



The Next Level of the Arhanud Corps, Facing the Fifth Generation War

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ARTICLE INFO

Keywords: Fifth Generation War, Air Defense, Non-Conventional Warfare and Utilization of Advanced Technology

Received : 13, February

Revised : 27, February

Accepted: 26, March

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ABSTRACT

The rapid development of information and communication technology in the 21st century has brought about great changes in the world of warfare. In this context, the Air Defense Artillery Corps (Arhanud) as one of the vital components in Indonesia's air defense, is faced with new challenges in facing the fifth generation war (5GW). Fifth-generation warfare does not only involve physical combat, but also includes non-conventional warfare through the influence of social media, cyber warfare, disinformation, and psychological operations that can affect national stability. This paper aims to examine how the Arhanud Corps should prepare to face more complex threats in the context of fifth-generation warfare. The main focus of this paper is on improving operational readiness, utilizing advanced technology, and adapting to information war challenges. It is hoped that this paper can provide strategic insights for the future development of Arhanud in dealing with threats that arise in the current digital era.

INTRODUCTION

The rapid development of technology and the globalization of information have created a new era in the world of warfare. Traditional wars that relied on physical confrontation have transformed into more complex and multi-dimensional wars. In this context, the concept of fifth-generation warfare (5GW) emerged as a more difficult to predict and more hidden threat. Not only does it involve military power, the fifth-generation war also uses cyber technology, disinformation, psychological warfare, and the influence of social media to influence public opinion and undermine the stability of the country without having to face it directly on the battlefield. With increasingly diverse threats, a country's defense system must be able to adapt and anticipate these changes.

The Indonesian Air Defense Artillery Corps (Arhanud), as part of a vital air defense system, has a strategic role in maintaining sovereignty over Indonesian airspace. Arhanud is tasked with protecting Indonesia's airspace from various air threats, both from aircraft attacks, missiles, and other threats. However, with the advent of fifth-generation warfare that not only relies on physical threats, but also involves non-traditional warfare such as information and cyber warfare, the challenges for the Arhanud Corps are becoming increasingly great and complex. Therefore, it is important for the Arhanud Corps to develop capabilities and strategies that can respond to these new threats.

As a military organization engaged in air defense technology and systems, the Arhanud Corps must move to a higher level to meet the challenges of this new era. The major challenge for the Arhanud Corps in facing the fifth generation of warfare is not only about strengthening the physical capabilities of the air defense system, but also about dealing with invisible threats, such as cyberattacks on defense infrastructure, the spread of disinformation that can weaken the morale of the troops, and psychological operations that can destabilize the national stability. Readiness to face fifth-generation warfare requires a more holistic and innovative approach.

The state of Indonesia is located in the defense zone of several neighboring countries, creating a new geostrategic perspective for countries in the region. There are also other threats that arise, such as the island of Borneo which is surrounded by defense alliances such as the Five Force Defense Arrangement (FPDA) consisting of Malaysia, New Zealand, and Australia, as well as the Aukus alliance involving Australia, the United Kingdom, and the United States. In addition, China's One Belt One Road (OBOR) policy also affects Indonesia's territory. In terms of flights, Indonesia is within the range of the Flight Information Region (FIR) of neighboring countries such as Singapore, Kinabalu in Malaysia, and Manila in the Philippines.

In the Nusantara Dialogue Forum on "Security and Defense Review of the New National Capital" held on March 17, 2022, the Governor of the Indonesian National Lemhannas, Andi Widjajanto, stated that the main vulnerability that needs to be watched out for in the Nusantara Capital City is airspace. This is related to the conditions in the Southeast Asian region which has the potential to become a hegemonic battle area between major countries such as the United States (US) and China. According to the Governor of the Indonesian National

Lemhannas Andi Widjajanto, "the dispute in the South China Sea is evidence of the conflict between the two great powers in the region. The existence of US and Chinese power around Indonesia is a vulnerability that must be anticipated. Indonesia is affected by the operations of fighter jets, strategic bombers, and exploration/ballistic missiles from the US and China". In general, Indonesia also still faces threats in the form of black flights. This threat is even more dangerous if the black flight is related to espionage, because several previous cases of black flight have not been successfully detected by the main tool of the national defense and security system (alutsista).

