International Journal Of Humanities Education And Social Sciences ***(IJHESS)*** *E-ISSN:* **2808-1765**
Volume 3, Number 4, February 2024, *Page. 1771 – 1781*
Email : editorijhess@gmail.com

Indonesia's Defense Policy In Addressing Space Threats In Perspective Of Defense Management

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Abstract

This article investigates Indonesia's defense policy in addressing space threats, driven by the research objectives of analyzing the policy, assessing its effectiveness, and providing recommendations for improvement. Employing a qualitative research method with an analytical descriptive design, the study explores Indonesia's approach to space security through an extensive review of legal and strategic documents. The research highlights key components, including foundational laws emphasizing the protection of sovereignty and the recognition of the Fourth Industrial Revolution's impact on defense, leading to the expansion of the defense domain into cyberspace and space. Strategies involve modernization, resilience, and the nurturing of domestic space capabilities. The analysis reveals challenges, such as the rapid evolution of space technology, resource allocation, coordination, international partnerships, human capital development, and managing the dual-use nature of space technology. Indonesia's defense policy aligns with broader defense and security objectives, emphasizing the importance of space in safeguarding national sovereignty and promoting economic growth. The study concludes that continuous adaptation, coordination, and international collaboration are vital to effectively mitigate space threats and secure the nation's interests in the 21st century. The utilization of space has expanded in the modern age. Indonesia is looking to space to overcome its geographical challenges. However, Indonesia must formulate defense policy to address emerging threats. This research problems are comprehending Indonesia's defense policy in addressing space threats and evaluating the effectiveness of the existing policy. The objectives are to analyze the policy and assess its effectiveness. Employing a qualitative literature research method with analytical descriptive design, the research subject is Indonesian Defense Ministry. The object is Indonesia's defense policy in addressing space threats. The research result highlights laws emphasizing the protection of sovereignty and the recognition of the Fourth Industrial Revolution's impact on defense, leading to the expansion of the domain into cyberspace and space. Strategies involve modernization, resilience, and the nurturing of space capabilities. The analysis reveals challenges, such as rapid evolution of space technology, resource allocation, coordination, international partnerships, human capital development, and dual-use nature of space technology management. Indonesia's defense policy aligns with broader defense and security objectives, emphasizing the importance of space in safeguarding national sovereignty and promoting economic growth. The study concludes that continuous adaptation and international collaboration are vital to effectively mitigate space threats and secure the nation's interests.

Keywords: Defense Policy, Space Threats, Space Security, Sovereignty, Defense Management

INTRODUCTION

In the modern age, the utilization of outer space has expanded dramatically, playing an increasingly integral role in numerous aspects of human life, from communication and navigation to Earth observation and scientific research. This surge in space activities is driven by advancements in technology, satellite technology, and the growing global dependence on space-based assets (Ferretti, 2020). Against this backdrop, Indonesia has found itself at the crossroads of remarkable opportunities and unprecedented challenges. The strategic importance of space, both in terms of national development and defense, has thrust Indonesia into a complex landscape, where it must address the need to safeguard its space assets while concurrently ensuring national security (Sudjatmiko, 2017).

As one of the world's most populous and geographically diverse nations, Indonesia's interest in space extends far beyond the confines of earthbound concerns. The archipelagic nation is looking to space as a means to overcome some of its unique geographical challenges, such as improving communication across its thousands of islands, bolstering maritime surveillance, and enhancing weather forecasting and disaster management capabilities. Moreover, Indonesia is eager to establish a presence in space for scientific research and economic purposes, as evidenced by its launch of satellites (Triharjanto et al, 2019), participation in international space missions, and the expression of its aspirations in space exploration (Nugraha et al, 2022).

Figure 1. Indonesia Launches First Internet-Only Satellite With SpaceX Rocket in 2019
Source: Harsono (2019)

However, alongside these opportunities lies the pressing need to safeguard these space assets and the data they generate. With the exponential increase in space debris (Dewantoro & Putranti, 2020), the potential for cyber-attacks on space-based infrastructure (Lin et al, 2022), and the looming specter of the militarization of space (Bernat, 2019), Indonesia must formulate a robust defense policy that addresses these emerging space threats.

