National Space Policy: International Comparison of Policy and the 'Gray Zone'

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Abstract

The 'Space Race' started as a competition between two nations, the United States and the Soviet Union. The Soviet launch of Sputnik in 1957 sparked swift expansion of new U.S. federal guidelines and systems (Stine, 2011). The rise of space-faring nations has triggered the expansion of national-level policy development and international cooperation. Policy development further expanded global markets and protected respective national security interests. International cooperation has allowed like-minded nations to discuss intentions and capability in the space domain. This research describes, analyzes, and reviews contrasting space policies and their application to the space domain. Furthermore, this research presents an international comparative analysis regarding the impact of Gray Zone activity to space policies, or lack thereof, in regards to U.S., China, and India.

Keywords: national space policy, gray zone, international, space race, space domain, United States, China, India

Política espacial nacional: Comparación internacional de política y 'Zona gris'

Resumen

La "carrera espacial" comenzó como una competencia entre dos naciones, Estados Unidos y la Unión Soviética. El lanzamiento soviético del Sputnik en 1957 provocó una rápida expansión de las nuevas directrices y sistemas federales de EE. UU. (Stine, 2011). El auge de las naciones que navegan por el espacio ha desencadenado la expansión del desarrollo de políticas a nivel nacional y la cooperación internacional. El desarrollo de políticas expandió aún más los mercados globales y protegió los respectivos intereses de seguridad nacional. La cooperación internacional ha permitido a naciones con ideas afines discutir las intenciones y la capacidad en

el ámbito espacial. Esta investigación describe, analiza y revisa las políticas espaciales contrastantes y su aplicación al dominio espacial. Además, esta investigación presenta un análisis comparativo internacional sobre el impacto de la actividad de la Zona Gris en las políticas espaciales, o la falta de las mismas, en lo que respecta a EE. UU., China e India.

Palabras clave: política espacial nacional, zona gris, internacional, carrera espacial, dominio espacial, Estados Unidos, China, India

国家太空政策：政策和“灰色区域”的国际比较

摘要

“太空竞赛”以美国和苏联两国之间的竞争展开。1957年苏联斯普特尼克卫星发射一事触发了美国联邦新指导方针和系统的迅速扩大（Stine, 2011）。太空强国的兴起已引发了国家层面的政策发展和国际合作的扩大。政策发展进一步扩大了全球市场，并保护各自的国家安全利益。国际合作允许志同道合的国家探讨太空领域中的意图和能力。本研究描述、分析、审视了截然不同的太空政策，以及这些政策在太空领域中的应用。此外，本研究提出一项国际比较分析，以美国、中国和印度为例，分析了“灰色区域”（Gray Zone）活动对太空政策产生的影响，或是没有产生影响。

关键词：国家太空政策，灰色区域，国际，太空竞争，太空领域，美国，中国，印度

I. Introduction

The ‘Space Race’ started as a competition between two nations, the United States and the Soviet Union. The Soviet launch of Sputnik in 1957 sparked swift expansion of new U.S. federal guidelines and systems (Stine, 2011). The rise of space-faring nations has triggered the expansion of national-level policy development and international cooperation. Policy development further expanded global markets and protected respective national security interests. International cooperation has allowed like-minded nations to discuss intentions and capability in the space domain. This research describes, analyzes, and reviews contrasting space policies and their application to the space domain. Furthermore, this research presents an international comparative analysis regarding the impact of Gray Zone activity to space policies, or lack thereof, in regards to U.S., China, and India.

The U.S. and U.S. Intelligence Community is faced with a difficult and complex problem. Although currently policy and doctrine exists to help examine the space domain, it is vital to examine how particular threats are within the gray area of the space domain. Space systems encompass an array of capabilities from non-kinetic to kinetic effects. However, the complexity of space and its connection to critical national security infrastructure pose significant vulnerabilities to the international community. The rapid growth of space-faring nations and indigenous capabilities leave nations and their allies susceptible to space-centric targeted attacks. National level policy and strategic direction by senior military and political leaders is continually developed to ensure the protection of national infrastructure. Nevertheless, adversarial nations continue to blend hard and soft power tactics to achieve strategic objectives.

