

Improving Decision-Making Capabilities in a Complex Air Combat Environment

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ABSTRACT

This study aims to improve the decision-making ability of Indonesian Air Force pilots in a complex air combat environment by establishing a special school for pilots. The study results indicate that establishing an air combat school is very important to overcome the challenges of rapid decision-making in dynamic and uncertain situations. In addition, realistic exercises, such as Mission-Oriented Training (MOT) and Composite Air Operations (COMAO), play an important role in improving the combat readiness of pilots. This school is also expected to function as a center for developing air combat tactics and strategies and providing comprehensive training for all Indonesian Air Force pilots. With the establishment of this school, synergy will be created between various air power units to strengthen the combat capability of the Indonesian Air Force in maintaining Indonesia's air sovereignty. It is hoped that the Indonesian Air Force can immediately establish an air combat school that focuses on developing the operational capabilities of pilots through realistic exercises and international collaboration.

Keywords: Air Combat, Decision Making, Mission-Oriented Training, TNI AU.

1. INTRODUCTION

Quick decision making under pressure is one of the crucial skills that fighter pilots must possess. In combat situations, pilots are often faced with conditions that require quick decisions with information that is often uncertain or incomplete. These decisions must be made quickly and accurately to ensure the mission runs smoothly while minimizing risk and limited resources. In the context of the Indonesian Air Force, this capability becomes increasingly important considering Indonesia's geographical and strategic challenges. The vast airspace and diverse potential threats require pilots to have high readiness and decision-making capabilities (Boyd, 1987). However, many Indonesian Air Force pilots have never been exposed to or have adequate operational experience or training. Limited literature and the absence of special schools providing knowledge and sharing experiences also inhibit improving this capability (Warden, 2000).

Facing this reality, the Indonesian Air Force, through the Swa Bhuwana Paksa Doctrine, carries out several main tasks, including air defense, law enforcement and security in the airspace, fostering and developing air force strength, and empowering air defense areas (Henderson, 2021). These tasks include the operationalization of air power and the development of pilots' capabilities and readiness. By understanding the importance of the tasks and functions of the Indonesian Air Force and the challenges that exist, strategic steps are needed to improve the pilots' quick decision-making capabilities. These include increasing training and simulations, establishing special schools, increasing access to literature and research, and international cooperation through joint exercises (Boyd, 1987).

Considering the current limitations of the country's ability to build a modern air force, the approach is to prepare an air force integrated effectively and efficiently with the defense equipment owned. This concept prioritizes increasing the knowledge of TNI AU personnel, especially those directly involved in air combat, including fighter pilots, transport, helicopters, drones, ground controller interceptors, and rapid response troops, such as ground teams forward air control and combat controllers, intelligence, weapons officers, and other personnel with a relationship with air combat. Increasing knowledge to improve and develop strategies is a key activity to control airspace, and it is one of the realizations of state sovereignty (Warden, 2000). The current strength of the Indonesian Air Force is not yet

considered an ideal force. This force, if designed and used in such a way with limited resources, is expected to be able to protect the country's sovereign territory as part of carrying out its duties (Henderson, 2021).

Considering the current limitations of the country's ability to build a modern air force, the approach used is to prepare an air force that is integrated effectively and efficiently with its defense equipment. This concept prioritizes increasing the knowledge of Indonesian Air Force personnel, especially those directly involved in air combat, including fighter pilots, transport, helicopters, and drones, ground controller interceptors, rapid response troops, such as ground forward air control teams and combat controllers, intelligence, weapons officers, and other personnel who have a relationship with air combat. Increasing knowledge to improve and develop strategies is the main activity in controlling airspace, which is one of the realizations of state sovereignty (Warden, 2000). The current strength of the Indonesian Air Force has yet to be considered an ideal force. This force, if designed and used in such a way with limited resources, is expected to be able to protect the country's sovereign territory as part of carrying out its duties (Henderson, 2021).

In general, the implementation of air combat does not only consist of aircraft, radar, missiles, and air bases but also requires an integrated weapons system to obtain the potential of air power, including but not limited to air control, air attacks, and air support (Warden, 2000). With all the limitations and considerations in developing air combat capabilities, this concept will only discuss the general basics in answering questions about the basis for determining school specifications to improve air combat capabilities so that the ability of the Indonesian Air Force to obtain air superiority in its territory can be achieved. Establishing an air combat school for Indonesian Air Force aircrew and personnel is an important strategic step to improve combat capabilities and readiness. With a focus on integration between units, intensive mission training, and conducting accurate and precise mission evaluations, this school can also be a center for the development and research of Indonesian Air Force aircrew, ensuring that they are ready to face future challenges and maintain the sovereignty of the Republic of Indonesia's airspace (Warden, 2000).

