



**RESEARCH PAPER**

**Exploring Space Warfare: The Strategic Contest among US, Russia, and China for Dominance in Outer Space and its Role in Reshaping Fifth Generation Warfare**

**Ayesha Khalid**

M. Phil Scholar, Department of Political Science and International Relations, University of Management and Technology, Lahore, Punjab, Pakistan

**Corresponding Author**

ayeshakhalidask2001@gmail.com

**ABSTRACT**

Space has emerged as a critical frontier due to its scientific, technological, and strategic significance, particularly since the mid-20th century. This research explores the geopolitical contest between the United States, Russia, and China, as they vie for dominance in outer space. With the United States currently leading in space capabilities, Russia and China are rapidly advancing their counter-space technologies to challenge U.S. military hegemony and reshape the international space order. The integration of space warfare with fifth-generation warfare signals a transformative shift, extending the competition for global supremacy beyond Earth's boundaries. This study analyzes how space has become a battlefield for strategic dominance, redefining the dimensions of modern warfare. Drawing on Neo-Realism, Constructivism, and Technological Determinism, the research examines the strategic interplay among these powers and evaluates the implications of their space race in shaping the evolving landscape of fifth-generation warfare.

**Keywords:** 5<sup>th</sup> Generation Warfare, Geopolitical Competition, Power Maximization, Space Dominance, Space Militarization, Space Warfare

**Introduction**

Geopolitical competition among the world's great powers like the United States, Russia, and China is now not limited to this planet. Our outer space has also become the battlefield among these belligerents over the recent few decades, which unveiled a new type of warfare known as Space Warfare. Space warfare is one of the sub-fields in Military Sciences. It indicated all sorts of military activities that take place or target objects in outer space. The concept of Space Warfare was launched in the course of the Cold War era. It was primarily begun by the United States and the Soviet Union as they sought strategic and technological dominance (Muzaffar, Yaseen, & Rahim, 2017; Muzaffar, & Khan, 2016).

Initially, space technologies were developed for surveillance, navigation, and communication purposes. But later, both these powers realized the value of space-based assets and fell into a space race to confront each other's outer space capacities. Now space warfare encompasses different kinds of technologies and activities that include Targeting, disabling, distracting, hacking, and jamming satellites and their communication networks (through ASAT systems and cyber operations). Installation of kinetic energy, Direct Energy, and nuclear space weapons in space are also involved and a key part of this space war.

To critically analyze ongoing space warfare among world major belligerents, it is imperative first to take a deep look at questions like why, how, and when this space exploration or race that is now evolved in space warfare was actually started. The answers to these questions brought us back to the time period when the world had just witnessed and endured the Second World War (WWII) and then entered into the era of the Cold War.

In that period, the world was divided into two superpowers i.e. United States of America (USA) and the Soviet Union (USSR). These adversarial superpowers dissected the world into two blocs. One is the Capitalistic Bloc led by us and the other one is the Communistic Block headed by the Soviet Union. Both rivals were inclined to expand their blocs by adding more and more states in their respective blocs, so could further their ideological, geopolitical, military, and strategic concerns. The Cold War period actually highlights the ideological contention and conflicting geopolitical strategies between the US and USSR. Nevertheless, it is significant to note that, during the Cold War era, both these belligerents were not protecting each other as direct rivalries, nor they were plunging into any direct open warfare. Rather, both opposing powers were concentrated into a critical political, ideological, and military contest to maintain their dominance in their respective blocs. At that point in time, to enhance their respective influence and pace of their dominance, they began to include the field of space.

### **Literature Review**

Both great powers the US and the USSR used space explorations as a tool to counter each other in their strategic battle. In October 1957, that were Soviets launched the world's very first artificial satellite named Sputnik, and commenced the space race as well. The launch of Sputnik I by the Soviets set off warning signals for Eisenhower's administration and infused extreme anxiety among American citizens that the Soviets exceeded the United States' technological accomplishments.

