

## Indonesia's Defense Diplomacy to Strengthen National Airspace: A Study of the F-16 Fighter Upgrade

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### Abstract

This paper aims to analyze Indonesia's efforts through Indonesian defense diplomacy towards the US to optimize its air defense with the F-16 A/B Fighter eMLU (enhanced Mid-Life Upgrade) program. In facing the rapid development of military technology and potential threats from other countries, a defense equipment modernization program, increased personnel training, and the development of more integrated radar infrastructure and air defense networks are absolutely necessary to be able to carry out air defense functions optimally and effectively, and protect the sovereignty of Indonesia's airspace from various potential threats. However, in reality, Indonesia's air power is still faced with various obstacles, one of which is that the F-16A/B fighter aircraft currently owned by Indonesia is not optimal to match the strength of other countries' aircraft. To optimize this, modernization and improvement of weapons for the F-16 Fighter Aircraft are very important. The researcher uses the Defense Diplomacy Concept according to Cottey and Forster. The research was conducted using a qualitative method with data collection through interviews, internet-based research and literacy studies. The results of the research show that Indonesia's defense diplomacy towards the US is carried out through several instruments, military education and training, military meetings and dialogues, humanitarian missions, and military cooperation.

**Keywords:** Defense diplomacy, air defense, F-16 A/B fighter aircraft, eMLU

### 1. Introduction

Indonesia is a country with more than 17,000 islands and a vast and diverse geographical area. Geographically, Indonesia is located between two continents, Asia and Australia, and two oceans, the Indian and Pacific Oceans. This position not only provides an advantage in international trade, but also makes Indonesia in a strategic position. This strategic location makes Indonesia play a vital role in global geopolitics, especially in terms of regional defense and security (Ermaya, 2023). Indonesia faces complex challenges in maintaining sovereignty and territorial integrity, particularly in border areas, which represent state sovereignty and pose a threat to national security and integrity (Laksmono et al., 2020).

The Indonesian Air Force (TNI-AU) also plays a role in the construction and development of air matra power and the empowerment of defense areas, which directly supports efforts to maintain national air sovereignty (UU No 34 Tahun 2004, 2004). The Indonesian Air Force (TNI-AU) utilizes trained personnel and modern materials, including the main weapon system (alutsista), to patrol and secure airspace bordering other countries. Fighter aircraft enable swift response to threats, ensuring Indonesia's sovereignty throughout the air border. (Sudirin, Darmawan, & Hendra, 2022). Currently, the Indonesian Air Force operates various types of fighter aircraft from various manufacturers, one of the most recognizable being the F-16A/B/C/D Fighting Falcon made in the United States (US) (Af.mil, 2021). The Indonesian Air Force (TNI-AU) also operates the Sukhoi Su-27/30 Flanker from Russia (Nurrachman, 2022), the Hawk 100/200 from United Kingdom (Savika, 2024a), the T-50i Golden Eagle from South Korea (Bramasta, Dandy Bayu Nugroho, 2022), and the EMB-314 Super Tucano from Brazil (Savika, 2024b). This

diversity of equipment allows the Indonesian Air Force (TNI AU) to adapt to various types of defense missions, both to maintain the sovereignty of national airspace and in international military operations.

In 1989, Indonesia purchased 12 units of F-16 fighter aircraft from the US. In 2011, Indonesia received an additional F-16 fighter aircraft from the US as many as 24 units, consisting of 19 units F-16C and 5 units F-16D (Ibrohim, 2023). These additional aircraft were obtained through the Excess Defense Article (EDA) grant scheme. This is also part of the defense cooperation that has existed between Indonesia and the US for many years. Apart from the US, Indonesia also has good relations with Russia. In 2003, Indonesia purchased 2 units of Su-27SKM Flanker and 2 units of Su-30MK Flanker fighter aircraft made by Sukhoi KNAAPO (Ayu, 2023). This purchase marked the first step in strengthening its air force through diversification of defense equipment. In the context of defense equipment procurement, the two fighter aircraft purchases reflect diversification in air force power.

