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NATO and the Changing Space Security Environment: Strategic Challenges from China and Russia

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Abstract
Space has become a strategically critical domain for both state and non-state actors, including NATO and the European Union, due to its impact on sectors such as communication, navigation, intelligence, agriculture, transport, science, and banking. NATO's strategic concepts have evolved in response to this changing environment, culminating in the recognition of space as an operational domain and reflecting an evolutionary approach to emerging threats. This study analyzes NATO's growing focus on space, the development of its related policy frameworks, and the space programs of China and Russia, whose activities pose significant challenges to NATO's security posture. By examining these dynamics, the research highlights the strategic, operational, and policy implications of space competition for NATO in the 21st century.

Keywords
NATO; Space Security; Strategic Concepts; China; Russia; Policy Development; International Affairs

INTRODUCTION

The space race began with the launch of Sputnik-I, the USSR's first satellite, in 1957. In 1961, Yuri Gagarin was launched into space aboard the Vostok 3KA capsule, becoming the first human to orbit Earth. Initially led by the USA and the USSR, the space race later saw participation from other countries, including France and Canada. Today, while the USA and Russia remain leaders in space endeavors, they are followed by nations such as China, Japan, India, and members of the European Union. Additionally, private sector involvement in space activities is growing rapidly. These organizations can operate launch sites, manufacture launch vehicles and spacecraft, and provide related services.

One key indicator of interest in space activities today is the number of space agencies worldwide, along with the policy documents developed by states and international organizations. The primary responsibility of these agencies is to develop their countries' space ecosystems by preparing policy documents that outline goals, strategies, and future perspectives regarding space, an area of increasing importance, closely aligned with global developments. Currently, 77 countries have their own space agencies (Space Crew 2024). Beyond national initiatives, international organizations such as NATO and the European Union have also developed space-related policies in recent years, highlighting the crucial role of space in safeguarding collective security and promoting prosperity.

For NATO, the growing emphasis on space is closely linked to its broader strategic adaptation to technological change. NATO's evolving approach to Software-Defined Warfare,

Network-Centric Warfare, and Cognitive Warfare was emphasized in its Multilevel Governance Architecture (2016). These frameworks directly influence NATO's cyber and space policies, reflecting the broader integration of technology within the Alliance's strategic transformation. However, analyzing these aspects in detail is beyond the scope of this study, which focuses on NATO's space policy in general and compares it with the policies of Russia and China, rather than exploring space's interconnection with these emerging forms of warfare.

The aim of this study is therefore to analyze NATO's growing strategic focus on space and the development of related policy documents while also examining the space programs of China and Russia. Both countries seek to establish themselves as major space actors, and through their expanding activities and missions, they pose significant challenges to NATO's security framework in the 21st-century space domain. To this end, the study first analyzes the strategic significance of space within the new space ecosystem and changing global dynamics. It then examines NATO's evolving security context over the years, highlighting how space has gradually been integrated into its security agenda and policy development. The final chapter focuses on the space policies of China and Russia to fully understand the importance of space for NATO, as both countries pursue ambitious programs and activities that challenge the Alliance's security framework in the space domain.

METHODOLOGY

This study employs a qualitative document analysis approach, which involves examining policy documents to gather data and understand the context in which they were created, why, and how. It focuses on policy documents related to the space strategies of NATO, China, and Russia to explore how each actor conceptualizes and frames its approach to outer space. The analysis is qualitative, emphasizing descriptive interpretation rather than numerical data.

LITERATURE REVIEW

Research on NATO's increasing strategic focus on space, the development of related policy documents, and the space programs of China and Russia has been extensively examined in the academic literature. Scholars such as Wallander (2020) emphasize that, as a military alliance, NATO's strategic concepts have evolved in response to changes in the global security environment. This evolution is reflected in NATO's policy documents. For example, the Cyber Defense Pledge (NATO 2016) recognized cyber defense as a core task of NATO's collective defense, while the London Declaration (2019) formally acknowledged space as NATO's newest operational domain, alongside air, land, sea, and cyberspace. Additionally, NATO's Overarching Space Policy (2019), as the Alliance's primary policy document on space, outlines how various aspects of space utilization should be assessed in relation to allied security and NATO's deterrence capabilities. Together, these documents underscore NATO's adaptive approach to emerging security domains and its recognition of space as a critical component of Alliance operations.

