


## Modernization of Indonesian Naval Fleet to Realize Asta Cita

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KEYWORDS	ABSTRACT
modernization of the naval fleet, Asta Cita, maritime security, Indonesian defense, surveillance technology	The modernization of Indonesia's naval fleet is a critical strategic endeavor to achieve Asta Cita, the national vision for a sovereign, secure, and prosperous maritime nation. This research employs a descriptive qualitative method, analyzing documents, literature, and secondary data from relevant government institutions to assess this modernization effort. The findings indicate that fleet modernization through the procurement of advanced patrol vessels, warships, and state-of-the-art surveillance technology has significantly enhanced maritime defense effectiveness. Key results show a 31.5% increase in active warships from 2018 to 2023, a 54% rise in patrol frequency in the North Natuna Sea, and an 88% accuracy in predicting illegal vessel movements through integrated AI systems. Furthermore, trained personnel increased by 47%, directly contributing to operational readiness. This modernization has strengthened Indonesia's maritime sovereignty, reduced illegal fishing by 12%, and bolstered its diplomatic standing in regional security cooperation. The study concludes that a holistic modernization strategy—encompassing vessels, technology, human resources, and regulatory frameworks—is essential to sustainably realizing Asta Cita and supporting the Golden Indonesia 2045 vision.
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## INTRODUCTION

Indonesia, as the largest archipelagic country in the world, has a very large sea area, reaching more than 5.8 million km<sup>2</sup> and stretching along the strategic path of the Pacific and Indian Oceans (Pulungan, 2024). This vast sea area is not only an important natural resource but also a vital international trade route. This condition requires a modern, resilient, and integrated naval fleet to maintain sovereignty, security, and national interests (Sugiharto, 2025). Along with regional and global geopolitical dynamics, the modernization of the Indonesian naval fleet to realize Asta Cita is one of the government's strategic focuses in realizing Asta Cita, the ideal of the Indonesian nation to become a sovereign, safe, and prosperous country (Solehudin, 2023).

Since the beginning of the 21st century, threats to Indonesia's maritime security have become increasingly complex (Tsailas, 2025). Illegal fishing, piracy, infiltration by foreign ships, and potential conflicts in the South China Sea demand a more adaptive and effective maritime defense capacity. According to Suga (2025), the modernization of Indonesia's naval fleet is not only related to the quantity of ships but also their quality, including weapon systems, surveillance sensors, and integrated operational capabilities in large sea areas. This condition underscores the need for a holistic strategy combining the strengthening of physical fleets with cutting-edge technology and responsive security policies (Najafi et al., 2024).

The novelty of this research lies in an integrative approach that not only assesses the technical aspects of ship modernization but also evaluates the role of surveillance technology, operational readiness, and its strategic impact on Asta Cita. Most previous research focused on

the quantitative aspects of the fleet or military capacity alone, while this research combines the dimensions of technology, strategy, and policy. For example, a study by Ditria (2022) emphasizes the importance of AI integration in marine surveillance, while Mahmud (2025) highlights the geopolitical impact on maritime defense. This study merges these two perspectives to provide a more comprehensive analysis.

Previous research has also shown the importance of fleet modernization in the face of hybrid threats. Imran (2024) notes that island nations face unique challenges due to the vast expanse of hard-to-reach sea areas, while Słomczyńska (2016) emphasize the role of satellites and advanced sensors in improving patrol effectiveness. In Indonesia, the modernization of the naval fleet has begun through the procurement of fast patrol ships, corvette warships, and the development of radar systems and reconnaissance drones. However, the study shows that significant gaps remain in vessel numbers, system integration, and rapid response capabilities, especially in remote areas such as Natuna and the South China Sea border.

In addition, previous literature shows that the modernization of the marine fleet must be accompanied by the development of competent human resources (Theotokas et al., 2024). According to Haryanto & Lim (2021), personnel's ability to operate sophisticated ships, weapon systems, and surveillance technology greatly determines fleet effectiveness. Therefore, fleet modernization is not only a matter of adding ships but also training, simulation, and integrating professional operations.

The formulation of this research problem can be stated as follows: What is the current condition of the Indonesian naval fleet and its level of modernization in supporting Asta Cita? What are the threats that Indonesia faces at sea, and how can the modernization of the naval fleet overcome them? How do technology integration, human resource development, and operational strategies contribute to the effectiveness of maritime defense? What are the strategic recommendations to accelerate the modernization of the marine fleet to realize Asta Cita in a sustainable manner? By answering these questions, this research is expected to provide a comprehensive understanding of the modernization of Indonesia's naval fleet as well as offer more focused policy direction to support sovereignty, security, and national ideals.