The central focal point of this study resides in comprehending how Indonesia's defense policy grapples with the mounting complexity of space threats. These multifaceted challenges encompass a spectrum of concerns, ranging from the accumulation of space debris that poses hazards to both satellites and spacecraft, to the ever-looming specter of cyber-attacks directed at vital space-based infrastructure, and the broader apprehension of the militarization of space. This research is uniquely positioned to shed light on how Indonesia's defense establishment navigates this intricate landscape.

It also embarks on a crucial evaluation of the existing policy measures in place, scrutinizing their effectiveness in confronting these emergent threats and ensuring the nation's continued security in the space domain. By addressing these research problems, this study contributes to a deeper understanding of Indonesia's readiness and resilience in safeguarding its interests in the new frontier of space security.

No.	Time	Location	Objects
1	March 26, 1981	Gorontalo	Part of the rocket motor Cosmos-3M/Space Launcher 8 (SL-8)/11K65M owned by Russia/USSR
2	April 16, 1988	Lampung	Part of the rocket motor Soyuz A-2/Space Launcher 4 (SL-4)/11A511U owned by Russia
3	October 13, 2003	Bengkulu	Fragment of the CZ-3 (Chang Cheng/Long March 3) rocket owned by China
4	February 23, 2007	Flores	Fragment of the Okean 3 satellite (Okean 3 deb) owned by Russia
5	September 26, 2016	Sumenep	Part of the Falcon 9 rocket owned by SpaceX for launching the JCSAT 16 communication satellite of the United States
6	July 18, 2017	Agam	Part of the Chang Zheng 3-A rocket for launching Beidou M1, the navigation satellite owned by China

Table 1. Space Debris Insidents on Indonesia
Source: Dewantoro & Riswanti (2021)

This comprehensive study is guided by three interconnected research objectives. Firstly, it aims to thoroughly analyze Indonesia's defense policy regarding space threats, delving into the frameworks, strategies, and initiatives employed to understand how the nation addresses these multifaceted challenges. Secondly, it seeks to assess the effectiveness of current policy measures, highlighting their strengths and weaknesses in dealing with evolving space threats to gauge Indonesia's readiness and resilience. Lastly, the research endeavors to provide concrete recommendations for enhancing Indonesia's defense posture in the ever-evolving and contested space domain, drawing from both an understanding of the existing policy landscape and a forward-looking perspective. These objectives collectively serve as a crucial guide for exploring Indonesia's role and preparedness in the realm of space security.

Numerous studies have delved into the space security policies of major spacefaring nations like the United States and China. Wu (2015) investigated the discrepancy between China's professed commitment to responsible space activities and the perception of it being a potential space security threat. It identifies several factors contributing to this misperception, including ideological and military concerns, misunderstandings about China's space policies, allegations of non-compliance with international space laws, and perceived inexperience in international negotiations. To bridge this gap, the study recommends measures such as improving transparency, reducing military involvement in space, encouraging commercial space exploration through national legislation, enhancing space governance mechanisms, and promoting effective information exchange and policy dialogue to foster cooperation and trust in the realm of space activities.

Meanwhile, Goehring (2015) explored the evolving U.S. policy to protect its vital space assets, which are vulnerable to interference, damage, and destruction. The focus is on the changing landscape due to shifts in Presidential Administrations and growing security threats from China and Russia. A constant element of this policy is the freedom to develop and use capabilities to defend against space aggression. The study examines the European Union's proposed International Code of Conduct for Outer Space Activities (ICOC) and assesses whether adopting it would enhance or impede space security. It specifically examines the 2014 version of ICOC, considering its non-binding nature and provisions in relation to existing laws and policies. The research concludes that stronger norms against harmful interference and debris-

causing activities in space, as promoted by the ICOC, can benefit U.S. space security without excessively limiting security-related capabilities. However, it also highlights the challenges of conducting U.S. foreign policy through non-binding instruments, which may affect the development of "soft governance" in space.

