space station/lunar program to international partners, and forming regional space organizations to promote its services (APSCO). All of these actions, which have been recently branded under a “space silk road” are part of an effort to establish itself as a US rival in space and “demonstrate to the world that countries can stimulate their space technology sectors without relying on the US.”⁴⁶ In some cases,

⁴⁵ Doug Messier, “China Making Aggressive Moves to Dominate Commercial Space Sector,” *Parabolic Arc*, December 6, 2019, <http://www.parabolicarc.com/2019/12/06/china-making-aggressive-moves-to-dominate-commercial-space-sector/>.

⁴⁶ “China’s Pursuit of Space Power Status and Implications for the United States,” *U.S.-China Economic and Security Review Commission*, <https://www.uscc.gov/research/chinas-pursuit-space-power-status-and-implications-united-states>.

like the replacement of the ISS with the CSS, even if it isn't China's intent to replace the US, Beijing is slowly doing it by default. The singular dependence phenomenon will only strengthen over time as either the US or China will build space-based quantum Internet or space-based solar architecture to export services back to customers on Earth. In a climate-ravaged society, such demand for services like green energy or even the interplanetary transportation of foreign citizens to Mars could be met with extreme demand. While this final example might seem extreme, the more short-term considerations of the terrestrial-extraterrestrial reliance are still valid. If China's actions on Earth are any indication of how it might leverage its influence as a space power, it could use its participation in its civil space program, satellite launches, or access to its space-based services as effective foreign policy tools. For example, "some countries may be willing to support China's political priorities" in exchange for access to subsidized launch services.⁴⁷

Conclusion

It is inevitable in the long arc of human history that our species must depart from our home planet and colonize first, the celestial bodies in our own solar system, and ultimately solar systems beyond our own. With the advent of climate change, what seemed to only be a distant inevitability has quickly become an urgent necessity. So while this paper has explored and theorized on the potential Chinese outlook on space from the perspective of national competition, of geopolitical strategy, and of natural self defense of one's own interests, this shouldn't be the outcome we should strive for. The world should take enormous pride in, and celebrate the extraordinary achievements of China's space program, for it is in the interest of all of humanity to compete in the noble enterprise of space exploration. As one American writer put it, "Our flight must be not only to the stars but into the nature of our own beings. Because it is not merely where we go, but what we are as we make our pilgrimage there. Our natures will be going there too."⁴⁸ To explore the distant heavens by way of cooperation on Earth should and will ultimately be our chief mission. There is always a grander strategy.

⁴⁷ Ibid.

⁴⁸ Philip K. Dick, *The Shifting Realities of Philip K. Dick: Selected Literary and Philosophical Writings* (New York: Vintage Books, 1996).