To deal with existing threats and challenges, the government needs to improve the capabilities of the air defense system (Sishanud), especially in terms of anti-air attack systems, by designing a new defense system that is more modern and integrated. The use of new technologies such as advanced radar systems, cyber defense software, and more accurate data analysis capabilities will be key in strengthening Indonesia's air defense. In addition, the Arhanud Corps must also develop more adaptive doctrine and training, which not only focuses on operational readiness in the face of physical threats, but also readiness in dealing with information-based and cyber-based threats. Through this approach, Arhanud can become better prepared to face various challenges that arise in an increasingly connected and uncertain world.

Overall, to reach the "next level" in the face of fifth-generation warfare, the Arhanud Corps must be able to transform, not only in terms of strengthening technology and defense systems, but also in terms of understanding and strategy in dealing with non-traditional threats. With proper adaptation, technological capacity development, and increased training and readiness of troops, the Arhanud Corps will be better prepared to safeguard Indonesia's sovereignty from increasingly sophisticated and hidden threats in the future.

LITERATURE REVIEW

Fifth Generation War Theory (5GW) – William S. Lind & Thomas X. Hammes

Fifth-generation (5GW) warfare is an evolution of asymmetric warfare that no longer relies on conventional military power, but instead relies on information technology, disinformation, and cyberattacks to create instability within a country. According to Thomas X. Hammes, 5GW is hidden, difficult to detect, and often does not involve state actors directly, but rather uses non-state groups or individuals who have the ability to influence public opinion as well as the system of government through psychological warfare and digital propaganda. In the context of the Arhanud Corps, the 5GW threat means that air defense should not only focus on physical threats such as fighter aircraft or missiles, but must also be prepared for information-based and cyber-based attacks that can digitally cripple defense systems before a physical confrontation occurs.

Cybersecurity Theory – Richard A. Clarke & Robert K. Knake

Cybersecurity is becoming a crucial element in national defense, especially in the context of modern warfare that relies on high technology. Richard A. Clarke and Robert K. Knake in *Cyber War: The Next Threat to National Security and*

What to Do About It assert that cyber threats can destroy military and economic infrastructure without the need to carry out a direct physical attack. Cyberattacks can target radar systems, communication networks, and air defense control commands, all of which rely heavily on digital technology. Therefore, the Arhanud Corps must strengthen its cyber defenses by developing stronger encryption systems, improving real-time cyber threat detection capabilities, and building cooperation with cyber security agencies to ward off potential attacks from invisible enemies.

Information Warfare Theory – P.W. Singer & Emerson T. Brooking

In the fifth generation of war, information became a very influential weapon in shaping public perception and weakening the stability of a country. P.W. Singer and Emerson T. Brooking in *LikeWar: The Weaponization of Social Media* explain how social media has become a new battleground that allows state and non-state actors to spread propaganda, disinformation, and psychological warfare on a massive scale. Information warfare campaigns can attack the morale of the troops, divide society, and create distrust of the government and the military. Therefore, the Arhanud Corps must not only protect the airspace physically, but also must be active in counter-narratives to counter digital propaganda that has the potential to disrupt national stability and weaken the army's combat readiness.

Military Complexity and Adaptation Theory – Alvin & Heidi Toffler

Alvin and Heidi Toffler in *War and Anti-War* explain how war has evolved from the agrarian and industrial era to the information age, where digital technology plays a major role in military strategy. To deal with fifth-generation warfare, the military can no longer rely on traditional strategies, but must adopt a more flexible, data-driven approach capable of responding to unexpected threats. In the context of air defense, the Arhanud Corps must transform by utilizing artificial intelligence, big data analytics, and network-based air defense systems that enable rapid response to cyber and physical threats. Rapid adaptation to technological developments will be the key to success in facing the challenges of modern warfare.

Asymmetry Theory and Defense Strategy – Ivan Arreguín-Toft

Wars are not always won by those with greater military power, but by those who are able to implement more effective strategies. Ivan Arreguín-Toft in *How the Weak Win Wars* explains that asymmetric strategies allow weaker actors to defeat stronger opponents by taking advantage of gaps in the opponent's defense system. In the context of air defense, the enemy does not have to use fighter aircraft or missiles to attack, but can use small drones, cyberattacks, or propaganda that damages the morale of the troops. Therefore, the Arhanud Corps needs to implement a more flexible defense strategy, such as the development of AI-based threat detection systems, increased interoperability with other defense units, and capacity building to deal with increasingly complex hybrid threats.

These five theories are an important foundation in understanding and developing the defense strategy of the Arhanud Corps in facing the fifth generation of war.

