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# Redshift

## The Acceleration of China's Commercial and Civil Space Enterprise & The Challenge to America

A Strategic Report from the Commercial Space Federation

September 2025

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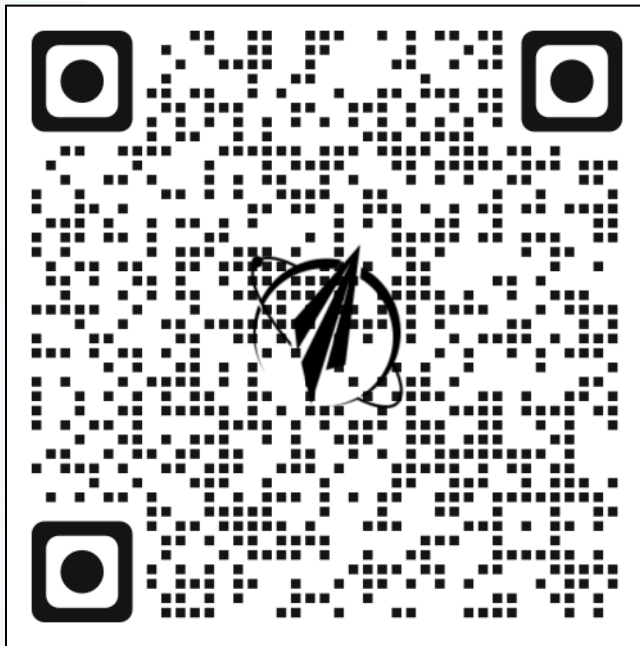
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# Introduction and Context

This report arrives at a pivotal moment for global space affairs. Over the past decade, China's space enterprise has transformed rapidly, driven by sweeping policy reforms, surging investment, and an intentional merging of commercial, civil, and national security ambitions. The timeliness of this analysis is underscored by China's shift from aspirational planning to tangible achievement—changes that are fundamentally altering the strategic landscape for the United States and its partners. By providing a comprehensive, segment-by-segment assessment of China's space progress and its implications for American interests, this report aims to serve both as a factual record of China's emerging capabilities and as a risk assessment for U.S. industrial competitiveness and national security.

## Objectives and Scope

To dissect the rapid evolution of China's commercial and civil space sectors and its implications for American interests, this report uses some guiding questions:

- What official goals, plans, and doctrines drive China's recent pace of investment and innovation?
- What concerted shifts in policy and regulation, funding, and public campaigns has China undertaken to achieve these goals?
- Which tangible achievements have materialized across the various segments of China's space enterprise, whether technological developments, programmatic milestones, or cultivation of new stakeholders, domestic innovation hubs, and international projects?
- How does this alter the risk profile for U.S. commercial and strategic leadership?

After an opening section that provides a holistic overview of China's space ambitions and landscape, the report continues with six sections analyzing China's progress across key areas of the space ecosystem.

- |  |  |
|--|--|
| 1. Spaceports and Infrastructure                             | 4. Satellite Communications (Satcom) and Positioning, Navigation, and Timing (PNT) |
| 2. Launch and Reentry  | 5. Commercial low Earth orbit (LEO)  |
| 3. Remote Sensing (RS) and Space Situational Awareness (SSA) | 6. Space Exploration   |

Each of these sections begins by examining Beijing's stated ambitions and reforms, evaluates the real-world milestones it has achieved by 2025, and finally details the resulting risks posed to U.S. industry, international competitiveness, and national security. The analysis covers the full scope of China's commercial and civil space enterprise including mapping their international projects and collaborations. The report ends with recommendations distilled from in-depth expert review and the guidance of sector advisory boards, ensuring actionable insights for policymakers and commercial stakeholders seeking to respond to China's accelerating influence in space.

