

High Deterrence Capacity and Maritime Oriented Defense Transformation Towards a Golden Indonesia 2045

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ABSTRACT

As the largest archipelagic country in the world, Indonesia consists of more than 17,000 islands with a coastline of 108,000 km, making it one of the countries with the largest maritime area. With a strategic position between two oceans (the Indian and the Pacific) and two continents (Asia and Australia). In realizing the big vision for Golden Indonesia 2045, one of them is having a strong defense needed to face increasingly complex global challenges. The research method used is a literature study involving analysis of documents, books, journal articles and information from official websites. Furthermore, the study results show Countries that have high technology in defense systems such as advanced radar systems, submarines and drones can increase the effectiveness and deterrence of maritime defense systems. Apart from that, joint military exercises and cross-field operations can increase naval readiness and operational capabilities, Defense Diplomacy and Regional Cooperation can also help build alliances and increase deterrence and lastly, Human Resource Capacity Development can help in achieving success. operating a sophisticated maritime defense system relies heavily on the capabilities of military personnel

INTRODUCTION

In the modern era filled with global dynamics, a country's security no longer depends solely on conventional military strength. Information technology has become the core of strategic transformation in a country's defense efforts. The National Defense Information Technology System has emerged as the backbone that supports and improves the nation's defense capabilities in facing ever-growing threats. As the largest archipelagic country in the world, Indonesia consists of more than 17,000 islands with a coastline of 108,000 km, making it one of the countries with the largest maritime area. With a strategic position between two oceans (the Indian and the Pacific) and two continents (Asia and Australia), Indonesia is located on vital international trade routes, including the Strait of Malacca, the Sunda Strait and the Lombok Strait, which are the busiest shipping lanes in the world (Luh Komang Wijayanti Kusumastuti, 2014). Archipelagic and maritime orientation is very crucial in the context of national defense because of potential threats originating from waters, both in the form of conventional and non-conventional military threats such as smuggling, piracy, maritime terrorism and violations of sovereignty by foreign ships. To be able to continue maintaining Indonesia's maritime sovereignty, the breadth of Indonesia's maritime resources makes Indonesia's maritime as one of the resources that need to be properly secured nationally and internationally. In this case, maritime is not only related to the sea area, but also all matters related to land, sea and water (Hadyanti, 2023). Therefore, focusing on a maritime-based defense system not only increases national security but also plays a role in maintaining regional stability and prosperity.

Dynamic geopolitical conditions, with increasing competition between large countries such as the United States and China in the Asia-Pacific region, give rise to the potential for conflict that could threaten Indonesia's national interests. In addition, developments in military technology in the region have driven an arms race, in which neighboring countries have strengthened their sea and air fleets with the latest technology (Aziz & Rifqi, 2023). In addition, developments in military technology in the region have driven an arms race, in which neighboring countries have strengthened their sea and air fleets with the latest technology (Hadisancoko, 2019). Therefore, Indonesia needs a high deterrence capacity system that is able to ward off potential threats through a proactive and preventive approach. High deterrence does not only depend on the number of troops or the main weapons system but also on the ability to utilize technology, the professionalism of military personnel, and the ability to operate in various terrains. Thus, transformation of the deterrence capacity is an urgent need to ensure that Indonesia is able to face various threats, both from state and non-state actors.

One of the main challenges in realizing defense system transformation is the modernization of the main weapons system and the integration of high technology in the defense system. Indonesia's defense budget in 2022 will reach around 9.2 billion USD, but this amount is still relatively small compared to neighboring countries such as Singapore (10.5 billion USD) and Australia (42 billion USD) (States et al., 2022). Budget limitations are an obstacle in acquiring high technology and modernizing defense equipment needed for maritime defense. Apart from that, the professionalism of human resources (HR) is also a challenge. Data from the Ministry of Defense (2019) shows that 35% of Indonesian military personnel do not have sufficient skills and competencies to operate modern equipment and technology. Therefore, efforts to improve the quality of training, education and human resource development are crucial aspects in defense transformation. However, there are great opportunities in terms of defense diplomacy and international cooperation. The ASEAN Defense Ministers' Meeting (ADMM) and ADMM-Plus, for example, provide a maritime security cooperation platform that allows Indonesia to build strategic partnerships in order to increase defense capacity (ASEAN Secretariat, 2023). Defense diplomacy can also be used to encourage technology transfer, joint training and military research cooperation. Thus, the transformation of an island-oriented and maritime defense system based on professionalism, high technology, cross-terrain operations and defense diplomacy will not only strengthen deterrence but also ensure national sovereignty and security.