METHODOLOGY

Fifth-generation warfare (5GW) has changed the warfare paradigm from conventional conflict to more complex and unpredictable warfare. Not only does it involve physical military force, but it also includes cyber threats, information warfare, and asymmetric attacks that can undermine the stability of a country without direct confrontation. In this context, the Indonesian Air Defense Artillery Corps (Arhanud) has a strategic role in protecting national airspace from various modern threats. However, to be able to face the challenges of fifth-generation warfare, Arhanud units need to have more adaptive capabilities, not only in the aspect of conventional air defense, but also in dealing with cyberattacks and psychological warfare that are the main characteristics of 5GW. Therefore, it is important to identify the main capabilities that must be possessed by the Arhanud unit in order to face the increasingly complex and multidimensional threats in this modern era.

In addition to strengthening unit capabilities, interoperability and synergy between units within the TNI AD and with other dimensions are key in creating an effective air defense system. In the context of modern warfare, strong coordination between Arhanud units, infantry, other combat units, and elements of the Indonesian Air Force and the Indonesian Navy are crucial in creating an effective command and operation unit. As the complexity of threats increases, a more systematic strategy is needed to ensure that each unit in the TNI can work in an integrated manner and support each other in dealing with attacks from various dimensions. Therefore, it is necessary to study how to strategize to improve coordination and management between units within the TNI AD and between other dimensions to ensure interoperability in facing the threat of fifth-generation war.

In facing the challenges of modern warfare, the Arhanud Unit also needs to adapt its operations to the development of the main tools of the weapon system (Alutsista) and the medium-term Strategic Plan (Renstra) for 2025-2029. The use of advanced technology-based air defense systems, such as radars with artificial intelligence (AI), network-based defense systems, and the integration of sensor systems and weapon systems are crucial to increase the effectiveness of Arhanud unit's operations. However, the modernization of defense equipment must be balanced with the right operational strategy in order to achieve maximum effectiveness on the battlefield. Therefore, it is necessary to study how the Arhanud Unit's operations can be adjusted to the challenges of tasks at *the next level* and how the available equipment can be optimized in supporting the success of air defense operations.

In addition, Arhanud's readiness to face future challenges does not only depend on the modernization of the Defense Equipment, but also on personnel development and combat capacity development. A strong defense system depends not only on technology, but also on the readiness of the human resources that operate it. In the context of fifth-generation warfare, the capability

development of the Arhanud Unit must include increasing competence in dealing with cyber threats, mastery of the latest defense technologies, and increasing combat readiness through more adaptive training. Therefore, it is necessary to study how the strategy for fostering the Arhanud Unit's ability to carry out tasks at *the next level* effectively and sustainably.

Taking into account the various challenges that exist, this study aims to explore strategies that can be applied by the Arhanud Unit in facing the fifth generation of war. The main focus of this research includes the identification of capabilities that must be possessed by the Arhanud Unit, strategies to improve coordination and interoperability between units, optimization of operations and equipment, as well as strategies for fostering personnel capabilities in order to be able to respond to future challenges more effectively. With a more adaptive and innovative approach, it is hoped that the Arhanud Corps can become more prepared in maintaining Indonesia's air sovereignty in the increasingly complex era of modern war.

Based on this background analysis, in writing the formulation of the problem is raised, namely:

1. What are the abilities that the Arhanud unit must have in facing the fifth generation war?
2. How to improve coordination and management between the TNI AD corps and between other dimensions to ensure interoperability and create a unified command in the face of the threat of modern warfare?
3. How is the operation of the Arhanud Unit to achieve the challenges of tasks at the next level with the equipment owned by the Arhanud Unit and the Medium-Term Strategic Plan for 2025 - 2029?
4. How to develop the ability of the Arhanud Unit to be able to carry out tasks at the next level?

RESEARCH RESULTS

Fifth-generation warfare (5GW) has changed the pattern of modern warfare by presenting more complex and asymmetrical threats. No longer relying on direct physical attacks, 5GW leverages advanced technology, cyber warfare, disinformation, and psychological operations to weaken a country from within. According to a report from *the Center for Strategic and International Studies (CSIS)*, cyberattacks targeting defense infrastructure and military command systems have increased significantly in recent years, with more than 50% of global attacks targeting military and government systems. This shows that the threat in 5GW cannot be ignored, and that the defense of a country, including Indonesia, must adapt quickly to these dynamics.

In the context of national air defense, the Indonesian Air Defense Artillery Corps (Arhanud) has a strategic role in protecting air sovereignty from various threats, both conventional and non-conventional. However, based on the 2023 report of the Indonesian Ministry of Defense, there are several main challenges faced by Arhanud in facing the threat of fifth-generation war. One of them is the limitations in the early detection system and the integration of air defense technology that still depends on the old system. Meanwhile, countries such as China and Russia have developed artificial intelligence (AI)-based air defense

systems and *network-centric warfare* technologies that enable faster responses to modern air threats.