## Key Findings

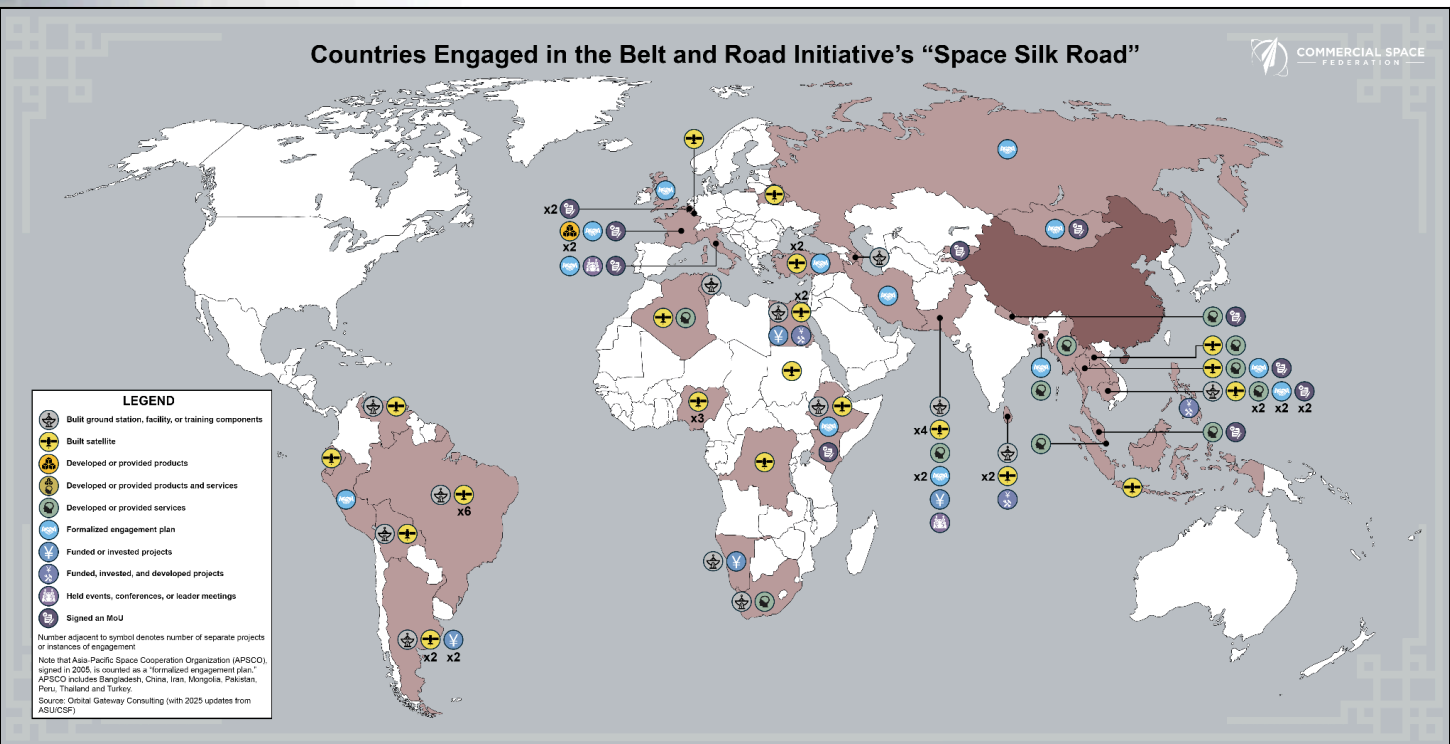
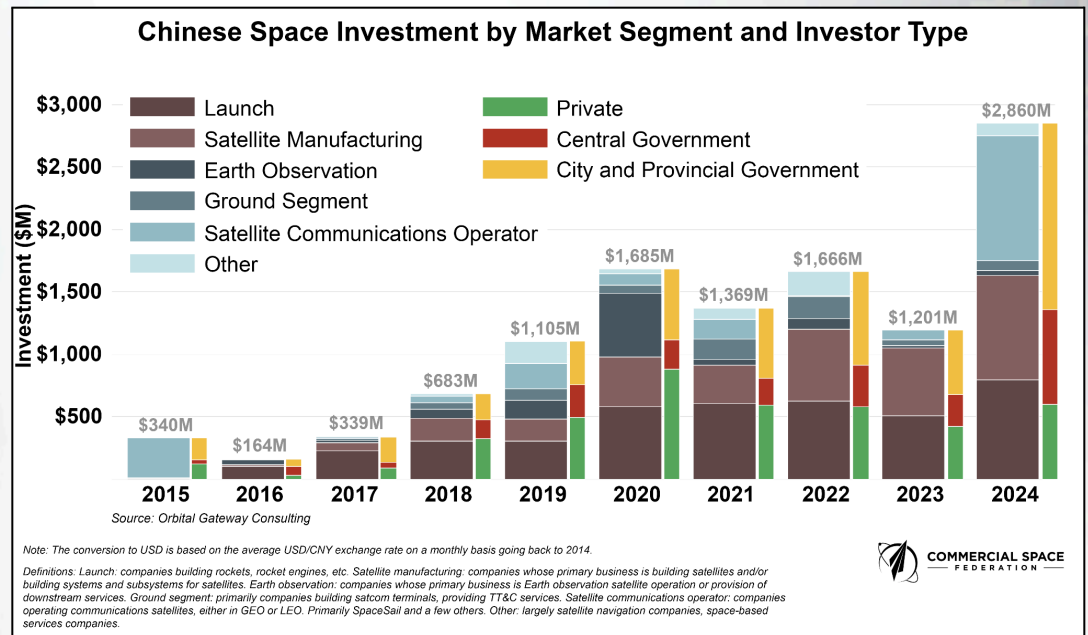
China's decade of steady progress in space is now reshaping the competitive landscape and may soon challenge U.S. leadership and commercial strength. The risks extend beyond technology to markets, partnerships, and governance, signaling a pivotal moment in global space competition. What began as milestone-driven missions has become a state-backed campaign to define norms, capture markets, and build international coalitions across all segments of the space ecosystem.



