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Space strategy and the rise of space forces

Estratégia espacial e a ascensão das forças espaciais

ABSTRACT:
This essay discusses the importance of space for military operations and the formation of new military forces in space. It is based on the recent national security and space strategy documents of several countries and is divided into three sections. The first section focuses on the historical development of the military use of space systems, the second on theories of space strategy and anti-satellite weapons, and the third examines the emergence of space forces from a comparative perspective. The creation of space forces is nothing new or unique to the United States. However, the United States is the country that has the most developed military strategy and doctrine for space, possibly inspired by the work of space strategists. The other countries, including Russia and China, do not yet have a clear definition of their strategic goals or a space-focused doctrine, at least not publicly.

Keywords: Space strategy; Space security; Space systems; Space forces; Military operations

RESUMO:
Este ensaio discute a importância do espaço para as operações militares e a formação de novas forças militares no espaço. Baseia-se em documentos recentes de segurança nacional e de estratégia espacial de vários países e está dividido em três secções. A primeira secção centra-se no desenvolvimento histórico da utilização militar dos sistemas espaciais, a segunda nas teorias da estratégia espacial e nas armas antissatélite, e a terceira examina a emergência das forças espaciais numa perspectiva comparativa. A criação de forças espaciais não é algo novo ou exclusivo dos Estados Unidos, porém este é o país que possui uma estratégia e uma doutrina militar para o espaço mais desenvolvida, possivelmente inspirada no trabalho dos estrategistas espaciais. Os demais países, incluindo Rússia e China, ainda não possuem uma definição clara de seus objetivos estratégicos ou uma doutrina focada no espaço como os Estados Unidos, pelo menos não publicamente.

Palavras-chave: Estratégia espacial; Segurança espacial; Sistemas espaciais; Forças espaciais; Operações militares

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INTRODUCTION

The U.S. government's announcement of a Space Force in 2019 was immediately met with jokes from around the world. The internet was flooded with photoshopped images and memes of U.S. politicians wielding lightsabers and wearing Star Trek uniforms. This theme even inspired a parodic streaming show called “Space Force”. Humor aside, the creation of the U.S. Space Force represents an ongoing process that has been neglected in the field of strategic studies. In recent years, the use of space systems by armed forces worldwide has increased dramatically, changing the way contemporary strategies are viewed and redefining the role of military organizations in the space domain.

This essay is intended to provide an overview of current thinking on space strategy and the formation of new forces operating in space. Although it does not claim to be exhaustive, it is expected that this text will provide a clear and informative introduction to the subject. It draws on bibliographic and documentary sources, particularly the recent national security and space strategies of a group of countries. It is divided into three sections: The first is a historical development of the military use of space systems, the second is an account of the main ideas of space strategy theorists and a brief analysis of the types of antisatellite weapons, and the third is an examination of the emergence of space forces in a comparative perspective.

THE GROWING STRATEGIC SIGNIFICANCE OF SPACE SYSTEMS

The evolution of space technology is directly linked to the development of the defense industry. During World War II, Nazi Germany developed the first ballistic missile capable of hitting enemy targets at long range. After the conflict ended, the United States and the Soviet Union rushed to adopt the technology, intending to use the missile as a delivery system for nuclear weapons. The discovery that the same technology could be used to launch objects into Earth orbit opened new possibilities. Thus, it was possible to develop artificial satellites capable of flying over enemy territory and gathering information from an intangible location without having to use manned aircraft, which were always vulnerable to interception. (PEEBLES, 1997; CADBURY, 2007; DAWSON, 2017).

Unlike the United States, which could penetrate enemy territory with its air forces without much difficulty, USSR did not have the means to use its nuclear weapons against its rival. Under these circumstances, the development of the first intercontinental ballistic missile was a priority. While the U.S. struggled with budget and bureau-

ISSN 2357-7975

cratic disputes over its projects, the Soviets launched the first artificial satellite, Sputnik 1, in 1957. The U.S. was stunned by this achievement, primarily because this act was a confirmation that the Soviets were capable of reaching their territory in a possible nuclear war. It was the beginning of the First Space Age (1957-1991) (SHEEHAN, 2007; BRZEZINSKI, 2007; HAYS; LUTES, 2007).