The blending of these tactics, or Gray Zone activities, allows nations to remain below the threshold of conflict and absolute war. Dalton et al. (2019) explain Gray Zone threats are "sharp power, political warfare, malign influence, irregular warfare, and modern deterrence" (n.p). The competition for space dominance is an elusive domain where space activity is ambiguous and susceptible to non-kinetic threats (Wright, 2018). Nations are employing these Gray Zone activities to destabilize and influence adversaries in an effort to shift the balance of power regionally and internationally.

As the capacity of space-faring nations has increased, the corresponding threats in the space-domain have expanded exponentially. Historically, the U.S. was faced the threat of communism and primarily focused on the Soviet Union. The launch of Sputnik shocked the U.S., triggering the Space Race. In contrast, the political unrest in China caused a cultural upheaval, impeding Chinese space program expansion (Drozhashchikh, 2018). The lag of China's space program fueled China's ambition to catch-up to the U.S. and Russia's space capabilities. Similarly, India was able to enter the space enterprise but through the development of rockets and nuclear capabilities. Nevertheless, India's nuclear program testing in the late 1970s caused China to place sanctions on India affecting their ability to construct a space launch pad (LeLe, 2017). This delay showcases China's strategy to achieve regional dominance by preventing nations, within the region, from expanding space capabilities. Although, each nation holds a different strategic purpose these nations are affected by a new common enemy, the Gray Zone. In turn, it may influence their respective decision-making abilities.

As the space domain becomes more advanced, it is crucial to examine the factors associated with Gray Zone activities. Space policy is not prepared to handle the challenges associated with Gray Zone activities. Space policy must reflect on Gray Zone challenges to implement an effective space strategy. The ambiguity of the space domain creates the ideal breeding ground for Gray Zone activities. However, for nations

to successfully manage, deter, and mitigate Gray Zone activity, these nations must critically assess their space policy or lack thereof. Policy is the foundation for the implementation of strategy.

Creating a structured, sound strategy requires more than establishing objectives. It requires critically thinking about threats associated with activities outside of red lines. Furthermore, it requires effectively employing a strategy with clarity, precision, and advancement in space and counterspace technologies. Gray Zone challenges require a multifaceted approach to include examining policy, strategy, and cooperation agreements. However, to develop an effective strategy, nations must consider the value of cooperation agreements.

The Gray Zone requires nations to create policy that allows nations to defend their interests while outlining strategic goals in the space domain. Although having a space program is vital, it is not efficient enough to support the space warfighting domain. Nations must seek to establish polices to maintain balance and order within the space domain. Furthermore, establishing national level space policy allows nations to be proactive by addressing Gray Zone challenges in the space domain and set expectations across the space enterprise.

II. Defining the Gray Zone

Various scholars have attempted to define Gray Zone activities, concluding they are inherently ambiguous in nature. For example, Brands (2016) states Gray Zone activities are "coercive and aggressive in nature, but are deliberately designed to remain below the threshold of conventional military conflict and open interstate war" (n.p.). These gray activities present a greater challenge for the creation and implementation of space policy because of the connection between space assets and critical national security infrastructure. Harold et al. (2017) argues that "although space systems are designed to operate in harsh environments, they are vulnerable to other phenomenon" (p. 78). While there are various definitions of the Gray Zone, for the purpose of this research, Morris et al.'s (2019) definition will be utilized. Morris et al. (2019) states:

> The Gray Zone is an operational space between peace and war, involving coercive actions to change the status quo below a threshold that, in most cases, would prompt a conventional military response, often by blurring the line between military and nonmilitary actions and the attribution for events (p. 7).

III. Space Policy Foundations

The two largest space domain competitors in the world today are the U.S. and China. As a result, establishing space dominance is essential to global market stability and economic growth. First, the U.S. established an official U.S. National Space Policy (NSP), which was intended to

expand global markets, influence capitalism, extend benefits of space, and promote safe operations in space while supporting national security by integrating intelligence (NSP, 2018). National leaders have recognized freedom of movement in space is not assured, thus the establishment of the NSP (Wilson, 2017). The NSP provides guidelines for how the U.S. government operates in the space domain and establishes directives to carry out the strategy.