In addition to NATO, recent literature on China's space sector primarily emphasizes its rapid growth and strategic ambitions over the past decade. Hilborne (2020), for instance, highlights China's space achievements, including lunar and robotic missions. Similarly, Na (2024)

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details China's mid- and long-term goals for space science missions, including the Space Exploration Plan. The European Space Policy Institute (ESPI) report (2024) also underscores the remarkable expansion of China's commercial space industry since 2014, noting its technological innovations and the development of new financial mechanisms.

Moreover, Julienne's article, "China's Ambitions in Space: The Sky's the Limit" (2021), identifies the main pillars of China's space policies, national development, military empowerment, and great power competition, tracing their origins to initial efforts in the 1950s. Building on these foundational pillars, recent literature emphasizes that President Xi Jinping's vision for outer space reflects broader aspirations for China to assert itself as a leading global power (Kashevarova and Panova 2023; Pollpeter et al. 2020). Overall, existing research portrays China's space program not only as a demonstration of technological capability but also as a deliberate instrument for asserting influence and shaping the future trajectory of international space activities.

In addition to NATO and China, scholars have extensively examined Russia's evolving role in global space activities, highlighting both its historical prominence and contemporary challenges. As Vidal (2021) notes, Russia's space legacy became a powerful symbol of national prestige and technological achievement during the Soviet era. However, the dissolution of the Soviet Union marked a turning point, leading to the gradual weakening of Russia's space program due to challenges in adapting its industrial and institutional infrastructure (Radin et al. 2025).

Despite these challenges, some scholars, including Aliberti and Lisitsyna (2018), emphasize the role of President Vladimir Putin, noting that he prioritizes the development of Russia's national space activities, particularly its military-oriented programs, to strengthen the country's strategic space capabilities. Nevertheless, these domestic efforts have increasingly been constrained by external geopolitical developments.

Recent studies indicate that Russia's structural weaknesses have been exacerbated by geopolitical events, especially following the annexation of Crimea in 2014 and the invasion of Ukraine in 2022 (Pohl 2023). Dickey and Gleason (2024) highlight that Western sanctions led many commercial companies to withdraw their services from Russia, effectively isolating its space sector from global markets. Similarly, Luzin (2024) notes that international collaborative projects have been canceled or curtailed due to funding shortages and political restrictions. This trend is exemplified by Germany's termination of all bilateral space cooperation and by the European Space Agency's 2022 decision to suspend joint missions with Roscosmos (Pohl 2023). Collectively, the literature underscores a clear shift in Russia's position, from a leading actor in space exploration to a more constrained and isolated power, as ongoing geopolitical tensions continue to erode its longstanding partnerships and capabilities.

THE NEW SPACE ECOSYSTEM AND THE CHANGING GLOBAL DYNAMICS

The current century is marked by a renewed focus on space among nation-states, international organizations, and private companies. The growing importance of space has driven advancements in space technologies, which in turn have prompted transformations in global and regional political, economic, legal, and social dynamics. The rapid development of space technologies and their integral role in societal functioning (Bayır et al. 2021, 114) have made the

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operationalization of space in relation to individual well-being, sustainability, efficiency, and social welfare a central concern on state agendas, particularly within the frameworks of Society 5.0 and Industry 4.0. Today, the use of space applications in critical sectors such as agriculture, food supply, and security, as well as their diverse roles in military, tourism, and communications, encourages states to develop comprehensive strategies in this domain (Bohlmann and Petrovici 2019, 2).

This raises an important question: What developments have compelled states and non-state actors to prioritize space issues so intensively? Unlike in the past, space is no longer monopolized or controlled by any single state; it is regarded as a shared heritage of humanity. The benefits of space activities are increasingly understood as collective, underscoring the need to analyze opportunities for both competition and collaboration among various actors. The contemporary perspective on the phenomenon known as "new space" makes such analysis almost imperative, a process that unfolded quite differently in the 20th century.