The purpose of this study is to analyze the modernization efforts of the Indonesian naval fleet, evaluate the achievements and challenges faced, and assess their contribution to the achievement of Asta Cita. This research also aims to provide strategic recommendations to improve the effectiveness of marine defense, hybrid threat mitigation, and sustainable management of maritime resources. It is expected to be a reference for policymakers, academics, and defense practitioners in designing a more optimal maritime fleet modernization strategy. The benefits of this research are twofold, both theoretical and practical. Theoretically, this study enriches the literature on maritime defense modernization, maritime security strategies, and the implementation of national ideals in the context of defense. Practically, the results provide a comprehensive overview of fleet strength, technological gaps, and strategic steps needed to realize a resilient and modern naval fleet. The modernization of the naval fleet also has implications for economic security, as it ensures that trade routes and maritime resources remain safe from various threats.

## **RESEARCH METHOD**

This study used a descriptive qualitative approach to analyze the modernization of Indonesia's naval fleet in the context of Asta Cita's achievements. This approach was chosen because it can describe the real condition of the marine fleet, the challenges faced, and the effectiveness of the modernization strategy comprehensively. Data was collected through document analysis, academic literature, and official secondary data from government agencies such as the Ministry of Defense, the Indonesian Navy, and the Ministry of Maritime Affairs and

Fisheries.

The analysis of the documents includes the annual report of the naval fleet, the defense strategic plan, the patrol report, as well as the modernization policy of ships and weapons systems. The academic literature is used to understand global and regional trends related to naval modernization, including the role of cutting-edge technologies such as radar systems, surveillance drones, and the integration of AI in maritime surveillance. Secondary data includes statistics on the number of ships, armament capacity, patrol levels, and reports of naval military exercises and operations.

The analysis process was carried out thematically, focusing on four main aspects: (1) the current condition of Indonesia's naval fleet, (2) maritime threats faced, (3) technology integration and human resource development, and (4) the contribution of modernization to the achievement of *Asta Cita*. The data is analyzed to identify the gap between the current state of the fleet and strategic needs, as well as to evaluate the effectiveness of the modernization measures that have been implemented.

The study also adopted a source triangulation approach to improve the validity of the findings. Information from official documents is combined with academic data and public reports related to maritime defense, resulting in a more accurate and comprehensive understanding. The results of the analysis are expected to provide a comprehensive overview of the maritime fleet modernization strategy, the challenges faced, and policy recommendations to support the sovereignty and vision of Golden Indonesia 2045.

## **RESULTS AND DISCUSSION**

The results show that the modernization of Indonesia's naval fleet has undergone significant development over the past five years, but still faces several strategic challenges. Based on official data from the Ministry of Defense of the Republic of Indonesia, the number of active Indonesian warships increased from 92 units in 2018 to 121 units in 2023, an increase of around 31.5%. Of these, 40% are fast patrol ships, 35% are corvette warships, and the rest are frigates and submarines (Ministry of Defense of the Republic of Indonesia, 2023). This increase reflects the government's efforts to strengthen maritime defenses, especially in the Natuna region and the South China Sea border, which have a high potential for geopolitical conflict.

In addition to increasing quantity, the quality of the fleet is also improved through the procurement of ships with modern weaponry. For example, the latest corvette-class warships are equipped with multifunctional radar systems and medium-range anti-ship missiles, thus being able to increase detection range up to 200 km and fire missiles with 85–90% accuracy (Yuliana & Putri, 2022). TNI Navy data shows that the frequency of patrols in North Natuna increased from 120 times per year in 2019 to 185 times per year in 2023, reflecting increased surveillance and response capacity to illegal activities, including foreign vessels crossing Indonesia's EEZ without permission.

The threat of illegal fishing remains a major concern. The MPA report noted that illegal fishing in Indonesia's maritime areas reached 48,000 tons in 2019 and increased to 52,500 tons in 2022, causing economic losses of around USD 135 million per year (Putra, 2022). The increase in the number of patrol boats and the application of satellite-based surveillance technology have reduced the frequency of illegal fishing in North Natuna by 12% compared to the previous year. This shows that the modernization of the marine fleet and the integration of technology have a positive impact on the protection of marine resources.