The U.S. has established a national space policy to inform the international community of the goals and objectives within the space domain. Furthermore, U.S. NSP supports the growth of the space industry, expands U.S. markets, and increases access to foreign markets. Additionally, the U.S. NSP indicates the Director of National Intelligence (DNI) shall "identify and characterize current and future threats to the U.S. space mission for the purposes of enabling effective protection, deterrence, and defense" (U.S. NSP, 2010, p. 14). However, the DNI has failed to identify intelligence requirements for the Intelligence Community related to Gray Zone activity. As stated by James Clapper (2010), "Intelligence is not just about things and not just about places. It is about things in places." It is imperative for the U.S. Intelligence Community to examine the developments in space and the challenges associated with those developments. The lack of foresight on Gray Zone activity causes a direct connection to the vulnerabilities in the implementation of the U.S. NSSS.

However, U.S. policy fails to identify the threshold for unacceptable activity within the space domain. Although agreements exist to promote the peaceful use of outer space, the art of war is complex. For example, China employs Gray Zone tactics to expand their campaign of influence in the South China Sea (Brands, 2016). Still, the broad and ambiguous nature of the Gray Zone compels nations to define it based on the threat environment.

In direct comparison to the U.S., China entered the "Space Race" for the purposes of research and development. China has not established an official national level policy, but outlined the China Space Dream. For example, Acuthan (2006) explains China's space activity principles are determined by their significance and ability to protect national interests. Furthermore, identifying Gray Zone activity in the space domain would not be conducive for achieving China's Space Dream.

For instance, China utilizes Gray Zone activities to strengthen its military position. For example, China's continual efforts to establish control and undermine international law advanced with the creation of artificial islands and militarized facilities in the South China Sea (Hicks, Federici, & Akiyama, 2019). In contrast to the U.S., China is not attempting to gain dominance in the space domain to promote capitalism. China is attempting to dominate the space domain through regional control over commerce and economics in Asia. The Space Dream is highlighted by President Xi as an important aspect of space dominance and national rebirth (Pollpeter, Anderson, Wilson, & Yang, 2017). However, becoming

a global power requires more than a grand strategy. China's lack of a national space policy leaves room for costly error when devising a space dominance strategy.

The U.S. and China utilize two different ideological underpinnings to establish themselves as dominant space powers. However, nations such as India have no desire, presently, to become a superpower in the space domain. In contrast, the desire is to obtain space-based capabilities to enhance human-kind and societal growth. India suffers internally from poverty and societal challenges, but views space capabilities as a way to improve socioeconomic growth while providing strategic benefits (LeLe, 2017, p. 27). Science and Technology has deep roots in the culture of India paving the way to India's early investments in the space arena. The philosophical view of India is to eliminate poverty by enhancing sections of its general population (LeLe, 2017). The space domain has provided a path to socioeconomic growth within India and the ability to grow knowledge within their populace.

Examining the strategic view of the U.S., China, and India's space policies is important to understanding the strategy used within the space domain. Official policy, determined by senior national and military leaders, creates a framework to support national interests while enhancing international presence. The U.S. has a strategic advantage because the establishment of the U.S. NSP allows for the incorporation of directives into strategy. For example, the U.S. NSP led to the U.S. National Security Space Strategy (NSSS). The policy created a standard for the U.S. government to operate from by laying out purpose and expectations. The strategy "draws upon all elements of national power" and sets the requirements for active leadership within the space domain (NSSS, 2011, p. 5). However, the NSSS (2011) fails to identify the factors associated with Gray Zone activities in the space domain.

In comparison, the China Space Dream does not explore conducting predictive analysis on other space-faring nations to deter or enable an appropriate response to potential Gray Zone activities. Additionally, the lack of an official space policy for China creates difficulty in determining the direction of China's space program. The concept of the Gray Zone requires nations to understand how and when such activities would be utilized. The nature of the space domain is ambiguous; therefore, it requires proactive policies and established objectives to deter, mitigate, and/or prevent such activities.

In contrast, India has taken a different approach. India understands the importance of space-based capabilities. However, India's foundational principles stem from philosophical thinking based on the improvement of its populace. The lack of a national space policy leaves India with a smaller budget for space capability development. LeLe (2017) notes India utilizes only 1% of their budget for space-based development. The goal of India can be construed as backwards, but the philosoph-

ical standpoint is to improve knowledge which in-turn will improve India's socioeconomics.

Although, it is imperative to understand the policy foundations of each nation, it is equally important to understand how these policies, or lack thereof, impact strategic planning. The following section will explore and analyze space strategy based on established priorities. The objective is to understand how these nations develop and implement strategy based on national interests, regional influence, and domestic survival. Furthermore, this analysis examines the strengths and weaknesses of respective strategies when factoring in Gray Zone activities.