While both the F-16 and Su-27/30 are modern generation fighters owned by Indonesia, there are significant differences in capabilities between the two, particularly in terms of the ability to fire Beyond Visual Range Air-to-Air Missile (BVR AAM). Indonesia's Su-27/30 is equipped with the capability to fire BVR AAM, giving it an edge in modern air combat (Kopp, 2012). This capability is critical to countering threats from longer ranges and improving air defense mission effectiveness. The disparity between the F-16 and Su-27/30 in the ability to fire long-range BVR AAM air-to-air missiles puts Indonesia's defense at a disadvantage, especially against airborne threats. With only the Su-27/30 possessing BVR AAM capability, the Indonesian Air Force (TNI AU) is forced to rely on the fighter to fire at targets from long distances, which limits operational flexibility. Given the importance of this advantage, Indonesia took strategic steps to upgrade the F-16A/B through the enhanced Mid-Life Upgrade (eMLU) program (Rizkia, 2023).

This upgrade involves the installation of modern radars, more advanced mission computers, processing units, and better communication systems. The eMLU program is an expansion of the program for US strategic partner countries. Through the eMLU program, as many as 7 units of F-16A and 3 units of F-16B units were rejuvenated and upgraded to be equivalent to the capabilities of the Su-27/30 (indonesiadefense.com, 2023). With this move, Indonesia not only improves the effectiveness of its air defense but also ensures that the Indonesian Air Force (TNI AU) remains better able to deal with threats in the airspace. Indonesia's success in obtaining permission to upgrade the F-16A/B is one of the key achievements in Indonesia's defense diplomacy. The upgrade process was conducted entirely in Indonesia, involving personnel from the Indonesian Air Force (TNI AU) and PT. Dirgantara Indonesia, with oversight assistance from the US (Prabowo & Rastika, 2020). Strategic steps such like this will continue to be an integral part of Indonesia's defense policy oriented towards self-reliance and increased international cooperation (Kemhan RI, 2015).

The upgrade of the F-16A/B fighter aircraft must be done because Indonesia has not received permission from the US to purchase a more advanced and modern 5th generation fighter aircraft, the F-35. The US refuses to sell the F-35 to Indonesia, because Indonesia does not yet have US-made 4th and 4.5th generation fighter aircraft (cnnindonesia.com, 2020). Another reason is the current proximity between Indonesia and China, which is a consideration for the US to not want to sell the technologically advanced fighter aircraft to Indonesia. The US, which has complex strategic interests in the Asia-Pacific region, still views China as its rival in the region, so US and China relations have not been harmonious until now (Vindia, 2023). This condition is certainly an obstacle for Indonesia to strengthen its air defense, especially in strengthening the role of the Indonesian Air Force (TNI AU). The important role of the Indonesian Air Force (TNI AU) in strengthening the air defense system through the use of resources and defense equipment has been conveyed in Sudirin, Darmawan, and Hendra's research (Sudirin et al., 2022). Unfortunately, this role has not been able to optimize air security in the territory of the Republic of Indonesia (NKRI). This non-ideal condition could be a gap that can be exploited by the Indonesian government to conduct defense diplomacy to strengthen its territory in the future. This shows how diplomacy can be used to strengthen national defense capacity (Wisesa & Prakoso, 2023). Defense diplomacy can also include military agreements, cooperation in counter-terrorism, and dialogue on defense issues (Drab, 2018).

Some previous studies show that modernization of defense equipment through technology is important to strengthen Indonesia's defense, but requires international cooperation and political support through defense diplomacy (Rafikasari, 2021). Another study shows that improving Indonesia's air defense is not optimal because it is influenced by the capacity of the TNI, cooperation between agencies, and existing diplomacy strategies (Sudarsono, Mahroza, & Surryanto, 2018). The threat of the Five Power Defense Arrangements (FPDA) has encouraged Indonesia to improve diplomacy with its member states and build strategic partnerships with major powers such as the US, Russia, and China (Manullang & Rachman, 2023), and this diplomacy also plays an important role in developing the defense industry and expanding international business (Sembiring & Susilo, 2024).

