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Beyond the Earth: US-China Space Rivalry and Its Implications on India

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ABSTRACT

This article examines the intensifying space rivalry between the United States and China and its implications for India's strategic positioning in the evolving space domain. Once dominated by Cold War-era competition, outer space has reemerged as a contested arena for geopolitical influence, national security, and economic interests. The study traces the historical trajectory of this rivalry, highlighting China's rapid advancements—such as the Tiangong space station and lunar missions—and the U.S. response through initiatives like the Artemis program and the establishment of the Space Force. Against this backdrop, India faces critical decisions as it balances its traditionally civilian-focused space program with growing militarization trends, exemplified by its 2019 anti-satellite (ASAT) test. The article employs realist and neo-classical realist frameworks to analyze India's strategic calculus, emphasizing its pursuit of autonomy through diversified partnerships and selective engagement with both U.S. and Chinese space initiatives. Key challenges include safeguarding space assets, fostering commercial innovation, and shaping global governance norms. The study concludes with policy recommendations for India, urging a comprehensive space security strategy, enhanced public-private collaboration, and proactive multilateral diplomacy to navigate this complex rivalry while preserving strategic flexibility.

Keywords: *US-China Space Rivalry, India's Space Policy, Strategic Autonomy, Militarization Of Space, Anti-Satellite (ASAT) Capabilities, Artemis Accords, Tiangong Space Station, Space Governance, Public-Private Partnerships, Neo-Classical Realism.*

1. Introduction

The expansion of geopolitical competition between the United States and China has transcended Earth's boundaries and moved decisively into the realm of outer space. This domain, previously characterized by the Cold War space race between the United States and Soviet Union, has reemerged as a contested arena that reflects broader global power dynamics. Contemporary space competition encompasses multiple dimensions beyond scientific advancement and exploration, including critical elements of national security infrastructure, economic interests in space-based resources and services, and the exercise of diplomatic influence through space capabilities.

In this evolving landscape of great power competition, India—with its established yet still developing space program—finds itself at a pivotal historical moment. The Indian space establishment must carefully navigate the complex dynamics of this intensifying rivalry while simultaneously advancing its own strategic objectives and adhering to its longstanding commitment to the peaceful utilization of outer space.

This research aims to provide a comprehensive examination of the US-China space rivalry in its current form, evaluate its strategic and technological dimensions through objective analysis, and investigate the wide-ranging implications this competition holds for India's security doctrine, diplomatic positioning, and indigenous space development agenda. Through this analysis, the paper contributes to expanding scholarly discourse on space geopolitics, particularly from the perspective of emerging powers in the international system.

2. Historical Context of Space Competition

The foundations of space rivalries trace their origins to the Cold War period, when the Soviet Union's successful launch of Sputnik in 1957 catalyzed what would become known as the first "space race." The United States responded to this technological challenge by establishing NASA and initiating the ambitious Apollo program, which reached its pinnacle with the historic moon landing in 1969. Following the conclusion of the Cold War, international cooperation in space activities became more prominent, exemplified most clearly by the International Space Station (ISS), which emerged as a powerful symbol of multinational scientific collaboration across previous ideological divides.

However, the early 21st century has witnessed China's methodical entry into advanced space exploration, marking the beginning of a new competitive era. Beijing formally established the China National Space Administration (CNSA) in 1993 and has since systematically advanced its space capabilities through a series of increasingly sophisticated missions, including the Chang'e lunar exploration program, the construction of the Tiangong space station, and the successful deployment of the Mars rover Tianwen-1 (Jones, 2021). Concurrently, the United States has intensified efforts to maintain its historical leadership position through strategic initiatives such as the Artemis lunar program and the formal establishment of the U.S. Space Force in 2019, representing the first new branch of the American armed services in over 70 years (Weeden & Samson, 2020).

3. US-China Space Rivalry: From Origins to the Current Landscape

The competitive dynamic between the United States and China in space has evolved substantially from initially separate, parallel ambitions into what now constitutes a direct strategic and technological competition. While the United States has historically maintained preeminence in space exploration and utilization through NASA's civilian program and extensive military space capabilities, China's methodical rise as a space power represents a deliberate, state-backed initiative that signals a significant shift in the global balance of power in this domain.

China's initial engagement with space technology occurred cautiously during the Cold War era, with primary focus directed toward developing ballistic missile capabilities rather than civilian space applications. The transformative period for China's space ambitions began in earnest during the early 2000s, when the nation's space program gained substantial momentum driven by a comprehensive national vision to achieve status as a "space power." Critical early achievements that demonstrated this commitment included the successful 2003 Shenzhou-5 manned mission, which made China only the third nation capable of independent human spaceflight, and the controversial 2007 anti-satellite (ASAT) missile test, which marked a significant advancement in China's military-space capabilities and raised international concerns.

The United States governmental and military establishment viewed China's ASAT demonstration as a direct challenge to American space assets and broader global security frameworks. This perception prompted not only enhanced monitoring of Chinese space activities but also catalyzed renewed investment in space resilience, deterrence capabilities, and defensive technologies. During this period, the United States policy community increasingly emphasized the conceptual framework of "space dominance," which ultimately manifested in the creation of the U.S. Space Force in 2019 as a dedicated military branch focused on space operations (Weeden & Samson, 2020).