IV. Implementation of Strategy

While, U.S. policy is focused on the peaceful use of space it imperative to recognize the threat competing powers. As such, the NSSS (2011) outlines U.S. reliance on space-based capabilities thus the need for a strategy to prevent and deter aggression within the space domain. The U.S. has focused on the incorporation of an intelligence posture into the space enterprise to assess current and emergent threats to the domain. This approach is critical to defending U.S. interests and the peaceful use of space. An example actualizing the protect and defend element of the national strategy is the creation of the Joint Task Force Space Defense (JTF-SD) under U.S. Space Command. The JTF-SD executes this policy and strategy through the National Space Defense Center (NSDC) providing protection of critical U.S. and allied space assets.

The growing number of space-faring nations should constitute a re-examination of what happens in case of a Gray Zone conflict. The intelligence community has entered a challenging time and defining Gray Zone activity is essential for successful implementation of strategy. For example, the National Security Strategy (NSS) emphasizes the challenges associated with access to the space-domain. The NSS explains these challenges include the ability for governments and private organizations to access space endeavors previously unavailable. The U.S. IC must examine this unfettered access to space and its associated challenges. It requires thinking longer and harder about what is considered to be Gray Zone activity.

In comparison, China has focused its efforts on the established Space Dream. The strategy within the Space Dream is to build China into a space power in all respects (White Paper, 2016). Furthermore, President Xi has implemented Chinese ideology into the Space Dream ensuring the survival of Chinese socialism. The space strategy of China is designed to influence the Chinese people by demonstrating the Chinese Communist Party is the greatest group to the run the country (Pollpeter, 2017). Similar to the U.S., China's space strategy connects leaders to all facets of China's business and international policies (Bowe, 2019). Although, China's ideology is inspired by total control, the underpinnings of how the U.S. and China implement strategy is fundamentally similar.

As China continues to implement the Space Dream with economic and security interests in mind, it has found an opportunity to employ its Belt and Road Initiative (BRI). As China continues to gain regional influence in order to obtain global dominance, the BRI provides a mode to increase connectivity while implementing strategy. The space projects related to the BRI may boost partaking nations economic dependence on China, giving Beijing superior influence over them (Rolland et al., 2019). The China Space Dream links directly to the BRI allowing China to gain space power while strategically positioning themselves around the region.

Scholars argue the BRI is not a strategy but rather a process. The broad over-reaching concepts within the BRI do not provide strategic focus. For example, the BRI addresses China's intentions to expand its trade into an estimated 65 countries (Hillman, 2017). However, it lacks a detailed plan of the desired outcome and the challenges associated with handling 65 countries. Moreover, Mauk (2019) argues China's new geopolitical and economic strategy to has provided opportunity to build fifty special economic zones. However, the BRI is just a blueprint outlining the approaches China desires to take in regards to expanding its dream across Indo-China.

In contrast to the U.S. and China, the implementation of India's space strategy is a matter of necessity. India is focused on socioeconomic growth and the defense against domestic challenges. Therefore, India must continue to develop a strategy that eases influence and deters nations, such as China, while reducing domestic poverty. India refocused their attention to address national security concerns. India began the development of new capabilities and while addressing and enhancing legacy capabilities (Rajagopalan, 2018). India understands the philosophical thinking of China and its tactic of exploiting weaker countries. For example, India spoke out against the BRI explaining China's intent was to create unmanageable obligations for the Indian Ocean neighbors to establish power of regional choke points (Chatzky & McBride, 2020). In response, India developed indigenous counterspace capabilities as a strategic deterrent capable of enhancing India's socioeconomic position.

India wanted to establish their name on the international stage in response to the rapid growth of space-faring nations. In 2019, India focused its strategic efforts by conducting a successful Anti-Satellite (ASAT) test (Masih, 2019). The test of India's ASAT capability made India the fourth country capable of destroying an enemy satellite. This test created a unique strategic opportunity for India to display a unique power possessed by few nations. India intended to prove to China their ability to hold China's space assets at risk, if needed (Tellis, 2019). Overall, in contrast to the U.S. and China, India's ASAT test and strategic thinking has restored strategic balance between India and China, whereas China and U.S. strategy implementation causes a flex a of strategic power.