The Golden Indonesia Vision 2045 is the main development guide that aims to make Indonesia a developed country as it celebrates one hundred years of independence. In the year two thousand and forty-five. In Indonesia, it is hoped that it will be able to achieve a position as one of the largest economic powers in the world, with a high level of prosperity and social justice, and a mature and stable democratic order. To realize this vision, strengthening it in various fields is very important, including in the defense sector. Changes in the defense sector have become very important in ensuring that the ideals of economic and political progress in the Golden Indonesia Vision can be realized in a safe and stable atmosphere. With increasingly complex global and regional dynamics, Indonesia needs to increase military capabilities, modernize defense doctrine, and strengthen its readiness to face today's challenges, both conventional and non-conventional.

Research on Indonesian defense strategies has been carried out by various researchers, such as Defense Policy Roadmap Towards a Golden Indonesia 2045: Establishment of The Indonesian Space Armed Forces written by Aris Sarjito which was published on CITIZEN: Jurnal Ilmiah Multidisiplin Indonesia (Sarjito, 2023), Indonesia's Defense Diplomacy in Facing Threats From The Five Power Defense Arrangement (FPDA) written by Gistyger Hasudungan, dkk which was published on Journal Lemhanas RI (Gistyger Hasudungan Manullang & Muhammad Fauzi Abdul Rachman, 2023), Indonesia's Defense Diplomacy in Joint Production of Harimau Medium Tank Between Indonesia-Turkey written by Sereffina Yohanna Elisabeth which was published on JPeHI (Jurnal Penelitian Hukum Indonesia (Elisabeth et al., 2021), Defense Strategy In Dealing With

Threats Of National Security written by M. Harlan Pariyatman, dkk which was published on International Journal Of Humanities Education And Social Sciences (M. Harlan Pariyatman et al., 2023), Defensive Defense: A Better Way to Protect US Allies in Asia written by Eugene Gholz, dkk which was published on The Washington Quarterly (Gholz et al., 2019).

All the research whose articles were published in the various journals above shows that the research is a normative study through conceptual studies and literature studies in looking at the various defense strategies used by Indonesia. Meanwhile, although this research has the same issue, namely about defense, this research is different in several ways, such as the object of study and the issue of study, namely the transformation of archipelagic and maritime-oriented defense with high strength towards a golden Indonesia in 2045. This is what, according to the researcher, is the novelty in this research.

LITERATURE REVIEW

National Defense Theory and Maritime Strategy

1. Maritime Oriented National Defense Concept

The national defense system is a system that involves all elements of society, territory and other national resources, which is comprehensively prepared by the government and implemented thoroughly and continuously in order to uphold state sovereignty, territorial integrity and the safety of all people from various threats that may arise (Waluyo et al., 2020). National defense can also be interpreted as a dynamic condition of the nation containing tenacity and toughness which contains the ability to develop national strength in facing and overcoming all threats, disturbances, obstacles and challenges both coming from outside and within, which directly or indirectly endanger integrity, identity, the survival of the nation and state and the struggle to pursue national goals.

Maritime oriented state defense focuses on the state's ability to protect sovereignty, territorial integrity and national interests in territorial waters and the exclusive economic zone (EEZ). In this context, Geoffrey Till in his book *Seapower: A Guide for the Twenty-First Century* emphasizes that an archipelagic country like Indonesia must have the ability to control the sea (sea control), protect its territory from external threats, and utilize marine resources optimally.

The geopolitical dynamics of the region, faced by Indonesia's position as a maritime pivot, require Indonesia to have a strong maritime defense to anticipate various vulnerabilities that may occur due to the dynamic conditions of the struggle for hegemony between the US and China. Maritime defense is needed to maintain Indonesia's sovereignty, protect the entire nation and the entire homeland of Indonesia, promote public welfare, educate the nation's life, and participate in implementing world order based on independence, eternal peace, and social justice, as mandated by the Preamble of the 1945 Constitution of the Republic of Indonesia. Maritime defense forces are also needed to ensure the safety of navigation of ships sailing throughout Indonesian waters.

In addition to maritime defense as hard power, Indonesia can play its role as the largest economy in Southeast Asia to use its soft power as the G-20 Presidency and in 2023 as the Chair of ASEAN to strive for the creation of a stable and peaceful Indo Pacific region. During the G-20 Presidency, Indonesia's role becomes crucial, considering that the G-20 is a multilateral cooperation group consisting of 19 major countries and the European Union with a focus on policy coordination in the economy and development. The G-20 represents the world's economic and political power with the composition of its members covering 80 percent of world GDP, 75 percent of global exports, and 60 percent of the global population. The goal of the G-20 is to realize strong, sustainable, balanced, and inclusive global growth.

2. Deterrence Theory

Deterrence theory is part of the utilitarian theory put forward by Jeremy Bentham which states that punishment is not a means of retribution but rather to prevent crime. According to utilitarianism, the aim of actions is at least to avoid or reduce the harm caused by actions carried out both for oneself and others. One of the main elements is finding a balance between the need for punishment and the costs of punishment. If the benefits outweigh the costs of punishment, then punishment is necessary. Likewise, if the deterrent effect of the punishment does not exist, then the punishment does not need to exist (Piquero et al., 2011). Deterrence theory can be divided into 2 types: 1. Special deterrence, where the preventive effect of the sentence imposed is expected to occur after the sentence is carried out so that similar crimes are not committed in the future. 2. General deterrence, where the preventive effect is expected to occur before punishment is imposed. This prevention is carried out through threats that are imposed openly so that other people can be prevented from possibly committing crimes.