**Key Finding 1: China**  
*is using a hybrid growth playbook; ours to innovate, theirs to scale, with striking outcomes.*

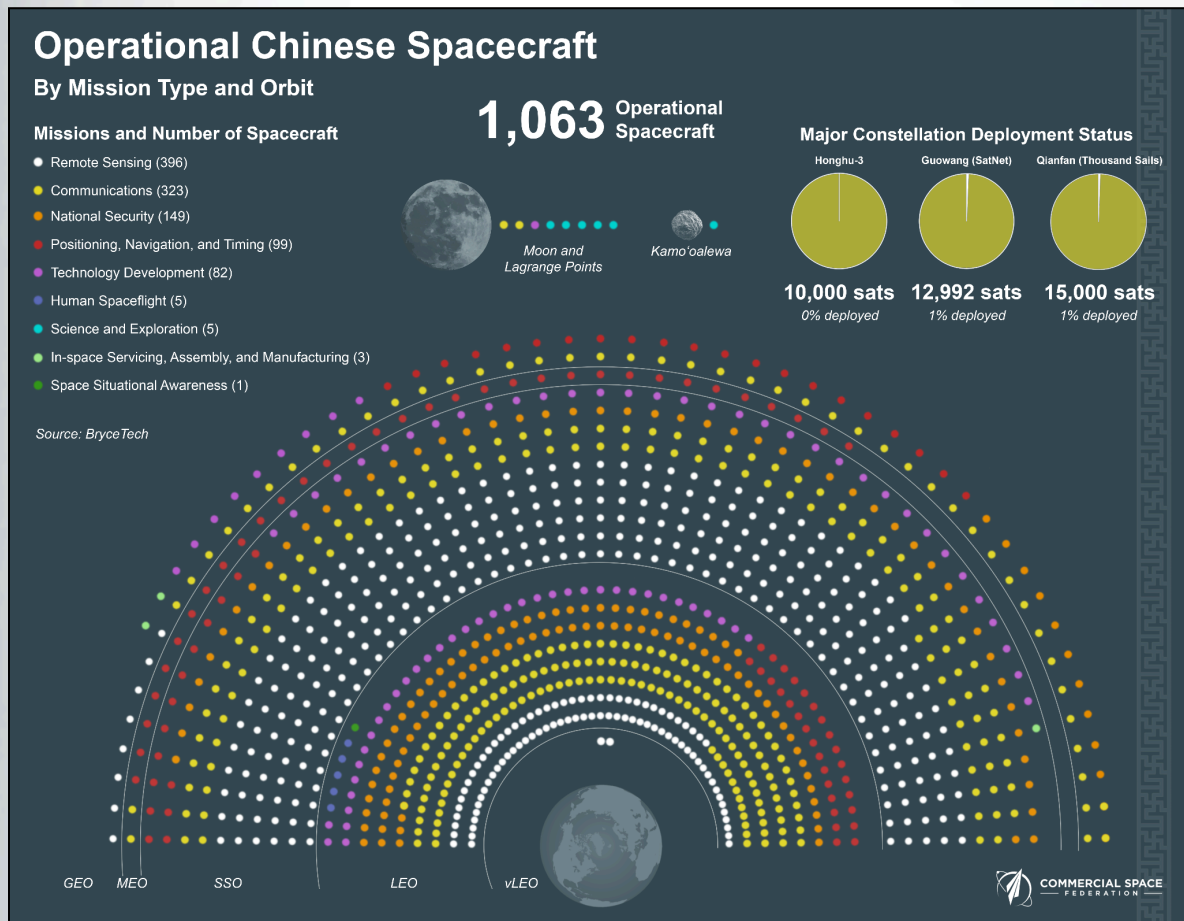
China's space sector has rapidly evolved into a powerhouse that combines long-term state planning with market-driven commercial innovation and regional government support. This transformation is marked by private companies now representing a substantial