The U.S. responded by increasing its space budget and reorganizing the bureaucratic structure that would carry out these projects. This process triggered the creation of NASA, which helped dispel criticism that the U.S. was dangerously behind the Soviets technologically. NASA became a visible part of the U.S. space program and focused attention on scientific and peaceful space exploration. However, the dispute between the U.S. and USSR over space milestones, such as landing on the moon, was merely an exercise in soft power. The real race for survival took place away from the public eye, with the maintenance of robust scientific and industrial complexes working to develop space technologies for military purposes, such as spy satellites and counterspace weapons (PEEBLES, 1997; BOWEN, 2023).

Initially, the United States and USSR harbored some doubts about where the limits of their military space operations should lie. With this in mind, both countries worked to draft the Outer Space Treaty, which was signed in 1967. It allows free exploration of outer space by all countries as long as it is done for the benefit and in the interest of all humankind, with national appropriation prohibited. The treaty prohibits the placement of nuclear weapons and weapons of mass destruction in Earth orbit, on celestial bodies, and in outer space in general. The establishment of military bases, facilities, or fortifications, the testing of weapons of any kind, and the conduct of military maneuvers on celestial bodies are also prohibited (Article IV of the Outer Space Treaty).

It is easy to view the Outer Space Treaty as a mere ode to universalism and pacifism, but such an approach does not seem to reflect reality. While the document reduced tensions between the U.S. and USSR, it ensured that the only space powers of the time could continue their military operations as long as they were conducted in a defensive or non-aggressive manner. It should be noted that the treaty deliberately did not prohibit the use of military satellites or even the installation and use of conventional weapons in Earth orbit, which continued to be developed (KLEIN, 2006; STEPHENS, 2018). The exclusion of military operations on celestial bodies (such as the Moon) had little impact, since military domination of that environment offered few strategic advantages at that time.

The legacy of the First Space Age is clear: space technologies have always been developed

ISSN 2357-7975

for military-political purposes and in the self-interest of the nations involved. If it were not for strategic advantage, the United States and USSR would hardly be investing so much money in experimental technologies These investments laid the foundation for today's space systems (BOWEN, 2023).

Space systems are interconnected mechanisms that allow various tasks to be performed in the space environment. They are divided into different segments: the orbital segment, a spacecraft in Earth orbit (remotely piloted, crewed, or autonomous); the ground segment, which consists of all the equipment in terrestrial domains required to operate the spacecraft, such as control stations, antennas, tracking stations, launch sites, launch platforms, and user equipment; and the link segment, which includes the signals in the electromagnetic spectrum that connect the orbital segment and the ground segment (USSF, 2020).

With the end of the Soviet Union in 1991, the Second Space Age (1991- ?) begins, characterized by an expansion of the use of these space systems. By 2021, nearly 5,000 satellites are registered (SIA, 2022). The new era is characterized by three features: first, a greater reliance on the use of space systems by armed forces; second, the emergence of the economic use of these systems; and third, unlike in the past when the U.S. and USSR were the only space powers, there are now a variety of state and non-state actors (HAYS; LUTES, 2007).

In national security and defense, space systems play an important role in various functions. Modern intelligence, surveillance, and reconnaissance (ISR) operations rely heavily on information from satellites. The military's interest in space technology extends far beyond mere access to imagery. For example, infrared capabilities can detect heat signatures, while radar systems provide valuable data on structures and materials. In addition, space systems can collect information on electronic emissions from enemy radar or missile tests and intercept wireless communications. Military use also includes maintaining military-only communications and data transmission channels (satellite communications - SATCOM). Another important function is real-time tracking of troops and military vehicle movements (manned and unmanned) via the Global Positioning System (positioning, navigating and timing - PNT). Last but not least, space systems enable Space Domain Awareness (SDA), the monitoring of space activities in Earth orbit to detect potential threats such as space-based weapons, space debris, or near-Earth objects (comets and asteroids) (DOLMAN, 2015; HOSTBECK, 2015; MOLTZ, 2014).

