

Star Wars: Comparing Military Space Power Among Major Nations

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Abstract: Advancements in space technology have significantly altered military and geopolitical dynamics worldwide. This research aims to explore the space military capabilities of major powers, specifically the United States, China, and Russia. Utilizing a qualitative method that includes literature review and case analysis, this study examines the latest developments in space technology, the military strategies employed, and the geopolitical impacts arising from competition in this domain. The findings indicate that these three countries enhance their space capabilities in different ways, such as the establishment of the Space Force by the U.S., the launch of the BeiDou navigation system by China, and the strengthening of the Aerospace Force by Russia. Additionally, this research highlights new challenges in maintaining global stability, where reliance on space technology may increase security risks. By understanding the strengths and weaknesses of each country, this study provides deeper insights into the dynamics of global power in the era of space.

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INTRODUCTION

The development of space technology has drastically changed military and geopolitical dynamics around the world. One of the key moments in modern military history was the Gulf War, led by the United States and known as Operation Desert Storm. This war demonstrated the effectiveness of navigation in desert terrain even though GPS technology was not fully functional at the time. In this context, the ability to utilize information obtained from satellites became crucial to the success of military operations (Nagashima, 2020). Operation Iraqi Freedom, which began in 2003, saw significant advances in long-range communications and precision strikes that relied heavily on satellite technology and GPS guidance to accurately pinpoint targets (Boucher, 2022). The use of these technologies not only provided strategic advantages to the military, but also contributed to operational efficiencies that were previously impossible to achieve. In addition to the direct impact on the military, space technology, including satellites, offers a range of benefits to society at large. Improved communication capabilities supported by satellites have enabled better interactions across locations, supported economic growth, and driven technological innovation globally (Pradana, 2022).

In today's information age, reliance on space technology is increasing. Countries that reduce this dependence may face reduced capabilities in the commercial, military and political sectors, which in turn may reduce their bargaining power on the international stage. Increased reliance on space technology also brings security risks that cannot be ignored. Threats from other countries developing space military power are becoming increasingly real, creating new challenges in maintaining global stability (Steer, 2020).

This research aims to explore and analyze various aspects of the space military power of major powers, as well as evaluate how such power affects the international order. This research includes an analysis of the latest developments in space technology, the associated military strategies, and the geopolitical impact of the race for control of the space domain. The research will discuss major powers such as the United States, China and Russia, each of which have different approaches and strategies in strengthening their space power. Through a better understanding of each country's strengths and weaknesses, this research aims to provide deeper insights into global power dynamics in the space age.

RESEARCH METHOD

This article applies a qualitative method with an approach that includes a literature review and case studies to evaluate space military power in major countries. (Sugiyono, 2017) explains that the purpose of qualitative research is to understand phenomena within a broader social context. In the desk study phase, data was obtained from various secondary sources, such as official reports, scholarly articles, books and policy documents, aiming to explore theories, concepts and recent developments in the field. This process helps in building a strong conceptual framework as well as identifying gaps that need to be filled in existing research (Creswell, 2014).

A case study approach was applied to analyze three main countries: The United States, Russia and China. (Creswell, 2013) states that case studies are very effective in exploring complex phenomena in real contexts. An in-depth analysis was conducted on each country's space military organizational structure, technology investment, and doctrine. By comparing data from these three countries, this research was able to identify strengths and weaknesses, and understand how each country is adapting to challenges in space. This combination of literature and case studies provides a deep understanding of space military power and its strategic implications in the context of global geopolitics.

RESULT AND DISCUSSION

In recent years, space activities have increased rapidly, with established countries increasing their involvement and new countries developing space capabilities, often characterized by the establishment of space agencies (ESPI, 2020). Countries participating in space activities can be categorized based on various indicators, most notably their ability to possess, develop and operate certain space technologies. (Oniosun, 2022) in his research categorized these countries into several classifications, such as Nations with no Space Involvements, Non-Spacefaring, Emerging Space Country, Spacefaring Country, and Nations of Spacefarers.