In 1959, the Soviets completed three successful launches of Sputnik I, II, and III and Lunik III a space probe. To counter the Soviet-led impression of its technological success, the US also launched its first satellite Explorer in 1958. Moreover, in October 1958, the US created its National Aeronautics and Space Administration (NASA) aims to further its aerospace research and programs. After the Soviet's success in entering the first man into Earth's orbit through spacecraft called Vostok I in 1961, NASA's primary goal was to take off its own human space flight program into Earth's orbit as soon as possible. Hence, with the passage of time, the number of launches and space explorations increased between both opposing powers. This was the beginning segment of the space race in outer space and a contest between the US and the USSR during the Cold War period.

Space warfare has changed outer space into Cyberspace. Here are given the series of evolutionary phases that elaborate how all this started with astronautics then evolved into the space race and was ultimately changed into space warfare. The space race first commenced when the USSR and the US launched their very first satellites into outer space Sputnik in 1957 and Explorer in 1958. In the 1960s, the US started its Apollo missions. These Apollo missions are very significant in the history of the space race between the US and USSR. It was a remarkable milestone for the US, showcasing its aptitude for space travel or human exploration, its technological achievement, and its vital part in this scientific discovery. After the Apollo missions of the 1960s, the US has managed to maintain a leading role in space. Then during the 1960s to 1980s, they both started targeting each other's satellites. It included the opponent's orbital access to disable satellites through jamming, hacking, and blinding-- Anti Satellite Weapon Development ASAT. Moreover, U.S. President Ronald Reagan created a missile defense system as SDI in 1983, which directly prompted the theoretical operation of space weapons. This was the first step towards weaponizing the common heritage of the human being. (Fazal Abbas Awan, 2020)

In the 2000s, China with its partner India also plunged into space exploration through the demonstration of ASAT tests (Batool & Muzaffar, 2024). In 2019, to exhibit its space dominance and to tackle potential threats, the US formed its official Space Force under the U.S. military. Both rivals Russia and China considered this move a threat and began efforts to cater the US dominance. Now, China has become the second leader in

space dominance, setting up new standards for space governance. Chinese technological and aerospace advancements made it a bigger threat against US dominance not only in the field of space but also on Earth in the context of different geopolitical and strategic areas. Additionally, some instances showcased the collaboration by both China and Russia, for example, they collaborated for joint Lunar-based missions and lunar search stations, joining hands to counter US hegemony in the realm of outer space. Though all three great powers are engaged in strategic contests against one another, to be the champion in this space warfare. This study analyzes the strategic contest between the US, Russia, and China in space dominance. All three great players invest in anti-satellite and advanced defense technologies of space. It is augmenting anxiety about the new armed-based conflicts. Tensions on Earth will be reflected in space. Space is not decoupled in that way. Where there are terrestrial tensions there will be Astro tensions. It's something very interconnected to what we do here on Earth. (Dr Sophy Antrobus, 2022)

Space has become the fourth medium of warfare as well as reshaping Fifth-Generation Warfare. The Integration of space warfare with 5th generation warfare underscores a paradigm transformation where the US, Russia, and China extend their battle for supremacy beyond the physical domain, leveraging informational and cognitive realms. This study also investigates how space warfare among the U.S., Russia, and China integrates with or reshapes the 5th GW. It is mandatory to consider the consequences of space war in the rise of any space conflict. Numerous space weapons and technology, e.g. ballistic missiles, are used in different geo-strategic incidents. The Ukraine war, the Israel-Iran war, and the war in Yemen are among the major conflicts. Others include the Persian Gulf War in 1991, the Afghan Civil War, Iran-Iraq war. Space weaponization raises numerous strategic concerns, including fostering distrust, jeopardizing commercial and scientific operations, contributing to space debris, and potentially monopolizing orbits. (Yaseen, Muzaffar& Aman, 2022; Retd, 2024)

Consequently, space warfare and satellite destruction during space wars can break out GPS systems, take out power grids, and badly impact emergency call centers, banking systems, market activities, and military actions. Space commanders have warned that it would no longer be "life as we know it" if a space war destroyed the satellites that the world now relies on. (Shepherd, 2022) Hence it can affect and distract every aspect of individual life. Therefore, to prevent the consequences of space warfare, there is a need for an international regulatory mechanism and international treaties that can limit the militarization and weaponization of space.

## **Material and Methods**

As a methodology, qualitative research methods are used with a combination of descriptive, analytic and predictive approaches. An integration of historical and strategic analysis is employed to explore the strategic dynamics of warfare.