This research holds significant importance due to Indonesia's growing dependence on space-based assets, crucial for its economy, military, and society. As Indonesia incorporates space technologies into its operations and future plans, a strong defense policy is imperative. This study provides insights that have global relevance in the field of space security. It serves as a valuable case study, offering guidance to policymakers and defense experts in addressing the complex challenges of the modern space environment, emphasizing Indonesia's role in this evolving domain.

The foundation of this study rests firmly within the realm of defense management. Defense management is a systematic orchestration, planning, guidance, and oversight of resources and undertakings aimed at fulfilling a nation's defense and security objectives. This multifaceted process encompasses military, economic, political, diplomatic, social considerations, as well as the effective and efficient strategic coordination of the armed forces (Sarjito & Djati, 2023).

A facet within the domain of defense management pertains to defense policy. Defense policy comprises a compendium of regulations, principles, and directives established by a nation's government with the objective of preserving the security and defense of its territorial integrity, its populace, and its interests. The primary purpose is to shield against both external and internal acts of aggression, thereby upholding its sovereignty (Sarjito & Djati, 2023).

Within the Indonesian context, the formulation of defense policy is the responsibility of the Directorate General of Defense Strategy, housed within the Ministry of Defense. This directorate encompasses various dimensions of defense policy, including overarching general defense policy, defense organizational policy, defense strategy, defense posture, and defense doctrine (Supriyatno, 2019).

In the context of this study, defense management provides a lens through which to examine the intricacies of Indonesia's defense policy, allowing for a nuanced exploration of Indonesia's strategies for addressing space threats and ensuring the resilience of its space assets. In doing so, it paves the way for a deeper understanding of the nation's preparedness in the increasingly contested and critical domain of space security.

RESEARCH METHODS

In conducting this study, a qualitative research method has been selected as the primary approach. The selection of this method is motivated by its capacity to offer a holistic understanding of complex issues or subjects under examination. It allows for a comprehensive portrayal, enabling a thorough grasp of the discussed problems (Creswell, 2016). The research design employed is that of an analytical descriptive nature, which allows for a systematic and comprehensive assessment of Indonesia's defense policy concerning space threats.

The research subjects under scrutiny are officials and experts from the Indonesian Defense Ministry, who possess valuable insights into the development and implementation of the nation's defense policy in the context of space security. The research object, the focal point of this study, is Indonesia's defense policy with a specific focus on addressing space threats, encompassing official documents, statements, and strategies related to space security.

To gather the necessary data, a rigorous literature research technique has been employed, which involves an extensive review of official government documents and academic

publications. Guba and Lincoln asserted that the utilization of literature research is grounded in its authenticity as a primary source of evidence for conducting examinations (Moleong, 2016).

The data analysis technique follows a structured process by Miles and Huberman involving data collection, condensation, data display, and a conclusive discussion (Sugiyono, 2016), enabling the identification of key themes and trends within Indonesia's defense policy while assessing its effectiveness in addressing space threats. This multifaceted research methodology ensures a thorough examination of Indonesia's approach to space security within the framework of defense policy.

RESULT AND DISCUSSION

Indonesia's defense policy concerning space threats is outlined in various legal and strategic documents. The Republic of Indonesia Law Number 3 of 2002 on National Defense forms the foundational basis, emphasizing that national defense aims to safeguard the nation's sovereignty, territorial integrity, and the safety of its populace from all forms of threats. These threats, as defined, encompass both domestic and foreign efforts perceived as endangering the state's sovereignty and security. This legislation also underscores that national defense is organized by the government and should be prepared early through a national defense system. The system designates the Indonesian National Armed Forces as the primary component, supplemented by reserve and support components when addressing military threats. For non-military threats, government institutions outside the defense sector are placed as the central elements, supported by other national strengths.