During the Cold War, the two superpowers fiercely competed to demonstrate their supremacy on a global scale. Among the most notable arenas of this competition was the space race, in which each side sought to achieve increasingly advanced space flights and missions. This rivalry ultimately laid the foundation for many technologies and tools that are now part of daily life, shaping the political, economic, and social implications of space utilization. At that time, space activities were primarily under state control, which significantly limited the participation of other actors, such as companies and international organizations. According to the understanding of "old" or "traditional" space, the primary objectives of costly space activities were defined by state interests and national security considerations (Paikowsky 2017, 85–87). As a result, prior to the 1980s, the economic and social impact of space activities was relatively limited. The emergence of the first private space companies in the 1980s marked the beginning of space commercialization, ushering in a new global era of space utilization (Denis et al. 2020, 433).

New Space and Its Differences from Traditional Space

During the Cold War, traditional space was almost entirely dominated by states. Today, however, the concept of "new space" has emerged, in which states are increasingly transferring activities and authority to the private sector and commercial space companies. New space not only represents the operational domain of these new actors but has also prompted profound changes in the visions and objectives of traditional space actors. What was once under the exclusive control of nation-states has now become an arena for large corporations and international organizations as well (Denis et al. 2020, 432–433). This process has accelerated in the 21st century, creating a complex network of relationships among states, companies, international organizations, and individuals, in short, all new actors in international relations.

In the 20th century, although private initiatives such as satellite broadcasting and communication existed, the primary players remained developed states. As societal needs evolved and technology advanced, the space ecosystem underwent significant changes. A key term that captures these dynamics in the 21st century is new space. While there is no universally accepted definition, the term is widely recognized and helps clarify the current landscape of space politics, highlighting the distinction between "old" and "new" space (Golkar 2021, 2).

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Technological advancements, particularly in miniaturization, have significantly reduced the mass of electronics by up to 50%, thereby lowering the resources required for launches and enabling new participants to enter the space arena. Additionally, new space is characterized by the emergence of a diverse range of actors, including nations that previously had no space activities and private companies of varying sizes. These new entrants have the potential to disrupt existing supply chains through innovative business models. Space activities are increasingly seen as viable commercial ventures, with sectors such as space mining, tourism, and energy beginning to attract investment from private entrepreneurs and public-private partnerships (Golkar 2021, 4–5).

Key Factors in the Transformation of Traditional Space

Three fundamental factors have contributed to the transformation of traditional space. First is the evolution of space equipment and the expansion of technical knowledge. With the development of CubeSat technology, missions can now be conducted using satellites weighing less than one kilogram. Since the early 2000s, CubeSats have been developed at low cost by non-state actors, such as universities and private companies. They are used in space missions related to communication, education, and technological and scientific advancement (Swartwout 2013, 213–214).

The miniaturization of space equipment has reduced the costs of space technologies, increased accessibility, and enabled riskier missions than previously possible. Consequently, the knowledge base surrounding space technologies has grown exponentially. This trend has facilitated the emergence of new actors who either conduct space activities or provide equipment and services for these activities. Space has thus diversified, moving beyond the state-centric and security-focused discourse of the Cold War era, particularly since the 1990s. The participation of a variety of actors with differing objectives constitutes the second key factor transforming traditional space.

Finally, the inclusion of new actors has spurred the development of new markets, supply chains, business models, and investment opportunities. This economic transformation, often examined within the framework of the space economy, has fundamentally reshaped traditional space and created complex, interconnected relationships among actors. Recent public initiatives aimed at promoting space commercialization and business development highlight a global trend of increasing institutional emphasis on enhancing the private space economy and commercial ventures (ESPI 2022, 9).

In summary, the development of space technologies, the emergence of new actors, and the economic transformation of space have fundamentally altered its nature as an operational domain. These changes have given rise to the phenomenon referred to in the literature as new space. Today, we are entering a new era in global space utilization, where the evolution and management of these relationships represent both a domain of curiosity and a central focus of space diplomacy.

