

Rise of the Chinese Space Program: How China Came to Rival the United States in Space Technology

By Rebecca Schembri

Abstract

This article defines the major American diplomatic moments that spurred China's space program from 1950 to 2022. Since ancient times, Chinese astronomers have produced accurate depictions of the cosmos. In the Dark Ages, the Chinese invented the world's first rocket, and within just six years of establishing the People's Republic of China, the Chinese government reignited its passion for space exploration and leadership. Seventy years later, China achieved space superpower status. This was not due to a Chinese quest for space, however. The main reason China made its space program a priority is because of a security dilemma in which US satellites, missiles, and spacefaring technologies—coupled with American distaste for China—threatened China's well-being. China wanted sovereignty, safety, and due respect; it wanted out of America's shadow.

Keywords: China, NASA, Wolf amendment, Qian Xuesen, space, moon, Sino–American, Artemis.

Introduction

The United States has historically withheld respect from China's space program. Although international scholars have written that China deserves equal recognition for its space technology, American scholars either do not share that sentiment or report that the United States does not share that sentiment. According to America, China's natural place was always under US dominance.¹ In 2005, Marcia Smith, a senior non-partisan analyst, reported to Congress that the United States "laugh[ed]" at space program rivalry between the two countries, and she noted that the United States refused to believe China could surpass American supremacy in space technology.² In 2008 Kevin Pollpeter, a US military analyst, reported that China was progressing but that China had neither "the foundation nor the resources" to conduct a space race with the United States.³ Both Smith and Pollpeter either noted or conveyed America's lack of care for Chinese space power. These and other analysts reiterated America's long-time suspicion of China stealing information to build its space program, stating that China was militarily motivated, and that China was

¹ Dong Wang, *The United States and China: A History from the Eighteenth Century to the Present*, 2nd ed. (Lanham: Rowman & Littlefield, 2021).

² Marcia S. Smith, "China's Space Program: An Overview," Congressional Research Service Report, Library of Congress, 2005, 6.

³ Kevin Pollpeter and the Army War College, "Building for the Future: China's Progress in Space Technology During the Tenth 5-Year Plan and the U.S. Response," Strategic Studies Institute (Carlisle Barracks, PA: US Army War College, 2008), 51.

incapable of matching—and especially surpassing—American strength in space leadership.⁴ The American mindset was that China could not bypass American space supremacy.

Historian Dong Wang reported on this anti-Chinese bias in her book *The United States and China: A History from the Eighteenth Century to the Present*. In it, she uncovered a dark history of Sino–American relations in which America pressed upon China acts of humiliation, unfairness, exclusion, and exploitation for over one hundred years.⁵ She noted that America historically believed that “China would never become a superpower because China [was] unstable and weak,” and that the United States maintained that China was neither important nor influential.⁶ This old, cultural attitude began with unfair tariff treaties and exclusionary laws in the 1800s, and by the 1950s it had permeated into US space relations with China, as Smith would one day testify that even in periods of rapprochement the United States excluded China from collaborating on space missions.⁷

However, many international scholars applauded China. They wrote that China’s space program was on similar ground to the American program, and it always had been. An Indian space agency scientist and scholar whose main role included assessing China’s space program and China’s space military strife with the United States wrote on the internal and external factors that shaped China’s space progress.⁸ In his book, S. Chandrashekar explained that although China did not put the first human in space (like the USSR) or the first human on the moon (like the United States), the Chinese came in at the heels of its competitors in space technology.⁹ Despite intense political upheaval in its early years, the Chinese space program remained strong.¹⁰

Likewise, spaceflight scholar Brian Harvey, who wrote the authoritative book on the rise of China’s space program, identified American scorn for China’s legitimate successes. He wrote:

many in the western media who ought to know better responded to Chinese space developments with a mixture of puzzlement, patronizing put-downs, and dismissal. If it worked, the presumption was that it must have been

⁴ James Oberg, “Testimony of James Oberg: Senate Science, Technology, and Space Hearing: International Space Exploration Program Status Report,” Senate Committee on Commerce, Science, and Transportation, Washington, DC, April 27, 2004, 2.