In terms of personnel readiness, the Indonesian Navy reported an increase in the number of personnel trained to operate sophisticated ships from 1,800 soldiers in 2018 to 2,650 soldiers in 2023, an increase of around 47% (Hadi, 2023). This increase includes training in the use of radar systems, electronic weapons, reconnaissance drones, and coordination of operations with

other agencies such as Bakamla and KKP. HR modernization is a key factor in ensuring that the increase in fleet quantity and quality can be optimized operationally.

The application of advanced technology has also shown significant results. The integration of AI in the surveillance system is able to process data from 12 main radar points and 18 surveillance drones in real-time, predict the movement of illegal vessels, and provide early warnings with an accuracy rate of up to 88% (Lee & Tan, 2022). This increase in patrol effectiveness allows for optimal placement of ships in strategic routes, so that the frequency of illegal vessel interception has increased from 65 ships in 2020 to 112 ships in 2023.

In addition to the technical aspect, fleet modernization also has an impact on maritime diplomacy. The presence of modern warships in the Natuna Sea demonstrates Indonesia's ability to defend territorial sovereignty and reduce pressure from overlapping claims in the South China Sea. Data from the Indonesian Ministry of Foreign Affairs shows that the frequency of joint patrols with ASEAN countries increased from 6 exercises per year in 2019 to 11 exercises per year in 2023, including simulated exercises to counter piracy and ship rescue (Sukma, 2023).

Data analysis shows that there is a capacity gap, despite significant modernization. About 35% of the remote sea area is still difficult for the fleet to reach today, especially North Natuna and the sea borders with Malaysia and Vietnam. This shows the need for the addition of fast patrol boats and frigates, as well as the strengthening of satellite-based surveillance systems in areas prone to illegal activities (Ramadhan, 2023).

The findings of the study also highlight the contribution of fleet modernization to Asta Cita's achievements. With a more modern fleet and trained human resources, Indonesia is able to strengthen maritime sovereignty, protect trade routes, and manage maritime resources more effectively. Indicators of Asta Cita's achievements include a 12% reduction in the frequency of illegal fishing, a 54% increase in the number of patrols, and an 88% increase in surveillance accuracy, which overall improves the effectiveness of maritime defense.

The modernization of Indonesia's naval fleet has shown significant results both in terms of quantity, quality, technology, and human resource readiness. However, there are still challenges related to the wide range of sea areas, system integration, and personnel capacity that must be continuously improved. These findings confirm that the maritime fleet modernization strategy must be holistic, combining an increase in the number of ships, cutting-edge technology, human resource development, and regional cooperation to realize Asta Cita in a sustainable manner.

The modernization of Indonesia's naval fleet is one of the strategic components in realizing Asta Cita, which is a national vision to increase the nation's sovereignty, security, and prosperity. Based on the results of the research, fleet modernization is not only an increase in the number of ships, but also an improvement in quality, the integration of cutting-edge technology, and the development of professional human resources. Data shows that the number of Indonesian warships increased from 92 units in 2018 to 121 units in 2023, an increase of about 31.5%, with the proportion of fast patrol ships 40%, corvettes 35%, and the rest frigates and submarines. This increase shows the government's seriousness in dealing with maritime threats at the border, especially the North Natuna Sea, which is prone to illegal fishing activities and violations of the EEZ by foreign vessels (Ministry of Defense of the Republic of Indonesia, 2023).

Further analysis shows that the modernization of the marine fleet has a significant impact on the effectiveness of patrols and surveillance. The frequency of patrols in North Natuna increased from 120 times per year in 2019 to 185 times per year in 2023, or an increase of 54%, which is in line with hybrid threat mitigation strategies, including piracy and infiltration of foreign vessels (Yuliana & Putri, 2022). This is supported by the development of AI-based and multi-sensor surveillance systems that enable real-time integration of data from radar, satellites, and surveillance drones, increasing the accuracy of predicting illegal vessel

movements by up to 88% (Lee & Tan, 2022). Thus, fleet modernization not only increases military capacity but also operational efficiency in the management of vast sea areas.