As for air defense diplomacy, several previous studies have shown the importance of air defense, which can be conducted through defense diplomacy linked to the country's military budget (Ferisetiadi et al., 2022). Indonesia's defense diplomacy which involves joint exercises, procurement of defense equipment, must still prioritize the national interest approach (Napitupulu, 2024). However, it should also be noted that the modernization of the Indonesian Air Force's (TNI AU) defense equipment through defense diplomacy, the achievement of Indonesia's defense equipment strength still does not fully meet the Minimum Essential Force (MEF) target (Sudirman, Djujandi, & Pratama, 2023). The air defense diplomacy that has long been built with the US in stemming the power of the PRC, does not seem to be enough (Burgess, 2023), because Indonesia also needs the transfer of Indonesian Air Force (TNI AU) defense equipment technology, and this can be done through air defense diplomacy with Russia (Agatha, 2016). The success of diplomacy is not only measured by the outcome of formal negotiations, but also by the extent to which a country can build a reputation and attract alliances through positive influence (Yani & Lusiana, 2018; Prayuda & Sundari, 2019).

Based on the previous studies above, it can be seen that Indonesia's air defense diplomacy towards other countries has in common that it aims to strengthen national air defense, both equipment and personnel. Previous studies have also generally discussed air defense in a broad and comprehensive context. However, it is important to note that the analysis of the eMLU Program for the Indonesian Air Force's (TNI AU) F-16A/B Fighter Aircraft is still limited, opening up opportunities for further exploration. With this background in mind, the researcher seeks to explore in depth Indonesia's efforts in strengthening its air defense capabilities through the eMLU program for the F-16A/B Fighter. The analysis will also link the program to Indonesia's defense diplomacy, revealing how the two support each other in the context of national security..

## 2. Method

The researcher used qualitative research methods as the main approach. Qualitative methods allow researchers to explore and understand the meaning behind individual behaviors, interactions, and experiences. By using this method, researchers can gather deep insights and nuances that may not be revealed through quantitative methods. Research on the analysis of Indonesia's defense diplomacy towards the US in improving Indonesia's air defense through the study of the F-16 A/B Fighter eMLU Upgrade Program using qualitative research methods provides a description of Indonesia's diplomacy towards the US in improving Indonesia's air defense.

Data collection conducted in this research refers to Lamont (2015), namely interviews, documentation studies, literature studies, & internet-based research. Interviews were conducted with a number of relevant sources or informants. Informants are individuals who have an important role in providing information related to the condition or situation being researched (Moleong, 2017). In the context of this research, informants contribute by providing accurate information about Indonesia's defense diplomacy towards the US, especially regarding the eMLU upgrade program for the F-16 A/B Fighter. In selecting informants, non-probability sampling techniques are used, one of which is purposive sampling. This means that sampling (determining informants) is based on considerations or certain criteria such as expertise and in-depth understanding of the issues being studied, so that the information obtained is more relevant and reliable (Sugiyono, 2010). This technique was chosen because it provides practicality and

convenience in data collection by researchers. The informants of this research included Pabandasisbang Bandyaaavi Paban IV/PTTA and Avionik Skomlekau. The researcher applied semi-structured interviews, which provide more flexibility for the interviewer in asking questions than structured interviews. Through this technique, it is expected to obtain more meaningful and relevant data, which will strengthen the analysis in the research (Sugiyono, 2010). This research collected data through Internet-Based Research (IBR), which is a research method that uses the internet as the main tool to collect data, analyze information, and generate findings. This research also collected data through literature studies. This technique involves searching and collecting information from various literature sources, including reports, journals, online articles, and other important records related and relevant to the object of research (Sugiyono, 2010). Documentation studies were conducted to extract data from official government documents, diplomatic archives, international treaties, international organization reports, and other documents produced by political actors and global institutions. This research is located at the Indonesian Air Force Headquarters (Mabes TNI AU) in Cilangkap, Cipayung Sub-district, East Jakarta City, Jakarta Special Capital Region.

Data validity in this research uses source triangulation techniques. This process involves comparing data obtained by researchers from various sources, such as mass media, documents from literature studies, and interviews with informants. In this way, researchers can gain a deeper and more comprehensive understanding of the phenomenon under study.