Although India may have restored the balanced, it has failed to make significant progress in developing an effective space strategy. The Indian Space Research Organization (ISRO) has been the sole guardian of India's space program since the 1960s and is primarily focused on socioeconomic development (LeLe, 2019). As a space-faring nation, India must establish a space strategy to identify strategic objectives rather than relying on strategic capabilities. India's absence of a space strategy showcases India's lack of influence around the region. This shortage of influence exposes India to increased potential Gray Zone activity. Establishing a national space strategy could give India the strategic structure it needs to reduce the risk of increased Gray Zone activity.

Evidence suggests U.S. strategic thinking has showcased their space dominance through a structured framework that ensures political, strategic, and operational success. Conversely, China has incorporated a "one power fits all approach" by integrating the BRI into the China Space Dream. However, India has found a unique way to balance its national interests while strategically deterring China's influence on India's economic situation. Each nation must seek to critically examine space strategy to tackle Gray Zone challenges.

Finally, the analysis of strategy implementation showcases the importance of ensuring space dominance while promoting capitalism for the United States. However, there is no clear "red line" addressed in the NSSS leaving the U.S. to manage Gray Zone escalation in a space conflict quickly. In the same respect, China's ability to promote the Space Dream while embracing the Chinese Communist Party highlights China's goal of being the sole power in the region. Nonetheless, the lack of strategic consideration of Gray Zone activity could turn China's Dream into a nightmare. On the other hand, India strategically harnesses their ideology of enhancing socioeconomics by advancing their space capability. India's ability to conduct and successfully test their ASAT capability shocked not only the U.S. but heightened China's awareness to India's tolerance of the "Chinese Bully." Yet India is going to have to develop a space strategy capable of outlining Gray Zone deterrence mechanisms to prevent persistent gray activity from nations, such as China.

V. Policy Cooperation

Cooperation between nations is based on the concept of trust. As nations continue to strategically compete with potential adversaries, they must seek allies. Cooperation, in space, began in the late 1960s when the international community recognized the potential for militarization in space. In 1967, the U.S. signed the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, known as the Outer Space Treaty (OST) (Department of State, 2017). The concept behind the treaty was to ensure the use of space contributed to the prosperity of mankind.

Specifically, the OST is a "weapons specific treaty, which prohibits, inter alia, the placing or testing of nuclear weapons or any other kinds of weapons of mass destruction in outer space" (OST, 1967). Furthermore, in comparison to the U.S., China and India both signed the OST in 1967 to continue to show the international community their support for the peaceful use of the space domain. The OST provided the foundational framework for the international community's exploration and operations in the space domain. However, space capabilities have advanced and the Gray Zone is creating disputes over what is legal and acceptable in the space domain.

The U.S. has recognized Russia and China as crucial competitors. However, the U.S. has continued to seek allies from nations such as Europe, Canada, and India. As the title for space dominance continues, the U.S. has recognized the importance of establishing and working together with such allies. For example, in 2018 the establishment of the Combined Operations Space Center (CSpOC) represented the ability for nations such as the U.S., United Kingdom, Canada, and Australia to collaborate on space issues. The CSpOC "ensures the combined space enterprise meets and outpaces emerging and advancing space threats" (Public Affairs, 2018, n.p.). The establishment of the CSpOC provided a mechanism for the U.S. to work in partnership with coalition forces.

Furthermore, the U.S. has utilized its goal of expanding global markets to seek out stronger cooperation with India. As India continues to imprint themselves in the space domain, the U.S. has discovered India's space launch services appealing and of economic value (Bommakanti, 2019). Enhancing the U.S.-India relationship is vital to shaping and gaining influence in the Asian region. Furthermore, President Trump stated in his visit to India on 24 February 2020, he looks forward to expanding space cooperation with India (Howell, 2020).

Although China has agreed to peaceful operations in the space domain there is speculation about some agreements China has entered. For example, China entered an agreement with Latin America in 1987 and by 2017 opened a satellite tracking and control center in Patagonia (Klinger, 2018). As previously identified in China's Space Dream, this provides a mechanism for China to strategically achieve global space access. This particular area of Patagonia sits "directly south of Washington D.C. and therefore can spy on the geostationary satellites that serve the U.S. East Coast" (Klinger, 2018, p. 47). This cooperation with Latin America has provided China an avenue to expand economically, increase influence, and garner space access in the Western Hemisphere. It is this sphere of influence that allows China to continue Gray Zone activities to manipulate information and influence political relationships.