⁵ Wang, *United States and China*, xiii–xix (late 1800s: China submits to US trade norms); xx (United States forces its values); 53 (exclusionary laws deny rights to Chinese immigrants); 62–63 (hate crimes); xxi (United States refuses to recognize Chinese government until 1970).

⁶ Wang, *United States and China*, xxiii, as cited by David Shambaugh, *China Goes Global: The Partial Power* (Oxford: Oxford University Press, 2013), x and 6.

⁷ Smith, “China’s Space Program,” 4.

⁸ S. Chandrashekar, *China’s Space Programme: From the Era of Mao Zedong to Xi Jinping* (Singapore: Springer, 2022).

⁹ Chandrashekar, *China’s Space Programme*.

¹⁰ Chandrashekar, *China’s Space Programme*.

stolen or developed for sinister military purposes. There remains an extraordinary reluctance to concede to the Chinese the credit of having created, designed, and built their own equipment. This is a problem not peculiar to the space program, for the west often forgets how China pioneered so many things, from medicine to mathematics.¹¹

According to Harvey, America refused to accept that a communist China could be on equal ground with the United States, a democratic nation.

Moscow University scholar Evgeniia Drozhashchikh concurred with Chandrashekar and Harvey. Her assessment of China's space program history was that China built a world-class program, bartered for any technology it was lacking, and deservedly became a space superpower. According to Drozhashchikh, the Chinese space program was efficient and powerful, yet historically undervalued by America.¹² These perspectives from non-American scholars who respected China, and from American scholars who did not, give insight into China's dedication to equality in space technology, and to the country's disappointing rejection by its American counterpart.

This article adds to the claims that the United States was in denial of China's ability to succeed in space power. In addition to America not ceding China its due respect in aerospace advancement, because of discriminatory American acts toward China, China would eventually match the United States in space power and would become America's greatest space rival. Certain defining moments spurred China's space program, and these aligned with the American treatment of China. The historical backdrop of American abuse of China since the mid-nineteenth century formed the overarching sentiment between a hubristic, powerful America and a modest, unsuspecting China. It is against this scenario that five defining moments in the Sino-American timeline emerge.

First was the Red Scare in the 1950s, when Chinese nationals were persecuted in America under suspicion of communist sympathy.¹³ Many returned to China resolved to serve their mother country and to abandon America forever. This drew a hard line between the two countries, and it made the Chinese determined to escape American dominance. The second defining moment was external: in the 1960s the United States and the Soviet Union raced to exceed each other in space technology, and China found itself in a security dilemma where, based on its past relationship with the United States, it felt forced to manufacture arms or be safety-compromised. In 1971 China admitted that it was testing nuclear weapons to "break the monopoly of certain superpowers."¹⁴ This

¹¹ Brian Harvey, *China in Space: The Great Leap Forward*, 2nd ed. (Chichester, UK: Springer, 2019), xi.

¹² Evgeniia Drozhashchikh, "China's National Space Program and the 'China Dream,'" *Astropolitics* 16, no. 3: 175–86.

¹³ Robert Ferrell and Peter Szatmary, "The Villains of the 'Red Scares' of 1950," *Phi Kappa Phi Forum* 90, no. 3 (2010): 10–11.

¹⁴ US Department of State, "Memorandum of Conversation," Office of the Historian, July 10, 1971, history.state.gov/historicaldocuments/frus1969-76v17/d140.

threat drove China to make space technology a national priority and to keep much of its program secret.¹⁵ The military space power of the United States—which ultimately won the space race against the Soviet Union—threatened China.

