

**DEFENCE COOPERATION BETWEEN INDOENSIA AND GERMANY IN AIR
DEFENCE: A STUDY ON DIEHL DEFENCE'S IRIS-T MISSILE**

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ABSTRACT

The Indonesian Air Force as a state instrument in the field of air defence has a duty, which one of it is to maintain sovereignty in the airspace of national jurisdiction using combat aircraft in carrying out air defence and taking action against airspace violations. However, in reality, the current condition of air missiles owned by the Air Force is still very limited in number to support operations and the trend of readiness has decreased, so that it is necessary to increase the strength of defense equipment through defence cooperation that needs to be carried out by Indonesia with Germany in the acquisition of IRIS-T missiles. This research uses a qualitative method. The required data were collected through interviews with a number of relevant informants, observation, literature study and documentation. The data obtained in the research were then analysed through three stages of analysis, namely data reduction, processing and analysis, data presentation, and conclusion drawing. The results showed that defence cooperation between Indonesia and Germany in the acquisition of IRIS-T missiles is possible and feasible. If the Indonesian Air Force acquires IRIS-T missiles, there will be compatibility with air defence systems owned by fighter aircraft such as the F-16 AM/BM emlu, F-16 C/D and T-50i aircraft. There are four opportunities if the IRIS-T acquisition is carried out, namely increased missile capability, flexibility and interoperability, deterrence and trust and modernisation and technology.

Keywords: Air defence, Air force, Defence Cooperation, Fighter Aircraft, IRIS-T Defence Missile.

ABSTRAK

Tentara Nasional Indonesia Angkatan Udara sebagai alat negara di bidang pertahanan matra udara memiliki tugas yang salah satunya menjaga kedaulatan di wilayah udara yurisdiksi nasional melalui penggunaan pesawat tempur dalam melaksanakan pertahanan udara serta melakukan tindakan terhadap pelanggaran wilayah udara. Namun pada kenyataannya kondisi rudal udara yang dimiliki TNI AU saat ini masih sangat terbatas jumlahnya untuk mendukung operasi serta tren kesiapannya mengalami penurunan sehingga diperlukan peningkatan kekuatan alutsista melalui kerjasama pertahanan yang perlu dilakukan oleh Indonesia dengan Jerman dalam akuisisi rudal rudal IRIS-T. Penelitian ini menggunakan metode kualitatif. Data-data yang dibutuhkan dikumpulkan melalui wawancara terhadap sejumlah informan yang relevan, observasi, studi literatur dan dokumentasi. Data-data yang diperoleh dalam penelitian kemudian dianalisis melalui tiga tahap analisis, yaitu reduksi data, pengolahan dan analisis, penyajian data, dan pengambilan kesimpulan. Hasil penelitian menunjukkan bahwa kerjasama pertahanan Indonesia dan Jerman dalam akuisisi rudal IRIS-T berpeluang dan layak untuk dilakukan. Jika TNI AU melakukan akuisisi rudal IRIS-T maka akan terdapat kesesuaian dengan sistem pertahanan udara yang dimiliki oleh pesawat tempur seperti pesawat F-16 AM/BM emlu, F-16 C/D dan T-50i. Terdapat empat peluang jika akuisisi IRIS-T dilakukan yaitu peningkatan kemampuan rudal, fleksibilitas dan interoperabilitas, deterensi dan kepercayaan serta modernisasi dan teknologi.

Kata kunci: Kerjasama Pertahanan, Rudal IRIS-T Defence, TNI AU, Pesawat Tempur, Pertahanan udara.

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INTRODUCTION

As the largest archipelago in the world, Indonesia has a marine area of 3.25 million km². Geographically, Indonesia is located between two large oceans, namely the Pacific and Indian, which makes Indonesia one of the busiest shipping lanes in the world, such as the Strait of Malacca and the Sulawesi Sea (Samy & Kusumadewi, 2021). With these conditions, apart from having a positive impact on economic growth, there are potential threats to national security faced by the Indonesian state. In an aspect of national security, there are strategic constraints experienced by Indonesia in overcoming threats from outside and from within the country, which include the limitations of the main defence system owned by Indonesia owned by each army institution and the qualifications of these defence equipment that have not been able to reach the national security area as a whole. (Suoth et al., 2018)