The objectives to be achieved in this study include identifying the urgent need for the establishment of a special school for Indonesian Air Force pilots, as well as identifying the challenges and opportunities in introducing a school as a supporting tool for pilots to determine the best steps, taking into account the resources, opportunities, and risks involved.

2. RESULTS AND DISCUSSION

The following will present a discussion of the research results on Improving Decision-Making Capabilities in a Complex Air Combat Environment, as follows:

The history of air combat in the United States, particularly during the Vietnam War, provides valuable lessons on the importance of training and doctrinal changes in air combat. Early in the conflict, the U.S. Navy and U.S. Air Force faced great difficulty countering the North Vietnamese Air Force. The low success rate in air combat forced the U.S. to re-evaluate its tactics and strategies (Clodfelter, 1989). In the early years of the Vietnam War, both the U.S. Air Force and the U.S. Navy experienced low success rates in air combat. U.S. fighters such as the F-4 Phantom were designed to meet the Soviet Union's heavy bomber threat in conventional warfare, not for close-in dogfights against the more agile North Vietnamese MiG-17s and MiG-21s, which were designed for close-in dogfights (Michel, 1997). As a result, U.S. pilots often struggled to counter the guerrilla air tactics used by the North Vietnamese. This failure prompted the establishment of an intensive training program to improve the skills and tactics of U.S. fighter pilots.

In 1968, the U.S. Navy established a fighter pilot training program known as "Topgun" at Naval Air Station Miramar, California. Topgun aimed to teach more effective air combat tactics and improve pilot skills through intensive, realistic training (Boyne, 2003). The program proved highly successful, significantly increasing the Navy's success rate in air combat. The U.S. Air Force also developed a similar training program called "Red Flag" at Nellis Air Force Base, Nevada (Boyne, 2003). Red Flag is an intensive, realistic air combat training exercise designed to provide pilots and aircrews with a combat experience as close to real-world situations as possible (Laird, 2017).

In the Red Flag exercise, the US Air Force invites participation from various US allied countries. Allied countries such as the UK, Australia, Canada, Germany, Japan, South Korea, and other NATO countries routinely send their pilots and aircraft to participate in this exercise (Laird, 2017). International participation strengthens military relations between allied countries and allows for the exchange of valuable combat tactics and techniques. Hundreds of aircraft of various types and functions are deployed in each Red Flag session. Fighter aircraft such as the F-16 Fighting Falcon, F-15 Eagle, and F-22 Raptor, as well as fighter aircraft from allied countries such as the Eurofighter

Typhoon and Dassault Rafale, are often seen dominating the Nevada skies (Gordon & Holder, 2011). In addition to fighter aircraft, support aircraft such as the KC-135 Stratotanker aerial refueling aircraft and the E-3 Sentry AWACS surveillance aircraft also play an important role in this exercise.

Red Flag is known for its realistic, challenging, and complex training. Each scenario is designed to simulate the challenges faced in real combat, including threats from enemy aircraft, air defense systems, and extreme weather conditions (Boyne, 2003). The exercise includes intense air-to-air combat, precision air-to-ground strikes, and complex rescue and evacuation operations. Participants must adapt quickly to changing situations and work with other units to achieve mission objectives (Laird, 2017). In addition, Red Flag also emphasizes the importance of interoperability between countries. Pilots and aircrews from different countries must collaborate, share information, and use mutually agreed-upon procedures. This task is not easy, but it demonstrates the importance of coordination and cooperation in multinational operations (Boyne, 2003).

The Indonesian Air Force faced challenges in conducting realistic training due to the military embargo in 1998, which resulted in a shortage of aircraft and the cessation of joint training with other countries for political reasons. As a result, many Indonesian Air Force pilots needed help to engage in ideal air combat training (Smith, 2003). Along with the restoration of diplomatic relations between the United States and Indonesia, the readiness of the Indonesian Air Force's aircraft and support systems increased. However, increased aircraft readiness was not accompanied by increased knowledge of modern air combat due to limited literacy within the Indonesian Air Force regarding modern warfare (Jones, 2015).