Additionally, the Republic of Indonesia Presidential Regulation Number 8 of 2021 on the General Defense Policy of the State acknowledges the expansion of defense dimensions into the cyber and space domains due to the Fourth Industrial Revolution. The Indonesian Defense White Paper of 2015 further underscores the significance of space as a distinct domain for military operations, in addition to land, sea, air, and cyberspace.

Moreover, the Republic of Indonesia Minister of Defense Regulation Number 14 of 2023 on the State Defense Strategy highlights the evolving nature of threats in the space spectrum. It mentions Russia's activities in space, particularly the development of anti-satellite missiles, as well as Japan's continuous efforts to bolster its defense capabilities with a focus on cross-domain operations, which includes space.

Furthermore, the Republic of Indonesia Minister of Defense Regulation Number 3 of 2023 on the State Defense Posture emphasizes Japan's persistent commitment to strengthening its defense capabilities across various domains, including space.

In line with these regulations and strategic documents, the Republic of Indonesia Minister of Defense Regulation Number 12 of 2023 on the State Defense Doctrine underscores that the threat environment extends beyond the traditional domains of land, sea, and air to include the cyber and space domains.

To complement these legal and strategic frameworks, the Republic of Indonesia Law Number 21 of 2013 on Space emphasizes the importance of space activities as a supporting component of national defense and the integrity of the Unitary State of the Republic of Indonesia. It underscores the role of space activities in achieving national independence, enhancing competitiveness, ensuring the welfare of the people, and protecting the state from the negative impacts of space activities.

Collectively, these legislative and strategic components define Indonesia's defense policy regarding space threats, demonstrating the nation's recognition of space as a critical domain for security and the need to address evolving threats within this spectrum.

The Republic of Indonesia Minister of Defense Regulation Number 12 of 2021 on the Implementation of National Defense Policy for the Year 2020-2024 provides insights into Indonesia's strategies in addressing space threats. On Page 3, it acknowledges the impact of the Fourth Industrial Revolution, which has expanded the battlefields of the 21st century. This expansion goes beyond traditional land, sea, and air domains, now encompassing the realms of cyber and space.

Furthermore, on Page 17, the document underscores the strategic development of Indonesia's defense infrastructure, aligning it with the TNI's posture development. This primarily involves the modernization of strategic weaponry, such as the establishment of the Integrated Missile Defense Command/Unit to manage strategic and tactical missile defense systems and the Outer Space Defense Command/Unit, focusing on the acquisition of military satellites.

To fortify Indonesia's defenses in the aerospace domain, Page 21 delves into the implementation of defense zone development. This includes the cultivation of aerospace potential to render the aerospace, airspace, and outer space areas resilient, versatile, and combat-ready. Collaboration and coordination with relevant ministries and institutions play a crucial role in monitoring the progress of space technology, especially in the context of national security and defense.

Additionally, there is an emphasis on the establishment of a space launch center on Biak Island, strategically located as the nearest point on Earth for launching satellites into space. This initiative not only enhances Indonesia's domestic space capabilities but also serves as a valuable asset for defense and contributes to the country's economic growth. These strategies underline Indonesia's commitment to adapting to the evolving nature of space threats and ensuring the nation's readiness and resilience in the face of contemporary security challenges.