In addition to technical improvements, research shows that the modernization of the marine fleet also strengthens the ability to detect early detection and respond quickly to threats. TNI Navy data shows that the number of personnel trained in operating sophisticated ships increased from 1,800 soldiers in 2018 to 2,650 soldiers in 2023, an increase of 47%. These personnel are trained in the use of radar systems, anti-ship missiles, advanced communications, and coordination of integrated operations with related agencies such as Bakamla and the Ministry of Marine Affairs (Hadi, 2023). This increase in human resources is an important factor that ensures the effectiveness of fleet modernization, because sophisticated ships without competent personnel will not make an optimal contribution to maritime safety.

The modernization of the marine fleet also has an impact on the management of maritime resources. Illegal fishing activities in Indonesia's maritime areas reached 52,500 tons in 2022, with economic losses of around USD 135 million per year (Putra, 2022). After the implementation of advanced patrol and surveillance systems, the frequency of illegal fishing in North Natuna decreased by 12%, indicating that the modernization of the marine fleet and surveillance technology has a real impact on marine economic protection and food security. This shows the direct relationship between the modernization of maritime defense and the achievement of *Asta Cita* in the context of national prosperity.

The maritime diplomacy aspect is also an important result of fleet modernization. The presence of modern warships in the Natuna Sea increases Indonesia's bargaining position in the face of overlapping claims in the South China Sea. The frequency of joint exercises with ASEAN countries increased from 6 times per year in 2019 to 11 times per year in 2023, including anti-piracy exercises, search and rescue, and maritime conflict simulations (Sukma, 2023). This collaboration shows that the modernization of the naval fleet also serves as a tool for diplomacy and regional conflict mitigation, strengthening collective security in the region.

This study also found that the modernization of the marine fleet is not free from challenges. Despite the increase in the number of ships, about 35% of remote sea areas are still difficult for fleets to reach, especially North Natuna and the borders with Malaysia and Vietnam (Ramadan, 2023). This shows the need for additional fast patrol boats, frigates, and improved capabilities of satellite-based surveillance systems. In addition, the integration of weapon systems, operational coordination, and interoperability between ships still needs to be improved so that the entire fleet can operate effectively and responsively.

From a technological perspective, the application of AI and multi-sensor systems has improved the ability to monitor and predict the movements of illegal vessels. However, this technology requires infrastructure support, communication bandwidth, and the ability of personnel to analyze data in real-time. These findings show that the modernization of the marine fleet is not just about the procurement of new ships, but also the transformation of operations, data management, and human resource readiness (Hoffman, 2023).

Strategic analysis indicates that the modernization of Indonesia's maritime fleet is in line with the vision of a Golden Indonesia 2045. With a more modern fleet, competent personnel, and sophisticated surveillance systems, Indonesia is able to strengthen maritime sovereignty, protect international trade routes, and ensure the sustainable management of maritime resources. Indicators of *Asta Cita*'s achievements include a 12% reduction in illegal fishing, a 54% increase in patrol frequency, and an 88% surveillance accuracy. This shows that the modernization of the naval fleet is not just a military program, but a national strategy to realize sovereignty, security, and prosperity in an integrated manner.

Overall, the findings of the study confirm that the modernization of Indonesia's maritime fleet has had a significant impact, both in terms of quantity, quality, technology, and human resource development. The remaining challenges, such as the wide range of sea areas, system



integration, and personnel readiness, demand a sustainable strategy. With a combination of ship upgrades, advanced technology, human resource training, and regional cooperation, Indonesia is able to realize *Asta Cita*, while strengthening its strategic position in the Southeast Asian region. The modernization of the marine fleet is the foundation for security, diplomacy, and sustainable management of marine resources, in line with the goals of Indonesia Emas 2045.

### CONCLUSION

Based on recent research and developments, the modernization of the Indonesian naval fleet has made substantial progress in ship quantity, advanced weaponry, surveillance technology, and human resource capacity. Notably, the integration of multifunctional radar systems and AI-based multi-source sensors has enhanced real-time maritime situational awareness and illegal vessel detection, while improved training programs ensure operational readiness. Strategically, this modernization has led to a reduction in illegal fishing, increased patrol activities, and a stronger diplomatic presence, especially in contentious areas like Natuna, contributing significantly toward Indonesia's sovereignty and maritime diplomacy. Challenges remain, including coverage gaps in remote sea regions and the need to advance system integration and sustainment capacity. Future research could focus on optimizing system integration across diverse platforms, evaluating long-term impacts of AI and unmanned systems in operational effectiveness, and exploring human factors in the adaptation of new technologies to ensure sustainable naval modernization aligned with the *Asta Cita* vision and Indonesia Emas 2045 goals.

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