In this case, deterrence is the ability of a country to prevent aggressive actions by an opposing party through the appointment of military force that is capable of causing losses or risks that are unacceptable to the opponent (Freedman, 2021). In the context of an island nation, a high deterrence capacity means being able to demonstrate the ability to effectively defend territory and maritime sovereignty.

Indonesia, as an archipelagic country rich in resources and located on a strategic route for international trade, must develop a defense system that has high deterrence in order to ward off external threats and maintain regional stability. According to Colin S. Gray in *The Strategy Bridge*, deterrence does not only depend on military capabilities but also on the perception and belief of the opposing party in a country's military readiness and capabilities (Gray, 2016). Therefore, the development of a modern sea and air fleet, as well as mastery of advanced technology, is very necessary to create a high deterrence capacity that is relevant to the Indonesian maritime context.

3. Defense Diplomacy Concept

The term defense diplomacy was first mentioned in the British Ministry of Defense product, Strategic Defense Review (SDR), which was published in 1998. In this product it was also explained that Defense Diplomacy was a new task for British defense. Even though the activities included in Defense Diplomacy have been carried out in the past, mentioning this term as a new defense task is not wrong. Because there is a change in perspective on several things that need to be identified, both substantively and in presentation (Supriyatno, 2014a).

Defense diplomacy is a strategy that is expected to reduce the potential for conflict throughout the world. Defense Diplomacy is carried out not how to win a war but how to prevent a war. Thus, Defense Diplomacy is not aimed at dominating other countries by using force and power. The responsibility for peace is shared with all countries in the world through Defense Diplomacy. Defense Diplomacy is not only intended for the military to negotiate with enemies. With Defense Diplomacy, the military is expected to be able to develop and build a friendly environment and increase friends among the military environment.

Defense diplomacy is a state's effort to use military power and defense relations as diplomatic instruments to achieve political and strategic goals, both at the bilateral, regional and international levels. According to Andrew Cottey and Anthony Forster in *Reshaping Defense Diplomacy: New Roles for Military Cooperation and Assistance*, defense diplomacy involves activities such as joint training, military visits, defense dialogue, and participation in UN peace missions (Cottey, 2013). Defense diplomacy is important for Indonesia in facing geopolitical dynamics and growing threats in the region. By using defense diplomacy, Indonesia can strengthen relations with neighboring countries, encourage maritime security cooperation, and increase defense capabilities through the exchange of knowledge and technology.

4. The Role of High Technology in Modern Defense

The technological revolution has fundamentally changed the way countries design and implement their defense strategies. The use of high technology has provided competitive advantages, both in terms of destructive power, speed of response and logistical efficiency. According to Martin Van Creveld in *Technology and War: From 2000 B.C. to the Present*, technological progress has been one of the most important factors in determining the outcome of conflicts and wars from ancient times to the modern era (Van Creveld, 2010). In today's digital era, technologies such as artificial intelligence (AI), automated control systems, drones and advanced sensors have enabled countries to monitor threats in real-time and execute attacks with high precision. For example, the use of AI technology in intelligence data analysis has improved early detection capabilities and short-term decision making. In fact, the concept of "asymmetric warfare" has now expanded to include the use of cyber technology to target opposing countries' critical infrastructure, creating new threats that do not necessarily involve physical conflict (Jones & Libicki, 2008).

In the context of Indonesian defense, the influence of this technological revolution is also very significant. With a vast and complex territory, the use of high technology allows Indonesia to overcome geographical challenges and strengthen supervision of its territorial waters. Satellite-based technology, for example, has played an important role in improving surveillance and mapping of maritime areas that were previously difficult to reach. In maritime defense systems, high technology enables the development of more effective detection, targeting and response capabilities. One example of the application of high technology is the use of satellite-based radar systems and surveillance drones to monitor ship movements in territorial waters, which allows defense authorities to identify threats and take action more quickly (Gallo, 2018).

Advanced communications technology also enables better integration and coordination between various military units involved in defense operations. For example, satellite-based communications network systems enable real-time exchange of information between warships, aircraft, and command posts, increasing effectiveness in the face of evolving threats. In addition, the use of modern submarine and warship technology with AI-based automatic weapons systems has increased the deterrence and destructive power of the Indonesian navy. In the context of island defense, an air defense system equipped with high technology such as anti-ship missiles and anti-aircraft systems with advanced technology is a key component in defending the territory from air and maritime attacks. Developed countries such as the United States and China have developed "A2/AD" (Anti-Access/Area Denial) systems that utilize high technology to hinder or limit enemy access to certain strategic areas. This concept can be adapted by Indonesia to develop an archipelagic defense system that is capable of creating high deterrence for potential aggressors (Cordesman & Colley, 2016).