The Joint Fighter Weapons course between the TNI AU and RSAF in 2011 allowed the TNI AU to refresh its long-neglected air combat skills (Ng, 2012). Pilots who completed the course worked together to re-evaluate the optimal capabilities of the TNI AU weapons systems, allowing them to conduct realistic training. The arrival of F-16 C/D aircraft from the United States in 2015 brought new optimism to TNI AU pilots. This purchase increased the number of aircraft and provided TNI AU pilots with access to literature on modern air combat (Smith, 2016). In addition, pilots from the USAF provided hands-on training in modern combat using TNI AU aircraft. Furthermore, TNI AU headquarters brought in foreign instructors, not only from the USAF, to train TNI AU pilots in mastering their aircraft (Henderson, 2017).

Due to time, budget, and aircraft readiness constraints, not all TNI AU pilots had the opportunity to attend this training, resulting in an uneven distribution of information and literature, with only certain units experiencing development (Jones, 2015). One step to address this disparity was implementing mission-oriented training (MOT). The purpose of MOT at that time was to provide TNI AU pilots with experience in understanding how several units carry out a mission simultaneously to achieve mission success (Smith, 2016).

Since this was the first time MOT was conducted, there were still many inconsistencies among the units involved in the mission, both tactically and in terms of terminology, safety, and unit-centric ego, so the given mission could not be carried out properly (Ng, 2012). Reflecting on the results of this training, the idea arose of the need for a school whose main task is to conduct research, planning, and development related to air power, as well as air warfare doctrine and strategy, where this school plays an important role in linking air power research with actual combat operations, as well as organizing effective military air campaigns (Henderson, 2017). Its mission is to improve the capacity of the Indonesian Air Force for effective air warfare operations with a focus on optimizing the use of intelligence, surveillance, reconnaissance (ISR) assets, and precision strikes in combat scenarios.

Team building and improving air combat skills. "Air combat training is not only about flying an aircraft; it is also about working together as a team—a team that trains together and fights together," which means that air combat is not only about flying a fighter plane but also about working together as a team. This principle emphasizes the importance of cooperation in air combat. Air combat training is a multifaceted endeavor, preparing pilots for the complexities of flying and the challenges of operating as a solid team in the midst of a battle (Boyne, 2003). This is where the importance of training that approaches realistic conditions comes in. Realistic training places pilots in situations that mimic the uncertainty of real combat, allowing them to develop critical thinking skills and decision-making under pressure (Michel, 1997). In addition, realistic training also helps improve adaptability, allowing pilots to respond to changing situations quickly and effectively.

Furthermore, realistic training also improves tactics and strategies based on simulated real-world scenarios, pilots' proficiency in handling aircraft in difficult situations, executing combat maneuvers and tactics, and improving situational awareness and the ability to react quickly (Clodfelter, 1989). Realistic training also facilitates the formation

of strong teamwork and effective coordination. With realistic training, pilots, support personnel, and various units can collaborate, test real-world communication protocols and teamwork scenarios, improve the ability to work effectively in a team structure, and identify and resolve potential communication breakdowns before they are encountered in combat (Boyne, 2003).

In addition, realistic training also aims to reduce the risk of error by exposing pilots to the complexities and pressures of real combat in a controlled environment, thereby minimizing the likelihood of fatal errors during actual combat and providing pilots with the opportunity to learn from mistakes without suffering the devastating consequences of war (Laird, 2017). Thus, realistic air combat training enhances individual and collective readiness and serves as a place for teamwork formation, skill sharpening, and risk reduction in preparation for the needs of air combat.

Experience from the US Navy and US Air Force shows that intensive training and changes in doctrine can provide significant advantages in air combat. Therefore, establishing an air combat school for TNI AU pilots is crucial. This school can help design and implement realistic training, providing opportunities for TNI AU pilots to practice in complex and realistic combat scenarios. This school is expected to change the current training paradigm by emphasizing the importance of exercises that test combat capability and readiness.

In addition, this air combat school can provide a platform to teach uniform air combat tactics and strategies, allowing all TNI AU squadrons and fighter units to work together more effectively in joint operations. Furthermore, this school must also play a role in synchronizing exercises between military commands, ensuring that all units in the TNI AU can operate harmoniously and effectively in joint operations. With this school, it is hoped that better synergy will be created between the various elements of air power so that they can face the challenges of air combat more effectively and efficiently. This specialized school can offer a curriculum that covers all aspects of air combat, providing relevant training for all types of pilots in the TNI AU.