Interoperability between units within the TNI AD and coordination with other dimensions are also challenges in facing the threat of modern warfare. Based on data from the *RAND Corporation*, the effectiveness of air defense relies heavily on the unit's ability to share information in real-time and build strong *situational awareness*. However, in Indonesia, coordination between units in the air defense system still experiences obstacles in terms of the integration of communication and command systems. This is a concern in an effort to increase synergy between the Arhanud Corps, other combat units, and defense elements from the Indonesian Air Force and the Indonesian Navy to create a more effective defense system against multidimensional threats.

In addition to the coordination aspect, the use of the main weapon system (Alutsista) owned by the Arhanud Unit is also an important factor in facing the fifth generation of war. According to the Strategic Plan (Renstra) of the Ministry of Defense of the Republic of Indonesia 2025–2029, Indonesia plans to modernize the air defense system by procuring advanced 3D radars, medium-range missile systems, and the integration of AI-based command systems. However, a report from *the Global Firepower Index* states that in terms of air defense technology, Indonesia is still below countries such as South Korea and India that have adopted more advanced network-based air defense systems. Therefore, optimizing the use of available equipment and accelerating the modernization of the air defense system is crucial for the Arhanud Unit.

In addition to technological modernization and improved coordination, the readiness of human resources (HR) in facing fifth-generation warfare is also a major factor in the effectiveness of air defense. Based on research from *the International Institute for Strategic Studies (IISS)*, military training oriented towards cyber threats and disinformation is increasingly becoming a priority in various countries, given that fifth-generation warfare relies not only on physical strength but also on information manipulation. In the Indonesian context, training programs within the Indonesian Army still focus more on conventional war scenarios, while training based on cyber warfare and *hybrid warfare* still needs to be improved. Therefore, there is a need for a renewal in Arhanud's doctrine and training to be more adaptive to modern threats.

Taking into account these various challenges, this study aims to analyze the strategies that can be applied by the Arhanud Corps in dealing with the fifth generation of war. The main focus of this study includes the identification of the main capabilities that must be possessed by the Arhanud Unit, increasing coordination and interoperability between units, optimizing the use of Defense Equipment in accordance with the 2025–2029 Strategic Plan, and strategies for fostering personnel capabilities to be better prepared to face future challenges. With a more innovative and technology-based approach, it is hoped that the Arhanud Corps can improve its combat readiness and become more effective in maintaining Indonesia's air sovereignty in the increasingly dynamic era of modern war.

DISCUSSION

Abilities That Must Be Possessed by the Arhanud Unit in Facing the Fifth Generation War

Fifth-generation warfare (5GW) has brought about fundamental changes in the dynamics of global warfare. If in previous generations war was still physical with conventional strategies, now the threat has evolved to be more complex, blurring the line between war and peace. In this context, the Air Defense Artillery Corps (Arhanud) faces a major challenge in developing its capabilities to be able to respond to multidimensional threats.

The main abilities that Arhanud must possess in dealing with 5GW include aspects of technology, tactics, and readiness to face non-conventional threats. First, mastery of radar technology and artificial intelligence (AI)-based early detection systems is a top priority. The latest generation of 3D radar technology allows for more accurate detection of aerial threats, increasing the speed of response in the face of air attacks or autonomous drones. The use of AI-based systems also plays a role in faster and more effective intelligence data analysis. Second, the integration of *network-centric warfare* is an important element in increasing the effectiveness of Arhanud. In 5GW, attacks are often asymmetrical and do not always originate from conventional threats such as warplanes or ballistic missiles. Therefore, defense systems must be able to adapt to unforeseen threats by integrating data from various sensors and air defense units into a single, centralized command system. Third, readiness to face the threat of cyber war is a crucial factor. In the context of air defense, cyber attacks can target radar systems, missile control, and military communication networks. According to a report by the Center for Strategic and International Studies (CSIS), cyberattacks on global air defense systems have increased by 45% in the past five years, demonstrating the urgency to improve cybersecurity in the military environment. Therefore, strengthening data encryption, developing AI-based firewall systems, and intensive training for personnel in dealing with cyber threats are steps that cannot be ignored. Fourth, Arhanud must also improve his skills in dealing with the threat of disinformation and psychological warfare. Information warfare has become a key tool in 5GW to weaken the morale of the forces and disrupt the command system through digital propaganda. Therefore, Arhanud needs to have a special unit that is tasked with counter-disinformation and psychological analysis, so that it can anticipate the threat of information wars spread through social media or other digital platforms.