Defense Cooperation Concept

Defense cooperation is a cooperative effort between two or more countries in the field of defense with the aim of increasing their defense capacity and effectiveness through joint activities. This collaboration covers various fields such as procurement of defense equipment (main equipment for the defense system), military training, defense strategy, intelligence exchange, and other activities related to defense (Supriyatno, 2014).

Defense cooperation is carried out for various reasons, such as to increase military readiness, reduce defense costs, and increase security and stability in their region. Through this cooperation, countries can strengthen their defenses and help maintain stability in their regions and around the world. Defense cooperation can be carried out bilaterally between two countries or multilaterally involving more than two countries. Some examples of defense cooperation that have been carried out between countries are cooperation between the United States and Israel in technology development defense, cooperation between ASEAN (Association of Southeast Asian Nations) in increasing defense capacity in the Southeast Asia region, and cooperation between NATO (North Atlantic Treaty Organization) in maintaining security in the North Atlantic region.

Defense cooperation is very important in the current global context, where security and stability throughout the world are increasingly complex and conflicts often occur in various regions. And defense cooperation is one of the important efforts in maintaining global peace and security. Defense cooperation concepts that Indonesia can implement to improve its security and defense include: 1. Bilateral cooperation: This concept involves two countries agreeing to cooperate in matters of security and defense. Examples of bilateral cooperation between Indonesia and Australia in terms of handling terrorism and maritime security, 2. Regional cooperation: This concept involves countries in a region agreeing to work together in matters of security and defense to increase stability and security in the region. An example of regional cooperation is the ASEAN Regional Forum (ARF) which involves 27 countries and aims to promote cooperation and dialogue in the field of security and defense in Southeast Asia (Anwar, 2014).

METHODOLOGY

The method applied in this research is literature study. This happens because the data is collected from various information and materials in the library, such as documents, books, notes, research results, and so on. According to (Sugiyono, 2011), literature study can be interpreted as theoretical investigation, references and analysis of written works that are connected to values, culture and norms that are relevant in the context of social research. Meanwhile, according to (Arikunto, 2010), library research can be explained as a way to collect data by looking for information from various sources such as books, newspapers and literature with the aim of developing theories. In this study, library research is understood as a review of literary works that explores previous research to be analyzed or continued. The types of material that can be used as references consist of scientific journals, research reports, textbooks, papers, seminar reports, as well as various official writings published by the government and other institutions. The results of library research can be obtained by collecting information from various book sources, then processing and presenting it so as to reveal fresh discoveries.