portion of activity across segments. In China, a private company is a business legally owned by individuals or non-state entities that is profit-driven, engaged in market competition and innovation, but more heavily subject to regulatory oversight and alignment with state policy than U.S. private firms. Enabled by targeted policy shifts like 2014's National Development and Reform Commission "Document 60" and reinforced by their 14th Five-Year Plan and 2021 Space White Paper, China built concentrated regional hubs—Shanghai, Beijing, Chengdu, Xi'an, Guangzhou, Jinan and more—that unite universities, state organizations, and private firms in a "triple helix" of accelerated aerospace growth. Long known for its ability to scale innovations from one to one hundred, China is now learning to pioneer its own breakthroughs "from zero to one". Yet, activity remains tightly overseen by the Chinese Communist Party and subject to military-civil fusion laws, which mandate that even private companies and academic researchers must share technologies and expertise with the military when ordered—allowing authorities to quickly mobilize talent and hardware in a crisis, and underscoring the strategic risks of China's flexible, state-backed innovation model.



## Key Finding 2: The “Space Silk Road” is tethering even more countries to Beijing.

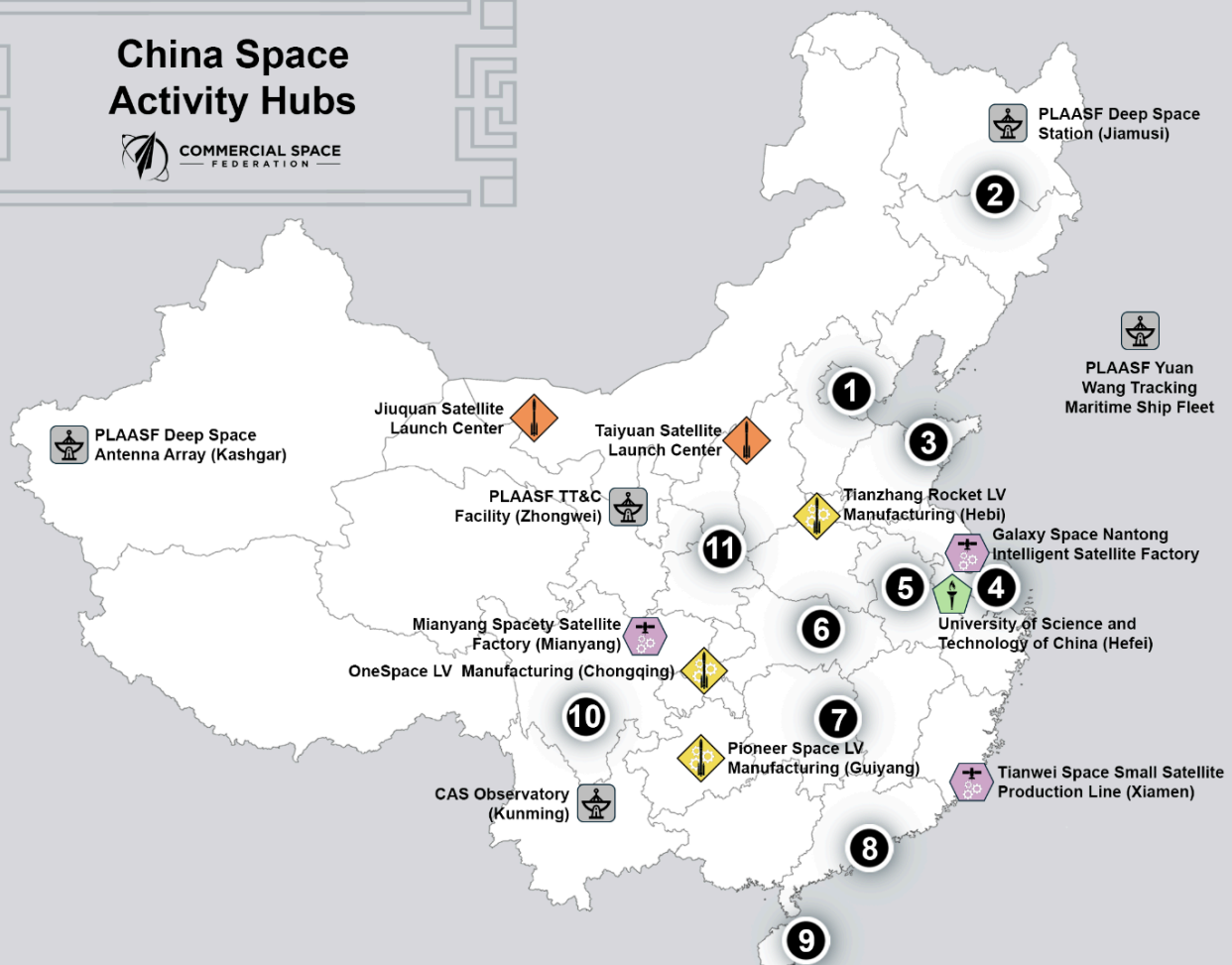
China’s Space Silk Road under its Belt and Road Initiative has prompted over 80 international space diplomacy infrastructure projects in satellite manufacturing, ground stations, launch services, data sharing, and training centers. It is rapidly embedding Chinese state-owned firms and sanctioned entities into the space and communications infrastructure of dozens of countries, often supplemented by preferential loans and long-term maintenance contracts. Beijing’s expanding footprint risks leaving countries engaged in these projects vulnerable to debt diplomacy, surveillance, information censorship, and operational encroachment, as seen in instances across South America and Africa. Without urgent U.S. strategic countermeasures and targeted alternative opportunities for infrastructure cooperation and market access, nations across the globe may find their digital and orbital futures tethered to Beijing, eroding American influence and introducing new coercive leverage in international and security domains.