Improving Coordination and Management between TNI AD Corps and Other Dimensions

Coordination between units in the TNI AD and between other dimensions such as the TNI AU and TNI AL is a key factor in facing the threat of modern warfare. Fifth-generation warfare requires high interoperability between various elements of national defense so that each element can work synergistically in responding to emerging threats.

One of the main challenges in this coordination is the limited integration of communication and command systems. According to a report by the RAND Corporation, the effectiveness of air defense is greatly influenced by the speed at

which information is shared and situational *awareness* is built in real-time. Failures in communication between units can result in a delayed response, which can ultimately be fatal in combat.

To overcome these challenges, strategic steps are needed such as the development of a digital-based command and control system that can be accessed in an integrated manner by all dimensions. Technologies such as the Battle Management System (BMS) can be used to unify data from various units in a single digital platform that can be accessed in real-time by every command involved. In addition, the regular increase in joint exercises is also an important factor in building a more effective operational unit.

In addition, optimizing the use of *joint operation commands* in dealing with multidimensional threats is also a solution in improving coordination between dimensions. With a joint command that can centrally manage each element of defense, the effectiveness of the response to threats can be significantly increased.

Arhanud Unit Operations to Achieve "Next Level" Challenges with Owned Defense Equipment and Strategic Plan 2025–2029

In facing future challenges, the development of modern defense equipment is one of the main factors in increasing Arhanud's operational effectiveness. Based on the 2025-2029 Strategic Plan (Renstra) issued by the Ministry of Defense of the Republic of Indonesia, one of the main priorities is the modernization of the air defense system with the procurement of the latest generation of 3D radars, medium-range missile systems, and the improvement of artificial intelligence-based command systems.

However, in its implementation, there are several main challenges that must be faced. Budget constraints are often an obstacle in the modernization of defense equipment as a whole. In addition, dependence on foreign technology is also a factor that needs to be considered, considering that many components of Indonesia's air defense still depend on imported technology. Therefore, the strategy that can be applied is to strengthen defense cooperation with strategic partner countries and improve the domestic defense industry in order to reduce dependence on imports.

The modernization of Arhanud Defense Equipment is very necessary to meet the demands of building professional Arhanud soldiers so that they become a national power that is able to carry out the task of facing increasingly complex threats in Indonesian airspace. The TNI as a tool of state defense, functions as an antidote to every form of military threat and armed threats from abroad and within the country to the sovereignty, territorial integrity, and safety of the nation, an action against every form of threat and a restorer of the country's security conditions that are disturbed due to security chaos. In this context, the Arhanud TNI AD as one of the air defense tools of Indonesian airspace. Defense efforts to maintain state sovereignty and the integrity of Indonesia's airspace and ensure the safety of every threat will be very difficult without the support of more modern defense equipment. The defense equipment owned by the Arhanud TNI AD unit is mostly an old asset where its useful life is more than 20 years and its ability is less effective to deal with modern air vehicles today.

In order for the concept of an integrated Indonesian air defense system to be realized, strategic and comprehensive steps are needed, namely providing modern and sophisticated air defense equipment and support. The availability of modern and sophisticated defense equipment will encourage increased durability, combat power, and air defense vibration. The increased availability of air defense equipment includes:

1) *Remote sensing*. It has two main alternatives that can be used to monitor and supervise the airspace of the National Capital. First, increasing the capabilities of radar units on the island of Kalimantan. Second, utilizing micro-nano remote sensing satellite technology with high-resolution cameras placed in low Earth orbit. In this case, it is necessary to conduct further studies involving various related sectors. In addition, another alternative to support surveillance power, because radar systems can still result in blind spot areas and satellite technology has not been fully utilized, is to use Unmanned Aerial Vehicles (UAV). Therefore, the development of UAVs is needed, especially HALE (High-Altitude Long Endurance) quality because this type is able to fly for a long period of time and can communicate with operational satellites, which makes it possible to support the accuracy of data and information from monitoring results.