### **3. Result and Discussion**

#### *Indonesia's Defense Condition*

Constitutionally in Law No. 3 of 2002 on national defense, national defense is defined as all efforts made to maintain the sovereignty of the state, the territorial integrity of the Unitary State of the Republic of Indonesia, and the safety of the entire nation from various forms of threats that can pose a threat to the security of the nation and state. Article 3 of the Law further explains that the preparation of state defense is carried out with the basic principles of democracy, human rights, public welfare, the environment, the provisions of national law, international law and international customs, and the principle of peaceful coexistence. In addition, state defense efforts are carried out through consideration of Indonesia's geographical condition, which is an archipelago (Republik Indonesia, 2002).

As the main component in dealing with militarized threats, the current condition of the TNI is seen from the number of personnel. Mahdi said that the number of TNI personnel is 395.500 personnel with details of Army personnel (TNI AD) as many as 300.400 personnel, the Navy (TNI AL) as many as 65.000 personnel, and the Air Force (TNI AU) as many as 30.100 personnel. Meanwhile, paramilitary personnel totaled 280.000 personnel and reserve personnel totaled 400.000 personnel (Mahdi, 2022). In the aspect of defense equipment, based on data released by Global Firepower, Indonesia ranks 13th out of 145 countries by considering as many as sixty factors, including the level of sophistication of equipment, finance, geography, and resources. The data states that the Indonesian Air Force (TNI AU) has 474 combat aircraft including 41 fighters and 37 attack helicopters. The Indonesian Navy (TNI AL) has 333 defense equipment assets including 8 frigates, 25 corvettes, and 4 submarines. Meanwhile, the Indonesian Army (TNI AD) has 313 tanks, 11.604 combat vehicles, 153 self-propelled artillery, 414 towed artillery, and 63 rocket projectors (Deny, 2024).

The Ministry of Defense (Kemenhan) has a defense budget of Rp139 trillion, covering three dimensions of the TNI. The budget is divided into personnel, goods, and capital expenditures. The modernization program for defense equipment, non-defense equipment, and infrastructure is allocated in goods and capital expenditures. TNI needs are covered by Army, Navy, and Air Force headquarters (cnnindonesia.com, 2024). In national defense, the aspect of defense industry becomes one of the important aspects to support national defense that is ready to face various forms of dynamic threats. Constitutionally, regulations regarding the defense industry are regulated in Law No. 16/2012 on the Defense Industry which contains various rules regarding the synergy of parties involved in the production of the defense industry in order to optimize the defense equipment industry and security (Kemenhan-RI, 2012).

In addition to the law, the Ministry of Defense also issued Minister of Defense Regulation No. 23/2016 on the Guidance of the Defense Industry in order to fulfill the needs of Defense and Security Equipment in order to encourage the realization of a professional, effective, efficient, integrated, modern, and innovative national defense. In Minister of Defense Regulation No. 23/2016 regulates the implementation of Guidance on National Industry which includes State-Owned Enterprises (BUMN) or Private-Owned Enterprises (BUMS) that are carried out independently or in groups through Government provisions for part or all to create defense and security equipment that can be empowered in defence industry (Kemenhan-RI, 2016). According to the Defense White Paper, in the defense industry, there are three pillars that become the stakeholders of the defense industry, which include the users, those who carry out production, and those who make designs or researchers (Kemenhan-RI, 2015). In defense industry policy, the Government gives responsibility to KKIP to coordinate various national policies in planning, formulating, implementing, controlling, harmonizing, and evaluating the implementation of the defense industry. KKIP is led by the Head of State of Indonesia, assisted by the Minister of Defense and Minister of State-owned Enterprises (BUMN) as Chairman and Daily Vice Chairman, and nine Working Cabinet Ministers as well as the Commander of the Indonesian Armed Forces and the Chief of the Indonesian National Police as members.

### *Indonesia's Air Defense Optimization in F-16 Fighter Technology Transfer*

Indonesia and the US established air defense cooperation in 1982 by purchasing F-5E/F Tiger II fighter aircraft for TNI-AU, replacing CAC Sabre due to an embargo on spare parts from Eastern Block (Edwards, 2016). The Indonesian Air Force (TNI AU) acquired the F-5 fighter, its first supersonic aircraft, and strengthened its defense equipment through the Peace Bima-Sena I program in 1989 (F16.net, 2022). The Indonesian Air Force (TNI AU)'s defense technology system is not optimal compared to other Southeast Asian countries. The strength of TNI AU's defense equipment ranks 26th out of 145 countries, indicating a lack of optimal strength and function. The current number of radar units is 24 out of 36, and the number of aircraft units is 293 out of 395. The equipment is generally 25-40 years old, requiring maintenance and repair to maximize Indonesia's air defense operations (Bakrie, 2007; Multazam, 2010).