## **Theoretical Framework**

This study employs the theoretical paradigms of Realism, Constructivism, and Technological Determinism as theoretical frameworks to analyze the role of the US, Russia, and China-led space race in redefining 5th Generation Warfare. The national space policies and the strategies employed, which are discussed in the next parts of this study, by these adversarial players showcased that all the three US, Russia, and China are somehow realistic in their approach. From the theoretical perspective of realism, two lenses are used. The first one is Kenneth Waltz's perspective of neo-realism which focused on arms contests in space for survival and power maximization. According to this all three US, Russia, and China view, the space and their strategic contest for dominance they're as a tool, significant for their security and power maximization. The second one is John

Mearsheimer's offensive realist perspective which concerns the proactive and preemptive efforts of major powers for their strategic dominance in outer space.

This study also includes other realist perspectives of hegemonic stability theory, the Power tradition theory of A.F.K Organski, the Balance of power theory, and Post-Classical Realism by Stephen Brooke. Under the idea of hegemonic stability theory, there would be only, an all-powerful state that governs or leads (for example US as leader of space creates hegemony and international order) the whole world as a hegemon. The extremely offensive realist approach of the US made it a Hegemon. Moreover, as all three are counter-willing forces heavily investing in their defensive space technologies, they are maintaining the balance of power the idea given by Hans Morgenthau. The next one is A.F.K. Organski's idea of power transition. It can incorporate both China and Russia's individual and collaborated efforts to cater to US-led dominance in aerospace. China, through its modernization of space-building technologies, set new standards for space governance and to make the transition of power, from the US to China possible. The last lens used from realism is post-classical realism by Stephen Brooke. According to this, all three powers because of the probability of threat and aggression from each other are preparing for war, by investing in both armaments and non-armament means.

Constructivism as a theoretical paradigm includes the ideas of Alexander Wandt and Martha Finnimore. Their ideas can help to investigate the role of the US, Russia, and China in their narrative and identity construction. It focused both on space exploration and influencing each other in shaping behaviors and States' space policy. The constructivist notions viewed the contest among these global players for dominance as not just physical or material competition but also include abstract and ideational factors that influence and drive international affairs. The constructivist approach incorporates the social construction of power, identity interests, and interactions among these states. For example, in the context of their contracted identities US viewed itself as a liberal leader, China showcased itself as a peaceful emerging power and wanted a peaceful power transition, and Russia projected itself as a defender of its historical legacy and sovereignty. Martha Finnimore's idea of norms shaping state behavior in constructivism, advocates for mainly Chinese aspiration toward reshaping leadership norms in space and countering the US-led status quo in space.

Lastly, to integrate the technological superiority and space warfare among the US, Russia, and China with 5th-generation warfare, the theoretical lens of Technological Determinism by Langdon Winner is used. According to L. Winner's idea of technological determinism, technological modernization is not just about aviation. Rather these technical advancements shape social structures like politics, relationships, hierarchies, and power dynamics among world great powers.

### **The Strategic Contest for Dominance**

The National Space policy of the United States of America encompasses scientific exploration, national security, and commercial partnerships. Its space national security objectives include the Pentagon's interest in space-based surveillance and communication and satellite defense. The US also collaborates on international schemes of International Space Station ISS and Artemis accords. Through its space policy goals, the US firstly leads, encourages, and expands international cooperation. Secondly, to ensure secure and sustainable space activities, it upholds the rights of states. Moreover, its space policy goals include the preservation and expansion of the US's leadership with its allies and ensuring deliberate retaliation in the time of any international attack and interference towards the US space system. (NATIONAL SPACE POLICY of the UNITED STATES OF AMERICA, 2020) Hence, the US national space policy clearly reflects the offensive and defensive Realist approach to power and security maximization (Yaseen, Muzaffar & Shahbaz, 2023).