Not only land and sea areas, potential threats can also arise from airspace. Until now, there is no international treaty that regulates the height limit of each country's sovereignty in the airspace, but each country is fully sovereign over the air and space above its territorial area (Savitri & Prabandari, 2020). TNI Commander Admiral Yudo Margono said that military and civilian aircraft from several countries often violated Indonesia's airspace borders during January-June 2023. Meanwhile, violations committed by military aircraft occurred 10 times, of which 8 violations were committed by United States military aircraft and twice by Indian military aircraft. In addition, US civilian aircraft were also recorded violating Indonesian airspace three times and civilian aircraft belonging to the Czech Republic violated Indonesian airspace once (Dirgantara, 2023). Considering these geographical conditions and potential threats, strategic steps are needed both in increasing the strength of defence equipment through defence cooperation that must be carried out by the Indonesian state (Darmawan et al., 2020).

One of Indonesia's defence cooperation is cooperation that carried out with Germany. Bilateral relations between Indonesia and Germany began in 1952. During the visit of the President of the Federal Republic of Germany, Dr. Christian Wulff to Indonesia on 30 November - 2 December 2011 ahead of the 60th anniversary of diplomatic relations between Indonesia and Germany in 2012, produced the "Indonesia-Germany Joint Declaration for a Comprehensive Partnership: Shaping Globalisation and Sharing Responsibility" as a reference for the implementation of the Indonesia-Germany Bilateral DCA. The *Bilateral Defence Cooperation Agreement between Indonesia-Germany* is a relationship carried out by Indonesia and Germany in the form of bilateral cooperation in the field of defence which is intended as an effort to realise defence diplomacy, whose implementation is more developed to build mutual trust (*trust building*), find peaceful solutions for handling security issues that are of concern to both parties.

Purchasing defence equipment from the original producing country is a smart move and has positive strategic impacts such as *Transfer of Technology* (ToT) issues. On 5 June 2023, Defence Minister Prabowo Subianto received a courtesy call from German Defence Minister Boris Pistorius at the Indonesian Ministry of Defence in Jakarta. Although the meeting discussed the strengthening of defence cooperation between Indonesia and Germany in terms of education and training, German Defence Minister Boris Pistorius stated that Germany is open for other cooperation to be implemented next year (Kemhan, 2023).

Germany is one of the countries that can be used as an alternative in implementing a diversification strategy in fulfilling the Air Force's air-to-air missile needs. Germany produces an air-to-air missile called IRIS-T which has the same level of capability as the AIM-9X-2 missile and outperforms the capabilities of the AIM-9P-5 missile. Based on data released by *Stockholm International Peace Research Institute* (SIPRI) in 2012-2018 (SIPRI, 2017), Germany is among the world's top 5 arms exporters. Some of the countries that use IRIS-T missiles include Germany itself, Austria, Brazil, Greece, Italy, Norway, Saudi Arabia, South Africa, Spain, Sweden, and Thailand which are ASEAN Region countries. Based on SIPRI data, from 2012 to 2018 Thailand has purchased 220 IRIS-T missiles to meet the missile needs of F-16, F-5 and JAS 39 Gripen aircraft. Not only Thailand, Greece, Italy, and Norway as F-16 aircraft operator countries have also acquired IRIS-T missiles to meet the needs of *air-to-air* missiles which shows that

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IRIS-T missiles are compatible for various types of combat aircraft, especially F-16 aircraft.

While in Indonesia at this time there has been cooperation with South Korea in the development of the 4.5 generation fighter aircraft, namely KFX / IFX (*Korean Fighter Experiment/Indonesian Fighter Experiment*) or known as the KF-21 Boramae aircraft. In its planning, the mass production stage of the KF-21 aircraft will be carried out in 2026 with a plan to purchase 48 units of the aircraft (Mawangi, 2023). In addition to these plans, on 4 April 2023, the KF-21 Boramae aircraft successfully carried out a test firing of an IRIS-T missile. The acquisition of IRIS-T missiles on this aircraft is an alternative to *air-to-air* missiles because the US government has not given permission for the use of AIM-9X missiles to be integrated on the KF-21 Boramae aircraft (Gain, 2023). Based on these conditions, it can be said that in the future, the potential acquisition of IRIS-T missiles to strengthen Indonesia's air defence needs to be done.