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NATO'S SPACE POLICY IN A CHANGING GLOBAL SECURITY LANDSCAPE

NATO's concept of threat has evolved over the years in response to changes in the global security environment. Established in 1949 as a collective defense alliance, NATO initially served as a strategic counterbalance to the Soviet Union during the Cold War. With the dissolution of the Soviet Union in 1991, however, debates over NATO's relevance intensified in the absence of its primary adversary. During the Cold War, the threat was specific and singular: the Soviet Union. After its dissolution, the number and types of potential threats expanded within the evolving security landscape (Wallander 2020, 717). Under these conditions, NATO redefined its role by adopting new strategic concepts at the Rome Summit on November 7–8, 1991. The first post-1991 strategic concept emphasized collective security and defense, not against a predefined threat but in response to unpredictable risks, including political, economic, and social instability, nationalist and ethnic conflicts, terrorism, human rights violations, and the proliferation of weapons of mass destruction (Wallander 2020, 718–719).

In subsequent years, NATO began incorporating cyber defense into its political agenda. At the 2002 NATO Summit in Prague, cyber threats were recognized as increasingly destructive, coercive, and frequent in the twenty-first century. By the 2014 NATO Summit in Wales, cyber defense had been recognized as a core task of NATO's collective defense, enabling the invocation of Article 5 of NATO's founding treaty in the event of a cyberattack (NATO 2024). Most importantly, at the 2016 NATO Summit in Warsaw, cyberspace was officially recognized as a domain of operations for NATO, elevating it to the same level as the air, land, and maritime domains (NATO 2016). This recognition highlighted the central role of cyberspace in Alliance operations, notably as rapid technological advancements created both opportunities and threats within the domain. Among these advancements, the growing importance of artificial intelligence (AI), outlined in NATO's Multilevel Governance Architecture, emerged as a key development. This evolution ultimately led to the adoption of the NATO Artificial Intelligence Strategy in 2021, which identifies AI as a crucial enabler of cyber defense and a significant factor influencing the success of NATO operations (NATO 2024).

More recently, in 2019, space was recognized as NATO's newest operational domain, alongside air, land, sea, and cyberspace (NATO 2019). This step reflects NATO's commitment to enhancing its awareness and understanding of the space environment, particularly regarding its opportunities, challenges, and threats. Although the space race began during the Cold War, especially from the 1980s onward, the economic and social significance of space activities has grown considerably. In today's world, both state and non-state actors prioritize space-related activities, which are deeply interconnected with diverse sectors such as communication, navigation, intelligence, transport, agriculture, science, and banking (Baykal and Bayır 2024, 265).

In this context, the 2018 NATO Summit in Brussels marked the first time space was officially recognized as a critical domain for Allied security (NATO 2018), a development driven in part by the rising significance of emerging technologies such as AI. Artificial intelligence has become crucial for enhancing space situational awareness and decision-making, as the massive data flows from satellite and surveillance systems require AI tools for real-time analysis and threat detection. By integrating AI into its space governance and operational frameworks, NATO strengthens its capacity to monitor and protect critical space-based infrastructure, thereby

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enhancing the Alliance's resilience and strategic responsiveness in the space domain (NATO 2024).

Through the Brussels Declaration, NATO agreed to develop an Overarching Space Policy, which subsequently became the Alliance's primary policy document on space (NATO 2018). NATO's perspective on space has since been primarily defined by the 2019 Overarching Space Policy (NATO 2019), which comprehensively outlines how various aspects of space utilization should be assessed in relation to Allied security and NATO's deterrence capabilities. Over the years, the evolution of space utilization and rapid technological advancements have brought significant benefits to multiple sectors, including agriculture, environmental monitoring, transportation, science, communication, and banking. Additionally, the growing reliance of military and security operations on space is widely recognized as a critical consideration. For example, NATO depends on space-based systems to execute missions such as collective defense, crisis response, disaster relief, and counterterrorism, all of which rely on data and information obtained from or transmitted through space (NATO 2019).

In this context, NATO emphasizes several critical areas from a security and defense perspective, reaffirms its commitment to international law, and explicitly states that it has no intention of deploying weapons in space. The Alliance highlights the strategic importance of space, particularly regarding positioning, navigation and timing, early warning, environmental monitoring, secure satellite communications, intelligence, surveillance, and reconnaissance (NATO 2025). These advancements have led NATO Allies to recognize that space is increasingly a shared security concern, which must be integrated into the Alliance's deterrence and defense agenda.