The third defining moment was tripart and occurred between 1996 and 1999. When China began to emerge with competitive space technology, the United States accused China of stealing information.¹⁶ Then the United States formed a Congressional inquisition that accused Chinese people in America of decades of spying.¹⁷ Finally, the United States launched an international space station and prevented China from participating. In 2003, China sent humans into space, but America had already taken steps to marginalize China from space advancement. The fourth defining moment came in 2011, when the US Congress codified a US ban on all Chinese collaboration with NASA, including Chinese students and space professionals who specialized in space technology.¹⁸ This caused an upset within the scientific community, and it caused China to gain non-American supporters.¹⁹

The fifth defining moment happened in 2017 when the United States disregarded international law and announced its bilateral plan to territorialize the moon.²⁰ In effect, the Artemis moon program would maintain US leadership and supremacy in space, and it would use other countries as cushion consent, protecting it from international legal backlash.²¹ This apparent enclosure movement was the final flashpoint that propelled China—in just four years—to launch its own space station, land on Mars, create its own satellite GPS system, and partner with Russia to territorialize the moon as well.²² These were acts that rivaled the United States.

Historical Narrative

1950s: Qian Xuesen and Mao's Giant Space Leap for China

The official Chinese space program first began in 1956 under the People's Republic of China.²³ This brought an era of Chinese rockets, missiles, and satellites, which would soon

¹⁵ Chandrashekar, *China's Space Programme*; Harvey, *China in Space*.

¹⁶ Brian Harvey, *China's Space Program: From Conception to Manned Spaceflight* (New York: Springer, 2004), 122.

¹⁷ Harvey, *China's Space Program*, 125.

¹⁸ Department of Defense and Full-Year Continuing Appropriations Act of 2011, Pub. L. No. 112–10, 125 Stat. 58 (2011), §§ 1340a–b.

¹⁹ Harvey, *China's Space Program*, 191.

²⁰ NASA, "Artemis," 2020, www.nasa.gov/specials/artemis/. Bilateral agreement: NASA, "The Artemis Accords," 2020, www.nasa.gov/specials/artemis-accords/index.html.

²¹ United Nations Office for Outer Space Affairs, "United Nations Office for Outer Space Affairs and NASA Sign Landmark Memorandum of Understanding to Advance Peaceful Uses of Outer Space," December 17, 2020, www.unoosa.org/oosa/en/informationfor/media/unoosa-and-nasa-sign-landmark-mou-to-advance-peaceful-uses-of-outer-space.html.

²² "International Lunar Research Station (ILRS)," China National Space Administration, June 2021.

²³ Chandrashekar, *China's Space Programme*, 27.

be placed under the protection of China's military for safekeeping during the coming political upheavals.²⁴ During this time, a defining moment was brought on by American McCarthyism. In the words of biographer Iris Chang, it is "[t]he story of Tsien Hsue-shen, the brilliant, enigmatic, Chinese-born scientist who helped pioneer the American space age, [and] when rejected by the nation he sought to adopt as his own, became the undisputed father of the Chinese missile program."²⁵ Tsien Hsue-shen (Qian Xuesen) left China for America in his twenties. In the 1940s, he rose to American aerospace prominence for his mathematical abilities, MIT education, and Caltech collaborations. Qian was key in building America's rocket program, and he directed research at the Jet Propulsion Laboratory after working on the Manhattan project as a US Air Force colonel during World War II.²⁶ However, in 1949, when Mao Zedong took power in China, US "witch-hunters" accused Chinese-born Qian of communist sympathy and had him imprisoned.²⁷ After five years of house arrest, China traded American prisoners for Qian, and he returned to his birth country in 1955. Soon after, Mao made Qian—the Chinese scientist who had initiated America's space program—head of China's space program. Qian, whose name in Chinese means "knowledge like the forest," taught China's next generation of aerospace engineers.²⁸ By abusing democracy and human dignity, America had gifted China a scorned genius space scientist and military colonel. This emboldened China.