Civil uses of space systems include sectors such as telecommunications, environmental change monitoring, natural resource exploration, meteorology, disaster relief, digital services, civil aviation, and agribusiness. Dual space systems,

ISSN 2357-7975

serving both civil and military purposes, are widely used (MOLTZ, 2014). By 2021, the space industry will be worth $386 billion of dollars (SIA, 2022).

The current state of the space industry is characterized by the participation of more than 70 countries with their own space programs, many of which are capable of building and operating their own satellites or collaborating with other countries (DAWSON, 2017). A select group of nations, including the United States, Russia, China, Japan, India, Israel, Ukraine, Iran, North Korea, South Korea, and members of the European Space Agency (ESA), are capable of launching satellites using their own technology. Although their recent efforts have been associated with ESA, it should not be forgotten that France and the United Kingdom have intercontinental ballistic missile launch technology that theoretically also contributes to space capability. This has led to an expansion of nations capable of conducting military operations in space, making it a critical aspect of today's space age.

SPACE STRATEGY THEORIES AND SPACE WEAPONS

Advances in space technology in the military domain have stimulated discussion of a possible space strategy aimed at using these systems in modern warfare. Colin S. Gray (1999) turns away from the diluted and commonplace use of the term “strategy” and instead focuses on its military origins to restore its true meaning and significance. Gray (1999, p. 17) defines strategy as “the use that is made of force and the threat of force for the ends of policy”. In this sense, space strategy can be defined as the way of use of force or the threat of force for the objectives of policy when space systems are involved. Currently, four authors have distinguished themselves in study of space strategy: Colin S. Gray, Everett C. Dolman, John J. Klein, and Bleddyn E. Bowen.

Gray (1996) traditionally divides the strategic utility of a war technology into four phases. The first phase is purely experimental and has only marginal impact on ground power; in the second phase, the technology becomes a useful and important adjunct; in the third phase, it becomes an indispensable adjunct; and in the fourth phase, the technology is capable of winning the war in an independent manner (independent war winner). For the author, space technology would be experimental until the 1960s; between 1960 and 1990, it would be useful and important; and after the 1990s, with its use in the Gulf War, it would be indispensable. The condition of an independent war winner would still be open, since it has not been proven.

Space strategy must be placed in the contemporary context of what has been called “war in

ISSN 2357-7975

the information age". Somehow, warfare has always been based on information, whether obtained through spies, scouts, aircraft, or satellites. The difference that is experienced today is the quantity and quality of information that space systems can provide. (GRAY, 1996).

Gray (1996) points out some challenges and limitations that must be considered when examining space strategy. Harmful analogies should be avoided; this is a new experiment. Building a new critical mass thinking about the use of space systems in a new context is essential. It is also important to be clear about the strategic limitations of this technology. Although space technology is transforming warfare, space systems are not the only source of information. Overpromise should be avoided, as traditional land, sea, and air strategy and power will continue to be employed.

The author does not regard outer space as a "sanctuary" that can only be used for purely peaceful purposes, as a naive interpretation of international norms would suggest. Following maritime strategy, space strategy must understand the ability to use space for military, civil, and commercial purposes and deny the enemy the ability to do the same. Despite the undeniable and increasing importance of space, Gray (1996) argues that wars continue to be fought primarily on Earth and on land because that is where the interests lie and where the people live. The tendency is for space power to continue to function as an auxiliary force, supplementing the power of other means.

Dolman (2001) incorporates elements of geopolitics and geostrategy into his thinking. The main point is to understand the space environment and its "geography". It is important to remember that motion in space is defined by orbital mechanics. Space consists of numerous celestial bodies that have their own gravitational fields capable of attracting space objects. Just as ancient seafaring relied solely on winds and currents, space navigation requires jumping (or transferring) from one orbit to another to optimize fuel consumption. Launch sites and orbits are considered strategic points.

Klein (2006) presents several ways to include space in the realm of strategic studies. The first approach considers space as a sanctuary without considering possible military use. The second assumes that space systems are not essential because of their high vulnerability and fragility. Therefore, these two approaches have difficulty implementing a space strategy. The third believes that space has a dominant influence on modern military operations. In this view, whoever dominates space also dominates land, because that would be the ultimate high ground. Finally, the fourth approach, advocated by Klein, interprets space strategy by analogy with maritime and air strategies and focuses on "command of space".