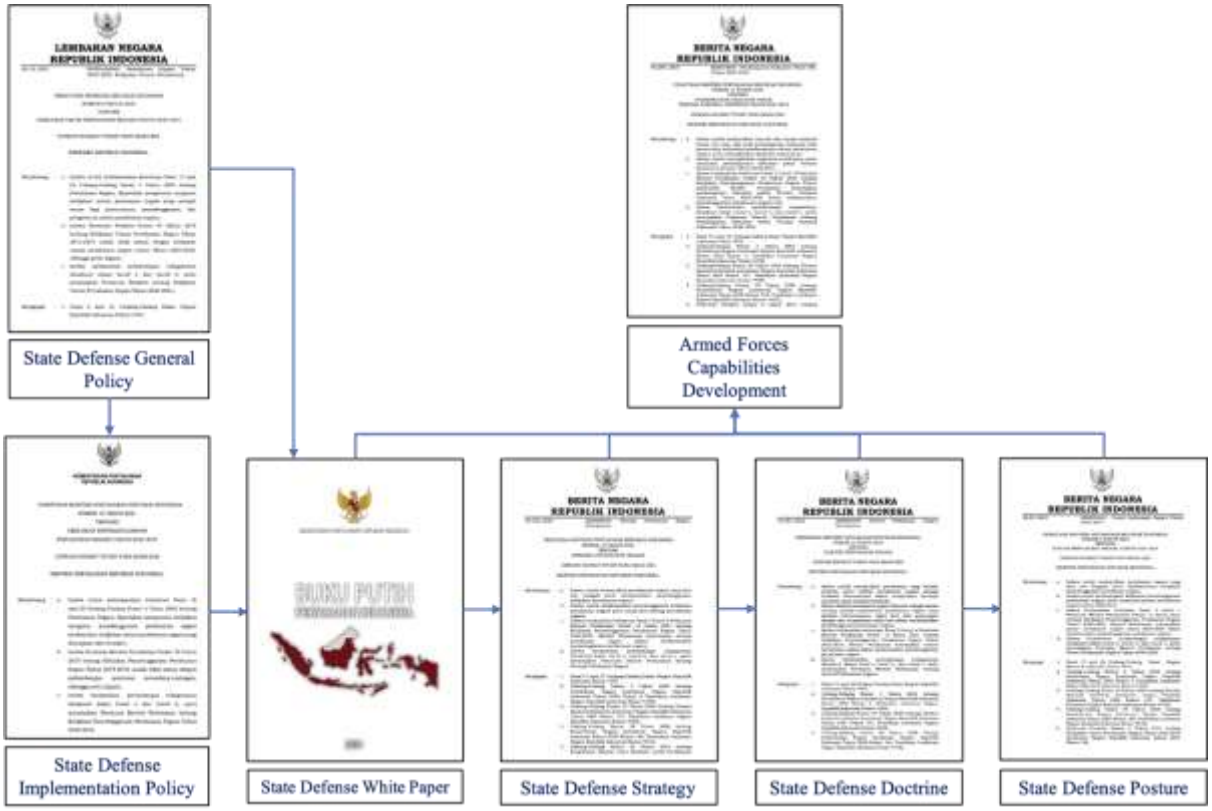

Figure 2. The Nexus of Indonesia's Defense Policy, Implementation Policy, and Strategic Products
Source: Supriyatno (2019)

Indonesia's defense policy in addressing space threats is shaped by a set of key components and strategies, as outlined in various legal and strategic documents. However, this approach is not without its challenges. Firstly, the rapid evolution of space technology and the emergence of new space actors present a formidable challenge. Space threats, including the militarization of space and cyber-attacks on space assets, are continually evolving. Indonesia's defense policy must keep pace with these developments, necessitating constant adaptation and updates to remain effective.

Secondly, resource allocation is a significant challenge. Effectively addressing space threats requires substantial investment in space surveillance, cybersecurity, and the development of space assets. Balancing these financial commitments with other national priorities can be a complex task.

Moreover, the coordination and collaboration among various government agencies and ministries play a crucial role in the success of Indonesia's defense policy. The integration of defense, technology, and space-related efforts demands seamless communication and cooperation, which can be hindered by bureaucratic complexities and competing interests.

Additionally, international partnerships and cooperation are vital for addressing space threats effectively. Collaborating with other spacefaring nations to share information and best practices is essential, but it also requires diplomatic finesse and alignment with Indonesia's national interests.

Furthermore, the need for skilled human capital presents a challenge. Building a workforce with expertise in space technology and security is a time-intensive and resource-demanding endeavor, but it is vital for ensuring the nation's space defense capabilities.

Lastly, addressing the dual-use nature of space technology is another challenge. The same technologies used for peaceful purposes, such as communication and navigation, can also be exploited for military ends. Indonesia's defense policy must navigate the delicate balance between fostering space advancements for civilian applications while safeguarding national security.