2) *Ballistic Missile Defense System or Missile Defense System*. Indonesia has locations closer to border areas, including hotspots in the South China Sea and the Indonesian Archipelago Sea (ALKI) II. This makes the ballistic missile defense system a very important element to be prepared. The Missile Defense System to be built must synergize three air defense forces, namely point air defense, terminal air defense, and area air defense. The Ballistic Missile Defense System will act as a shield and at the same time an attack tool in Indonesian airspace. In order to strengthen air defense artillery (Arhanud), it is necessary to pay attention to several medium-range hanud systems that are currently operating in foreign markets, namely NASAMS (National/Norwegian Advanced Surface to Air Missile Systems), Pantsir S1, Iron Dome, Sky Sabre, VL Mica, and Spyder. In order to increase Indonesia's missile power and development, it is necessary to accompany the construction of the NASAMS system consisting of active missiles guided by AIM-120 AMRAAM radars, high-resolution Raytheon MPQ-64F1 Sentinel radar for 3D fast tracking with distances of up to 75km, infrared (IR) and electro-optical (EO) sensors, and command centers or FCUs.

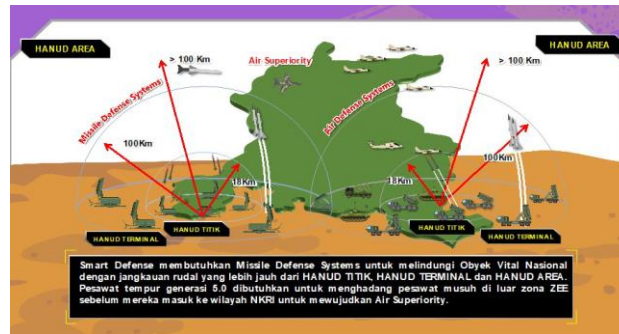


Figure 1. Concept of Missile Defense System of the Capital City of the archipelago

3) *Means of communication and information.* Communication and information facilities are very important to improve coordination between sub-systems horizontally and between vertical leadership levels. Communication and information required include reports of airspace violations. To do this, it can be done through synergy between the display of TDAS monitors (for radar) or ground station display monitors (for satellite technology) from Koopsud-Kosekhanud to Kopasgat, or between leadership units in stages within Koopsud-Kosekhanud. This aims to ensure that follow-up steps can be taken quickly and appropriately.

4) *Cyber defense systems.* Along with the rapid advancement of digital (cyber) technology, it is necessary to strengthen the cyber defense system to protect Indonesia as a modern city and a smart city that is entirely supported by integrated computer systems. In addition, digital technology will also be used in air defense systems. Cyber defense is very important because the development of cyber technology is also accompanied by an increase in crimes that use cyberspace. When there is no strong cyber defense, the air defense system becomes vulnerable to cyber attacks that can disrupt the operation of the electronic systems used in air defense systems. Therefore, the concept of a cyber defense system in Indonesia is based on a cybersecurity framework that includes detection, protection, response, and recovery. By applying the concept of a cyber defense system, the air defense system in Indonesia can overcome cyber threats as a form of non-military threat. This helps support the operation of air defense systems in the face of military threats, thus creating an integrated air defense system in Indonesia.

Fostering the Ability of Arhanud Units to Be Able to Carry Out Tasks at the Next Level

The development of Defense Equipment within the TNI AD that has begun in recent years has not been fully balanced with the concept of developing combat tactics, because with new and different Defense Equipment, of course, it will also be different in the application of tactics and combat techniques that already exist in its branches. In this case, hanud units in Indonesian territory must really recognize the capabilities and limits of their units' capabilities. Arhanud's combat techniques and tactics are implemented with consideration of factors that affect both in terms of tasks, terrain and weather, enemies and own troops. The

battle tactics of the arhanud units that are developing today are: 1) Deployment. With the current Cannon Defense with a low and limited level of mobility, it requires a long planning process and takes a long time to place the Satbak in the designated title place. 2) Shooting. The defense capabilities possessed by the Arhanud TNI AD unit are currently limited to the characteristics of weapon capabilities so that conventional shooting techniques rely heavily on radial obstruction, rectangular map, cardinal direction or direction of the sun. This shooting process goes through complicated, time-consuming procedures and inaccurate shots. 3) Transfer of Degrees. With low mobility/mobility ability, the tendency of the Satbak to carry out the transfer of the title position is very minimal unless the enemy knows the position of the Satbak title so that a change of position is held from the main title to the reserve title to avoid air attacks.

