The U.S. Space Strategy and Its Impacts on International Security: Based on the Space Policy of Trump's First Administration

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Keywords: Space Strategy, International Security, Trump.

Abstract: Since the twenty-first century, space power has been increasingly important. The U.S. also pays much attention to it. As one of the powerful nations in the world, the U.S. space policy has profound impacts. This article mainly does research on the U.S space strategy and uses the space policy of Trump's first Administration as a starting point, aiming at finding out what Trump's space policy is and how it influences international security. To solve such questions, the article makes elaborate analysis on the characters of the U.S. space policy, reasons for these characters, impacts on international security, and measures to maintain space security. To protect space security, the international community is suggested to shape cooperation to draft better international laws in space, promote extensive resource sharing and call for sustainable and peaceful use of space.

1 INTRODUCTION

On October 4, 1957, the former Soviet Union launched the first artificial satellite in the world, signaling that mankind entered the space age. With rapid development of modern space technology, an increasing number of satellites, rockets and spaceships have been launched into space. Space has become the new arena for human activities and space security has become one of the areas of non-traditional security. During the Cold War, a fierce space race happened between the U.S. and Soviet Union, which influenced the international situation at that time and reflected the growing impact of space on international security. At present, the evolution of the international system is accelerating, and the international situation is volatile, thus the major powers have entered a new round of strategic games. Given that military development on land and at sea has been relatively advanced，an increasing number of countries have turned their sights to space, elevating the strategic importance of space onto a new level. The strategy of the U.S., as the traditional space hegemon, profoundly shapes the international security order. From the 1950s to the 1970s, it was the initial stage of the U.S. space strategy. The federal government included space exploration into its national strategy and space started to become an area of fierce arm race. From the 1980s to the beginning of the 21st century, the U.S. space strategy witnessed much development and turned into a relatively complete strategic system. During Obama administration, the U.S. space strategy entered a phase of restructuring and transformation. Based on America First, Trump made more prominent adjustments regarding his space strategy, so it was concerned a lot by other nations. Space commercialization and space militarization are increasingly obvious, bringing challenges to existing international security. And this year Trump has started his second term, studying his space policy of his first administration is conducive to understanding or predicting in the following four years.

2 U.S. SPACE POLICY IN TRUMP'S FIRST TERM

Though the space policy of Trump Administration is similar to that of previous administration to a certain extent, it still presents some distinctive characters at the same time.

Shi, J.
The U.S. Space Strategy and Its Impacts on International Security: Based on the Space Policy of Trump's First Administration.
DOI: 10.5220/0014294300004859

In *Proceedings of the 1st International Conference on Politics, Law, and Social Science (ICPLSS 2025)*, pages 96-102
ISBN: 978-989-758-785-6

2.1 Promoting the Breadth and Depth of Space Exploration

Space Policy issued by the Obama Administration in 2010, the Asteroid Redirect Mission (ARM) was the major task, namely, to send astronauts to a near-earth asteroid and collect rock sample, preparing for human's landing on Mars Mid-2030s (Reneau, 2020). However, such plan was forced to cease after Trump took office. During his election campaign, Trump promised to liberate NASA from logistical activities in near-Earth orbit and redirect its focus to the deep space exploration. To fulfill his promise, on December 22, 2017, Trump approved and issued Space Policy Directive-1 Reinvigorating America's Human Space Exploration Program , accelerating the pace of American space exploration. The core goal is to lead an innovative and sustainable program to enable human expansion across the solar system and to bring back to Earth new knowledge and opportunities (Trump, 2017). Unlike Obama's focus on asteroid, Trump regarded moon as the springboard for Mars exploration. In the Artemis program he approved, landing on the Moon is incorporated, laying solid foundation for a manned mission to Mars in the future. In the breadth of the space exploration, Trump's space strategy breaks through the traditional geosynchronous orbit boundaries and expands the radius of space activities to the entire domain of the Earth-Moon space. While in the depth of exploration, the U.S. space strategy has upgraded its paradigm from arrival-type exploration to systematic development. In addition to landing on the moon, Trump also paid attention to other earth-moon space activities, such as the establishment and application of earth-moon as well as space orbital transport and space-based positioning, navigation, and timing (PNT) programs (Domotor, 2023). The United States not only wants to plant the flag on the surface of the Moon again, but also to realize a sustainable presence on the Moon and long-term resource exploitation.