NATO's first concrete step toward a space security policy was announced in December 2019 through the London Declaration, which officially defined space as an "operational domain" and publicly recognized it as such. The declaration stated: "We have declared space an operational domain for NATO, recognizing its importance in keeping us safe and tackling security challenges, while upholding international law" (NATO 2019). NATO continues to develop policies in response to the dynamic and rapidly evolving nature of space. The adoption of the Overarching Space Policy and the recognition of space as an operational domain reflect the Alliance's evolutionary approach to adaptation, rather than a revolutionary shift.

Following the publication of NATO's Overarching Space Policy and the London Declaration in 2019, several additional key policy documents on space have been issued, including the NATO 2022 Strategic Concept and the NATO Commercial Space Strategy (2025), as well as broader strategic frameworks such as the NATO 2030 Agenda. Notably, the 2022 Strategic Concept identifies the growing influence of China and Russia in international politics, particularly in counter-space technologies and outer space activities, as a significant challenge to Allied security (NATO 2022). This underscores that state actors such as China and Russia, whose space capabilities and ambitions are comparable or nearly comparable to NATO's, have developed ambitious programs that drive the Alliance to strengthen its space security policies and maintain strategic stability in the space domain.

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CHINA AND RUSSIA AS STRATEGIC SPACE POWERS: A CHALLENGE TO NATO'S SECURITY FRAMEWORK

The year 2019 is widely regarded as a pivotal moment for NATO's space policies for several reasons. First, it marked a significant shift and escalation in the Alliance's strategic focus on space. Second, NATO formally recognized space as a new operational domain, alongside air, land, sea, and cyberspace, acknowledging that space-based assets are increasingly vital for collective security and prosperity. Third, in the same year, the Alliance adopted the Overarching Space Policy, signaling a formal institutional commitment to space as a strategic priority.

NATO's Overarching Space Policy is critical because it highlights the multi-dimensional role of space in the Alliance's security framework. It emphasizes space's critical contribution not only to deterrence and defense capabilities but also to a wide range of civilian and strategic sectors, including weather monitoring, environmental and agricultural management, transportation, science, communications, and banking.

NATO's growing strategic focus on space and the development of related policy documents have been driven in large part by the ambitious space programs of China and Russia. To fully understand the strategic significance of space for the Alliance, it is essential to analyze the space policies of these two nations. Both China and Russia aspire to become leading actors in space. Through their expanding activities and missions, they collectively pose a significant challenge to NATO's security framework in the 21st-century space domain.

China

China's space sector has been among the fastest-growing in the world over the past decade. Notable achievements include humanity's first successful landing on the far side of the Moon in 2019 with the Chang'e 4 mission and the Chang'e 5 robotic mission in 2020, which collected and returned samples from the lunar surface. This accomplishment marked the first triumphant lunar sample return since the Soviet mission in 1976 (Hilborne 2020, 5–6). In addition, China has outlined its national mid- and long-term development policies for space science missions and research, including missions to Mars, Venus, and Jupiter, as well as plans to establish a global lunar research station by 2025 through the Space Exploration Plan (Na 2024).

China's commercial space industry has also experienced remarkable growth since 2014, driven by goals of stimulating innovation and creating new financial channels. Several key factors, including government policies, technological advances, commercialization efforts, and funding mechanisms from both government and public institutions, support this growth. The Chinese government has played a central role in shaping strategies and long-term objectives for the space sector. It has been a significant source of support for China's commercial space industry, particularly up until 2023. Following the impacts of COVID-19, the trade war, and related challenges, public actors intervened to address funding shortfalls, leading to increased investment from a variety of state sources, including provincial and municipal development funds, the Chinese Academy of Sciences, major universities, and other institutions (European Space Policy Institute 2024, 20–21).

Figure 1 illustrates trends in Chinese commercial space funding over the years.