1960s–1980s: A Security Dilemma Unfolds

Around this time, a second defining moment spurred China's space program. It began in 1957 when the Soviet Union secretly launched the world's first artificial satellite and startled America into a security dilemma. Now the Soviets had advanced technology that could be used for military purposes. Immediately the US government established the National Aeronautics and Space Administration (NASA), and the 1957–1975 space race between the Soviet Union and the United States began. China, ever-cognizant of American abuse, became greatly threatened as America grew in space military power, and in 1958, Mao declared that space would be a national priority—an integral part of his Great Leap Forward. While the United States and the Soviet Union rivaled to send humans to space in the 1960s, China sent animals.²⁹ The program garnered public pride by naming its first satellite: "the East is Red," and its first launcher: "Long March," two terms that represented the heart of communist China. Under Qian, China advanced in Earth observation, weather monitoring, communications, space environment, aerodynamics,

²⁴ Chandrashekar, *China's Space Programme*, 27, 39–40.

²⁵ Iris Chang, *Thread of the Silkworm* (New York: Basic Books, 1995).

²⁶ Gregory Kulacki, "Qian Xuesen," *Encyclopedia Britannica*, December 7, 2021, <http://www.britannica.com/biography/Qian-Xuesen>.

²⁷ Chang, *Thread of the Silkworm*.

²⁸ Chang, *Thread of the Silkworm*.

²⁹ Harvey, *China's Space Program*, 44.

orbital mechanics, rocket engines, and space medicine, and by 1970, China had formalized its human space program.³⁰ Despite the failures of Mao's Great Leap Forward and Cultural Revolution, Chinese space power advanced nearly in line with its international counterparts.³¹ After Mao gave the program his approval in 1956, China was always a quiet contender for space power.³²

Meanwhile, America had surpassed the Soviets in the race for space and succeeded in landing multiple human missions on the moon.³³ However, as the Cold War ensued, China continued to see the United States as a threatening military force. In 1971, Chinese Prime Minister Zhou Enlai met with US State Department delegate Henry Kissinger in Beijing. In this meeting, Zhou admitted to Kissinger that China felt unsafe. He said:

Some people have asked us, since we advocate the complete prohibition and thorough destruction of nuclear weapons, why we are testing nuclear weapons. We must say very frankly that we do so to break the nuclear monopoly and to fight against the nuclear blackmail of certain great powers.³⁴

This second defining era in China's space program derived from China's need to protect itself from American power.

1990s: From Limited Licensing to Blatant Exclusion of Chinese Space Collaboration

The Red Scare of the 1950s was not the only time America would fail in its space diplomacy with China. By the 1980s, the United States had begun to deny Chinese commercial satellite licenses. America had a long-standing claim that the Chinese space program was advancing through espionage and foreign bartering.³⁵ In 1996, when a Chinese launch carrying private American cargo failed, the United States accused China of stealing American satellite data chips from the wreckage. This resulted in another inquisition into Chinese collaboration in which a 1998 congressional committee accused China of using:

over decades and in a systemic way, fair means and foul, neutral scientific conferences, licensing arrangements, dual-use military–civilian technologies

³⁰ Chandrashekar, *China's Space Programme*, 31.

³¹ Chandrashekar, *China's Space Programme*.

³² Chandrashekar, *China's Space Programme*; Harvey, *China's Space Program*; Harvey, *China in Space*.

³³ NASA, "The Apollo Missions," 2019, www.nasa.gov/mission_pages/apollo/missions/index.html.

³⁴ US Department of State, "Memorandum of Conversation," Washington, DC, Office of the Historian, July 10, 1971. history.state.gov/historicaldocuments/frus1969-76v17/d140.

³⁵ Oberg, "Testimony."

and straightforward spying to ferret out information on nuclear technology, computers, rockets, submarines, and atomic bombs for decades.³⁶

By now, the United States fully distrusted China and took China's every space move as militarily motivated. America put its International Space Station in orbit and did not allow China to participate. This excluded China from collaborating on the ISS with Russia, Japan, Canada, the United Kingdom, and the European countries cataloged under the European Space Agency. It was the third defining moment in China's space program rivalry with America; the United States had made China an outlier, preventing it from advancing in space technology as other nations advanced with the United States.