The F-16 A/B Combat Aircraft eMLU upgrade program is urgent due to four factors: lagging technology, extending operational life, cost savings, and increasing defense capabilities. The program involves three stages: Ministry of Defense, Indonesian Air Force DCS contract, and FMS field. Indonesia's defense diplomacy towards the US involves six stages: proposal of agreement, proposal of upgrade plan, ratification of CISMOA, coordination with Lockheed Martin, FMS, and preparation of hybrid contract. The F-16 A/B Fighter eMLU program, involving Indonesia's Air Force, Ministry of Defense, US Embassy, Lockheed Martin, and other parties, has been in diplomatic cooperation since 2015. The program offers five benefits: increased combat capability, longer operational life, reduced dependence on expensive procurement, experience in implementing large programs like Falcon STAR-eMLU, and increased competence of Indonesian Air Force technicians. It also enhances defense diplomacy towards the US. There are obstacles in the F-16 A/B Combat Aircraft eMLU upgrade program, namely the complexity of the technology applied, so that technicians need to carry out technological adjustments/adaptations and work patterns; AWP needs are not met before and after the upgrade is implemented; delivery of mod kit (equipment to be installed) does not run on schedule and there are shortages of some mod kits; budget limitations so that some systems do not have spare parts; and the readiness of maintenance infrastructure that is not in accordance with the requirements outlined in the contract, where it is the responsibility of the Indonesian Air Force (TNI AU) (buyer furnished items), causing delays in the first induction process.

Another obstacle in the F-16 A/B Combat Aircraft eMLU upgrade program is the limited budget which has an impact on the unpreparedness of the maintenance system and infrastructure in accordance with the agreed contract. The budget aspect is important in the defense industry and improving the quality of defense equipment owned by the Indonesian Air Force (TNI AU) in particular. With the discovery of this obstacle, it is hoped that the parties concerned can pay attention to this problem in the hope that the defense equipment owned by Indonesia, especially combat aircraft, can be optimized. This is in line with the results of research conducted by

Ferisetiadi which shows that Indonesia's military capacity needs to be improved in order to strengthen its bargaining position in defense diplomacy which depends on the military budget from the state (Ferisetiadi et al., 2022).

The research results show that there are expectations that Indonesia has through the cooperation of the F-16 A/B Fighter eMLU upgrade program which includes increasing the combat capability of the F-16 Fighter, as well as increasing its operational age (modernization of defense equipment without having to buy new aircraft); *ToT* and increasing the capabilities of the domestic defense industry; the realization of a culture of flight and work safety and such as by Lockheed Martin and the Indonesian Air Force (TNI AU) who have project management experience in terms of aircraft upgrades/modifications. On the aspect of human resources, Mahdi mentioned that the number of Indonesian Air Force (TNI AU) personnel is 30.100 personnel. TNI AU personnel are the armed forces with the least number of active personnel. This is because the air power approach focuses on the strength of defense equipment rather than the number of personnel. The Indonesian Air Force (TNI AU) does not recognize combat units, combat support units, and others and only qualifies forces based on air weapon systems, such as aircraft (fighter, transport, helicopter), radar, missiles, and bases (Bakrie, 2007).

The results show that national interest is the source of the Indonesian Air Force Doctrine. Through the Indonesian Air Force (TNI AU) Doctrine, it is expected that various efforts made by the Indonesian Air Force (TNI AU) to optimize airspace security strategies can be realized. This is in accordance with the results of Napitupulu's research which shows that Indonesia's defense diplomacy involving joint exercises, procurement of defense equipment, must continue to prioritize the national interest approach (Napitupulu, 2024). Taking into account the explanation put forward by Kreis, which states that technology, human resources, and military doctrine are influential components in air defense (Kreis, 1989), the following table shows the results of research with aspects of air defense put forward by Kreis.