ISSN 2357-7975

Space operations are on the same level as the other domains (land, air, sea, and possibly cyberspace) and complement each other.

Command of space is ensured by controlling the “celestial lines of communication” to deny or limit the enemy's access. These lines are divided into “physical”, which include orbits, launch centers, and communications centers, and “non-physical”, such as communications channels and bands. Identifying choke points and valuable positions is important (KLEIN, 2006).

Bowen (2020) points out that military operations in space are designed to achieve political goals on Earth. The author is particularly critical of the ultimate high ground view, believing that control of space does not necessarily guarantee control of Earth. A parallel could be drawn with the maritime experience, where control of the sea does not guarantee domination of nations the size of a continent. Thus, space power is a supporting force that is not able to fully determine victory in a war. Earth orbit would be a kind of “coastal zone”, an extension of the planet's environment where the conflict actually takes place. Military use of the solar system beyond this “coast” is only an exercise of the imagination and has no direct bearing on the formulation of contemporary space strategies, since its exploration remains economically infeasible to this day.

Because today's space systems rely on satellite resources, access to celestial lines of communication can be denied or limited through the use of anti-satellite weapons - ASAT. In the 1960s, the United States developed nuclear-armed ASATs, but stopped research after a test that destroyed several satellites. In 1985, the Americans blew up one of their own satellites with a missile attached to an F-15 Eagle aircraft. More recently, in 2008, the U.S. destroyed an out-of-control satellite with a guided missile fired from a Navy ship, the USS Lake Erie. The Soviets have also conducted their own nuclear weapons tests in space. They have also developed space mines that can change orbit and an ASAT missile that can be fired from a MiG 31 aircraft. In 2007, China fired a ballistic missile at one of its satellites. In 2019, it was India's turn to conduct its test. In 2020, the U.S. accused Russia of conducting a test involving the launch of an artifact from an orbiting satellite.

ASATs can be divided into four types. Kinetic and physical weapons aim to cause physical damage or destroy satellites by direct impacts. It is possible to use ballistic missiles launched from Earth or to equip a satellite with weapons in the form of a co-orbital space weapon, as in the recent Russian case. Kinetic weapons can generate space debris that poses a serious collateral risk to other satellites in orbit and to Earth itself, which can be hit by the fragments. Non-kinetic and physical

ISSN 2357-7975

weapons are capable of causing physical damage without direct contact. Examples include electromagnetic pulses, including nuclear detonations, or high-power microwaves. Another possibility is the use of ground-based lasers (HOSTBECK, 2015; WAY, 2020; DAWSON, 2017; SADEH, 2015).

Electronic weapons target the means by which space systems transmit and receive data. The electronic attack uses radio signals to disrupt and temporarily cripple communications, or to spoof frequencies to send false data to users or control the satellite. Cyberweapons are similar to electronic weapons, but they do not jam radio signals; instead, they attack the data system itself. Any space system interface can be hacked. Cyberattacks allow interception, monitoring, and destruction of data or control of the satellite itself.

Although these military space technologies are available, their future use faces several obstacles, such as the high financial cost and the risk of debris that would render Earth orbit permanently unusable. There is a tendency to favor electronic or cyber-attacks. It also seems much easier and cheaper to promote a conventional attack on the terrestrial infrastructure of space systems, such as control bases, reception and information centers, and antennas (HARRISON, 2020; MOLTZ, 2014).

THE RISE OF SPACE FORCES AND THEIR STRATEGIC DOCUMENTS

The increasing importance of space systems has led some countries to incorporate these structures into their military organizations. In the 1980s, the United States created space components in three branches of the military. At that time, the United States also created the United States Space Command (USSPACECOM), a joint military command or unified combatant command responsible for leveraging the resources of the military readiness components and conducting military operations using space systems. In 1999, discussions began on creating a military branch specializing in space security to consolidate personnel, doctrine, tactics, and procedures in this area. Following the attacks of September 11, 2001, U.S. security priorities changed and USSPACECOM was incorporated into U.S. Strategic Command, which also has responsibility for nuclear weapons and cyber operations.