## Key Finding 3: China’s infrastructure surge could upend U.S. launch assumptions.

With six operational spaceports—including new coastal and sea-based launch sites—China is now positioned as a formidable launch competitor, able to support near-simultaneous launch operations with a high frequency cadence and attract international clients with increasingly cost-competitive options. This rising infrastructure is matched by a boom in commercial launch activity; more than a dozen private rocket manufacturers are now active and venture funding in the sector has topped \$3 billion since 2020. Manufacturing ecosystems are flourishing in advanced urban clusters nationwide, feeding innovation and regional economic growth, with tens of thousands of satellites planned for future megaconstellations—though fewer than 1% have been launched thus far. Even as China remains behind the United States in realized launch capacity, the momentum is tangible. Meanwhile, elements of the U.S. infrastructure operate in a relative status quo, with viable legacy launch sites but underutilized inland ports and only incremental investments in launch infrastructure. Should China’s surge accelerate as many industry leaders predict, the competitive balance could quickly shift, with America’s long-assumed launch and orbital dominance facing new and unprecedented pressures.

# China Space Activity Hubs



1 Beijing-Tangshan-Tianjin Binhai-Xiong'an Hub		4	3	1	2	7	5	4
2 Harbin-Jilin Hub		1			2		1	
3 Haiyang-Jinan-Qingdao Hub	1		4	1		4		
4 Hangzhou-Jiaxing-Jinhua-Nanjing-Quozhou-Shanghai-Shaoxing-Shengzhou-Tai'an-Taizhou-Wuxi-Zhangjiagang Hub		1	9		2	23		5
5 Anqing-Bengbu-Chizhou-Weinan-Wuhu Hub		1	6	1		3		
6 Wuhan Hub			1			2		
7 Changsha-Zhuzhou Hub						3		1
8 Guangzhou-Hong Kong-Shenzhen Hub			1		2	4	1	2
9 Wenchang Hub	1		1			1		
10 Chengdu-Chungu-Deyang-Xichang Hub	1		3			4		1
11 Xi'an Hub		1		1		2		3

LEGEND	
	Launch site
	Launch Provider Headquarters
	Launch Vehicle Manufacturer
	TT&C Site
	Satellite Headquarters
	Satellite Manufacturer
	Government Organization
	University

Sources: Arizona State University and Orbital Gateway Consulting

## Key Finding 4: Tiangong is already absorbing orbital science demand.

As the International Space Station nears retirement, China's Tiangong station is poised to become the primary hub for orbital science, already attracting international participation—including from U.S. allies—and engineered to absorb demand once the ISS is gone. While the ISS currently dominates in experiment volume and global engagement, the absence of a U.S.-led successor would leave the international science community little choice but to turn to China's platform, enabling Beijing to set new norms and expand its influence over orbital space research.