In parallel, China continued its strategic advancement by launching the Beidou Navigation System as an indigenous alternative to the U.S. Global Positioning System (GPS) and initiated development of the Tiangong space station program after being systematically excluded from participation in the

International Space Station due to restrictive U.S. legislation—specifically the Wolf Amendment of 2011—that prohibited NASA-China cooperation. China's subsequent Chang'e lunar exploration missions and Mars exploration program (Tianwen-1) have progressively narrowed the technological capability gap with the United States (Jones, 2021).

The contemporary manifestation of this rivalry now encompasses multiple orbital regimes including low Earth orbit (LEO), cislunar space, and ambitious lunar exploration initiatives. The United States has promoted the Artemis Accords, which advocate for transparent and cooperative lunar governance under principles aligned with American interests, while China and Russia have countered with the International Lunar Research Station (ILRS) initiative, which advances a distinctly multipolar governance framework operating outside U.S. influence. These competing projects represent fundamentally different visions for space development pathways and normative frameworks.

This competition has evolved to encompass multiple dimensions—military, commercial, and diplomatic—resulting in an increasingly bifurcated international space order within which countries like India must carefully position themselves, facing mounting pressure to either align with one of the competing blocs or develop sophisticated hedging strategies to maintain strategic autonomy.

4. Methodology

This investigation employs a qualitative research methodology primarily centered on comprehensive secondary data analysis. The research corpus includes peer-reviewed academic journals, policy briefs from relevant think tanks, official government publications from space agencies including NASA, ISRO, and CNSA, documents from the U.S. Department of Defense related to space security, expert commentary from recognized specialists in the field, and analytical reports from leading international think tanks specializing in space policy and security.

Discourse analysis techniques are applied to interpret the strategic narratives presented by key state actors in their official communications and policy documents regarding space activities. This approach enables examination of how space policies are framed and justified within broader national security and international relations contexts.

Additionally, a case study approach provides focused analysis of India's specific position within this broader rivalry. The paper employs a comparative analytical framework to systematically assess India's capabilities, alliance structures, and strategic approaches in relation to those of both the United States and China.

5. Theoretical Framework

This study is anchored in two major theoretical paradigms from International Relations (IR) that provide explanatory power for understanding space competition:

Realism

Fundamentally grounded in power politics, realist theory conceptualizes the international system as inherently anarchic, with states engaged in perpetual competition to secure their national interests against potential threats. Within the space domain, realism offers explanatory value for understanding how outer space has evolved into another arena for competition, deterrence, and security maximization. (Dr. Muhammad Usman Askari, 2023) The development of counter-space capabilities by both the United States and China, including anti-satellite weapons systems (ASATs), directly reflects the realist logic of maximizing relative power capabilities and establishing credible deterrence (Mearsheimer, 2001). Through this theoretical lens, space assets constitute critical components of national power that states rationally seek to protect and enhance.

Neo-Classical Realism

Neo-Classical Realism introduces important nuance to traditional realist theory by incorporating domestic variables into the analytical framework. This approach emphasizes how internal factors—including elite perceptions, state institutional capacity, resource constraints, and domestic public opinion—significantly shape a state's foreign policy decisions and implementation capacity. India's characteristically cautious posture in space can be effectively understood through this theoretical framework, as it represents a careful balancing of external geopolitical pressures with significant domestic constraints and priorities (Ripsman, 2016). This perspective helps explain why India's space responses may not always align perfectly with what pure structural realism might predict.

6. India's Position and Strategic Calculus

India's space program, developed and operated under the Indian Space Research Organisation (ISRO), has historically emphasized peaceful, civilian-focused initiatives prioritizing socioeconomic development applications. However, evolving regional security dynamics and accelerating technological competition have gradually pushed India toward adopting a more strategically oriented posture in its space activities.

Military and Security Aspects

India's demonstration of anti-satellite capability during Mission Shakti in 2019 represented a watershed moment that signaled the country's deliberate entry into the militarized domain of space operations. This test established India as only the fourth nation (after the US, Russia, and China) to demonstrate direct-ascent ASAT capability. The subsequent creation of specialized institutions including the Defense Space Agency (DSA) and the Defence Space Research Organisation (DSRO) further institutionalized this strategic reorientation, creating permanent organizational structures to advance India's military space capabilities (Saran, 2020). These developments reflect India's recognition that maintaining purely civilian space operations is increasingly untenable in a context where potential adversaries are rapidly militarizing the space domain.

Strategic Autonomy

India has deliberately maintained its position as a non-signatory to both the United States-led Artemis Accords and the China-Russia International Lunar Research Station (ILRS) framework. This stance reflects India's traditional foreign policy preference for strategic autonomy—avoiding formal alignment with competing blocs while maintaining practical engagement with multiple partners based on specific interests. India's diverse collaborations across the space domain, including partnerships with the United States, France, Japan, and Australia, exemplify a sophisticated hedging strategy that preserves maximum flexibility amid great power competition (Bajpai, 2021). This approach allows India to access critical technologies and capabilities while avoiding the constraints associated with exclusive alignment.

