Enhancing the Indonesia Air Defense System: Confronting the challenges and military build-up In the Indo Pacific region

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Abstract. As the fourth most populous country in the world, and the 17th strongest military power in the world (according to global fire power index) Indonesia is racing towards modernisation of its militaries. Understanding the worldwide conflict of the 21st century against the backdrop of South China Sea potential conflict, and as a non-bloc country, Indonesia is at a crossroads. Between reality and survivability. Modern Air Defence Systems is the key to national sovereignty and safety.

Keywords. Missile, air defense, Indonesia, China, South China Sea, Defence, Technology

Introducing the hypothesis

The case for Indonesia to establish credible nationwide air defense and airspace situational awareness systems to maintain the right of passage of aircraft, and vessels in Indonesian and international waters and airspace, and to maintain the safety of more than 270 million citizens is more critical today than at any part of its history. Primarily, the Asia Pacific region has become an evolving, and tense geopolitical tinder box fuelled with the factors discussed below. At some point before 2045, or even two decades earlier, a series of incidents and occurrences will trigger an all out sophisticated hybrid conflict involving nations surrounding the South China Sea. And by all accounts, the preparation should be well on the way to cope with this inevitable crisis in the making.

The first and foremost factor is China’s blatant, assertive and formal control of the airspace and maritime territory marked by the “nine dashed lines” map from 1947 which Chinese scholars and officials claim go back to the a document called the “Yi Zhou Shu” (逸周书/逸周書) from about 1046–771 BCE. Today, all ‘respectful’ China-based analysis and academics affirm that historical claim of the name and ownership of the South China Sea.1 Numerous scholarly recollections suggested continued Chinese control of the waters long before the onset of colonialism in Southeast Asia. Hence, the Chinese government and the PLA will not tolerate non-compliance to their new legislations by the US and Australian navies as they continue to conduct ‘freedom of navigation exercises’ in the disputed waters. Beijing

1 Wang, Z. (2015). Chinese Discourse on the “Nine-Dashed Line”. Asian Survey, 55(3), 502-524.
undisputedly considers these activities as intrusion of their ‘historic maritime territory’.

This disregard of the United Nations Convention on the Law of the Sea (UNCLOS) has led to its persistent refusal to acknowledge any dispute to that ‘Chinese territory’. Beijing regards the South China Sea as China’s own all this while and at no point of the present or future will China back off from its reclaimed islands.

The second consideration is China’s relentless pursuit of building advanced military aircraft, vessels, and missile technologies and operating its bases on reclaimed atolls. It leads to the conclusion that it will be projecting its strike capabilities into the heart of ASEAN. Since invoking ‘Dual-Use’ Civil-Military Technology industrial clusters and investing extensively in military-related education, training, and professional development, China had recruited the best talent from their universities. In 2000, China’s National Science Board which is the backbone of the military industry clusters, recruited 400,000 graduates in the field of Science and Engineering. By. 2012, that number rose to 1.6 million per year. Those engineer-trained minds fed the military innovation sector leading to massive advancements. Twenty years of investments have paid off. The PLA now has the military capacity with long range bombers, MRBMs, IRBMs, carrier launched multirole aircraft, cyber weapons. It has fewer missiles when compared to the stockpile of the US or Russia but what is lacks in numbers, it compensates with severe accuracy, speed, ease of deployability and an almost unrestricted source of domestic supply. That now defines China’s military complex.

Above that China also has the national legal mandate, and geographic foothold to enforce an extended maritime territory. With that capability it is certain for China to consider the maritime zone between the Kuril Islands, through the Japanese Archipelago, the Ryukyu Islands and the island of Taiwan, the northwestern portion of the Philippines and Borneo as its First Island Chain which its navy, airforce, and rocket force could patrol, deploy, and enforce compliance. That places Chinese military prowess at the doorstep of Natuna and the rest of the critical waterways running through the Indonesian archipelago. In Jan 2021, China expanded its legislation to enable the Chinese Coast Guard, usually regarded as a domestic force but all nations, to operate freely in the South China Sea with the mandate to engage civil and military targets when needed. It is part of the Chinese concept of pursuing ‘near-seas defence with far-seas protection ’ (近海防禦、遠海防衛). Naval and air dominance and force projection is inherently written in their legal playbook to justify all actions.