2.2 Promoting the Commercialization of Space

According to Space Directive 2, it is conspicuous to find that guaranteeing the U.S. leadership in space commerce is placed in the central position of Trump's space policy, accelerating the progress of space commercialization. Space activities shift from government-led to market-driven. Firstly, emphasis on the importance of private sectors. To promote the participation of private space corporations, the government endows more autonomy for them. The government minimizes its intervention, like creating transparent regulatory processes, simplifying application procedures and lowering licensing requirements. Trumps administration encourages public private partnership in space area. Public private partnership refers to a cooperative relationship between the government and private sector. Through franchise, service purchase and equity cooperation, both sides (especially the government) can share the benefits and risks, then strengthening the service provision capacity. For instance, the Defense Advanced Research Projects Research Agency (DARPA) signed a contract with Boeing in May 2017 to study the experimental Space plane XS-1. On November 9, 2020, NASA selected 17 U.S. companies to form 20 partnerships, aiming at advancing industry-developed space technologies for the agency's mission (MacDonald et at. , 2024). The cooperation between space sectors and private space corporations is beneficial to each other. Private space corporations can obtain technical instruction and make more innovation. Space sectors can introduce new space techniques into the market, generating considerable economic gains. Secondly, commercialization of International Space Station (ISS). The Trump Administration hopes that the U.S. private enterprises but not the government take on the operation of the International Space Station. Though such a shift is impractical in the short term, NASA is still taking certain measures. On June 7, 2019, NASA announced that tourists were expected to visit the ISS by 2020, and astronauts are allowed to be involved in private missions for at most 30 days. However, in the past NASA had made explicit prohibitions of any commercial programs of the ISS. Thirdly, transformation into space capitalism. Since 1980s, the U.S. has always supported the privatization or commercialization of space activities by giving various supports to private companies. Trump's Administration has further deepened space capitalism. The American Space Commerce Free Enterprise Act published in 2017 declared that 'space is not a global commons', manifesting that the outer space was quickly being recast as a private good private property instead of being shared by all human beings.

2.3 Promoting the Militarization of Space

Previously, each American administration always emphasized the peace use of space and avoided setting connection between the space and war. So, the policymakers directed the Defense Department to try

to avoid public talk about space war." Whereas, after Trump took his term, he stated to escalate the space to the military level. He said in a speech in San Diego that space is incorporated into a war-fighting domain, just like the land, air and sea (Gannon, 2022). Due to the ideology of achieving peace through strength, he keeps emphasizing the necessity of reinforcing the U.S. military space ability, then posing strategic deterrence to other nations. Firstly, reviving American National Space Council (NSC). In 1993, National Space Council was abolished by President Nixon. In March 2017, Trump signed NASA Transition Authorization Act, indicating that the revival of National Space Council was put on the agenda. On June 30, 2017, President Trump signed an executive order to reestablish the National Space Council. The composition of NSC reflected a strong space militarization dimension, whose chair was Vice President Mike Pence and whose other members included the Secretary of Defense, the Secretary of Homeland Security, the Director of National Intelligence Assistant, the President for National Security Affairs and so on. Also, it is designed to directly serve national security objectives and coordinate the civil space and military space policies. The revival of NSC after the long-term of inactivity since the Cold War is a clear signal that space has gained importance, and that the U.S. are committed to stay on top. Secondly, establishing the U.S. Space Force. During the UN Conference on Disarmament in 2019, Trump Administration declined to endorse the draft Treaty on Prevention of the Placement of Weapons in Outer Space and of the Threat or Use of Force against Outer Space Objects (PPWT), while simultaneously announcing the formation of the U.S. Space Force — a historic reorganization marking the first addition to America's military branch structure since 1947. It is well worth mentioning that the U.S. Space Force is independent of the Air Force and becomes the sixth branch of the U.S. Armed Forces. The motto of the new branch was Semper Supra, and the force began to take shape when the Air Force Space Command's 16,000 active-duty soldiers were reassigned to the new service (Lantis, 2025). Thirdly, accelerating the pace of inventing and deploying weapons in the outer space, which Trump thinks is an effective way to defuse any threats to national security. For example, according to the 2019 Missile Defense Review, the deployment of space-based sensors facilitates the interception of missiles. Hence, the Trump administration pursued the space-based missile defense system as an anti-satellite weapon system. Trump's space policy focus on further space exploration, space commercialization and space militarization, all of which reflect his concern for national interests and America First.