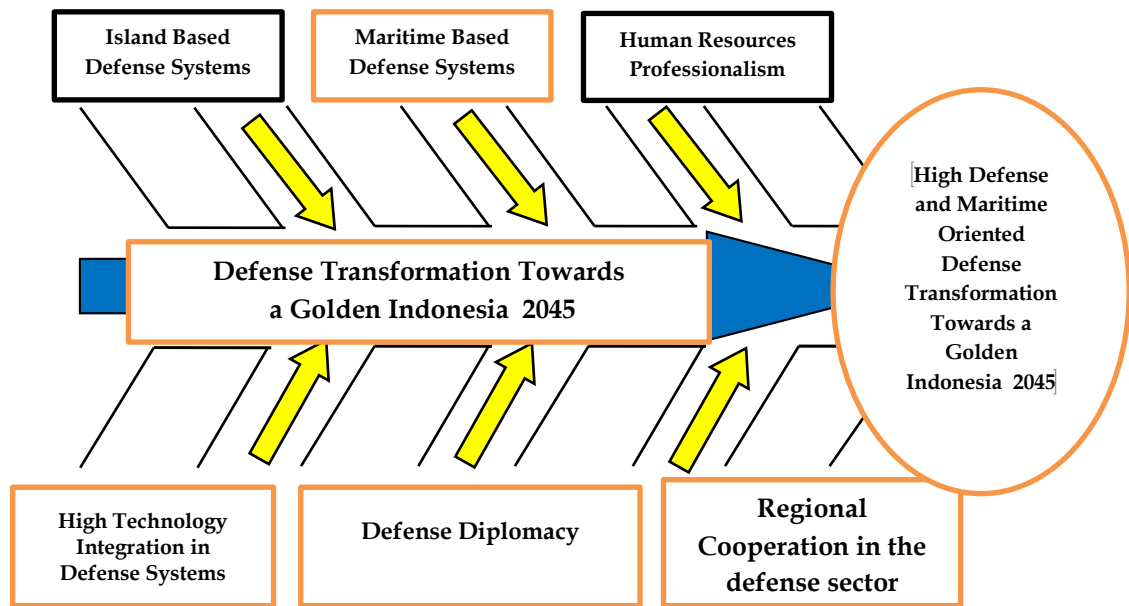


Figure 1. Fishbone Diagram Research

RESULT AND DISCUSSION

Analysis of Island and Maritime Based Defense Systems

As the largest archipelagic country in the world with more than 17,000 islands and a water area of around 3.25 million km², Indonesia has a strategic geographical position at the junction of the Indian and Pacific Oceans. This potential gives Indonesia a strategic advantage in terms of control over international shipping routes, especially the Malacca Strait, Sunda Strait and Lombok Strait, which are important trade routes for the world economy. In terms of military strength, the Indonesian Navy (TNI AL) has a number of warship fleets consisting of frigates, corvettes, fast patrol boats and submarines. According to the 2023 Global Firepower report, Indonesia has around 221 naval fleet units, including 4 submarines and 10 frigate warships. Apart from that, the Indonesian Navy has also begun to adopt modern technology such as maritime radar, underwater sonar systems and surveillance drones to strengthen surveillance in water areas (Djunarsjah et al., 2021).

However, another potential that Indonesia has in maritime defense is its natural resources. Indonesian waters are rich in fish, oil, gas and deep sea mineral resources, so they have significant economic and geopolitical value. The existence of these resources requires adequate defense readiness to protect marine resources from the threat of piracy, illegal fishing and exploitation activities by foreign parties. Despite having great potential, Indonesia's maritime defense system still faces a number of weaknesses and challenges. One of the main challenges is the limited defense budget allocated to strengthen maritime defense capabilities. According to data from the Ministry of Defense, Indonesia's defense budget in 2022 will reach around IDR 134.3 trillion, or only around 0.8% of GDP. This budget is relatively small compared to neighboring countries such as

Singapore and Australia, which allocate more than 2% of their GDP to defense budgets (Destyananda et al., 2022).

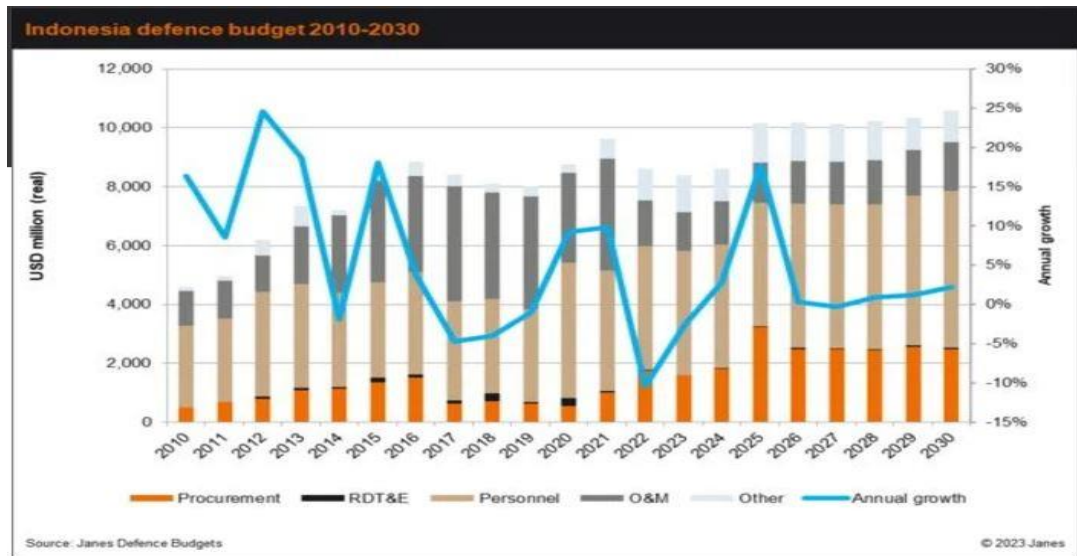


Figure 2. Indonesia Defence Budget 2010-2030



Figure 3. Comparison of National Defense Budgets in South East Asia Region

These budget limitations have an impact on Indonesia's ability to modernize defense equipment, equipment and maritime infrastructure. Many of the Indonesian Navy's warships and equipment are outdated and require rejuvenation. In addition, patrol and surveillance capabilities in large areas of waters are still limited, so they are often unable to overcome problems of violations of sovereignty, illegal fishing and piracy. Another challenge is limitations in coordination and synergy between agencies in maintaining maritime security. According to a report by the Maritime Security Agency (Bakamla), there are still many cases of overlapping authority between the Indonesian Navy, Polri, Bakamla and other agencies in handling maritime security issues (Andini et al., 2023). This results in a lack of effectiveness in law enforcement and supervision in water areas.