Development of future Arhanud unit combat tactics. Drone technology (unmanned) and other technological advances in observation and reconnaissance have resulted in Arhanud units being easily found as early as possible and attacked during the journey (tactical movement) and deployment, so there is a need for tactics to deal with these threats, namely hide, shoot and scoot (camouflaged, shoot and change titles). Hide means that the position placement cannot be known and found by the enemy, shoot means the placement of the Satbak so that it is possible to shoot air targets as early as possible and the scoot prioritizes the placement of the position to immediately change positions with high mobility. In principle, the tactical advantage applied in the current generation of air strikes is the use of stealth technology, remote command and control range from the target so that it can carry out surprise as optimally as possible (shock and awe). Arhanud's Hide, Shoot and Scoot tactics are very effective in overcoming these types of attacks on the condition that basic air defense principles are applied in a disciplined manner and supported by more advanced technology.

The effort made to be able to develop the battle tactics of the Arhanud unit to face the challenges of future tasks is to review the formulation of the function of the Arhanud so that a modern Arhanud tactic is formed. In accordance with Bujukin Arhanud in carrying out his main task, namely organizing active air defense to destroy, eliminate and reduce the usefulness and results of enemy air attacks using aircraft, missiles and ballistic missiles. Arhanud performs the following functions: 1) Search and discovery, 2) Identification, 3) Tracking, and 4) Destruction. However, in the implementation of these air defense functions, when faced with the air defense implementation system using new defense equipment, the implementation of Arhanud functions that have been embraced so far is no longer valid because they can be carried out at once and in a short and integrated time, almost inseparable from each other. Moreover, with future plans that require the ability of Arhanud to manning medium-range missiles and long-range missiles that use modern technology, the function of the Arhanud TNI-AD (Detection, Identification, Tracking, Destruction) function is certainly no longer relevant to the specifications or capabilities of these modern weapons. In a battle involving multiple branches of the Indonesian Army, of course, synergy between branches is needed that can support each other so that the

implementation of the battle can run effectively and efficiently with optimal results. Therefore, there is a need for adjustments in tactics and combat techniques involving multiple branches so that synergy is created in the implementation in the field. Faced with the demand to enlarge Arhanud's capabilities in order to be able to provide air protection to maneuvering forces, the Arhanud TNI AD must be able to optimize its role as an air umbrella to protect airspace from increasingly modern air threats.

For this reason, the development of the function of Arhanud below is expected to accommodate or replace the function formulated in Bujukin in 2004 which is considered no longer relevant in the face of modernization and strengthening the role of Arhanud in the future.

1. Air Protection Function. This function is a universal function embraced by Arhanud around the world. Where at the operational and tactical level, Arhanud must be able to carry out air defense from enemy threats coming from the air by forming an air umbrella in the area of objects protected by Arhanud units. In this case, the Arhanud units participating in the Joint Ground Operation carry out the function of protecting troops on the ground, both in the form of maneuver units and TNI AD infrastructure in battles that receive priority protection, such as Posts and Armed Positions.
2. Shot function. In the battle situation, Arhanud carried out assistance fire in prerequisite conditions when the protection function could be carried out optimally. Shooting assistance is provided when there is a request from other units carrying out operations. The shots fired by Arhanud's units aimed at destroying ground targets, which threatened the existence of maneuvering troops.
3. Maneuver Function. Arhanud carries out a maneuver function where Arhanud follows or deploys his forces in order to protect troops carrying out joint ground operations. This function is based on the implementation of Arhanud operations in order to protect maneuver units starting from the order to change degrees, followed by moving in order to protect units that carry out maneuvers according to the priorities that have been set by the top leadership.
4. Ground-Air Combat Function. The prominent thing contained in the context of the land-air war is the communication and control system. Organizationally, the implementation of the Arhanud kodal does not solely depend on the function of the kodal supported by the Army Transportation unit, but must be integrated with the Kohanudnas K4IPP system. From some of the above considerations, it can be concluded that the function of Arhanud in order to organize active air defense is as follows: 1. Maneuver Function; 2. Protection function; 3. Fire Assist Function; 4. Ground-air combat.