In the research conducted by the researcher, the researcher focused on the defence cooperation between Indonesia and Germany in the acquisition of IRIS-T Diehl Defence Missiles. This is motivated by direct observations by researchers which show that the Air Force as a state instrument in the field of air defence has a duty, one of which is to enforce the law and maintain sovereignty in the airspace of national jurisdiction in accordance with the provisions of national law and ratified international law. In order to maintain sovereignty in the airspace of national jurisdiction, the Air Force adheres to the concept of *defence in depth*, where the defence area is divided into area air defence, terminal air defence and point air defence (Sumintaatmadja, 2015).

Combat readiness is the main requirement so that the role of fighter aircraft as a respected deterrent in the region is maintained. "*War will begin in the air, he who is unprepared is lost*" (Hakim, 2022). In a dogfight, fighter aircraft rely heavily on advanced air-to-air missile capabilities. Air to air missiles owned by the Air Force currently includes the AIM-9P-5 and AIM-9X-2 missiles originating from the United States as the country of manufacture. The AIM-9P-5 missile can be operationalised by almost all types of fighter aircraft owned by the Indonesian Air Force including the F-16 A/B eMLU, F-16 C/D, T-50i and Hawk 200 aircraft, so that this missile is very reliable in carrying out the task of protecting airspace. The AIM-9X-2 missile is a new type of missile with the latest technology, but is only able to be integrated on F-16 A/B eMLU aircraft.

But in reality, based on direct observations of researchers, the condition of air missiles owned by the Air Force is currently still very limited in number to support operations and its readiness trend has decreased. This is inseparable from the policies of the United States as a producer country that has strict export regulations for military technology and equipment, regulated in the *International Traffic in Arms Regulations* (ITAR). ITAR is issued by the US State Department and is designed to help the United States achieve its foreign policy and national security objectives by controlling the export of defence material and defence-related services. This regulation is one of the causes of the complexity of the missile procurement process and the *transfer of technology* provided, so that maintenance capabilities are limited. There needs to be a solution to overcome the problem of missile readiness in order to support combat readiness. It is time for the Air Force to take steps to diversify defence equipment, especially missiles, by looking for alternative new producer countries to be able to meet the operational needs of air missiles in the same class as the AIM-9X-2 and AIM-9P-5 missiles that can be compatible with Air Force combat aircraft in the present and future.

In this study, researchers reviewed previous studies as supporting studies. Previous studies in this research are divided into three categories. First, the category of defence cooperation consists of research on the impact of Indonesia-United States defence cooperation on the achievement of *Minimum Essential Force* (MEF) Phase II by Andrew Figo Maulana Ervin (Ervin, 2023), research on defence cooperation between Indonesia and Germany from 2012-2017 (Mangkusubroto & Setiawan, 2023) and research on Germany-Indonesia defence cooperation through the Jakarta declaration in 2012-2016 (Karomah &

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Tjarsono, 2017). The category of studies on defence equipment procurement policies consists of research on Indonesia-Germany defence cooperation in the procurement of Leopard Tanks and *transfer of technology* for the modernisation of TNI's defence equipment (Andiani, 2017), analysis of Germany's interests in the delivery of *Main Battle Tank* Leopard to Indonesia (Putri, 2021), factors driving Indonesia's defence equipment procurement diversification policy (Azzara, 2020) and the political economy of Changbogo submarine equipment procurement in the context of the process of independence of the Indonesian defence industry (Susdarwono, 2019). The category on defence acquisition consists of research on the analysis of the acquisition of Indonesian defence industry technology, a case study of the development of the KFX/IFX fighter aircraft (Salsabiela, 2018), and an evaluation of the implementation of the *joint development of the National defence equipment program in the KF-X/IF-X program* (Roslinawati, 2021). The relevance of the above research to this study is that this research has the same concern about the defence cooperation between Indonesia and Germany so that it can add reference references for researchers in conducting research. Meanwhile, research on the prospects for Indonesia's defence cooperation with Germany in the acquisition of IRIS-T Defence missiles is still limited by previous researchers. Taking into consideration the background and urgency of this research, the researcher is interested in analysing the defence cooperation between Indonesia and Germany in the acquisition of IRIS-T Diehl Defence missiles as outlined in a paper with the title, '*Indonesia and Germany Defence Cooperation in Air Defence: A Study on the Prospects of IRIS-T Diehl Defence Missile Acquisition*'.