Diplomatic and Soft Power

India's internationally recognized achievements in cost-effective space missions, particularly the high-profile Chandrayaan lunar program and the remarkably economical Mangalyaan Mars orbiter mission, have significantly enhanced the country's global standing and soft power. These accomplishments position India to potentially leverage this accumulated goodwill and credibility to serve as an influential mediator in global space governance discussions. India can particularly utilize this position to effectively advocate for developing countries' interests in international space forums, potentially establishing itself as a bridge between established space powers and emerging space-capable nations.

7. Implications for India: Strategic Options and Future Trajectories

The intensifying space rivalry between the United States and China presents India with a complex set of challenges and opportunities that require careful strategic navigation.

Technological Development

To maintain relevance and competitive advantage in the evolving space environment, India must systematically increase investments in several critical capability areas. These include advanced satellite constellation architectures capable of providing

persistent coverage and resilience, sophisticated space situational awareness (SSA) systems to monitor threats and activities in orbit, and ambitious deep-space exploration missions that demonstrate technological prowess and scientific capability. Development of indigenous launch systems with increased payload capacity and reliability remains essential to ensure autonomous access to space under all geopolitical conditions.

Security and Deterrence

India's growing constellation of space assets—critical for navigation services, intelligence collection, military communications, and remote sensing—face increasing vulnerability to both kinetic and non-kinetic threats from potential adversaries. Developing a multilayered approach to space security requires not only hardening satellites against interference but also creating redundant systems, distributed architectures, and rapid reconstitution capabilities. A credible space infrastructure resilience posture is increasingly fundamental to India's overall strategic deterrence framework in a multi-domain competition environment.

Commercialization and Innovation

The emergence of promising private sector space entities in India, including companies like Skyroot Aerospace, Agnikul Cosmos, and Pixxel, demonstrates significant potential for accelerating innovation through public-private partnerships. India's space economy shows substantial growth potential if appropriate regulatory frameworks, financial incentives, and technology transfer mechanisms are established to nurture this emerging ecosystem. Commercial space capabilities can complement government systems while potentially offering cost advantages and technological agility.

Multilateral Engagement

India possesses a unique opportunity to shape evolving global space governance norms by taking a more proactive leadership role in international forums such as the UN Committee on the Peaceful Uses of Outer Space (COPUOS). Drawing on its established credibility as a responsible space actor and its influential position within the Global South, India can advocate for inclusive governance frameworks that balance security concerns with equitable access to space benefits for developing nations.

Findings and Recommendations

Key Findings

1. Space has definitively emerged as a critical domain of geopolitical rivalry, with particularly intense competition between the United States and China that mirrors broader strategic tensions.
2. Competing governance frameworks for space—exemplified by the contrasting approaches of the Artemis Accords and the International Lunar Research Station initiative—are creating fragmentation in the international space legal regime, potentially undermining previously established consensus principles.
3. India has thus far successfully maintained strategic autonomy through careful balance and diversified partnerships, avoiding entanglement in exclusive blocs while accessing critical technologies and capabilities.
4. The accelerating militarization of space operations by major powers creates substantial security implications for India's space infrastructure and broader defense posture, necessitating adaptive responses.
5. India possesses significant diplomatic capital and scientific credibility that could be leveraged to influence multilateral space governance dialogues and represent developing nations' interests.

Recommendations

1. India should formulate and publicly articulate a comprehensive National Space Security Strategy that integrates civilian and military space activities within a coherent framework aligned with broader national security objectives.
2. Policymakers should establish targeted incentive structures and streamlined regulatory pathways to foster productive public-private partnerships in strategically important space technologies, particularly those enhancing resilience and autonomy.
3. Cybersecurity protections and advanced encryption protocols should be prioritized for all space-based infrastructure to counter the growing threat of non-kinetic interference with critical space systems.
4. India should maintain its approach of selective engagement with both the United States and China on specific space initiatives of mutual benefit, while avoiding entanglement in exclusive bloc arrangements that would restrict strategic flexibility.
5. Indian diplomacy should proactively advance norm-building initiatives for peaceful and sustainable space exploration through existing multilateral forums, positioning India as a responsible stakeholder offering constructive alternatives to binary US-China frameworks.

9. Conclusion

The escalating rivalry between the United States and China in space is fundamentally reshaping global power dynamics and governance structures in this increasingly vital domain. While space was historically conceptualized primarily as a scientific frontier, it has progressively evolved into a theater of strategic competition where technological capabilities translate directly into geopolitical advantage. For India, this dual-use environment presents both significant vulnerabilities and strategic opportunities that demand careful consideration.

To navigate this complex landscape effectively, India must transform its approach from being merely a capable participant in space activities to becoming a proactive architect of space diplomacy, technological innovation, and international norm-setting. As space capabilities become increasingly central to economic development models and comprehensive national security frameworks, India's capacity to maintain an agile, autonomous, and assertive posture will substantially influence its broader position not only in space activities but within the emerging geopolitical order of the 21st century.

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