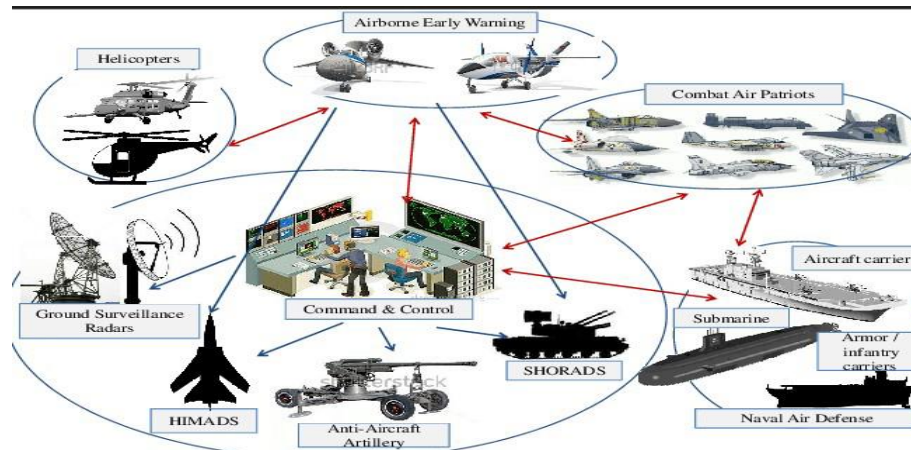


Figure 6. Integrated Hanud System

In addition to the modernization of defense equipment, the development of human resources (HR) in the Arhanud Unit is also an important element in readiness to face the fifth generation of war. According to *the International Institute for Strategic Studies (IISS)*, many countries have adapted military training models oriented towards cyber threats and disinformation to increase the resilience of troops in the face of unconventional wars.

In the Indonesian context, the development of Arhanud's capabilities must include increasing training based on cyber war and information warfare, strengthening educational programs integrated with digital technology, and developing data analysis capabilities in early detection of air threats. By building a more adaptive and technology-based training system, Arhanud can be better prepared to face the challenges of modern warfare that are increasingly dynamic and difficult to predict.

CONCLUSION

Building an integrated air defense system as an effort to increase national resilience has challenges in the form of airspace conditions that are prone to the threat of enemy air attacks. Therefore, it is important to continue to strengthen and develop the national air defense system in order to better deal with threats and maintain the stability of the country's security. By increasing the support of modern and sophisticated air defense defense equipment and supporting equipment such as advanced remote sensing systems, ballistic missile defense, communication and information facilities, and cyber defense systems. As well as in the development of Arhanud combat tactics to face the threat of modern air attacks in Indonesian airspace, it is to continue to fulfill the functions of Arhanud and the principles of Hanud principles as well as the general basics of the preparation of the title of Satbak Arhanud by paying attention to the factors of TUMMPAS (Duty, Terrain, Enemy and Own Troops). To overcome this, Arhanud tactics are needed which emphasizes the principle of camouflage, shoot and scoot.

RECOMMENDATIONS

The establishment of the Hanudnas Task Force under the Commander of the TNI within the framework of State Security Defense by involving all elements of Hanud's capabilities which is manifested in an integrated effort and action continuously throughout the year, both operational and coaching to overcome every form of air threat. In carrying out air defense operations, adhering to the pattern of the title of the Main Weapon System (Alutsista) is Area Air Defense, Terminal Air Defense and Point Air Defense. By adhering to the pattern of the title in Sishanud, the depth of air defense can be carried out effectively and successfully in order to protect vital objects. Basically, the National Air Defense System is a series of Hanud elements that are deployed in national vital objects in an integrated manner to carry out airspace defense against enemy threats that come through air media over their territory, by means of the title and active detection, identification, enforcement and countermeasures involving national potential with Hanud capabilities. and integrated action in tackling threats.

TNI air defense interoperability refers to the TNI's ability to cooperate and operate effectively with other dimensions or elements in supporting and protecting national airspace with continuous hanud capabilities. "For its implementation, Kohanudnas has facilities, facilities and infrastructure as well as support for related elements including ambush fighter aircraft, air bases, medium rare missiles, hanud cannons, TNI Army tactical missiles, KRI Capable of hanud, communication and electronic warfare, elements of civil aviation and passive hanud which are held in layers and support each other".

One of the elements capable of Hanud in question is medium-range and short-range Air Ground Missiles that play a very important role in carrying out Air defense operations, namely medium-range Air Ground Missiles for Terminal Air Defense and short-range Air Ground Missiles for Point Air Defense. Therefore, Air Ground Missiles as one of the elements of air defense are absolutely necessary for the stability of the Defense Equipment title pattern which is certain for the place of the title in the area of national vital objects that are always ready so that regular maintenance and maintenance are needed.

ADVANCED RESEARCH

Further study should focus on enhancing Indonesia's integrated air defense system by exploring advancements in modern air defense technology, such as remote sensing, ballistic missile defense, and cyber defense. Research should also analyze the adaptation of Arhanud combat tactics, emphasizing camouflage, shoot-and-scoot strategies, and the application of TUMMPAS principles to effectively counter modern air threats. Additionally, studies on improving communication, information systems, and coordination between defense units will be crucial for strengthening national resilience against evolving aerial threats.

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