Where is the ideal place to establish an air combat school? The Indonesian Air Force training is unique and has characteristics different from those of the Indonesian Army and Indonesian Navy. One of the characteristics of air power is its range and speed, which requires the Indonesian Air Force to have a very large training area, not only in kilometers but up to hundreds of kilometers. Let us look at training areas such as Red Flag and Pitch Black, where the training area is as large as Java Island. It is very difficult to find a similar area in Indonesia, especially considering the dense air traffic throughout the country.

Despite these limitations, the Indonesian Air Force currently has a relatively ideal training area that can be used for training with all its limitations, namely Iswahjudi Air Base in Maospati, Magetan, East Java, as the only Indonesian Air Force base that is not affected by the presence of a civilian airport. The training facilities at Iswahjudi Air Base cover an area of approximately 20,000 NM² (Iswahjudi Air Base Local Procedure in 2014). The base is supported by three Air Squadrons, Ground Control Intercept radar, three Air Weapon Ranges (Pacitan, Pulung, and Pandan Wangi), YonMatra Kopasgat with air defense weapons, and is close to other air bases and airports, allowing the base to be used as an alternative runway if it has to be used in an emergency.

In military aviation, pilot qualifications are not just about the ability to fly an aircraft but also reflect their readiness and ability to carry out various missions in combat and non-combat roles. Therefore, pilot training and qualifications in the Indonesian Air Force are designed to cover two main categories, namely mission qualifications and special qualifications. This division ensures that each pilot has the skills appropriate to the type of operation they will carry out. Mission qualifications focus on the pilot's ability to engage in and lead various combat operations. Each level of qualification reflects the increasing responsibility and ability of the pilot to lead aircraft formations and carry out increasingly complex tasks.

On the other hand, specialty qualifications are designed to train and develop pilot specialization in certain technical and operational aspects, such as becoming a flight instructor or testing new aircraft after repair. These qualifications require a deeper level of proficiency in specific areas critical to the Air Force's overall operation. With this two-category approach, the Indonesian Air Force ensures that every pilot, both at the mission and specialty levels, has the skills and experience to carry out their duties effectively in various operational situations. Based on IDAF-WINGUD3-1-1 (2023) the following are the mission qualifications that apply to the Indonesian Air Force:

1. **Wingman:** Wingman is the first position a fighter pilot holds after completing basic training. The wingman's job is to support the element leader by maintaining formation, monitoring threats, and carrying out orders given. The

wingman's main job is to provide support and protection to the leader and learn more about air combat tactics and strategies.

2. **Element Leader:** An element leader is a pilot who leads a small group of aircraft, usually consisting of two aircraft. The element leader's responsibilities include coordinating air combat tactics, making quick decisions in combat situations, and ensuring the safety of the formation. The element leader is also responsible for training and mentoring wingmen.
3. **Flight Leader:** Flight leaders lead larger formations, usually consisting of four aircraft. Flight leaders' duties include planning and coordinating complex missions, including attack and defense tactics. Flight leaders must have strong communication skills, the ability to make quick decisions and a thorough knowledge of air combat strategy.
4. **Mission Commander:** The mission commander is responsible for the overall mission, including planning, execution, and evaluation. The mission commander's duties include coordinating various air and ground elements, making strategic decisions, and ensuring the mission is carried out according to plan. The mission commander must have extensive experience and strong leadership skills.

The special qualifications are as follows:

1. **Pilot Instructor:** Pilot instructors train new pilots and teach them basic flight techniques and air combat tactics. Pilot instructors must have extensive experience and the ability to transfer knowledge and skills to other pilots.
2. **Fighter Weapon Instructor:** Fighter weapon instructors are highly qualified pilots specializing in advanced air combat tactics and strategies. They are responsible for training other pilots in advanced combat techniques and developing new doctrines and tactics.
3. **Functional Check Flight Pilot:** Functional check flight pilots are responsible for testing aircraft after major maintenance or repairs. They ensure that the aircraft functions properly and is safe for operational missions. This task requires a thorough understanding of aircraft systems and the ability to detect and resolve technical problems.
4. **Test Pilot:** Test pilots test new aircraft or systems under various flight conditions. They collect data to measure the aircraft's performance and identify potential problems. Test pilots must have high technical skills, analytical abilities, and the courage to fly in situations that have never been attempted before.
5. **Air Squadron:** Air squadrons are responsible for training pilots to qualify as flight leaders, as well as ensuring that pilots master all basic aspects of air combat and are ready to lead small formations on operational missions, as well as obtaining special qualifications such as Functional Check Flight Pilot and Test Pilot which require extensive technical expertise and flying experience.