METHODS

This research was conducted with the aim of analysing the potential for defence cooperation between Indonesia and Germany in the acquisition of Diehl Defence's IRIS-T Missile. This research uses a qualitative method approach. The qualitative approach allows this research to look at facts in reality based on social phenomena. The phenomenon that is the object of this research is the difficulty of increasing the number of missiles, strict arm regulation and the limited transfer of technology provided by the United States (US) as a producer of air-to-air missiles, so that a diversification strategy is needed. This research is based on inductive logic attached to a qualitative approach. Inductive logic is a way of thinking that sees that theory is generated from research findings, so the use of theory in the analytical framework only serves as a basic reference to help limit the scope of data (Clark et al., 2021). This research uses data collection techniques through interviews with a number of relevant informants, indirect observation through observation, and documentation studies of a number of important documents related to this research such as a collection of regulations and forms of written cooperation agreements in the defence sector, pictures, and activity reports in the form of related electronic documents. The informant determination technique used by the researcher is purposive sampling technique, where the researcher determines the informants based on the objectives, problems and research variables. Informants in this research include leaders at the Directorate of International Cooperation of the Indonesian Ministry of Defence, leaders at Maintenance Depot 60 (Depohar 60), leaders at the Air Force Operations Staff (Sopsau), leaders at the Air Force Planning Staff (Srenau), leaders at the Air Force Aeronautics Service (Disaeroau) and leaders of PT. Panglima Pandawa Sakti.

Regarding data analysis techniques, referring to Miles and Huberman (2014), that qualitative data analysis is an effort made through collecting, compiling, and selecting research data. The data collected is integrated into various patterns and then shared as research results. The data analysis technique developed by Miles and Huberman (2014) was used to analyse the research data through three stages of analysis of the collected data, namely data reduction, data presentation, and conclusion making. To maintain the validity of the data, the researcher conducted a triangulation technique. The triangulation techniques used in this research include triangulation of data sources (primary and secondary), triangulation of informants and triangulation of theory (looking at the relevance of the theory to the problem and research results).

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Triangulation of data sources was carried out by cross-checking primary and secondary data with the aim of obtaining the same information obtained.

DISCUSSION

Defence Cooperation between Indonesia and Germany

Perwita & Yani (2005), explained that in interstate cooperation there are four that are used, namely national interests, the form of the agreement, the purpose of the agreement and the agreement on the time of cooperation. In the first potential for defence cooperation between Indonesia and Germany, namely national interest, it was found that the national interest owned by the Indonesian state to conduct defence cooperation with Germany is found in the preamble of the 1945 Constitution. The results showed that the national interests that underlie the defence cooperation between Indonesia and Germany are protecting all Indonesian people, supporting the realisation of public welfare, participating in the intellectual life of the Nation and implementing world order based on independence, lasting peace and social justice.

Furthermore, Perwita & Yani (2005) mentioned that relations between countries in the contemporary era aim to explore various dimensions in protecting a country's national interests in global dynamics. Looking at the current global dynamics certainly has an impact on Indonesia's national defence. In order to overcome various kinds of potentials including potential threats in global dynamics, strategic steps are needed to overcome them. One of the steps that can be taken is to establish cooperation in the field of defence that can be carried out by the Ministry of Defence of the Republic of Indonesia with other countries and specifically with the German government. Bilateral relations are expected to create conditions of mutual interaction between two entities (countries) that are equal and mutually beneficial. This is in accordance with the results of research conducted by researchers on

The form of defence cooperation between the two countries shows that there are six forms of defence cooperation between Indonesia and Germany, namely conducting official visits from high-ranking officials, military and civilian representatives of the Ministry of Defence, becoming participants in joint courses and training of the armed forces of the two countries, equality in relations between Indonesian-German military institutions, talks involving experts from Indonesia-Germany, exchanging information and experiences and conducting various other forms of cooperation based on the principle of reciprocity and benefit.