The US, in the context of space activity, after exploration, militarization, stagnation, and diverseness, is now directing the world towards a new realm- the third space age. This new space age started from 2016 onwards. The new third age is all about the hasty accumulation and commercialization of space technology and armaments. In reference to this new realm of the third space age, superior satellite technologies, their aptitude, and production capacity will determine US dominance in outer space. In this regard, The US National Aerospace Administration and private American space tech companies are working in collaboration. They extended US space production up to 81 percent in 2023, Which is 4 times the rust of collective global launches. Out of this 81 percent, 78 percent of our space launches were driven, particularly by constellations by the contribution of a private American space tech company SpaceX's Starlink constellations. The introduction of much larger US launch vehicles, particularly SpaceX's Starship and Blue Origin's New Glenn, will give the United States a unique ability to launch much larger payloads at much lower costs, enabling new generations of satellites with designs unconstrained by size, weight, and power. (Harrison, 2024)

The third space age is marked by the higher production and launch of commercial satellites, comprising 84% of total third-age launches, due to the deployment of Amazon's Kuiper and Starlink commercial constellations. These developments of high-quality satellite productions at lower costs, gave the US the advantage to activate the harnessing of commercial space and new military expeditions in space.

Moreover, the US in order to retain its supremacy in the space sector is engaged in, exacerbating the engine of space innovation, enhancing its intelligence and military combined space campaigns, and increasing its international ventures to accomplish its comprehensive space policy objectives. These steps demonstrate the pro-active and pre-emptive efforts of the US for the maintenance of its strategic hegemony in outer space- Mearsheimer's perspective of offensive realism (The hegemonic stability theory). Moreover, the return of Trump to the presidency and the introduction of General B.C Saltzman's strategy reflect a shift towards a more offensive approach to US space operations. (Isakova, 2024)

Russia also has a powerful military existence in space. Russia's objectives of space policy include firstly, a state-driven space program (Roscosmos) emphasizing human spaceflight. Secondly, its role in the International Space Station ISS. It has also planned to establish an independent new space station named Ross by 2025. Russian miscellaneous avenue towards realizing its space dominance reflects its space exploring prestigious legacy and contemporary geopolitical challenges. Russian strategic motivations in the space race consisted of hedging against US Supremacy and political fulfillment of its national security concerns. Therefore, the Russian National Space Policy and its strategic motivations in space represent the defensive Realist approach of Russia as given by Kenneth Waltz. In this regard Russia; by the 2030s, has stated its two major preferences that will be part of its space program. Number one, even after the ISS era, it will manage to maintain the Russian astronautic presence in outer space. Number two, it must switch satellite manufacturing from space-grade electronics to relatively simple and cheap consumer-grade electronics. This preference for quantity over quality of satellites would allow Russia to boost its manufacturing of short-lived satellites, which will be replaced quickly and provide the armed forces with communication and intelligence capabilities. (Luzin, 2024)

The People's Republic of China joined the space race in the early 2000s. Before this, China had been also engaged in significant initiatives regarding space exploration including its first launch of a space program in 1956. However, it officially became a part of a strategic contest for space dominance in January 2007, when China intentionally demolished its non-functional weather satellite with its anti-satellite missile. It was all done by the Chinese government to exhibit its national space aptitude, to counter the US

leadership and status quo in space dominance. In the last few years China in order to track and target the U.S. forces, has deployed numerous kill webs, military communication, navigation, and intelligence satellite systems. Moreover, China has also progressed its space capabilities to oppose American spatial benefits. To combat U.S. military interventions in the time of crisis, China has developed its full spectrum series of anti-space armaments.

Chinese space policy evolved hastily and has a determined economic and military element. It has invested heavily in the independent space station (Tiangong), Mars exploration, advanced anti-satellite weapons, progressive satellite networks for defense, and the Chinese National Space Administration CNSA. Moreover, the establishment of commercial space services with the countries its partners in the Belt and Road Initiative BRI is also a part of China's national space policy. China has linked BRI with its strategic space exploration through Digital Silk Road which indicates China's power transition approach towards the US space dominance-Realist idea of A.F.K. Organ ski. It also aims to establish a permanent crewed lunar base by 2030, analogous to US-led Artemis accords. (Eastin, 2023) Current events and developments in China's space domination strategy include strategic Military integration and global Positioning, a program of Space Science (2024-2050), the upcoming **SMILE** mission Solar Wing Magnet to Sphere Logo sphere Link Explorer, the goal to send Astronaut to the moon by 2030, plans together samples from Mars.