3 REASONS

The three characters of Trump's space policy in his first term are not merely the corollary of technological advancement, but they are also the choices for the U.S. to respond to the domestic and international requirements. In the domestic level, ideology and policy inertia is indispensable. In the international level, economic and political pursuits are two major aspects.

3.1 Continuing previous Ideology of Space Exploration

As Trump is always regarded as a typically capricious person, the specialty of his policy tends to be amplified. Many people might take it for granted that his policy is made in a flash of inspiration and lack representativeness. Some of Trump's space policy has certain historical roots, which could be traced back to the previous Administrations. Since the Cold War, almost each U.S. President has held a long and firm belief of Command of the Space Power because of its considerable importance to national security. Gradually, space control has been the U.S. political-military creed. The aim of it is to seize the advantages of cosmic space and assure that the U.S. has the freedom of taking space actions and squeezes the one of other nations. In the early 1960s, the U.S. President J.F. Kennedy once declared that whoever controls space controls the Earth; whoever controls space controls the initiative in war. Different editions of National Space Policy released by Clinton Administration, the Bush Administration and Obama Administration have laid great emphasis on the assurance of space control capability. Continuing such ideology, National Space Policy released by Trump Administration in 2018 mentions space deterrence, which is also a composition of space control capability. Additionally, Strategic Defense Initiative (Star Wars Program, SDI) proposed by President Reagan has a profound impact on Trump. Many scholars think that there are many similarities between their space policy. For instance, Reagan advocated the utilization of anti-satellite missiles and killer satellites to defend against Soviet nuclear strikes, of which the essence is space militarization. Trump's space policy keeps logic and has further

derivation, emphasizing space's significance for active defense and offensive capabilities as a battlefield. Based on the analysis, it is no surprise that Trump encourages to extend the sphere of space exploration to the Moon then the Mars and fortify the military strength in the outer space.

3.2 Controlling the Government's Expenditure and Boosting the U.S. Economy

Commercial spaceflight, an emerging field, is increasingly becoming a new driver of high-quality socio-economic development. Given that Trump asked for increasing national defense expenditure, whose cost was the budget of many public sectors was undermined. Even though NASA's budget didn't experience cut-off and witnesses increase each year, with $20.7 billion in 2018, $21.5 billion in 2019, $22.6 billion in 2020, $23.2 billion in 2021, such growth is slight. It costs NASA about $3 billion a year to maintain the operation of the International Space Station, which accounts for 33.3% of its annual human spaceflight budgets (Oughton et al., 2024). At the same time, NASA also needs to take care of Artemis program sending humans to the Moon then to Mars. Limited budget constrains NASA's ability to implement its missions unless the government allocates more budget. However, during Trump's first term, the debt scale keeps extending and the fiscal deficit remains. Under such circumstances, it is almost impossible to get additional funds. Introducing private space companies into the U.S. commercial space area will bring more investments, not only lowering the operational cost of NASA, but also being helpful to relieve the fiscal burden of the federal government. Trump administration emphasizes the commercialization of the space, also aiming at activating the space economy to elevate the overall U.S. economy. The U.S. National Security Strategy, released in 2017, makes it clear that economic prosperity has risen to the core strategic level of national security and highlights the cutting-edge technology industry, represented by space science and technology, as a key engine for driving sustained national economic growth. Through developing space commercial activities, the U.S. has achieved either direct economic effects or indirect economic effects. Between 2006 and 2015, total global commercial space activity grew significantly, by approximately $100 billion, which shows that economy in the U.S. has benefited a lot from spaceflight area (Kulu, 2021). Plus, it can lead to the development of relevant industry chains, including spacecraft manufacturing, satellite applications and aerospace materials. These industries involve multiple segments, each requiring specialized technicians, thus creating many job opportunities in the U.S. The higher the employment rate is, the better the economic situation will be.