Bilateral interaction between Indonesia and Germany within the framework of cooperation is identified as a form of bilateral cooperation, which can be explained as the existence of an interest that is the basis for an agreement between two countries to interact with each other in certain fields in a mutually agreed manner and purpose. This is in line with the results of research on

There are three objectives of defence cooperation between Indonesia and Germany, namely realising a strong national defence from various forms of threats, building the life of the nation and state and strategic steps to achieve world peace and order through relations between Indonesia and Germany based on the principles of equality, benefits, and respect for sovereignty and territorial boundaries owned by Indonesia and Germany. This is also constitutionally contained in the MoU between the Ministry of Defence of the Republic of Indonesia and the Ministry of Defence of the Republic of the German Federation in the field of Defence, which was agreed on 27 February 2012. Constitutionally, this MoU was ratified in the Law of the Republic of Indonesia Number 5 of 2016 concerning the Ratification of the Memorandum of Understanding (MoU) between the Ministry of Defence of the Republic of Indonesia and the Ministry of Defence of the German Federation regarding Cooperation in the Field of Defence. This is in line with the results of research on Indonesia-Germany Defence Cooperation in 2012-2017 by Mangkusubroto and Setiawan, who explained that defence cooperation between Indonesia and Germany was marked by the agreement and signing of the MoU by both parties and was implemented by cooperating in the Indonesian defence industry with Germany.

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In terms of 'actors,' defence cooperation between Indonesia and Germany is included in organisational cooperation carried out by two countries. Based on the perspective of its form, defence cooperation is a formal cooperation between two or more countries, considering that the cooperation uses treaties or other forms, which can be binding or non-binding, namely in the form of defence cooperation agreements, namely in the MoU between the Ministry of Defence of the Republic of Indonesia and the Ministry of Defence of the Republic of the German Federation in the field of Defence which was agreed on 27 February 2012.

From the point of view of its binding force, defence cooperation is basically voluntary cooperation, but defence cooperation can also be antagonistic cooperation based on the national interests of each country. From a time perspective, defence cooperation is usually classified as periodic cooperation, because it is formal and uses agreements that usually specify that the agreement is valid for a certain period of time, for example five years, and will be extended in due course. This is also in accordance with the fourth time of cooperation where the research results show that the agreement on the time of defence cooperation between Indonesia and Germany takes effect on the date of the last written notification between the Ministry of Defence of Indonesia and the Ministry of the German Federation after the internal procedures of each country are carried out for five years legally after the date of entry into force and automatically applies for the following five years. If either party wants to cancel the cooperation, it must file an objection before ninety days of the maturity of the cooperation agreement.

In the study of defence cooperation, defence cooperation between Indonesia and Germany is needed as a strategic step to improve the security and defence of each country in this case Indonesia and Germany. This is as stated in the study of national defence, there is a cooperative defence explained by Michael Clarke (1999) in Suhirwan (Suhirwan & Global Akademia, 2023) that defence cooperation and collaboration with other countries need to be carried out in order to strengthen security and stability at the regional and global levels to realise national defence. This is also in line with the results of research conducted by Andrew Figo Maulana Ervin on the Impact of Defence Cooperation between Indonesia and the United States on the Achievement of Minimum Essential Force (MEF) Phase II which shows that defence cooperation with other countries has an impact on increasing Indonesia's defence capabilities in ensuring state security.

Indonesia's defence cooperation with Germany is one of the efforts made to overcome various forms of threats in global dynamics. Referring to Law No. 3 of 2002 on National Defence, threats are defined as all forms of efforts and activities with domestic and foreign coverage that have the potential to endanger the sovereignty of the state, the integrity of the state territory, and the safety of the entire nation. This is also explained in research by Titik Karomah on Indonesia-Germany Defence Cooperation through the Jakarta Declaration in 2012-2016, which shows that Indonesia's decision to cooperate with Germany is the right step because Germany is able to meet the needs of defense equipment and has an impact on the Indonesian defence industry.

The Acquisition of Diehl Defence's IRIS-T Missile by Indonesia

In analysing the potential of defence cooperation between Indonesia and Germany on the potential acquisition of IRIS-T Diehl Defence missiles, it refers to the theory of defence acquisition put forward by Sahabuddin in Arhan, et al (2022). In the theory, there are three processes or stages of procurement, capabilities and opportunities. First, the procurement process or stage, the results showed that at the initial stage, on 31 July 2019, DIEHL Defence together with PT Panglima Pandawa Sakti negotiated through an introductory presentation at the AU Headquarters. After the presentation, the results were obtained for the implementation of compatibility with TNI-AU fighter aircraft, DIEHL Defence then submitted a proposal for an activity agenda and technical specifications for conducting compatibility tests to the TNI AU.