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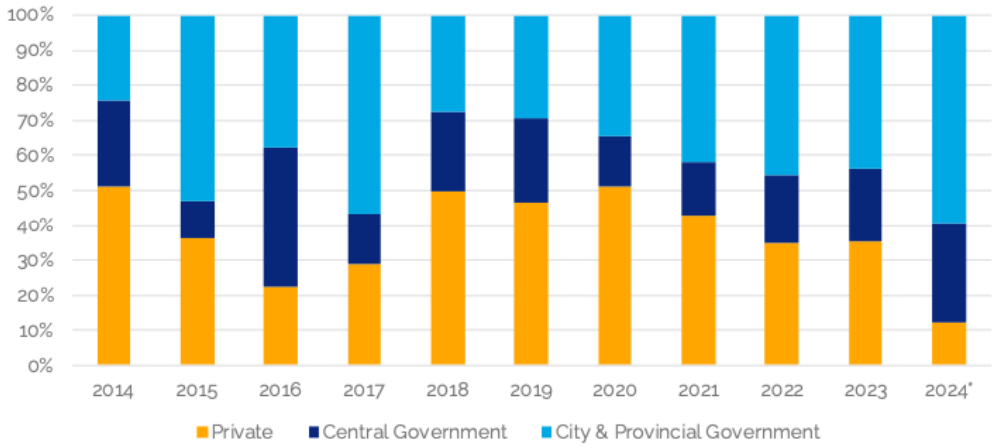


Figure 1: Trends in Chinese Commercial Space Funding Over Time (Source: ESPI 2024, 20)

The space sector, including both commercial and strategic activities such as the development of military satellite systems, national security initiatives, space-based intelligence, and deep space exploration, is considered a critical element of China's national policy, as the country seeks to gain a competitive edge in space (Pollpeter et al. 2020, 9). This priority is clearly reflected in the statements of Chinese political leaders and officials. For example, President Xi Jinping stated: "To explore the vast cosmos, develop the space industry, and build China into a space power is our eternal dream" (China National Space Administration 2022).

Analysts commonly cite the space sector's role in China's national development, its competition with the US and Russia in high-tech industries, its growing wealth, and efforts to boost national pride as key drivers of the country's enthusiasm for space (Pollpeter et al. 2020, 10). These factors, which enhance national strength, wealth, and prestige, are not unique to China but are common drivers of space programs in other nations as well (Hilborne 2020, 9).

China's space policy rests on three main pillars: national development, military empowerment, and great power competition. National development and military empowerment have been integral components of China's space program since its initial efforts in the 1950s, closely linked to the pursuit of nuclear weapons and ballistic missile capabilities (Julienne 2021, 13–14). The third pillar, great power competition, has gained prominence over the past decade, particularly since Xi Jinping assumed the presidency in 2012. This pillar reflects a perspective on space reminiscent of Cold War-era thinking, where a country's space capabilities serve as a key indicator of its power in the international system, as exemplified by the space race between the US and the USSR (Julienne 2021, 14–15). Under Xi Jinping, China's space policy has been fully integrated into its core national strategy, with space viewed as a critical factor in the country's pursuit of technological leadership. This integration aligns closely with his vision of the "China Dream of the Great Rejuvenation of the Chinese Nation" (Kashevarova and Panova 2023, 2; Pollpeter et al. 2020, 11).

Since 2016, China has made rapid progress in its space industry, including the completion of both the BeiDou Navigation Satellite System and a high-resolution Earth observation system. The country has also advanced its satellite communication and broadcasting capabilities, completed the final phase of its three-step lunar exploration program, and begun constructing the initial modules of its space station. Most notably, China achieved its

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first landing beyond the Earth–Moon system with the Tianwen-1 mission, followed by Mars exploration (China National Space Administration 2022).

Building on these achievements, China announced its Space Exploration Plan in 2024, aiming to become a global leader in space science and technology by 2050. The plan was jointly released by the Chinese Academy of Sciences, the China National Space Administration, and the China Manned Space Agency (Na 2024). These institutions form the backbone of China's space landscape, managing international cooperation and official governmental space activities. Other organizations, such as the China Aerospace Science and Technology Corporation (CASC) and the China Aerospace Science and Industry Corporation, primarily support the country's space programs and activities as instrumental bodies (Julienne 2021, 5–6).

The Space Exploration Plan is notable for marking the first time China has set national mid- and long-term policies for space science missions and research. It outlines five major scientific themes, the extreme universe, space-time ripples, panoramic view of Sun-Earth, habitable planets, and biological and physical sciences in space, and seventeen priority areas to achieve its objectives from 2024 to 2050. These include missions to Mars, Venus, and Jupiter, as well as the establishment of a global lunar research station by 2025 (Na 2024).