3.3 America First and Sustaining the U.S. Hegemony

The essence of U.S. space strategy is to maintain its hegemony. For the U.S., pursuing hegemony always permeates its domestic and foreign policies, Trump is no exception. His governing doctrine is to "Make America Great Again" and "America First". After the Cold War, the U.S. space technology once was far ahead and almost no nation had the ability pose a threat on its space security and national security. Nowadays, though the U.S. is the only superpower in the war, with the evolution of multi-polar pattern , it is inevitable that its hegemonic status is gradually undermined. In the context of multi-polar patterns, Space Democratization has emerged. Based on the public interests of all human beings and seeks the sustainable development of space, Space Democratization encourages the expansion of international cooperation and multilateral governance on space issues, to address common space challenges, but that decentralizes the U.S. status. The U.S. National Intelligence Agency noted in its National Intelligence Strategy released in January 2019 that the democratization of space poses a challenge to the United States and that space is no longer exclusively the domain of the United States (Pace, 2023). The fast-growing space capability of China and Russia was thought to challenge the U.S. hegemonic status. The China threat theory has escalated markedly, particularly prevailing during Trump Administration, with Washington systematically amplifying its rhetoric and policy actions as well as framing China's technological advancements and lunar exploration program as strategic challenges to U.S. space dominance. For the sake of retrieving its hegemonic status, Trump's administration was devoted to the commercialization and militarization of space. By upholding such policies, the U.S. could seize more space resources to bring potential economic opportunities and squeeze others' space survival area to elevate deterrence effects. In fact, space policy of Trump Administration is motivated by a continuation of previous domestic space policy and ideologies, the need to stimulate economic growth, and the maintenance of U.S. hegemony.

4 IMPACTS

The planning and implementation of Trump's space policy enhance the U.S. national security while imposing detrimental impacts on specific nations or regions and exacerbating international security.

4.1 Impacts on the Security of Emerging Spacefaring Nations

In the case that the U.S. hopes to keep absolute advantages in space, despite some cooperation, the U.S. attaches importance to taking precautions against emerging spacefaring nations by cutting down their space capability and restraining their space capability. Emerging spacefaring nations refer to those countries with independent launching capability from their territories, mostly located in regions like Africa, the Asia-Pacific, and South America (Harrison, 2023). China, as a typical emerging spacefaring nation, would be taken as an example here. The U.S. sees China-U.S. relationship as a zero-sum game, so it seeks to continuously suppress China in the space arena, posing a real threat and a serious challenge to China's national security. Trump's Administration has been playing up the China threat argument in the international society to exert external pressure on the development on China's space capability through the international public opinion. For a long time, the U.S. has excluded China from participating in any ISS co-operation projects. And, in Artemis Accords, though the U.S. claims to promote the accord in the name of international cooperation, NASA has never signed relevant treaties with China about moon exploration. Such exclusion is meant to isolate China and form strategic suppression. Thus, the U.S. could enhance the possibility to be dominant in space exploration. The application of space militarization could curb China's military advances in space. Meanwhile, compared with China, the U.S. still plays a leading role in space military strength. The incessant deployment of space weapons and upgradation of the supervision system are likely to increase the accuracy and promptness for the U.S. to command military information about China while adding obstacles for China to camouflage and conceal its military target. The exposure of strategic movement to the U.S. menaces the space security of China.