In 2007, after the test of a Chinese ASAT, the impression grew that the United States was lagging behind in the development of military space systems. The U.S. Air Force's role in this area was also seen as limited, with a primary focus on airpower and no place for space security. After nearly two decades of debate in the U.S. Congress, the bill received broad bipartisan support. In 2019,

ISSN 2357-7975

USSPACECOM was finally reactivated and the United States Space Force (USSF) was created. The U.S. Space Force is tasked with organizing, training, and equipping military forces to protect the interests of the United States and its allies in space. Compared to other branches of the U.S. military, the U.S. Space Force is a small force with a smaller budget. USSPACECOM, on the other hand, performs the operational function of power projection in space, forming a unified command in which all military branches with space missions are under the same chain of command. The goal of creating these two institutions is clearly to achieve greater administrative and financial autonomy, which translates into greater efficiency in the military use of space systems.

The current U.S. space strategy can be found in the 2020 Defense Space Strategy (USA, 2020) and the United Space Forces Doctrine (Spacepower: Doctrine for Space Forces) (USSF, 2020). Overall, the U.S. space strategy aims to protect U.S. interests in space and its space systems from potential hostile actions. Although it may be expanded in the future, the strategy's focus is clearly geocentric, i.e., it focuses on dominating Earth orbit. China and Russia are cited as the main threats to the United States in space.

According to U.S. Space Force doctrine (USSF, 2020), space power, despite its importance, is not capable of winning the war on its own. It must be viewed in the context of joint military operations. Its primary function is to enhance and synchronize the projection of other forces (such as land, sea, air, and cyber forces) through information sharing, which can be critical to victory. In addition, space systems enable ISR operations beyond the traditional line of sight because they have a truly global reach, making their use essential. The important role of the U.S. Space Force in PNT, SATCOM, and SDA activities is also highlighted. The brand-new military force is intended to be a small, resilient force that can operate in a high-tech environment.

The 2022 National Security Strategy (USA, 2022), produced under the Biden Administration, devotes a small section to space security and strategy. It is consistent with previous documents and similarly postulates the need to protect U.S. interests and ensure the resilience of its space systems. It also incorporates the space domain into the idea of joint operations. An important contribution of the document is the explicit statement to prevent an arms race in space.

Despite the prominence of the U.S. Space Force, it was Russia that pioneered the creation of the first military space force. In 1992, the Russian Space Force was established as an independent branch. In 1997, it was incorporated into the Strategic Missile Force, which is responsible for nuclear weapons. In 2001, it regained its autonomy,

ISSN 2357-7975

which lasted until 2011, when it was merged with the Air and Missile Defense Force. In 2015, a new structural change promoted integration with the Air Force and created the Russian Aerospace Forces. Its main objectives are to monitor space objects and identify and counter threats to Russia, detect ballistic missile launches, launch space objects into orbit, and control military or dual-use satellites (VENET, 2015).

Although there is no specific document on this topic, the 2014 Russian Military Doctrine offers some insights for building a space strategy from a Russian perspective. The first thing that stands out is the lack of detail as perceived in the U.S. strategy. According to the doctrine, it is foreseeable in peacetime to establish and maintain a strategic space zone with satellite constellations for military activities. The use of weapons in space is considered a military risk that could develop into a concrete threat. Therefore, Russian doctrine advocates the creation of international norms to regulate space-based weapons. The disruption of Russian control over space is considered a serious military threat that could develop into a large-scale armed conflict (RUSSIA, 2014). The recent 2021 Russian National Security Strategy is even more modest. It identifies space as a new sphere of warfare, classifies the space and rocket industries as necessary for economic security, and sets the protection of Russian interests in space as a foreign policy goal (RUSSIA, 2021).

Like Russia, Iran has incorporated space into the restructuring of its air force. In 2009, the Islamic Revolutionary Guard Corps Air Force was renamed the IRGC Aerospace Force. The impact of this change is not yet known. Although improving space-based capabilities is one of its goals, Iran appears to be more focused on using this technology to develop intercontinental ballistic missiles (USDIA, 2019).