2000s: The Breaking Point That Propelled China to Rival American Space Power

The fourth defining moment in Sino–American space relations came in 2011, when the US Congress codified distrust of China by passing the Wolf Amendment.³⁷ Designed to prevent espionage, the law banned China from space collaboration with NASA. This forced American and global space companies to pick a side, with many of them opting for Chinese partnerships that offered lower prices in an international market.³⁸ America's marginalization of China caused other countries and private industry to choose between the dominating United States and an incentivized China, and China began to win.

In 2017, space relations between the United States and China reached a breaking point. In this fifth defining moment in the Sino–American space rivalry, NASA announced an American-led international accord to territorialize the moon—which excluded China. The People's Republic of China called this American act an "enclosure movement"; a confiscation of global commons.³⁹ In addition, the US plan threatened to funnel access between the Earth and moon by claiming crucial points in cislunar orbit.⁴⁰ Although the United States was corralling other countries to support the mission, it was a breach of international law—the 1967 Outer Space Treaty required equal space access for all and it prohibited lunar land claims.⁴¹ After this, China propelled to outer space. By the time the United States realized that it had spurred a legitimate space rivalry with China, China was an equal in space technology.⁴² By 2022, China had launched its own space station,

³⁶ Harvey, *China's Space Program*, 125–27.

³⁷ Department of Defense and Full-Year Continuing Appropriations Act of 2011.

³⁸ Harvey, *China's Space Program*, 191.

³⁹ Stephen Chen, "China Speeds Up Moon Base Plan in Space Race Against the U.S.," *South China Morning Post*, December 29, 2021, www.scmp.com/news/china/science/article/3161324/china-speeds-moon-base-plan-space-race-against-us.

⁴⁰ NBC News, "Battlefield Space," *NBC News NOW Special*, May 26, 2022, youtu.be/luiF6U-TFvQ.

⁴¹ Treaty on the Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies (OST), 1967, United Nations Office for Disarmament Affairs, treaties.unoda.org/t/outer_space.

⁴² Mike Pence, Speech: "Make No Mistake About It—We're In a Space Race Today, Just As We Were in the 1960s, and The Stakes are Even Higher," National Space Council (NSC), 2019.

partnered with Russia on a moon base, created its own global GPS and satellite systems, and landed on Mars. And China—an active member in the United Nations' standards for equal access to space—invited the whole world to participate. China had met or exceeded American space power and space diplomacy and America was left with the consequences of having treated China as immoral, incapable, and substandard.

How and Why the Rivalry Happened

It is for these five defining moments in Sino–American space history that China grew to face the United States. The historical backdrop of unfair treaties, exclusionary laws, widespread American discrimination towards the Chinese since the mid-1800s, and the United States coercing China to adopt Western values of morality and democracy brought China to desire equality. When America failed in its mission to force China into democracy and partitioned from China in 1949, the Red Scare persecutions did not strengthen America's national security. Instead, they emboldened China with a new wave of purged scientists and the determination to succeed regardless of American scorn. However, between the 1950s and 1990s, America—the self-declared enemy of China—grew in military space technology. This greatly threatened China, as it saw it could not compete for national security unless it also developed advanced space weapons. When America excluded China from valuable collaboration with the United States and other spacefaring nations, this spurred China's need for international diplomacy and for support from the United Nations. After American anti-Chinese treatment stemmed from the 1996 rocket crash, the 1998 Cox report, the 1999 space station ban, and the full ban from the 2011 Wolf Amendment, China began to win America's market share in global space industry sales. Thus, China grew stronger while America weakened.

After NASA announced its exclusionary Artemis program, China moved to rival America in space power. Because NASA's act would block Chinese access to the moon and prevent China from building a lunar launchpad necessary for deep space travel, this was the breaking point for diplomatic relations between the United States and China, and it set the table for a militarized lunar arena. After China published its plan for an international moon base partnership with Russia and invited "all willing countries" to participate, the United States accused China of "trying to steal the moon."⁴³ Space diplomacy between China and the United States had reached its threshold as the US Air Force initiated a new team: the United States Space Force. The United States was ready to militarize space and stop China.