China rests their philosophical thinking on expanding Chinese thought but also recognizes the need for allied partners. In comparison to the U.S., China has established agreements with nations such as Russia to foster

collaboration in satellite navigation and space mechanisms (White Paper, 2016). Establishing these agreements allows China to continue to expand their space capability production while enhancing current space-based capabilities. Furthermore, China and France engaged in bilateral cooperation for other exploratory space related programs (White Paper, 2016). Although, this is used for scientific purposes, in theory, China can use these space capabilities as a strategic advantage during conflict. Access to these capabilities provides China the ability to acquire information on weather, for instance, predicting the use of airborne assets.

Establishing these agreements allows China to not only improve its current capability, but also to potentially extend and realize their space objectives in a more expeditious manner. For instance, space assets may have access to tertiary trademarked property and open-source capabilities with unknown vulnerabilities (Bailey et al. 2019). Access to more space capabilities enable Gray Zone activity in the space domain. Partnering with different nations may provide China access to new development initiatives exposing unique vulnerabilities to space systems. These agreements allow China to assert their dominance using lawful agreements to gain influence among nations and the potential to expand Gray Zone activities.

India has also instituted agreements to establish allied cooperation in the space domain. In 2014, the IRSO launched "57 satellites for 21 different countries" (LeLe, 2017, p. 30). This allows India to be a major competitor in the aspect of space launch. These agreements of cooperation allow India to focus on development of their space program while enhancing socioeconomics. However, the relationship of the U.S. and India rests on India's nuclear program.

As India and the U.S. continue discussions, the U.S. is focused on identifying India's intent with their nuclear program. India is not a signatory of the NPT creating concern for the U.S. relationship with India (Bommakanti, 2019). Strategically navigating the space enterprise includes recognizing what is and is not acceptable regarding space operations. The continued development of India's nuclear program creates discourse for U.S.-India relations. Nevertheless, India should consider cooperation agreements that can influence the decision-making process of its adversaries, in particular China.

India must evaluate the current pressure of China and effectively manage a deterrence strategy. For example, in 2018 a report to India's National Security Council Secretariat (NSCS) found China was responsible for approximately 35 percent of cyber-attacks against India (Radziszewski, Hanson, & Khalid, 2019). Partnering with nations, such as the U.S., would allow India deterrence options by securing the trust of a nation with significant international influence. As India strategically considers conflict management, with regards to China, it is imperative India acquires allies who can influence a decrease in Gray Zone activities.

VI. Conclusion

This research highlights the U.S., China and India's lack of incorporation of Gray Zone challenges into a national space policy. The U.S. has implemented the NSP; however, the policy fails to identify the competing challenges of Gray Zone activities. China has no publicly released national space policy and fails to identify Gray Zone challenges overtly because China employs such activities to gain regional influence (Acuthan, 2006). India has not established a national space policy due its priority of enhancing socioeconomics to eradicate poverty. Space policy plays an integral role in maintaining, sustaining, and expanding as a nation in the space enterprise.

These three nations all have different strategic objectives; however, they will all face the challenges of Gray Zone activity. As the U.S. protects and defends vital national security infrastructure in the space enterprise it must consider how it will strategically maneuver Gray Zone activities. Furthermore, China continues to employ Gray Zone tactics to achieve regional dominance (Hicks et al., 2019). China has mapped out an ambitious space plan focusing on how the BRI will provide funding for China's space program. However, China must realize the challenges associated with gaining such influence around the region. Gray Zone activities could prevent the BRI from achieving its objectives thus reducing influence in the region rapidly. Lastly, India's lack of a space policy reduces the influence India may have in the region. Furthermore, with the many challenges India is facing domestically, a national space policy may just provide a strategic structure.

Policy is important, but creating a strategy to achieve those objectives outlined in policy is vital. The U.S. has a publicly released NSSS that outlines the goals and strategic approach the U.S. will utilize to maintain space superiority. However, the broad and ambiguous nature of space requires the Gray Zone be tackled in a strategy of its own. Conversely, China has placed high stakes in the BRI, showcasing China's will to gain regional influence while advancing their strategic objectives (Hillman, 2017). Yet China is relying on Gray Zone tactics to achieve regional dominance without examining how Gray Zone tactics can be employed against their own strategy. India has strategically placed themselves among the prestigious ASAT community anticipating it will deter influential nations, like China. But the inability of India to create an agenda outlining military and space objectives leaves India significantly vulnerable to Gray Zone activity.