a. *Nations with no Space Involvements*

Countries in this category have not established any space program, have not signed any treaties, do not have a national policy on space activities, do not have an astronomy program, do not launch satellites, do not engage in human exploration and spaceflight programs, and are not involved in the space sector. However, the country may still use space technology such as satellites for earth observation and communication services.

b. *Non-Spacefaring*

Countries in this category do not have a space program, but are working to establish one and half in this category are already involved in the space sector such as launching satellites.

c. *Emerging Space Country*

Countries in this category are described as those that have started to develop their space programs and have had varying degrees of success, such as conducting

fundamental space research, having space-related policies, having satellite programs, having launch programs, or having space exploration programs.

d. *Spacefaring Country*

Countries in this category have an established space program, but do not yet have the capability to conduct space exploration and send humans into space independently.

e. *Nations of Spacefarers*

Countries in this category refer to those that are sovereign from end to end and do not require cooperation to implement their space programs. Countries in this category have implemented their national space policy, signed various treaties that are relevant to their country, have unlimited capability to launch various payloads into space, and have a proven ability to develop various space technologies independently. However, countries in this category still maintain cooperation and collaboration with other countries, this is not always done to increase their capacity, but this is done to obtain raw materials for their space technology components obtained from various countries transnationally. Countries that fall into this category include the United States, China and Russia.

Capacity and autonomy are two key criteria in classifying space actors, reflecting their ability to execute space strategies to achieve economic, political and social goals (Oniosun, 2022). Capacity is divided into hard capacity, which relates to the ability to carry out various space activities, and soft capacity, which focuses on the integration of space in national policies and strategies. Autonomy reflects a state's ability to define its own space interests, with technical autonomy related to access to space and political autonomy on space policy determination (ESPI, 2020).

Research (Oniosun, 2022) does not include defense and security elements in its categories, while research (Aliberti et al., 2019) implicitly includes these aspects in hard and soft capacity. Both classify China, the United States and Russia as “space powers” with high capacity and autonomy, while India and Japan fall into the second category as “autonomous spacefaring” with limited capacity but high autonomy. In the context of space military power, countries in the “Nations of Spacefarers” category have extensive space military programs, while “Spacefaring Countries” have significant military elements (Harvey, 2022).

The term “full-spectrum” space military originally referred to the capacity possessed by the United States and the Soviet Union in various aspects of space, including the use of satellites (Harvey, 2022). This includes optical photo-reconnaissance capabilities to capture images of landscapes, radar-based reconnaissance that can monitor movements at sea, and Electronic Intelligence (ELINT) and Signals Intelligence (SIGINT) that serve to intercept, collect and analyze electronic signals to understand enemy activities and intentions (Awati, 2024). It also includes military communications and missile warning systems that commonly use infrared detectors.

Nowadays, the term full-spectrum space military may change and is not limited to the technologies mentioned above due to the development and emergence of technologies such as ASAT and the formation of space forces. Then for spacefaring countries such as Japan and India to have significant space military programs means that these two countries do not explicitly have military forces in space as the United States, Russia and China do. These two countries engage in space militarization that is associated with civilian programs such as space exploration and social and economic goals (Harvey, 2022).

1. Amerika Serikat

The United States has become the dominant power in space, backed by cutting-edge technology and extensive military programs, and has the largest space budget in the world during President Donald Trump's presidency. In 2019, Trump declared that space was the new battleground and considered it an increasingly significant source of threats to US national security (Wehtje, 2023). The US sees the development of space military power as a defensive measure against existing threats, including the development of space weapons (Muhammad,

2019). Increased satellite launches by competitor states such as Russia and China, as well as advances in their space capabilities, are considered serious threats to national and global security. This has prompted the US to enhance its counter-space capabilities, including the use of anti-satellite weapons (ASATs) and ground-based jammers (Wehtje, 2023).

The United States relies heavily on its space assets to support military operations on Earth. About 95% of the US Navy uses space technology, particularly in communications (Muhammad, 2019). The creation of the Space Force as a new branch in 2019 under the leadership of President Donald Trump was deemed essential to manage and protect the country's space assets. This decision has generated much debate regarding the possible consequences, as the presence of the Space Force could trigger an armed conflict that is risky for all parties with interests in space (Nugraha & Amalia, 2019; Tingley, 2023). Currently, the United States is building alliances with India, Israel, Japan and South Korea to counter China's increasing space capabilities, laying the foundation for Asian involvement in the new space race (Abbas Awan & Javaid, 2020).