What the Rivalry Means

The United States created a security dilemma by growing in space military technology while simultaneously stifling China in space advancement. America made China feel

⁴³ Reuters, "China Rejects Nasa Accusation It Will Take Over The Moon." *NBC News*, July 5, 2022, www.nbcnews.com/science/space/china-rejects-nasa-accusation-will-take-moon-rcna36656.

emboldened, threatened, excluded, and blocked. Because of this, China did not stop until it matched or exceeded the United States in space diplomacy, industry sales, satellite weapons and technology, human spaceflight, space travel, and space military power. In 2022, US and Chinese officials admitted that the two countries were in a dangerous race to territorialize the moon. The United States, however, refused to admit that China deserved to be a space equal. The US Congress also stated that China partnered with Russia to weaponize space, and that the US military must rise to meet the threat of Chinese space domination.⁴⁴ As a result, China must stand down or prepare to militarize against the United States. This kind of spiraling security dilemma has historically ended in a Thucydidean war, as when ancient Athens built a navy that exceeded neighboring Sparta's army, so Sparta attacked Athens to avert a future Athenian attack.⁴⁵ The space rivalry means that lunar access may be decided with military power—the United States and its allies fighting against China and its allies.

Conclusion

Although American policymakers argue that China cannot be trusted, this article argues that it is America's treatment of China that has made China harder to trust and that has turned China into America's greatest space rival. Every American exclusionary act made China stronger because China sought equality and safety. Perhaps ancient wisdom, which teaches that "unjust peace is far better than righteous war," gives insight to the issue.⁴⁶ Over the years, the United States has fundamentally disagreed with Chinese norms. However, excluding China from space collaboration did not make America stronger. Instead, it led to tensions teetering on a righteous war that Americans and the Chinese may pay for with lives, infrastructure, and generational wealth. Had America depolarized international relations with China and sought diplomatic peace, even if it was "unjust," acknowledging that both sides were right, and giving in whenever possible, perhaps China would not have become a space rival to the United States.

In hindsight, America should not have theorized that China was an enemy subjugate. China was a country that was doing its best to live peacefully and to prosper. America should have apologized many decades ago for its mistreatment of China and the Chinese. The children's children of those who made these decisions, some of whom dream to become astronauts and space travelers themselves, will suffer the consequences of America's strong resolve to avoid working things out.

⁴⁴ Mike Rogers, "We Are Not Weaponizing Space. Space Has Already Been Weaponized By China and Russia. We Have to be Able to Defend Our Assets and We've Got to be More Aggressive In Doing So." R. Mike Rogers, Ranking Member, House Armed Services Committee, "Battlefield Space," NBC News NOW Special, May 26, 2022, youtu.be/luiF6U-TFvQ.

⁴⁵ Thucydides *The History of the Peloponnesian War*, trans. Richard Crawley (Overlands, Park, KS: Digireads, 2017).

⁴⁶ Both Cicero and Erasmus made this observation.

Copyright © 2022, Rebecca Schembri. All rights reserved.



About the Author: Rebecca Schembri is an author and Space Diplomat from Reno, NV. She holds a bachelor’s degree from Harvard University in Social Science and International Relations. She aspires one day to represent the United Nations as ambassador to the moon, Mars, or another celestial habitat. Follow: [@rebeccafromreno](https://twitter.com/rebeccafromreno).

Editors’ Notes: Rebecca Schembri returns to the pages of the *JSP* for the third time in two years. As part of this retrospective issue, she turns the lenses of public policy and space diplomacy on the changing relationship between the United States and China as space superpowers. Like Grace Jones in the earlier article, Schembri reaches back to the 1950s to begin her narrative. She then illustrates how key milestones in the following decades led to a “dangerous race to territorialize the moon” in 2022. Her conclusions suggest that apologies may be key to a more unified approach in the decades ahead.

Mark Wagner and Gordon Arthur.