Indonesia's current approach to space threat mitigation, as delineated in the key components and strategies of its defense policy, reveals both strengths and potential areas for improvement.

One of the strengths lies in Indonesia's recognition of the evolving nature of space threats. Acknowledging the impact of the Fourth Industrial Revolution and its expansion into cyber and space domains is a significant stride. This demonstrates an awareness of the need to adapt to contemporary security challenges, particularly in the space realm.

The strategic development of defense infrastructure, such as the establishment of the Integrated Missile Defense Command/Unit and the Outer Space Defense Command/Unit, indicates a proactive approach to space threat mitigation. These units are designed to manage missile defense systems and the acquisition of military satellites, suggesting a well-structured response to potential space threats.

The commitment to nurturing aerospace potential and developing a space launch center on Biak Island is another positive sign of readiness. Such initiatives have the potential to significantly enhance Indonesia's domestic space capabilities and contribute to the nation's economic growth.

Indonesia's approach to space threat mitigation should be viewed in the context of its broader defense and security objectives. Firstly, safeguarding space assets is intricately linked to the protection of national sovereignty and territorial integrity, which are fundamental pillars of Indonesia's defense and security strategy. Space, as the fourth domain of warfare, has become an integral part of the overall defense posture, aligning with the nation's commitment to ensuring its territorial integrity.

Secondly, Indonesia's defense policy's alignment with broader objectives is evident in the recognition of the Fourth Industrial Revolution's impact on defense. Embracing the cyber and space domains as integral parts of national security reflects a forward-looking stance that aligns with Indonesia's aim to be technologically competitive in the global security landscape.

Furthermore, the strategic development of defense infrastructure, including the Integrated Missile Defense Command/Unit and the Outer Space Defense Command/Unit, is consistent with the nation's commitment to modernizing its defense capabilities. These components aim not only to counter potential space threats but also to bolster Indonesia's defense and security overall.

Nurturing aerospace potential and developing a space launch center on Biak Island not only align with broader defense objectives but also have significant economic implications. Enhancing domestic space capabilities contributes not only to national defense but also to the nation's economic growth and technological advancement.

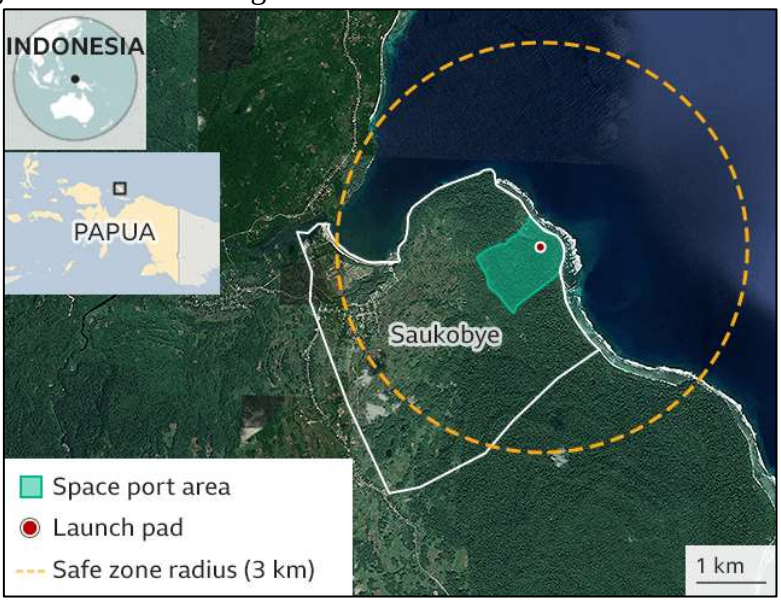

Figure 3. Biak Space Port
Source: Amindoni & Tan (2021)

Concurrently, two pertinent studies on space security policies, particularly in the United States and China, offer insights for Indonesia. Indonesia can draw lessons from these studies by emphasizing transparency, fostering cooperation, and carefully considering the effectiveness of non-binding agreements in shaping its own space security policies.