Cooperation agreements are vital as nations continue to promote the peaceful use of space and implement space strategy. As the U.S. continues to gain large allied partners such as the U.K, Canada, and India, these agreements increase the influence the U.S. has on the international stage. However, the ambiguous nature of space requires nations to step forward and establish norms in the space domain (Wilson, 2017). The growing concern of Gray

Zone activities calls upon nations with significant influence, both regionally and internationally, to create operating standards in the space domain. The U.S. has partnered with nations large and small; however, it is time the U.S. begins discussion about Gray Zone activity and its impact to those cooperation agreements and space capabilities.

As China continues to seek out space capability cooperation agreements with regions such as Latin America, it imperative to identify the impact of Gray Zone activity. China has implemented the BRI in an effort to sustain and gain regional influence (Rolland et al., 2019). However, as China continues to expand its economic influence, they fail to identify the impact of Gray Zone activity on such initiatives. China succeeded in gaining regional influence through coercive tactics and international influence. However, China must be cautious on how it approaches the implementation of the BRI as nations, such as India highlights the financial burdens it imposes.

Conversely, India is working toward promoting and enhancing socioeconomics. However, the development of India's nuclear and missile program has created hesitation for nations, like the U.S., to enter bilateral space cooperation agreements (Bommakanti, 2019). India must evaluate the current tensions with China and assess the value of having space cooperation agreements with the U.S. A space cooperation agreement with the U.S. would not only enhance socioeconomics, but also potentially deter Gray Zone activity domestically. Furthermore, space cooperation agreements could possibly provide India with insight into a strategic framework for developing space capabilities and enhance India's space operations.

Although, agreements have been established to promote the peaceful use of space, space capability development, and data sharing agreements, nations must consider the challenges of the Gray Zone. The aim of Gray Zone activity is to influence or coerce other nations without directly violating legal agreements or directives (Dalton et al., 2019). Nations are doing exceptionally in creating agreements for the development of space capabilities and cooperation in Human Space Flight. However, as space capabilities begin to develop, acknowledging the Gray Zone is vital to maintaining, sustaining, and promoting the peaceful use space.

As the international community continues to promote space domain exploration and research, they must also reflect on Gray Zone activities and its impact to space policy. Although this research highlighted several different aspects to include strategy and cooperation, it is vital to see the interconnectedness these aspects play in the development of space policy. Furthermore, this research highlights areas in which nations such as the U.S., China, and India must seek to enhance and/or create space policy to tackle the challenges of Gray Zone activity. The space domain creates a breeding ground for Gray Zone activity. The ambiguous nature of space and its capabilities call upon all nations to protect and preserve the

space domain and its contributions to society.

First, this research recommends nations such as the U.S., China, and India develop space policies that address the Gray Zone phenomenon specifically. Identifying these challenges and its impact to space capability development is vital to ensuring an effective space strategy is developed and implemented. Moreover, these nations should come together as a space enterprise community and seek guidance from one another to develop space cooperation agreements in regards to the Gray Zone. These discussions can potentially assist in shaping operating norms in the space domain. As some nations continue to seek space dominance, they must consider the consequences of ignoring the ambiguity of the space domain.

Next, nations must reevaluate their space strategy to effectively integrate the challenges of the Gray Zone when navigating the space domain. For example, although the U.S. has established the NSSS, it fails to clearly describe the challenges of the Gray Zone. Analyzing and evaluating the NSSS will allow for the U.S. to create a clear and precise operating picture when navigating Gray Zone activity (Brand, 2016). Although China is focusing on regional influence with the BRI, China fails to acknowledge Gray Zone activities due to the Gray Zone being the primary mode of gaining regional dominance for China. Finally, India has been a key player in the space enterprise and an evolving space-faring nation. However, India requires a national space policy that will provide India with a sound strategic framework to mitigate the Gray Zone tactics around the region.

As these nations continue to advance space capabilities, counterspace options, and cooperation agreements they must examine the challenges in the Gray Zone. It is imperative these nations identify Gray Zone challenges and incorporate these into national space policy. This will allow these nations to develop a strategy that encompasses the challenges of Gray Zone activities while ensuring the peaceful use of space development and operations. Nations must not wait for the opportunity to acknowledge Gray Zone activity in space—they must act on it before it's too late.

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