4.2 Impacts on European Districts

Considering the ethnicity and history, the U.S. and Europe have a natural geographic proximity, especially with the western European countries, so Trump's space policy is not directing at smothering their space development. But the U.S. aspiration in space is more or less adverse to the security of the European district. Trump's space policy in his first term is based on the principle of America First. Due to the necessity of space militarization, in 2018 Trump Administration has identified space as an operational frontier and spread the aggressive attitude to a broader sphere. On December 4 in 2019, the 29 NATO heads of state on Wednesday jointly declared space as a domain of operations, which served for the U.S. ambition of pursuing hegemony in the space field (Palombi, 2023). To economize on the cost, Trump required the EU members to afford more spending on space and coordinate with the U.S. space actions. Several EU countries are not willing to be as dominant as the U.S. in space, yet they need to pay for the U.S. space ambition. Considering that their security is greatly contingent upon NATO, if they refuse to do so, their national security may not be guaranteed. They need to make a hard and tricky choice between autonomy and national security. In response to the U.S. radical space policy, the EU made some breakthroughs during 2017-2021 like launching the CSO satellites and establishing the European Union Space Surveillance and Tracking Partnership (EU SST). But such breakthroughs are limited, its space defense system still relies on the NATO framework that the U.S. dominates.

4.3 Impacts on Global Security

Trump's space policy has aggravated the Security Dilemma. The Security Dilemma refers that states often perceive the actions of other states as threatening, even if they are defensive. In detail, the international community is in a state of anarchy, when a nation takes some measures to ensure its own safety, other nations' sense of security will be lowered and take corresponding measures to enhance the defense system. This kind of interplay between nations would finally turn into a vicious cycle, which may result in a series of issues. When noticing that the U.S. keeps intensifying space strength, they would probably be beset with anxiety for lack of trust. They might assume that they need to resort to the same way to prevent their survival space from being compressed. Thus, despite unwillingness, other countries have no alternatives but to employ a counterpart strategy against the U.S., being harmful to harmonious international relations. Additionally, Trump's space policies have slowed down the arms control and have intensified arms race in outer space. Trump

Administration rejects to joining in any international treaties related to space arms control like the Treaty on the Prevention of an Arms Race in Outer Space (PAROS) and unilaterally pursues space Transparency and Confidence-building Mechanisms (TCBMs) that exclude the U.S. In other words, the U.S. hopes to become the rule maker instead of the rule observer. This has led to other nations' reasonable suspicion that the U.S. might have a motivation to launch a space war in the future. Meanwhile, the U.S. continuous attempts at inventing and deploying space weapons give many nations a deeper sense of threat, so they sense that there is increasing necessity to carry out a series of expansively aggressive space strategies to promote their power in the space field. In fact, besides China, Russia and America, there are still more than 10 nations being capable of launching satellite with military functions into space. In July 2009, France created a space force and armed satellites in orbit with machine guns and lasers, with full operational capability planned for the 2030s (Baccelli et al., 2024). In September 2019, the European Commission established the European Policy Department for Defense and the Space Industry, and in November of the same year, launched 13 space projects, including the Timely Warning and Interdiction Space-Based Theater Surveillance (TWISTER) project, which primarily aimed at improving NATO's space war fighting capabilities. These aggressive and defensive actions cause more obstacles to space governance. Affected by Trump's space policy, a sense of threat lingers on in the international community, putting international security on the verge of turbulence and unrest.