Taking into account the dynamic forms of potential threats and challenges faced in the era of the industrial revolution 4.0, Indonesia's defense diplomacy towards the US through the F-16 A/B Fighter eMLU upgrade program is needed to increase defense power from various forms of threats. Defense diplomacy is needed to overcome border challenges and global threats, but is currently not optimal because it is influenced by the capacity of the TNI, cooperation between agencies, and existing diplomacy strategies (Sudarsono et al., 2018). Through the eMLU F-16 A/B fighter upgrade program, the Indonesian Government has made efforts to strengthen defense. This is in line with the National Program (defense industry roadmap) which provides direction and targets in mastering technology in the defense sector (KKIP, 2020). In the roadmap, it is written that there are three targets of the defense industry, namely creating a professional, effective, efficient, integrated and innovative defense industry; forming independence and improving production capabilities; and maintaining defense equipment (*alpalhankam*). This target is in accordance with the results of research that shows the benefits obtained through Indonesia's defense diplomacy towards the US through the F-16 A/B Fighter eMLU upgrade program, where through this program there are benefits obtained by Indonesia such as independence and increasing the ability to produce and maintain defense equipment, especially on fighter aircraft owned by Indonesia.

#### **4. Conclusion**

In addition, this research also shows that diplomacy in the F-16 A/B Fighter eMLU upgrade program includes three aspects namely, the stages of diplomacy carried out; the parties involved; and the objectives of the F-16 A/B Fighter eMLU upgrade program. The six stages of defense diplomacy conducted by Indonesia towards the US through the F-16 A/B Combat Aircraft eMLU upgrade program include proposing the CISMOA agreement; proposing the F-16 A/B Combat Aircraft upgrade plan; ratification of the CISMOA; coordination meeting with Lockheed Martin (DCS); coordination meeting with the FMS; and preparation of the F-16 A/B Combat Aircraft eMLU upgrade plan into a hybrid contract (combined DCS and FMS contract). The parties involved in defense diplomacy through the upgrade of the F-16 A/B Fighter eMLU program are the Ministry of Defense (Kemenhan), the US Embassy in Indonesia, the Indonesian Embassy in

the US, Lockheed Martin, and the FMS. The results show that Indonesia's defense diplomacy towards the US in the F-16 A/B Fighter eMLU upgrade program is carried out with the aim of improving the quality and quantity of the Indonesian Air Force's (TNI AU) defense equipment through increased combat capability in avionics and weapons systems that become more sophisticated on fighter aircraft owned by the Indonesian Air Force (TNI AU); reducing dependence on the procurement of new fighter aircraft that are more expensive; and creating independence for the Indonesian Air Force (TNI AU) and PT. Dirgantara Indonesia.

The results of this research show that in the F-16 A/B Combat Aircraft eMLU upgrade program there is an evaluation carried out to see the effectiveness of the F-16 A/B Combat Aircraft eMLU upgrade program with the results of the evaluation, namely the planning aspect which requires the involvement of relevant stakeholders so that after the contract is officially signed, a special task force needs to be formed to oversee the implementation of the contract. In addition, research shows that there are five obstacles in the F-16 A/B Fighter eMLU upgrade program namely, technological complexity; AWP needs are not met before and after the upgrade is implemented; mod kit delivery does not run on schedule and there are shortages of some mod kits; limited budget; and the readiness of maintenance infrastructure that is not in accordance with the requirements outlined in the contract. TNI AU personnel are the armed forces with the least number of active personnel because the air power approach focuses on the strength of defense equipment rather than the number of personnel. In the implementation of national defense, the TNI AU Swa Bhuwana Paksa Doctrine has a position at the military strategic stratum which is a derivative of the Tri Dharma Eka Karma TNI Doctrine which guides doctrines at the operational stratum and tactical stratum.

## 5. Recommendation

Based on this study, the researcher suggests that the Ministry of Defense form a special task force to oversee the implementation of defense cooperation contracts, especially in cooperation in the F-16 A/B Fighter Aircraft eMLU upgrade program. In addition, the Indonesian Air Force needs to conduct ongoing training for soldiers involved in the F-16 A/B Fighter Aircraft eMLU upgrade program. For future research, it is very interesting to combine quantitative and qualitative research methods so that researchers can obtain richer, deeper, and more relevant results. This approach allows for more flexible, holistic research and can have a greater impact on practice or policy.

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