China, under its space science satellite series, entered in new era of development by making breakthroughs in science frontiers such as the discovery of dark matter signals, the exploration of the Dark Ages and the dawn of the universe, extraterrestrial habitable planets, and solar activity and its impact on Earth. (Wang et al., 2024) These developments had made China an international leader in aerospace, the second leader after the US, setting up new standards for space governance. Furthermore, China has begun to launch several large constellations of commercial communications satellites—systems intended to rival SpaceX's Starlink constellation. China is also building out commercial remote sensing systems, again with a stated goal of competing in global space markets. In many cases these systems rival—or exceed—the performance of similar U.S. commercial systems.(Bingen, 2024) All the above developments demonstrate Chinese aspirations towards reshaping leadership norms in space and countering the US-led status quo in space, elaborating M. Finnemore's constructivist idea of norms shaping state behavior.

In a nutshell, the space race among global major players US, Russia, and China has gradually unfolded into a strategic competition with crucial military, economic, and geopolitical implications. The proliferation and commercialization of key assets and technologies, like missile defense systems, GPS, and anti-satellite weapons ASAT capabilities are space-built deterrent systems, extension towards interstellar space and lunar exploration has proved a true manifestation of a US China, and Russia's strategic obsession for space rule. It is high time for all three players, specifically the United States and China to become more focused on their engagement in space. Otherwise, if these powers accidentally or deliberately misstep into any space conflict, the consequences would be worse. Hence, the US, Russia, and China's space progressions for dominance reflect an arena where these major players are reshaping 5th-generation warfare by asserting their powers to further their national and security concerns and shaping the future of Man's existence in outer space.

## **Results and Discussion**

Space consciousness in the late 20<sup>th</sup> century made space a significant field mainly because of the scientific, technological, and strategic aptitude of space. Big powers of Earth extended their geo-political or strategic interests beyond the physical realm. They started to integrate their space-build technologies and advancements to further their terrestrial

interests. It encompasses the establishment of space stations, satellites, space weapons, space forces, and other space technologies, both to resolve and to counter their strategic concerns of the Earth. It integrates the warfare on Earth with space warfare for strategic dominance.

The Integration of space warfare with modern fifth-generation warfare underscores a paradigm transformation where the US, Russia, and China extend their battle for supremacy beyond the physical domain. It includes the amalgamation of space warfare with cyber and electronic warfare, leveraging informational and cognitive realms. It also incorporates the utility of space-based systems for tactical influence, psychological operations, and informational dominance.

Space plays a crucial role in redefining 5th-generation warfare. Firstly, it influences the global governance system and impacts operations and networks through orbital or satellite communication and propaganda. It prioritizes the twofold use of technology and asymmetrical tactics to seek dominance and interests. Big powers have also been using space as a tool for political and military messaging to influence adversaries. By using their space technologies, data, and information as a tool, they undertake political messaging, narrative generation and control public opinion that sometimes heightens global tensions. The powers like the US and China, employ their space achievements as a core component of their national propaganda, projecting themselves as major global players, powering the beliefs of competition. The continuous contest for dominance in outer space undermines collaborations in global governance mechanisms.

Secondly, it creates a shift in the military doctrines of nations. The transformation from physical to psychological and informational dominance and mental subjugation of others is a real-time example. It mainly includes the use of satellite communications, news networks, and broadcasting media to transmit targeted information to a particular audience at the time of conflict. For example, At the time of the Gulf War (1990-1991), the US employed its satellite telecasting to transmit psychological operations (PsyOps) messages to the population of Iraq pressing them to quit Saddam Hussain's regime. On the other hand, Russia employs its military space capacities that include surveillance systems, and anti-satellite weapons (ASAT) to induce fear and psychological ambiguity in enemies. China depicted itself as a technological dominance, waging information-based warfare. It also introduces multi-domain and hybrid strategies under the impact of space warfare.

Thirdly, space via its technical integration, enhances cyber vulnerabilities and their exploitation through the use of autonomous framework, artificial intelligence AI, and robotics. It includes the impact of space-based navigation systems such as the United States Global Positioning System (GPS), China's BeiDou, and Russia's GLONASS that are imperative for air and maritime transportation, trading, agriculture, banking and transactions, and military operations. These systems are extremely susceptible to cyber interference, cyber interception, and generating cyber insecurity. It requires increased protection and vigilance to cater to the expanding threat of cyber warfare aiming at space technologies, otherwise will create difficulties and challenges for state security.