The results and discussion reveal that Indonesia's defense policy concerning space threats is rooted in a comprehensive framework of legal and strategic documents. These include foundational laws emphasizing the protection of sovereignty and security from a wide range of threats, extending beyond traditional domains to encompass cyber and space. Strategic regulations underscore the recognition of evolving space threats, modernization efforts, and initiatives to enhance domestic space capabilities, aligning with Indonesia's broader defense and security objectives. However, this approach faces challenges, including the rapid evolution of space technology, resource allocation, coordination among government agencies, international partnerships, human capital development, and the dual-use nature of space technology. Overall, Indonesia's defense policy shows awareness of space's significance in national security and its alignment with broader defense and security goals, emphasizing the need to address evolving threats in the space domain effectively.

CONCLUSION

This article has delved into Indonesia's defense policy in addressing space threats, examining its key components, strategies, challenges, and alignment with broader defense and security objectives. Indonesia has demonstrated a proactive stance in recognizing the evolving nature of space threats and incorporating space security into its defense posture. The legal and strategic frameworks provide a strong foundation for this policy, emphasizing the need for early preparation and the significance of space as a distinct security domain. However, challenges, including technological advancements, resource allocation, coordination, international partnerships, human capital development, and the dual-use nature of space technology, require careful consideration.

Indonesia's approach aligns well with its broader defense and security objectives, emphasizing the importance of space in safeguarding national sovereignty and promoting economic growth. The commitment to modernization, the establishment of specialized defense units, and initiatives to enhance domestic space capabilities reflect a forward-looking stance. To maintain the effectiveness of this policy, continuous adaptation, coordination among agencies, and international collaboration are imperative.

As Indonesia strives to navigate the complex landscape of space security in the 21st century, it stands poised to secure its interests and protect its national sovereignty while contributing to the peaceful and responsible use of outer space. This article serves as a valuable contribution to the discourse on space security and offers insights for policymakers, defense strategists, and scholars aiming to strengthen Indonesia's defense posture in the face of evolving space threats.

Based on the analysis of Indonesia's defense policy in addressing space threats, several recommendations are proposed to enhance the nation's preparedness and resilience in the evolving space security landscape.

Firstly, Indonesia should prioritize the regular review and adaptation of its defense policy to keep pace with the rapid advancements in space technology and the emergence of new space actors. The dynamic nature of space threats necessitates continuous assessment and updates to the policy to ensure its effectiveness and relevance in addressing contemporary challenges.

Strategic resource allocation is another critical consideration. Balancing financial commitments for space surveillance, cybersecurity, and space asset development with other national priorities requires careful planning. The government should strategically allocate resources to strengthen its space defense capabilities while maintaining fiscal responsibility.

Effective coordination among government agencies and ministries is crucial for the holistic and coordinated implementation of Indonesia's defense policy. Streamlining communication and cooperation among these entities is essential to ensure the seamless integration of defense, technology, and space-related efforts.

Furthermore, Indonesia should actively engage in diplomatic efforts to foster international partnerships and cooperation in the field of space security. Collaborating with other spacefaring nations to share information, best practices, and resources is essential to collectively address space threats and contribute to global space security.

Building a skilled workforce with expertise in space technology and security is a long-term investment that Indonesia should prioritize. The establishment of educational and training programs can help cultivate the necessary human capital to support the nation's space defense efforts.

Indonesia's defense policy should also navigate the dual-use nature of space technology. Striking a balance between fostering civilian space advancements and safeguarding national security interests is a complex challenge that requires ongoing attention and careful management.

Finally, initiatives to enhance domestic space capabilities, such as the establishment of a space launch center on Biak Island, should be leveraged to stimulate economic growth and technological advancement. By maximizing the economic benefits of space activities, Indonesia can strengthen its defense posture while contributing to economic growth and technological competitiveness in the 21st century.

Addressing these recommendations will better position Indonesia to meet the challenges posed by evolving space threats, ensuring the nation's security and contributing to its economic growth and technological advancement.

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