2. Tiongkok

In October 2007, Tiongkok again highlighted the importance of space as a post-Cold War era battleground by introducing their anti-satellite weapon (ASAT) (Nagashima, 2020). Tiongkok development of space military capabilities began in the 1950s, stemming from the nuclear program. Several reasons prompted Tiongkok to upgrade these capabilities, including the Strategic Defense Initiative (SDI) policy of the United States during the Cold War, as well as the need to promote economic growth, strengthen national defense, and enhance sovereignty (Muhammad, 2019). BeiDou, a navigation satellite system developed by Tiongkok since the 1990s, aims to reduce the Tiongkok military's dependence on US GPS, and by 2020, BeiDou will successfully cover the full global navigation network (Dawei & Jia, 2023).

In 2015, the Tiongkok People's Armed Forces (PLA) established the Strategic Support Force (SSF) in response to new space- and cyber-related threats. In addition, tests of weapons that can operate in space, both inter-satellite and from space to Earth, were conducted as Tiongkok space technology advanced (Wehtje, 2023). In 2022, Tiongkok unveiled its latest space technology in the form of a satellite with a robotic arm known as Shinjian-21 or SJ-21, which is capable of removing non-functional satellites from orbit, posing a potential threat to the U.S. Space Force (Kube & Luce, 2023; Tingley, 2022).

Tiongkok has also established space cooperation with Russia to challenge the United States' dominance in this area, especially regarding defense against missiles that threaten their nuclear weapons (Pollpeter et al., 2023). This cooperation includes the establishment of the International Lunar Research Station (ILRS), an experimental research facility to be built on the lunar surface or in its orbit together with Pakistan, Azerbaijan and South Africa (Jones, 2024; Nadarajah, 2024). More recently, Tiongkok and Russia plan to build a nuclear power plant on the moon by 2035, with the aim of supporting lunar settlement (Nadarajah, 2024).

3. Russia

Russia was a pioneer in space exploration during the Cold War as part of the Soviet Union. In 2015 it established a new branch of its armed forces called the Aerospace Force, which covers the space region (Wehtje, 2023). The Aerospace Force is responsible for effectively monitoring and responding to situations in space, providing early warning against ballistic missile threats, and launching and operating satellites. They are also in charge of maintaining the entire space infrastructure. One of their main missions is to detect threats both from space and against space aimed at Russia (Bendett et al., 2021).

Russia continues to strengthen its counter-space capabilities by developing enhanced kinetic ASAT weapons, as well as non-kinetic ASAT weapons such as Earth-operated lasers capable of blinding satellites. Russia uses satellite jamming systems to damage or degrade satellite-dependent weapons. Recent information suggests that Russia is developing ASAT weapons that use nuclear explosive devices, which can produce large blast waves and electromagnetic waves capable of destroying, blinding or disabling other satellites (Kimball,

2024; Sangkaran, 2022; Tingley, 2024). In addition, Russia has also developed electronic warfare systems that can disrupt or spoof signals from communications satellites, counter reconnaissance satellites, and protect Russian satellites from electronic attacks, all developed with the full support of the Russian military (Bendett et al., 2021).

CONCLUSION

The development of space military power among the United States, Tiongkok and Russia shows an increasingly fierce competition. With the largest space budget and the establishment of the Space Force, the United States views space as a new battleground and continues to develop weapons to counter potential threats from Tiongkok and Russia. Tiongkok has strengthened its space capabilities through the BeiDou navigation system and the development of anti-satellite weapons, as well as forging strategic cooperation with Russia to rival US dominance. Russia, previously a pioneer in space exploration, is now strengthening its capabilities through its Aerospace Force and advanced ASAT technology. These three countries are not only competing in terms of technology and strategy, but also significantly affecting the international order. In the face of such a situation, it is important for the world's nations to encourage collaboration and diplomacy to prevent space conflicts that could have far-reaching effects on global security.

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