The program also specifies a three-phase roadmap covering 2024–2027, 2028–2035, and 2036–2050, with specific goals for each phase. During the first phase (2024–2027), the focus will be on space station operations, manned lunar exploration, the fourth phase of the lunar exploration program, planetary exploration, and the approval of five to eight space science satellite missions. The second phase (2028–2035) will prioritize the construction of the international lunar research station and up to 15 scientific satellite missions. The third phase (2036–2050) will focus on launching more than 30 space science missions (Na 2024).

China's achievements in space are significant milestones, such as the Tianwen-1 Mars landing and the Chang'e-4 mission, which became the first to land on the far side of the Moon. These accomplishments, together with the objectives outlined in official programs, serve as concrete indicators of China's strategic efforts to position itself as a leader in space. While China publicly emphasizes peaceful goals in space, its military activities remain largely opaque, generating international concern regarding the more strategic aspects of its ambitions. Overall, it is clear that China will continue to advance in this highly competitive field, intensifying global space competition in the coming years.

Russia

Historically, Russia has been a major player in space activities. Yuri Gagarin's pioneering achievement in 1961, becoming the first human in space, was not only a milestone for humanity but also a profound source of national pride for Russia (Vidal 2021, 11). Although the dissolution of the Soviet Union weakened Russia's space program, mainly due to difficulties in adapting to new industrial conditions (Radin et al. 2025, 3), the past decade has introduced additional risks to a program that had been sustained for decades. These risks were further exacerbated by Russia's annexation of Crimea in 2014 and the war in Ukraine in 2022, which were followed by sanctions and embargoes that placed the country in a financially and technologically challenging position (Pohl 2023, 3).

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Several commercial companies have also withdrawn services from Russia due to the threat of sanctions, primarily from the United States and other Western powers, if they continued to cooperate during the Russia–Ukraine conflict (Dickey and Gleason 2024, 31). Additionally, multiple cooperative projects with Western partners were either cancelled or constrained by funding limitations (Luzin 2024, 1). For example, Germany terminated all bilateral space cooperation with Russia. At the same time, the European Space Agency announced in 2022 that it would discontinue joint missions with Roscosmos, including Luna 25, 26, and 27, as well as the ExoMars mission (Pohl 2023, 3–4).

One of the most significant disruptions occurred in the context of the International Space Station (ISS). In 2024, Roscosmos announced plans to build and deploy a new Russian space station by 2030. This initiative is intended to allow Russia to conduct research and technological development independently, tasks previously carried out under the ISS but constrained by international agreements. Although Russia has been a key partner of the ISS since its construction in the 1990s, collaboration became increasingly complex following the invasion of Ukraine. Currently, Russia plans to end its ISS partnership in 2028, an extension from an initially announced 2024 exit (Sauer 2022).

As part of this project, Russia also aims to develop new spacecraft and upgrade its launch infrastructure. Roscosmos head Yuri Borisov emphasized the importance of a new space station, stating that it would "solve problems of scientific and technological development, national economy, and national security that are not achievable on the Russian segment of the ISS due to technological limitations and the constraints of international agreements" (Dixit 2024).

These challenges have hindered Russia's ability to remain at the forefront of space activities and placed it at a disadvantage relative to rising space powers. While the United States and the European Union continue to maintain a strong presence in space, new actors, particularly in Asia, including China, India, and Japan, have launched ambitious national programs and emerged as significant competitors (Vidal 2021, 14–15).

Despite these challenges, Russia continues to pursue an ambitious, military-oriented space program. Since President Vladimir Putin came to power, he has emphasized the development of national space activities, placing space policy at the top of Russia's domestic and foreign agenda, as space capabilities are perceived as a key indicator of international standing (Aliberti and Lisitsyna 2018, 1).

Russia's space priorities for 2030 focus on two main goals: maintaining the presence of Russian astronauts in outer space and using lower-cost, consumer-grade electronics in satellites instead of specialized space-grade components (Luzin 2024, 1). These activities are primarily funded through state programs, which are viewed not only as crucial for national power and sovereignty but also as long-term symbols of Russia's international prestige (Luzin 2024, 2).

Russia's space programs inherently include a military dimension, reflecting the involvement of both Roscosmos and the Russian Space Forces. Unlike counterparts such as NASA and the European Space Agency, Roscosmos integrates military considerations into the development of its space programs and activities. In parallel, the Russian Space Forces play a direct role in coordinating space operations (Vidal 2021, 15). Therefore, Russia's space strategy is jointly shaped by these two institutions.