The Air Combat School serves as an Advanced Training Center. It plays a vital role in training pilots for advanced qualifications such as Mission Commander and Fighter Weapon Instructor. The Mission Commander course is designed to develop strategic leadership skills, plan complex missions, and coordinate multiple units. The Mission Commander is responsible for the overall mission, including planning, execution, and evaluation. After attaining the Mission Commander qualification, a pilot must pass on knowledge and experience to younger pilots. To do this, a pilot must attain the Fighter Weapon Instructor qualification, which can only be obtained after completing the Fighter Weapon Instructor Course. In this course, pilots focus on developing advanced tactical and strategic skills. Fighter Weapon Instructors are responsible for training other pilots in advanced combat techniques and developing new doctrine and tactics. They must be proficient in various combat scenarios and can teach and transfer that knowledge to other pilots.

In addition to the courses mentioned above, the Air Combat School can conduct Mission-Oriented Training (MOT). MOT is a specialized training designed to prepare pilots with various mission qualifications to face various combat situations and mission scenarios, both simple and complex. MOT involves real mission simulations and field exercises to ensure that pilots are mentally and physically prepared. One of the main components of MOT is Composite Air Operations (COMAO). COMAO is a combined air operation involving various aircraft and units, both air and ground, to achieve specific mission objectives. COMAO training involves complex coordination between various elements, including fighters, bombers, refueling aircraft, reconnaissance aircraft, and air defense units.

The purpose and benefits of COMAO are to teach pilots to work together and coordinate various air and ground assets in joint missions, introduce complexities and dynamics that are close to real combat situations, improve the efficiency and effectiveness of mission execution by utilizing the strengths of various units, and hone the ability to

make quick decisions in changing situations. To simulate realistic combat conditions, MOT uses war scenarios between two forces: The Red Force and The Blue Force. Blue Force usually consists of Indonesian Air Force pilots and their allies who are undergoing training. Blue Force acts as a defensive or offensive force in the training scenario, aiming to carry out the planned mission, while Red Force acts as an enemy or aggressor who tries to thwart the Blue Force's mission. Red Force may consist of special units trained to imitate the tactics and strategies of potential enemies. They provide realistic challenges and pressures to Blue Force, making the training more dynamic and close to real situations.

The MOT and COMAO components of the Red and Blue Forces exercises include Mission Planning, where both forces plan their strategies and tactics. Blue Force plans their attack or defense based on mission objectives, while Red Force plans how to deter or disrupt Blue Force operations. Mission Execution involves both forces executing their plans on the ground. During the execution, various combat scenarios are simulated, including air attack, air defense, aerial refueling, and reconnaissance. In Decision Making, pilots are challenged to make quick, accurate decisions based on the evolving situation during the exercise. The ability to adapt to changing enemy tactics is critical. Following the exercise, both forces are evaluated on their performance. Debriefings are conducted to analyze what went well and what needs improvement. Lessons learned from each exercise are used to improve pilot skills and strategies.

With the presence of the TNI AU Air Combat School, COMAO and MOT exercises can be carried out by the TNI AU to develop pilots' abilities in working together and coordinating various air and ground assets in joint missions at any time, with a permanent organization responsible for its implementation, ensuring the quality and efficient use of defense equipment. The presence of this permanent organization as an entity responsible for ensuring the quality and efficient use of defense equipment. These COMAO and MOT exercises bring great benefits to the TNI AU. With realistic and dynamic training, TNI AU pilots can improve their skills, strategies, and abilities in facing real combat situations, making them more prepared and effective in carrying out their duties in combat.