Defense is the key to the front line of a country's security. By increasing a country's defense capabilities, it is hoped that the integrity of the country will improve and be more able to secure all the wealth in that country. Good defense also requires optimal budget expenditure. Various countries are competing to increase their state budgets in the defense sector, including in the Southeast Asia region. In data released by Global Fire Power, Singapore was in first place as the country with the highest defense budget in Southeast Asia. Singapore in 2022 has a defense budget of 11,560 million US Dollars. In second position, there is Indonesia in this defense budget data. Indonesia is recorded by Global Fire Power as having a defense budget of 9,300 million US Dollars. Indonesia is followed by Vietnam with a defense budget reaching 6,238 million US Dollars.

Professionalism and Human Resources Analysis

In facing increasingly complex maritime defense challenges, the development of professional military human resources (HR) is an urgent need. The professionalism of military human resources includes technical and tactical abilities in operating defense equipment, understanding defense strategies, and the ability to collaborate with other parties in defense missions. Huntington in *The Soldier and the State* emphasizes that military professionalism is not only about technical skills, but also involves ethics, responsibility and commitment to duty (Huntington, 1981).

In the modern era, the Indonesian Navy's ability to operate high technology such as radar systems, sonar and surveillance drones has become very important, while still paying attention to understanding the concepts of asymmetric warfare and maritime security. It is crucial to remember how rapidly military technology is developing, where things like artificial intelligence (AI), big data, and cyber defense systems are becoming an integral part of defense operations. According to data released by the Ministry of Defense, currently there are around 74,000 personnel serving in the Indonesian Navy. Even though the numbers are quite significant, the most important thing is how we can improve the quality and readiness of personnel so they can handle increasingly complex challenges well. The development of human resource professionalism also needs to pay attention to continuous training and education, both at home and abroad through joint training programs with strategic partner countries.

To increase professionalism in maritime defense, several strategies can be implemented. *First*, increase investment in military education and training. According to a RAND Corporation report, countries with strong navies tend to have comprehensive education and training programs to improve the competence and professionalism of their personnel. Therefore, the Indonesian Navy needs to develop a training program that focuses on mastering maritime technology, naval warfare tactics, as well as understanding international law and ethics in a maritime context (Dilahwangsa et al., 2019). *Second*, strengthening global collaboration in the military education and training sector. By collaborating with other countries' navies, the Indonesian Navy can send its personnel to take part in training programs and exchange experiences. Programs such as the Joint Exercise Cooperation Afloat Readiness and Training (CARAT) between the Indonesian Navy and the United States Navy are one successful example of this kind of collaboration, which contributes to improving the skills of Indonesian Navy personnel in maritime operations. *Third*, the application of technology and simulation-based training programs have been carried out to improve the skills of personnel. The use of warship simulators, maritime patrol aircraft and advanced weapons systems allows personnel to train realistically without the risk of damaging real equipment. Singapore and Japan are examples of countries that have widely utilized simulation technology in the context of their military training. The use of this technology has proven effective in increasing the professionalism and combat readiness of personnel (Jane's Defence Weekly, 2021).

In addition, the implementation of competency standards and strict performance evaluation is also necessary to ensure that each Indonesian Navy personnel has an adequate level of skills and knowledge. These competency standards must include technical ability, tactical understanding, and high military ethics and discipline.

High Technology Integration in Defense Systems

In the modern era, the integration of high technology such as artificial intelligence (AI), drones and satellites has become an important element in strengthening the country's defense system. The implementation of this technology can increase the effectiveness of military operations and surveillance, especially in the context of maritime defense which requires high speed and precision in decision making. Below are several forms of implementation of modern technology in defense operations.

- **Artificial Intelligence (AI) in Maritime Defense:** Artificial Intelligence (AI) has become a key component in strengthening defense systems by providing fast and accurate data analysis capabilities. In a maritime context, AI can be used to analyze radar and sonar data in real-time, enabling the identification of enemy ships, foreign ship movements and other potential threats. For example, the United States Navy has implemented AI technology in the Sea Hunter program, an unmanned autonomous vessel capable of operating autonomously for 90 days.

- **Use of Drones in Defense Operations:** Drones or unmanned aircraft have become an important tool in maritime reconnaissance and surveillance operations. With the ability to cover large areas that are difficult to reach by ships, drones can carry out patrols, surveillance and even attack operations. Indonesia itself has started using drones in maritime surveillance, such as in border surveillance operations in the Natuna region. Apart from that, combat drones are also used to attack enemy targets with high precision, as has been done in various military operations in the Middle East. The main advantage of using drones is the ability to reduce risks to military personnel and increase effectiveness in attack and surveillance operations.
- **The Role of Satellites in the Defense System:** Satellites have an important role in providing accurate intelligence and surveillance data. Through satellites, armed forces can monitor enemy ship movements, map operational areas, and transmit real-time data to command centers. According to a report from the Center for Strategic and International Studies (CSIS), the use of military satellites has proven effective in improving early detection capabilities of potential threats in the maritime area [CSIS, 2020]. Indonesia itself has launched the Satria-1 satellite, which is designed to improve communications and surveillance capabilities in border areas (Ministry of Communication and Information, 2023).