From 2020 to 2022 compatibility tests could not be conducted due to the Covid-19 pandemic. In

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November 2023 the CEO of DIEHL Defence met with the Indonesian Minister of Defence, Mr Prabowo Subianto at the Paris Air Show with the result of the support given by the Indonesian Minister of Defence in the acquisition of IRIS-T for Indonesia. After two preparatory meetings, the Compatibility Test was conducted on 28 February 2023 to 2 March 2023 at Iswahyudi Airbase, Madiun, East Java. The results of the compatibility test showed that the Air Force's F-16A/B, F-16C/D, and T-50i aircraft are compatible with IRIS-T Analogue. This is in line with the results of research conducted by Putri Andiani, Mega (2017) on Indonesia-Germany Land Cooperation in the Procurement of Leopard Tanks and Transfer of Technology (ToT) for the Modernisation of the Main Armament System (Alutsista) of the Indonesian National Army (TNI) (2012-2017) where the results show that the process of defence cooperation between Indonesia and Germany must go through several studies and stages first.

Secondly, capability in this study refers to the capability related to the IRIS-T missile with the air defence system, especially the current TNI AU fighter aircraft (F-16, T-50i and Hawk 200). In general, currently the Air Force has 11 units of CATM-120C AMRAAM (Captive Air Training Missile) missiles for training activities and 36 units of AIM-120C-7 AMRAAM missiles for combat / operations. Of this number, 18 combat missiles are allocated for F-16 fighters, while the other 18 missiles are used for NASAMS air defence system weapons.

The results showed that after the compatibility test was carried out, the IRIS-T missile was tested and could be used in Analogue mode on F-16A/B, F-16C/D, and T-50i. In this case the Analogue mode is that IRIS-T can be used because it is detected on MFD/SMS as an AIM-9P-4 missile on F-16A/B, F-16C/D, and T-50i aircraft, AIM-9P-5 on F-16C/D and T-50i aircraft and AIM-9L/M on F-16C/D and T-50i aircraft. However, the Hawk 200 aircraft has not yet been compatibility tested. However, based on the information that the Air Force's Hawk 200 uses the LAU-7A launcher and can use Sidewinder missiles, it is certain that the same compatibility results will also be achieved.

In addition, DIEHL Defence and Embraer are currently conducting discussions on the possibility of integrating IRIS-T for the Super Tucano aircraft. The capabilities of IRIS-T in Analogue mode are not reduced at all compared to Digital mode. It is just that in Digital mode, targeting can be done using JHMCS as already owned by the Thai Air Force for the Southeast Asia region. DIEHL Defence Germany is currently working on making Digital mode possible even without the intervention of the manufacturer of the fighter aircraft in question (e.g. Lockheed Martin, Boeing, BAE, KAI).

The third aspect, namely opportunities, in this study refers to the opportunities for the acquisition of Diehl Defence's IRIS-T Missile in improving Indonesia's air defence capabilities and increasing the influence of the regional balance of power. The results show that the acquisition of IRIS-T has the opportunity to improve Indonesia's defence capabilities through the addition of weapons stocks to carry out air operations including Hanud operations because the current stock is very limited. IRIS-T's capability as a HOBS IR air-to-air missile is balanced with the AIM-9X which is also used by the Australian Air Force and Singapore, Thailand, the Philippines and Malaysia. Thus, it is indirectly affecting a more even balance.

In addition to the three aspects above, the results show that there are barriers faced in the potential acquisition of IRIS-T Defence missiles. There are six first obstacles in the acquisition of IRIS-T, namely Arm regulation of the United States (US) as a missile producing country. Missiles are goods/services that have special characteristics, such as sensitive, strategic, high-risk, and have a broad impact on regional geopolitics because the ability of air to air missiles will have a deterrent effect on air defence. US government regulations in terms of exporting weapons to other countries, especially missiles, require congressional approval where the US has a policy of maintaining a balance of power in the region, its alliance countries must have more sophisticated technology than non-allied countries so that in the implementation of missile procurement, especially AIM-9X-2 and AIM-120C-7 missiles categorised as EEUM (Enhanced end user monitoring) material, the regulations are very strict. This is stated in the

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International Traffic in Arms Regulations (ITAR). Only certain countries are allowed to purchase certain weapons, and this is often dependent on diplomatic and security relations with the US. This makes procurement difficult and time-consuming. This is as in the research conducted by Azzara (2020) on the factors driving Indonesia's defence equipment procurement diversification policy in 2006-2018 which shows that there is competition between policy-making actors which leads to the diversification of defence equipment supplier countries as the output of this political process. Thus, this has an impact on the implementation of the diversification strategy of defense equipment supplier countries which brings various problems and leads to the ineffectiveness of defense equipment procurement.