3. CONCLUSION

Based on the results of the research that has been described previously regarding the Improvement of Decision-Making Capability in a Complex Air Combat Environment, it can be concluded that the establishment of an Air Combat School for TNI AU pilots is a very important strategic step in improving decision-making capabilities in a complex air combat environment. This school is expected to provide comprehensive training and a knowledge center, ensuring that all pilots consistently understand air combat tactics and strategies. Realistic and intensive exercises such as COMAO and MOT play a key role in developing the capabilities of TNI AU pilots. These exercises improve the technical and tactical skills of pilots and strengthen teamwork and coordination between units. Experience from international exercises such as Red Flag and Pitch Black shows that training that simulates real combat conditions is essential for effective combat readiness.

The Air Combat School will also serve as a research and development center, ensuring that the Indonesian Air Force continues to develop and adapt to new threats and challenges. With the establishment of this school, it is expected that there will be a significant increase in the readiness and combat capabilities of Indonesian Air Force pilots, ultimately strengthening Indonesia's air defense and airspace sovereignty. Through training that focuses on air combat missions, the Air Combat School will help the Indonesian Air Force prepare pilots who are proficient in operating aircraft and able to make quick and precise decisions under pressure and work together with other units on a mission. This will ensure that the Indonesian Air Force is ready to face various dynamic and unpredictable combat situations and effectively maintain national sovereignty and security.

REFERENCES

- Boyd, J. (1987). *A Discourse on Winning and Losing*. Maxwell Air Force Base, AL: Air University Press.
- Boyne, W. J. (2003). *Air Warfare: An International Encyclopedia*. ABC-CLIO.
- Clodfelter, M. (1989). *The Limits of Air Power: The American Bombing of North Vietnam*. Free Press.
- Defense Security Cooperation Agency. (2011). *Indonesia – Regeneration and Upgrade of F-16C/D Block 25 Aircraft*. Defense Security Cooperation Agency. <https://www.dscamilitary.com>

- Gordon, D., & Holder, J. (2011). *Air Combat in the 21st Century: Red Flag and Beyond*. London: Aviation International Press
- Gordon, Y., & Holder, B. (2011). *F-22 Raptor: America's Next Lethal War Machine*. Zenith Press.
- Henderson, J. (2017). *The Importance of Foreign Military Instructors in the Indonesian Air Force*. Defense Studies.
- Henderson, M. (2021). *Future Employment of Small Air Forces*. Retrieved from Airpower Development Centre.
- Henderson, R. (2017). *Advancing Air Power: Lessons from Joint Operations with the Indonesian Air Force*. Singapore Press.
- IDAF-WINGUD3-1-1. (2023). *3rd Air Wing Pilot Qualification Standards*. Iswahjudi Air Force Base. Madiun: November 2023.
- Indo-Pacific Defense Forum. (2024). Indonesian, US military leaders deepen security cooperation. Indo-Pacific Defense Forum. <https://ipdefenseforum.com>
- Jones, M. (2015). *Challenges in Modern Air Warfare: The Indonesian Air Force Perspective*. Air Power Review.
- Jones, M. (2015). *Rebuilding Military Aviation Capabilities: The Indonesian Case*. Air Force Review, 23(2), 43–55.
- Laird, M. (2017). *The Role of Allied Air Forces in Red Flag*. The Journal of Military Aviation.
- Laird, R. (2017). *Rebuilding American Military Power in the Pacific: A 21st-Century Strategy*. Praeger Security International.
- Michel, C. (1997). *Clashes: Air Combat Over North Vietnam 1965-1972*. Annapolis: Naval Institute Press
- Michel, M. (1997). *Clashes: Air Combat Over North Vietnam 1965-1972*. Naval Institute Press.
- Nichols, J. (2009). *On Yankee Station: The Naval Air War Over Vietnam*. Naval Institute Press.
- Smith, A. (2003). *Indonesia and the US Military Embargo: The Impact on Air Power*. Southeast Asia Journal of Defense, 12(4), 112-125.
- Smith, A. (2016). *Reassessing Air Combat Readiness in Southeast Asia: F-16 C/D Induction and Implications*. Military Aviation Studies, 29, 78–95.
- Smith, R. (2003). *The Impact of the 1998 Military Embargo on Indonesian Air Force Readiness*. Southeast Asia Defense Journal.
- Smith, R. (2016). *Rebuilding the Indonesian Air Force: From F-16 C/D to the Future*. Journal of Modern Air Power.
- Warden, J. A. (2000). *Air Superiority in the Modern Age: Concepts and Applications*.

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