Fourthly space assets also plunged into psychological warfare. For example, The US's lead in space dominance showcased its worldwide superiority not only in space but also in strategic domains of economy and geopolitics. It made other nations feel left behind by underscoring the technological gap. This one's space achievements trigger rivalries and fuel their national pride, inferiority complex, and strategic competition.

Moreover, space exploration has changed the nature of wars on Earth in both defensive and offensive domains. The use of ASAT, communication, navigation, disabling of enemy technology, use of ballistic missiles, drones, and different space weapon technology as attack and defense systems to fulfill security and geostrategic concerns. For example,

during the Russia-Ukraine war, both the US as a proponent of Ukraine and Russia made their space-build capacities and resources central to the conflict by tracking battlefield conditions and monitoring rival troop movements. In the Israel-Palestine conflict, it includes the role of space-build intelligence, to track potential threats and to monitor key assets, communication infrastructure, target identification, and in ballistic missile defense system-Israel's Iron Dome. The contemporary Iran-Israel conflict, like the former two conflicts, demonstrates the advancing part of space in strategic competition on Earth.

Lastly, US-Russia in Cyber Operations- Stuxnet (2010), Russia's Space Based Jamming Operations (2014), India's ASAT tests-Mission Shakti (2019), US Space Force Establishment and Space Policy (2020), China's Space Capabilities and Strategic Rivalry (2021) are some recent real-time major incidents that proved the unification of space warfare with 5th generation warfare in the modern strategic landscape.

Hence, space warfare among the US, Russia, and China transformed the dynamics of fifth-generation warfare. Constructive notions from A. Wendt and M. Finnemore uncovered that space warfare among the US, Russia, and China also includes the aspects of norms creation, identity formation, and disagreement of social structures in the international arena. Their contest in space is all about how these powers perceive themselves and others and shape roles.

Major belligerents the US, Russia, and China are waging 5<sup>th</sup> generation warfare using decentralized, indirect, and non-traditional methods and space assets in cyberattacks, psychological operations, and information warfare against each other.

## **Conclusion**

The perspective of offensive and defensive realism made the strategic contest for space dominance among the US, Russia, and China more inclined towards power and security maximization. The contemporary analysis showcased the US as the lead and both Russia and China are quickly advancing their space aptitude, notably their counter-space technologies. It is done specifically to disrupt U.S.-established military hegemony and international order in space. It reflects China and Russia's power transition approach against the US. The military-civil fusion strategy (MCF) of China has sparked global concerns, particularly by the US as it has the potential to surpass its military capabilities because it aims to integrate civilian innovations with military applications to enhance China's military capabilities. (Sohail, 2024) Simultaneously, Russia is restructuring its space warfare capabilities to retrieve its historical legacy of dominance. In this regard, its orientation is towards modernizing its nuclear energy satellites and its hunter-killer system so it can interact directly or indirectly with US satellites. Hence, all three are investing more and more in this field, indicating a post-classical realist approach.

As these advancements unravel, the implications for fifth-generation and post-modern Warfare are substantial. The amalgamation of space capabilities into combat missions demonstrates transformation towards multi-dimensional and more dynamic conflictual scenarios where the results of terrestrial engagement can be determined by the control of space resources that directly mirrors L. Winner's idea of technological determinism. The contemporary strategic contest among the US, Russia, and China for dominance in outer space raises critical concerns about global stability in the third space realm and its future. The readiness of these nations for potential conflicts in space made it clear that the hold over space will act as a crucial part of determining global dominance in the future.

## **Recommendations**



Collaborative initiatives among the US, Russia, and China are crucial to achieving lasting solutions to this fifth-generation warfare and ensuring the mitigation of space conflicts. For this purpose it is crucial to further engagement in the space. In this context of space engagement, all the belligerents are required to come on board for peaceful negotiations on the subject of safe and responsible use of space and space-based technologies. Additionally, the US, Russia, and China can engage in innovative and peaceful space collaborations by establishing joint missions, forming space alliances, creating international agreements, sharing data and resources, joining hands in joint Space Research and developments, adhering to peaceful principles and hosting collaborative competitions, so that can make the field of space a “heavenly space”.

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