Although high technology provides many benefits, there are several challenges in its implementation. One of the main challenges is the high cost of procuring and maintaining the technology. AI systems, drones and satellites require large investments, both in terms of infrastructure and personnel training. Apart from that, limited human resources who have expertise in the field of technology are also an obstacle. A study by the RAND Corporation emphasized that one of the main challenges in integrating high technology is the lack of military personnel who have the technical skills and knowledge of advanced systems. Another challenge is the risk of cyber attacks on technology-based defense systems, which could result in disruptions in operations and threats to national security (RAND Corporation, 2020).

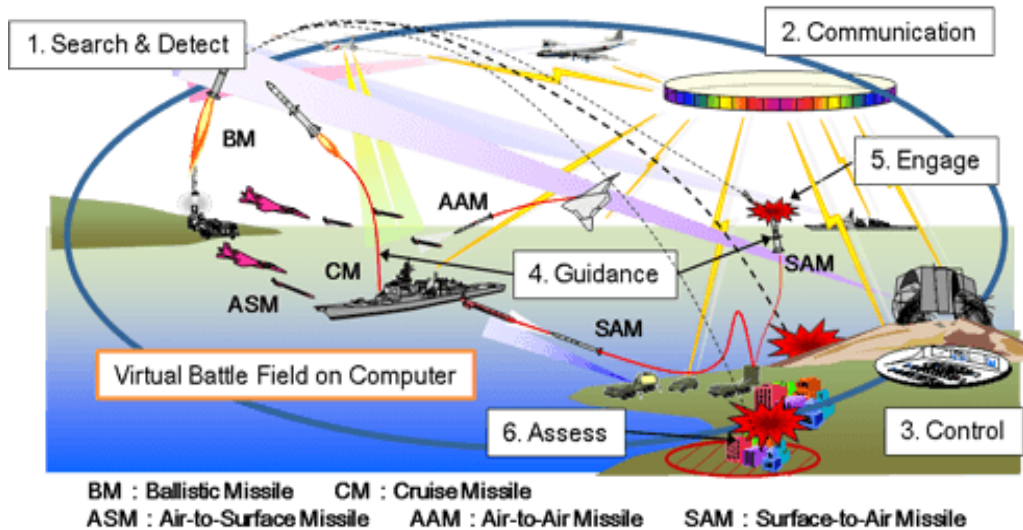


Figure 4. Integrated Air Defense System Simulation

The image above is an example of an integrated air defense system simulation, which is a simulation that ranges from system integration level to system level. This is a computational simulation that can plan and validate system concepts for R&D of future air defense weapon systems such as missiles, radars and others. From this simulation image we can see how important high technology is for Indonesia's national defense.

Defense Diplomacy in Realizing High Deterrence Capacity

Defense diplomacy is an important instrument in creating regional deterrence and stability. Through defense diplomacy, countries can build good relations with neighboring countries, conduct joint military exercises, and increase cooperation in matters of maritime security. According to The Routledge Handbook of Defense Studies, defense diplomacy allows countries to manage the risk of conflict and build trust with other countries (Galbreath & Deni, 2018). Indonesia has been actively involved in various defense diplomacy forums, such as the ASEAN Defense Ministers' Meeting (ADMM) and ADMM-Plus, which bring together defense ministers from ASEAN countries and their dialogue partners. Through this forum, Indonesia can participate in discussing regional security issues and build cooperation to face common threats.

Defense diplomacy also has a close relationship with Indonesia's foreign policy, which adheres to the principle of "free and active." Through a defense diplomacy approach, Indonesia can emphasize its strategic position as an influential maritime country in the region. For example, the Global Maritime Fulcrum policy launched by President Joko Widodo emphasizes the importance of Indonesia's role as the world's maritime axis and strengthening cooperative relations in the field of maritime security. Through defense diplomacy, Indonesia can increase its deterrence and demonstrate commitment to regional stability. This increase in fearlessness is not only seen from military strength alone, but also from Indonesia's ability to build alliances, cooperation and mutual understanding with other countries.

To create a military defense architecture that is able to answer the demands of realizing Indonesia as the world's maritime axis, building the capability of a military defense sensor system must be a priority, because the sensor system is the eyes and ears of the military defense system. Without a good sensor system, military defense posture buildings are unable to detect and identify threats to state sovereignty. So far, the development of military defense sensor capabilities has been oriented towards increasing the sensor capabilities of the national air defense system. The integration of sensor capabilities between dimensions is carried out at the operational level which is regulated by operational procedures by the National Air Defense Command. This does not adequately address the information needs of other units in the Integrated Tri-Measure joint operations. In the future, sensor system development must be carried out in an integrated manner from planning to deployment, so that it can better ensure integration between dimensions in its operation. To strengthen the sensor system, a remote sensing system using national satellites is a necessity that cannot be postponed. The use of national satellites will expand the scope of collecting information about the geographical conditions of operational mandalas with a relatively high level of confidentiality.