To overcome this, the acquisition of IRIS-T missiles is needed with the aim of facilitating the increase in missile procurement owned by Indonesia. This is as stated by Salsabiela (2018) on the case study of the development of the KFX/IFX fighter aircraft where the results show that Indonesia must reduce asymmetric interdependence on the US. The superpower country will always create interdependence so that its periphery is bound to it. Reducing dependence on the US has the potential to improve Indonesia's ability to catch up with the US in terms of technology. The second obstacle is that budget planning has not prioritised the development of missile forces. Indonesia is trying to build its military strength through the Minimum Essential Force Strategic Plan or MEF. MEF itself is divided into several stages in the process of achievement, namely phase I from 2009 to 2014, phase II from 2015 to 2019 and phase III from 2020 to 2024. The achievement of the Air Force MEF until 2019 based on the presentation of the achievement of the Air Force MEF development in 2019 has only reached 44.24%. In the achievement of MEF TNI AU in 2019, especially missile development is still 0%, which is because the TNI AU has not prioritised the budget for the development of missile forces in MEF phase 1 and MEF phase 2.

The third obstacle is Lockheed Martin's licence. To be able to use the IRIS-T missile in digital mode, a modification/upgrade of the aircraft's computer system is required. The upgrade needs permission from Lockheed Martin and will be very expensive. Next, is (4) Compatibility: IRIS-T missiles do not include the missile details stored in the SMS of the F-16 and T-50 aircraft, so compatibility is a crucial issue. Aeromechanical adapters are required to deploy IRIS-T missiles to F-16 and T-50 aircraft. With the analogue mode interface, the true capability of IRIS-T cannot be optimised by the aircraft without a system upgrade on the aircraft. The fourth obstacle is related to Test and Certification. Before the integration of the IRIS-T missile can take place on the F-16, it needs to be tested and certified to ensure that the missile functions properly and conforms to established safety and performance standards. This process involves field testing and simulation testing. Finally, there are obstacles regarding maintenance and logistical support. In the acquisition of the IRIS-T missile, maintenance and logistic support capabilities, in this case the maintenance capabilities at Depohar 60, must be involved so that the sustainment of the missile can be maintained. In addition to training and fulfilment of tools/special tools and testers, warehousing at Depohar and at the user Satker needs to be considered for improvement.

The various opportunities that arise from cooperation in the acquisition of IRIS-T Defence will have a positive impact on the advancement of TNI-AU's military strength. The TNI AU is tasked with carrying out law enforcement and maintaining the security of the airspace of National jurisdiction. Through proper consideration in the acquisition of IRIS-T missile defence, it is expected to have an impact on improving Indonesia's defence equipment capabilities. This is in line with the results of research by Roslinawati with the title evaluation of the implementation of the joint development of the National defence equipment program in the KF-X / IF-X program which shows that more mature and detailed strategic, tactical and operational planning is needed than if the acquisition of defence equipment through the purchase mechanism. Airspace security is an important thing that must be achieved as a form of upholding a country's sovereignty. The following figure 4.2 shows the urgency of the potential cooperation between Indonesia and Germany in the acquisition of IRIS-T Defence missiles in realising national defence.

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One of the important elements of airspace security is air defence which has elements including air defence radar elements, elements of ambush fighters, elements of medium-range guided missiles, elements of KRI, elements of air defence artillery, elements of low speed low altitude ambush aircraft, elements of passive air defence, elements of air bases, elements *of military civil coordination centre* and elements of civil airports that all contribute to supporting the security of national airspace in detecting, identifying and taking action against violations of airspace committed by military and foreign non-military aircraft. The concept of Indonesia's air defence operations adheres to the concept of *defence in depth*, where the defence area is divided into area air defence, terminal air defence and point air defence. The area air defence area is determined based on the maximum ability of active airstrip radar to detect and identify targets and the ability to direct fighter aircraft to the intended target. The role of ambush fighters and their weapons is vital in taking action against violations of national airspace.