## Key Finding 5: China is hitting all deadlines on their deep space roadmap.

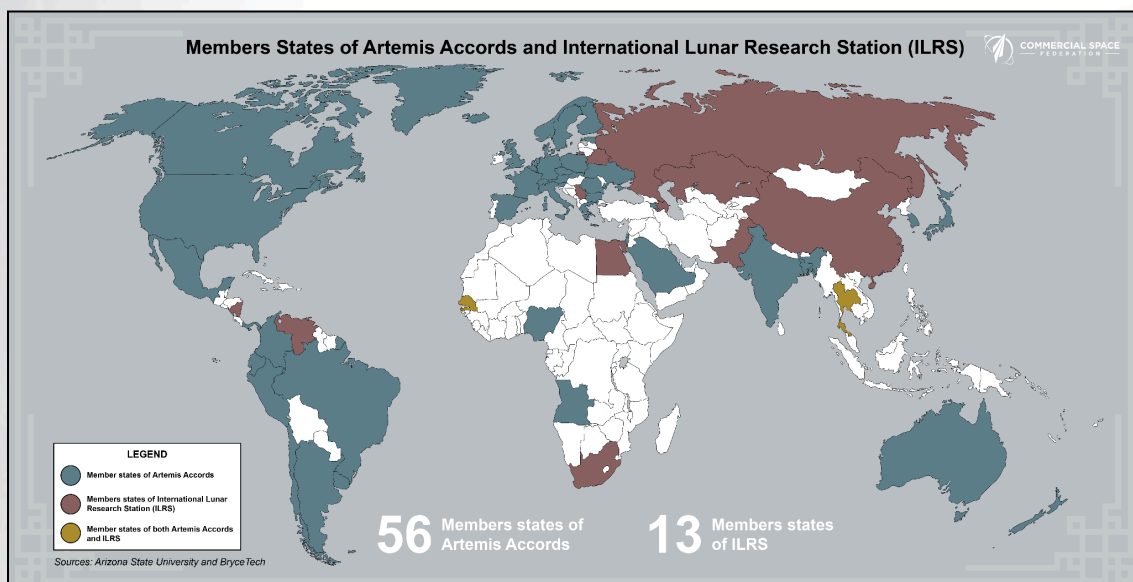
China's deep space strategy is rapidly converting technical ambition into global influence; by 2030 it aims to land a taikonaut on the Moon, by 2031 return Martian samples to Earth (by the late 2020's by some accounts), and its 2028 Chang'e-8 mission alone will include scientific payloads or involvement from nine countries. China's lunar program is on track toward Phase IV with active preparation for Chang'e 7 & 8 missions including successful pad abort tests of the Mengzhou crew spacecraft, along with key development milestones for the Long March 10 rocket and Lanyue lunar lander. Their Chang'e mission sequence could galvanize further international engagement via the International Lunar Research Station (ILRS), which already includes more than a dozen participant nations. Similarly, China is inviting international payloads and participation on its Tianwen-3 Mars sample mission. This rapid progression, combined with China's proven track record—such as the world's first lunar far-side sample return—signals not just technological ambition but a deliberate bid to redraw partnerships of deep space exploration.

**Comparison of Selected Major Experiments on Tiangong and ISS**  
35 Experiments Completed, Ongoing, or Planned for Period 2022-2025  
Source: CSF and Arizona State University

	<b>Tiangong</b> <i>In service since 2021</i>	<b>International Space Station (ISS)</b> <i>In service since 1998</i>
Life Science	6	6
Materials Science	5	5
Physics and Astronomy	8	8
Plant and Ecology	5	5
Quantum Technology	2	2
Space Medicine	3	5
Space Power and Robotics	5	3
STEM Student/General	1	1
Number of Astronaut Visits*	21	63

\* Two individuals per station.