5 MEASURES TO ENHANCE SPACE SECURITY

Regarding security risks Trump Administration has led to, the international community had better adopt scientific and reasonable approaches to mitigate it, which is helpful to create a favorable space environment. From the institutional perspective, the international community should make joint efforts to improve the international law on space. The current international space legal framework exists some structural flaws. In terms that most of the foundational space documents were published in the 20th century and the international situation has witnessed tremendous changes, they are not suitable to cope with problems and challenges arising in the new era of space commercialization and militarization. For instance, the Outer Space Treaty was signed in 1960s under the background of the Cold War, so partial treaties have already been outdated. At present, what is urgent is that nations, especially those spacefaring nations, are supposed to reach a new consensus as soon as possible on the governance of space security. The first priority is to promote the substantive implementation of the Treaty on the Prevention of Arms Race in Outer Space (PAROS), expressly prohibiting space weapons from be deployed in the orbit. Given that some treaties lack effective enforcement mechanisms to ensure compliance and resolve disputes, parties could add new penalty clauses to the original contents and increase the intensity of supervision (Wang, 2021). To those who violate the relevant law, rigid measures like economic sanction must be taken at once. Only by constructing a more comprehensive multilateral legal framework can the international society curb the systematic erosion of space security by unilateralism.

From the capability perspective, the deep technology gap between different nations could be narrowed by enhancing space cooperation and space resource sharing. Technological power imbalance is one of the main threats to space security. Nowadays, there is a universal phenomenon that a small number of spacefaring nations implement monopoly, commanding many orbital resources in space. It's pivotal to improve the fairness of space development and achieve inclusive space capacity building. To realize them, there is supposed to be a cooperative mechanism of resource sharing technology transfer. Because space is an important area of future human activities and its valuable resources are the common heritage of all humankind, each nation needs to abandon the hegemonic mindset. When exploring and utilizing space, all nations should adhere to the principle of free space, which means that no nation can monopolize space and that all nations have the right to use and explore space for peaceful purposes. For example, on July 23, 2023, China and Venezuela co-signed a space cooperation agreement to help Venezuela develop space science research, creating a harmonious international environment. At the same time, drawing on the experience of the World Health Organization in vaccine technology transfer like setting Medicines Patent Pool, the U.S., the EU, China and Russia may open some non-sensitive technology patents to those nations with weaker space capabilities (Li and Yang, 2021).

From the ideological perspective, nations should adhere to the concept of peaceful development and build a community with a shared future for space. As

globalization evolves continuously, nations have a closer relationship with each other than ever and they share common interests on a growing number of issues, including the space arena. If confrontation in space happens, the loss will be beyond the imagination and no nation will be exempt from the loss. Hence, nations should avoid setting a space strategy with a militarized mindset, instead, being open and inclusive is an excellent alternative. As one of the most powerful nations in space, the U.S. is expected to play a leading role in maintaining space security. Faced with the potential challenges and risks, the Cold War mentality is not feasible any longer. The U.S. should work with other major powers to optimize the space security environment. When problems emerge, each party has the obligation to insist on the basic principle of win-win cooperation and establish robust diplomatic exchanges for peaceful solutions. For example, to prevent misunderstanding as well as confrontation, the United States can improve the dialogue mechanism with nations like China and Russia, discussing "bright lines" in space, and mutual assurance measures (Kello, 2022).

6 CONCLUSION

This article takes the space policy under the Trump administration as the research object, focusing on the deep logic of the U.S. space strategy and the real impact on international security. Through the analysis of policy texts, the space policy of Trump's first Administration has three characteristics: broader and deeper space exploration, space commercialization and space militarization. Such characters are driven by multiple factors, including being consistent with former U.S. space strategy, reviving U.S. economy, and pursing hegemony in the space field. Then the article further shows that Trump's space policy results in challenges to other nations and international security. The U.S. is hostile to emerging spacefaring nations, so their space capability is deliberately suppressed. For the EU countries, cautious options remain to be made between autonomy and national security. In the worldwide, aggravation of Security Dilemma and space arms race emerge. In terms of the risk of a disordered space governance system, international society is encouraged to make joint efforts to improve the international law on space, enhance international space cooperation and space resource sharing, and adhere to the concept of peaceful development and a shared future for space.

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