After restructuring its military organizations, China created the Strategic Support Force in 2015. It combines cyber, electronic, and space warfare capabilities into a single structure. Its goal is to integrate reconnaissance, early warning, communications, command, control, and navigation to provide strong support for joint operations. Within the Strategic Support Force, the Space Systems Department is responsible for controlling all military operations in this area, including the launch and control of space-based artifacts. It is constituted as an autonomous branch of the Chinese Armed Forces (People's Liberation Army) to avoid redundancy and disputes over resources. Its growing presence in Chinese military parades may be a sign of its increasing importance (USDIA, 2018; COSTELLO; MCREYNOLDS, 2018). It is likely that it was inspired by the earlier configuration of U.S. Strategic Command, which combined space and cyber power under one roof.

ISSN 2357-7975

China´s 2015 Military Strategy and 2019 Chinese Defense White Paper ("China's National Defense in the New Era") rank space security as important to ensure the country's national and social development. The documents emphasize that space has become a site of international strategic competition. China explicitly advocates the peaceful use of outer space and the promotion of international cooperation, and opposes the weaponization of space. Finally, China states that it will face security threats and challenges in this domain and protect its space resources and security interests (CHINA, 2015; CHINA, 2019).

In 2018, India established its Defense Space Agency (DSA), which combines its three armed forces. The project appears to be still under implementation, with the goal of forming a unified command in the future. India does not have an official document outlining its national defense or security strategy, nor does it have a space strategy. An influential national security report circulated in the Indian Parliament in 2019 highlighted the need to improve defense capabilities in space (NAGAPPA, 2015; HOODA, 2019).

In 2010, France created the Joint Space Command (Commandement Interarmées del'Espace) under the Chief of the Defense Staff. The experience does not appear to have been positive, with criticism of the fragmentation of responsibilities and the geographical and functional dispersion of military space assets. Therefore, in 2019, the French Space Command (Commandement de l'Espace) was created within the French Air Force. As a result, it was eventually renamed the Air and Space Force (Armée de L'Air et de L'Espace) in 2020. The 2019 French Space Defense Strategy sets out a series of goals for the development of military space capabilities, focusing on reducing dependence on foreign technology (FRANCE, 2019). The 2022 National Strategic Review underscores the need to protect the nation's space systems from threats.

Japan is also trying to expand its military space capabilities. In 2008, the Basic Space Law authorized the development of space systems for national security for the first time. The 2018 National Defense Program Guidelines state that Japan's military superiority must also be promoted in space. As a result of this process, Japan established the Space Operations Squadron in 2020 as part of its Japan Air Self-Defense Force. Its main objective is to conduct military navigation and communications operations using space systems and to protect those systems from attack and space debris. The goal is to be fully operational with 100 members by 2023. The mission is conducted in cooperation with the U.S. Space Force (PEKANNEN; KALLENDER-UMEZU, 2010; JAPAN, 2018).

ISSN 2357-7975

In 2021, the United Kingdom created its own UK Space Command, a joint military command. The 2015 National Security Strategy and Strategic Defense and Security Review, clearly out of date, only emphasize the importance of space systems and the need to protect them. In 2022, the United Kingdom published the "Defense Space Strategy: Operationalizing the Space Domain", which details the country's actions in this area. One of the main concerns is protecting the UK's space assets from ASAT weapons that can temporarily deny access to Earth orbit or permanently cripple it. The importance of space systems for multidomain operations is also mentioned. The document primarily aims to define the level of investment required to develop military space capabilities (UK, 2015; UK, 2022).

In 2022, Australia established the Defense Space Command. Although the country is far from being a space power, it has an old missile test site (Woomera) that has been used in the past for joint European projects. Currently, Australia is trying to build a new space industry in the region. Both the 2020 Defense Strategy Update and the 2022 Defense Space Strategy identify space systems as a military priority. The space strategy document contains very bold proposals for the nation, even though its space capabilities are still underdeveloped and dependent on cooperation with other countries (AUSTRALIA, 2020; AUSTRALIA 2023).