*As the ISS nears retirement, international users and partners including U.S. allies will seek new orbital platforms for science. Where will they go? Some are already committed to conduct science aboard the ISS and China's Tiangong. Without an operational U.S.-led alternative post-ISS, the global scientific community would easily turn to the Chinese option, which is already positioned to absorb demand and elevate its global influence through scientific collaboration.*



# How to Maintain US Leadership

One thing is certain. China is not slowing down but accelerating beyond America's pace in many areas—(i.e., Redshift). They are not deviating from their "Space Dream"—China is living its Apollo, ISS, and commercial space eras all at once, bringing new strategic, economic, and commercial risks for America. As this report concludes, China's space program has matured rapidly—driven by strategic patience and state investment—meeting and often exceeding its goals, reshaping global space power, and posing complex risks to U.S. industry. China remains fully committed to its roadmap and milestones and will use all available resources to become a global leader in space.

Here in the U.S., innovative capabilities developed by our commercial space companies continue to push the boundaries of the possible. However, U.S. companies must deal with an uncertain and sometimes constraining policy, budget, and regulatory landscape that creates obstacles to continued success. Change is needed to unleash the U.S. space industry and further its lead in this new space race. Below, we provide recommended actions for consideration by the U.S. Congress, the White House, and Executive Branch agencies. These recommendations would focus national attention on the U.S. space industry, remove barriers to growth, and drive the investment of time, dollars, and resources needed to stay ahead of China's space ambitions.

## ***Spaceports and Infrastructure:***

- 1) Provide Federal investment in spaceports through grants
- 2) Streamline Federal and State environmental reviews
- 3) Reform regulations to enable inland vertical launch and orbital reentry operations

## ***Launch and Re-Entry:***

- 1) Streamline commercial launch/reentry licensing
- 2) Reform environmental reviews for launch/reentry operations
- 3) Provide appropriate resources to improve launch/reentry licensing
- 4) Reform export controls to increase international collaboration
- 5) Modernize the management of airspace during launch/reentry operations

## ***Remote Sensing and Space Situational Awareness:***

- 1) Reform U.S. export controls
- 2) Reform commercial remote sensing licensing
- 3) The U.S. government should utilize commercial data and services to the maximum extent practicable
- 4) Support the TraCSS Program and distribute basic SSA data free of charge to the end user

## ***Satellite Communications and Positioning, Navigation, and Timing:***

- 1) Allocate sufficient spectrum for satellite operations
- 2) Reform Federal spectrum coordination processes
- 3) Ensure U.S. communication accessibility programs are technology neutral

## ***Commercial LEO***

- 1) Fully utilize the ISS through end of life
- 2) Foster a smooth transition from ISS to commercial LEO stations and research facilities
- 3) Continue robust NASA human operations in LEO post-ISS

## ***Space Exploration***

- 1) Fully utilize commercial capabilities to achieve NASA's Moon to Mars Exploration and Science Objectives.
- 2) Partner with commercial space to enable space science
- 3) Implement a mission authorization process that facilitates commercial space exploration missions.



# Conclusion and Call to Action

China's space ascendancy—propelled by disciplined policy, strategic investment, and sweeping technological gains—has fundamentally redrawn the domain in which global power is contested. As this “Redshift” report makes clear, China's pursuit of its “Space Dream” is deliberate and relentless, merging commercial and civil space ecosystems and fusing terrestrial and orbital infrastructure in ways that directly challenge decades of American industrial, technological, and security leadership. The accelerating integration of Chinese space assets with terrestrial networks, the expanding network of global partnerships, and the rapid advance of “dual-use” systems now constitute not just a competitive threat, but a systemic risk to U.S. interests and the very frameworks that underpin international space norms and regulations.

The world is entering an era of divided space systems and multiplying risk, where the stakes are measured in innovation horizons, supply chain resilience, and new strategic high grounds. The trend line is unmistakable; China is not only racing to catch up—it is setting pace, deregulating, and, at times, redefining what leadership looks like on and above Earth. This new space race will not be won with a single breakthrough or headline achievement, but with sustained commitment, clear-eyed vigilance, and a willingness to adapt over decades. The United States and its partners must act now to invest boldly in resilient space and terrestrial capabilities, expand collaborative alliances, and foster a whole-of-nation innovative, agile ecosystem. Only by doing so can America secure its place at the forefront of the next chapter in the exploration and stewardship of the space domain.

## **ACTION REQUIRED:**

***Ensure Congress, industry, and allied partners have the mandate, resources, and strategic clarity to counter and outpace China's momentum. The choice is clear; proactive engagement, or strategic irrelevance in the most consequential domain of the 21st century.***