Figure 5. Military Defense Architecture in Defense Posture

The command and control function is defined as the activity of using authority and power by a commander appropriately over his subordinate units or other units under his authority to carry out tasks. From this definition, it can be understood that command and control is the center of all warfare activities carried out by units involved directly or indirectly in military campaigns within the war zone. This function is very essential in determining the success of war. In its implementation, the command and control function is carried out by the Commander/Commander who is supported by a command and control system which includes facilities and equipment, information management, procedures

and personnel. The existence of different dimensions in one war zone requires the integration of the command and control functions of the dimensions into one integrated combined command and control function. The integration of command and control functions between dimensions is the core of interoperability of all elements involved in the implementation of military defense.

Interconnection between command and control systems and sensor systems is one of the factors that determines the success of military operations in overcoming space and time constraints. The success of the Neptune Spear operation (which succeeded in killing Osama Bin Laden) is an example of the success of a command and control system that is able to overcome space and time constraints. In this regard, national satellites are utilized in carrying out command and control functions. Apart from overcoming space and time constraints, the use of national satellites in carrying out command and control functions will also increase the information security required in every military operation. The development of a command and control system must be carried out in an integrated manner in order to ensure the realization of unity of command in joint military operations. The development of a command and control system must also be combined with the development of a sensor system. This is intended to improve the performance of decision-making systems applicable in joint military operations.

The striking function is carried out through a series of destructive activities against opposing forces using the main weapons system equipment (Alutsista). Defense equipment is one of the main elements of military defense architecture which can produce a deterrence effect to prevent an opponent's intention to attack another country. Therefore, the development of military defense forces must pay special attention to the procurement of defense equipment, both domestic and foreign made. Procurement of defense equipment in the context of developing military defense forces is often hampered by various problems. In developing countries, the classic problem that arises is the limited amount of the government budget, while in developed countries the problem is the low level of public support for the use of the government budget for military spending. Therefore, every country always strives to increase efficiency in the defense equipment acquisition process. Apart from that, efforts that can be taken are to produce defense equipment domestically. The government's efforts to empower the domestic defense industry through Law Number 16 of 2012 deserve appreciation, because by using domestic defense industry products, the government can optimize the use of the defense budget for procurement of foreign-made defense equipment which is essential but cannot be produced domestically.

CONCLUSIONS AND RECOMMENDATIONS

Indonesia's defense capabilities are influenced by various factors, including its vast territory, limited resources, and evolving geopolitical challenges. While there are strengths to build upon, weaknesses and emerging threats must be addressed. Establishing the Indonesian Armed Forces as part of a comprehensive defense policy roadmap will provide the necessary capabilities to adapt to future challenges and contribute to Indonesia's vision of becoming a "Golden Indonesia by 2045". The government must prioritize defense funding, invest in modernization efforts, enhance coordination among military branches, and embrace technological advancements for a secure and prosperous future.

Military defense architecture not only plays a role in strengthening military defense posture to support the implementation of national defense, but what is even more crucial is to increase the deterrence effect of military defense posture against outside parties who would disturb state sovereignty. Faced with geographical conditions as an archipelagic country, the military defense architecture must be prepared early as one of the prerequisites for the success of the country's defense system in realizing the world's maritime axis.

From the case studies of Japan, Australia and the United States, there are several important lessons that Indonesia can take in developing its maritime defense system:

1. High-Tech Integration as a Priority: Japan, Australia, and the United States have demonstrated that investments in high-tech, such as advanced radar systems, submarines, and drones, can increase the effectiveness and deterrence of maritime defense systems. Indonesia needs to accelerate the integration of modern technology in its defense system and build the capacity to operate and maintain this technology (Christoplos et al., 2019).
2. The Importance of Joint Exercises and Cross-Theater Operations: Joint military exercises and cross-threat operations can increase the readiness and operational capabilities of navies. Participation in multinational exercises, such as Garuda Shield and Exercise Komodo, should be increased to strengthen interoperability and cooperation with other countries (U.S. Army Pacific, 2022).
3. Defense Diplomacy and Regional Cooperation: Active defense diplomacy, such as that undertaken by Japan and Australia in cooperation with the United States, can help build alliances and increase deterrence. Indonesia can take lessons from this approach and continue to strengthen its role in regional security forums, as well as establishing strategic cooperation with countries in the Indo-Pacific region (Chappell & Hallams, 2020).
4. Human Resource Capacity Development: Success in operating sophisticated maritime defense systems is highly dependent on the capabilities of military personnel. Japan, Australia, and the United States have invested in training and human resource development. Indonesia needs to do something similar by ensuring that Indonesian Navy personnel have the skills and knowledge needed to operate high technology (TNI Vice Admiral Aan Kurnia, 2021).

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