The most recent case is Spain, which added "space" to the name of its traditional air force (now Ejército del Aire y del Espacio) in 2022. There may have been a French influence. The topic is still very new and rarely addressed in Spanish security documents. The 2021 National Security Strategy is limited to mentioning space as important to national security, which could become a source of conflict (ESPAÑA, 2021; ESPAÑA, 2023).

From the data collected, it can be concluded that the development of space forces is not new or exclusive to the United States. The creation of the Russian, Chinese, Iranian, and Indian space forces appears to be proceeding independently of the U.S. initiative. In the case of France, Japan, the United Kingdom, Australia, and Spain, it is plausible that they have drawn inspiration from the U.S. Space Force, a key ally of these countries.

Another factor that attracts attention is the diversity of initiatives. Although they are all usually referred to as space forces, the United States is a clear exception, being the only nation that maintains a stand-alone branch of the armed forces with a joint military command. The complexity of its military organization and the size of its budget are unprecedented compared to other countries in the world, so the United States has the luxury of maintaining this endeavor.

Although the "space" aspect of the armed forces has clearly become more important, coun-

ISSN 2357-7975

tries seem unwilling to follow the same path as the United States, possibly for organizational or budgetary reasons. After Russia had a stand-alone space force, it pulled back and integrated military space systems into the Air Force. France had a joint space command in the past and decided to create a new structure within its air force. The re-structuring of an air force with “space” added to its name has strong symbolic value. The goal is to emphasize the importance of space systems in the country's current military strategy. There is no one-size-fits-all model. Given the uniqueness of the United States, it is likely that other countries will consider more modest options, such as creating an Air and Space Force (or Aerospace Force) or establishing a joint military command. Although this process is currently focused on consolidated and emerging space powers, it is possible that it will also spread to countries whose space sectors are underdeveloped but who wish to expand their military operations in this area, such as Australia and Spain.

As for the relationships between the work of space strategy theorists and the formation of these new space forces, it is plausible that there is some kind of mutual feedback between the technological, the political and the academic process. It was the expansion of military use of space systems, long before the emergence of space forces, that stimulated this theoretical work. Currently, space force strategies and doctrines appear to be influenced by academic sources.

This is particularly evident in the case of the United States, the country whose military doctrine for space is the most developed. U.S. strategy leaves no room for an interpretation of space as a sanctuary. The pragmatic focus is on Earth orbit rather than the imaginative projection of power into deep space, a matter of science fiction. The U.S. Space Force is clearly concerned with securing command of space and protecting its satellite-based space systems. It also supports operations in other domains (land, air, sea, and cyber), with an emphasis on information sharing. It is possible to see some influence of space strategists when including concepts such as space as a unique environment, the supporting role of space power in joint operations, and command of space.

The experience of other countries, at least in their security and defense documents, is still in its infancy. Most countries do not have a clear definition of their strategic goals or the emergence of a space-centric military doctrine, at least not publicly. Perhaps the biggest surprise is Russia and China, the United States' military competitors, which have military structures concerned with space but no strategy or doctrine on the subject. It is plausible that these countries will be able to formulate their goals in the near future, either by taking inspiration from the U.S. initiative or from

ISSN 2357-7975

space strategy theorists, or even by developing an entirely new model.

CONCLUSION

The concept of space strategy for military purposes is defined as the use of force or threat of force for policy objectives when space systems are involved. Space technology has been considered indispensable since the 1990s. Challenges and limitations must be considered, and space power is a supporting force that complements other means of power. Various approaches to space strategy include understanding the space environment and its geography, and commanding space by controlling celestial lines of communication.

The importance of space for military operations is increasing, and many countries are taking steps to deal with this new scenario. While the United States has created a standalone Space Force, other countries are taking more modest approaches, such as integrating space systems into their air forces or creating joint military commands.

The U.S. Space Force, with its evolved military doctrine for space, is focused on securing command of space, protecting its satellite-based systems, and supporting operations in other domains through information sharing. Other countries are still in the early stages of defining their strategic goals and developing military doctrines focused on space, but it is possible that they will draw inspiration from U.S. Space Force efforts and the work of space strategists or develop new models.

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