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In general, Russia's objectives in space are to facilitate the exploration and utilization of outer space in ways that contribute to the country's socioeconomic development, scientific advancement, and technological progress. Additionally, Russia's military doctrine regarding space emphasizes two primary principles: the potential for jamming and radio interference, and offensive capabilities against ground-based space infrastructure (Vidal 2021, 14–15).

Over the years, Russia has implemented several significant space programs, including the Federal Space Programme 2006–2015, the Federal Target Programme for the Development of Russian Cosmodromes, and the Federal Target Programme for the Redeployment of GLONASS (Aliberti and Lisitsyna 2018, 1). Its most recent initiative, "Space Activity of Russia by 2030," outlines the country's short- and long-term goals in space and serves as an updated version of the earlier program, "Space Activity of Russia 2013–2020." This program includes two subprograms: "Priority Innovation Projects of the Space Industry" and "Ensuring Implementation of Space Activity of Russia 2013–2020." These subprograms encompass both civilian and military initiatives, such as the GLONASS satellite navigation system, which primarily serves military purposes, and the Plesetsk Cosmodrome, Russia's leading facility for military orbital launches (Luzin 2024, 2).

CONCLUSION

In the 21st century, space has firmly established itself as a distinct and multifaceted field in international relations, encompassing legal, economic, political, cultural, and technological dimensions. As a result, it has become a prominent issue on the agendas of states, international organizations, and the private sector. Today, a wide range of disciplines, from security and economics to law, sociology, and psychology, are exploring the possibilities offered by space. In this new era, it is essential to holistically address the various dimensions and relationships of space.

The emergence of new space, particularly as the operational domain of private companies and other non-state actors, has prompted significant changes in the policies, visions, and objectives of traditional space actors. This trend is expected to accelerate in the coming years, highlighting that space is no longer solely the domain of states. The designation of space as the fifth domain of international security, alongside land, sea, air, and cyberspace, has compelled both state and non-state actors to develop and implement new policies and strategies regarding space.

NATO provides a notable example of this trend. The Alliance formally recognized space as a critical domain for the security of its members in 2018, reflecting its growing importance across multiple sectors. Building on this recognition, NATO designated space as a new operational domain in 2019 to address emerging opportunities and challenges in the field. Since then, several key policy documents have been adopted, including NATO's Overarching Space Policy (2019), the NATO 2022 Strategic Concept, the NATO Commercial Space Strategy (2025), and broader strategic frameworks such as the NATO 2030 Agenda.

Russia and China's expanding roles in space have been a recurring focus in these NATO documents, as both countries pursue ambitious programs to consolidate their status as major space powers. While Russia, alongside the United States, has the longest history of space exploration and was a leading actor during the Cold War, China's recent achievements

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increasingly challenge that legacy. As discussed previously, Russia's space program has faced significant constraints in recent years. Events such as the annexation of Crimea in 2014 and the war against Ukraine in 2022 triggered Western sanctions and embargoes, placing the country in a financially and technologically difficult position and limiting its ability to sustain progress in space programs.

In contrast, China has made substantial advances over the last decade, with missions such as the Tianwen-1 Mars landing and the Chang'e-4 mission, which became the first to land on the far side of the Moon. These achievements are widely regarded as key indicators of China's ambition to become a leader in space activities. Compared to Russia, China is likely to continue advancing in this highly competitive field, driven by national and broader international objectives. Consequently, this trajectory not only intensifies global competition in space but also reinforces NATO's perception of China as a significant emerging challenge in the space domain.

This study primarily relies on qualitative document analysis of publicly available policy documents, official statements, and scholarly literature. As such, it may not fully capture the complete scope of classified or internal strategic considerations, particularly in the military aspects of Russia and China's space programs. The study also emphasizes strategic and policy dimensions, and does not provide a detailed technical or engineering analysis of space programs. Furthermore, while the research highlights key trends and developments in NATO, Russia, and China's space activities, the rapidly evolving nature of space technology and international relations means that findings are limited to the timeframe and sources examined. Future research could expand on this study by incorporating real-time developments, private-sector innovations, and broader international collaborations.

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