Strategy, logistics, and tactics are the three essential elements of war. Strategy is concerned with setting goals and general methods to achieve them, logistics is concerned with the creation and ongoing support of weapons and combat forces, while tactics are concerned with the specific use of weapons and forces to achieve strategic goals. In the strategic-logistical-tactical relationship, logistics serves as a bridge between the national economy and the real operations of combat forces on the battlefield. Good logistics are the basis for the development of flexibility and strategic mobility. However, logistics must also be managed wisely and well-planned so as not to exceed the actual combat support needs.

In the context of modern warfare, strategy and logistics are very closely linked. Economic and logistical factors affect strategic objectives, and conversely, strategic decisions also affect logistics planning. In some cases, logistical deficiencies can affect the ability to achieve strategic goals effectively. In war, strategy, logistics, and tactics interact with each other and influence each other. No single problem or situation has the exact same combination of strategic-logistical-tactical elements. Therefore, it is important for commanders to consider these three elements simultaneously and understand how they influence each other in the planning and execution of military operations.

In this context, logistical readiness involves the ability to meet the logistical needs needed to maintain and support combat operations. This includes the procurement, storage, distribution, and maintenance of logistical resources such as supplies of weapons, ammunition, equipment, food, and fuel. Logistics readiness will have a direct impact on combat operational readiness. In supporting *the combat readiness* of the F-16 aircraft, missile operational readiness is an absolute necessity to support law enforcement operations and the security of national airspace. The operational readiness of missiles depends on several factors, including the number of missile readiness to support operations, missile maintenance capabilities, the ability of manning personnel, supporting facilities and infrastructure, and the availability of a budget for missile force development.

CONCLUSION

Researchers found that the potential for defence cooperation between Indonesia and Germany in the acquisition of IRIS-T missiles has the opportunity to be carried out. This study shows that the procurement process for the acquisition of IRIS-T Defence missiles through Indonesia-Germany defence cooperation is carried out by negotiation through the implementation of an introductory presentation at the Air Force Headquarters and continued with the submission of a proposal by DIEHL Defence. After conducting 2 (two) preparatory meetings, the Compatibility Test was held on February 28, 2023 to March 2, 2023 at Iswahyudi Air Base, Madiun, East Java. In the capacity owned by the TNI-AU, if the TNI AU acquires the IRIS-T missile, there will be compatibility with the air defence system implemented by fighter aircraft such as the F-16 AM/BM emlu, F-16 C/D and T-50i aircraft owned by Indonesia.

The study also shows that there are four opportunities that arise if the IRIS-T acquisition is carried out, namely increased missile capabilities, flexibility and interoperability, determination and confidence,

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and modernization and technology. In addition to opportunities, the study also shows that there are six obstacles to the acquisition of IRIS-T which include the Arm regulation of the United States (US) as a missile producing country, budget planning that has not prioritized the development of missile forces, Lockheed Martin licensing, compatibility, testing and certification as well as maintenance and logistics support.

The researcher suggested that the Ministry of defence needs to develop the missile power of the Indonesian Air Force by collaborating with partners of other countries that have the ability to produce *air-to-air missiles* that can be *compatible* with fighter aircraft owned by the Indonesian Air Force, for example Germany which is a producer of IRIS-T missiles where the missile has capabilities equivalent to the American AIM-9X-2 missile and can be used as an alternative missile diversification. Germany is known to be more flexible in the application of the purchase and sale of defence equipment along with *the transfer of technology*. The target of capability development (Sasbinpuan) of the Indonesian Air Force is expected to not only focus on the readiness of defence equipment. However, missiles, which are fighter aircraft air ammunition that are able to provide a deterrent effect on the enemy, are also expected to have a set target for capability development. For this reason, the Air Force Operations Staff (Sopsau) is expected to be able to study the importance of missiles to be included in the TNI AU Sasbinpuan and can be implemented in the future so that the target of developing air-to-air missile forces can be more directed and get budget priorities.

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ISSN: 2406-8721 (Media Cetak) dan ISSN: 2406-8985 (Media Online)

Volume 11 Nomor 1 September 2024

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168

Indexed:



SINTA 5

PKP|INDEX