Thirdly, while the US military remains engaged with Australia and to some extent the United Kingdom, there is no single nation in ASEAN that could be insistent to expel China from the South China Sea. China has so far successfully used a blend of hard military show of force and using an economic investment noose to ensure that Vietnam, Malaysia, Philippines cannot singlehandedly oppose the takeover of the Spratly Islands, Paracel Islands, Scarborough.

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2 Retrieved from https://www.pacom.mil/Media/News/News-Article-View/Article/2768060/7th-fleet-conducts-freedom-of-navigation-operation/
3 Retrieved from https://edition.cnn.com/2018/12/19/asia/south-china-sea-look-ahead-intl/index.html.
4 Pillsbury, M. (2021). The Chinese View of Future Warfare. Barakaldo Books.
5 Nayan, R. (2007). US Policy on Dual-Use Technology Transfers to China. Strategic Analysis, 31(4), 553-581.
6 China’s Advanced Weapons Systems | U.S.- CHINA | ECONOMIC and SECURITY REVIEW COMMISSION. Uscc.gov. (2021). Retrieved 21 December 2021, from https://www.uscc.gov/research/chinas-advanced-weapons-systems.
7 Erickson, A., & Wuthnow, J. (2016). Barriers, Springboards and Benchmarks: China Conceptualizes the Pacific “Island Chains”. The China Quarterly, 225, 1-22.
8 Li, N. (2009). The Evolution of China’s Naval Strategy and Capabilities: From “Near Coast” and “Near Seas” to “Far Seas”. Asian Security, 5(2), 144-169.
Shoal, and other islands in the South China Sea. Through loans, investments, bulk purchase of sovereign bonds, and lofty promises of the ‘One Belt, One Road’ program, China had develop a somewhat guaranteed subservience among the political leaders in the region. Despite diplomatic protests by Najib Razak, Benigno Aquino, Nguyễn Xuân Phúc on the reclamation of the disputed atolls in the last decade, no nation mobilised its navy and air force to confront or harass the dredgers until finally the offshore Chinese cities and military bases got erected. China had paid for the silence with the billions of dollars of debt that had been in many ways restructured as ‘investments’. The common destiny that China wants is silence while it establishes its regional and global economic and military hegemony. Few remember today that before colonialism, all of rulers in Southeast Asia paid homage to China. In plain words, they bowed to China. Today, that reality is evident. Even the The Hague Tribunal’s South China Sea Ruling has no plans or capacity for enforcement. The Hague could produce a judgement for which there is no penalty for China’s incursions.

According to the Nikkei new sources, this is the list of countries that have extensive debt with China which does, to some extent, decide their tone when dealing with the South China Sea matters. (Sept 2021 Source: [https://asia.nikkei.com/Spotlight/Belt-and-Road/385bn-of-China-s-Belt-and-Road-lending-kept-undisclosed-report](https://asia.nikkei.com/Spotlight/Belt-and-Road/385bn-of-China-s-Belt-and-Road-lending-kept-undisclosed-report))

9 Lai, C. (2017). Acting one way and talking another: China’s coercive economic diplomacy in East Asia and beyond. The Pacific Review, 31(2), 169-187.
10 Retrieved from https://www.economist.com/asia/2018/09/06/the-perils-of-chinas-debt-trap-diplomacy.
11 Gul, S., Umer, S., & Malik, M. (2018). China’s Belt and Road Initiative (BRI): Debt Quagmire or a Ridge Rope for Struggling Economies. Global Economics Review, III(1), 62-70.
12 Lake, D. (2017). Domination, Authority, and the Forms of Chinese Power. The Chinese Journal Of International Politics, 10(4), 357-382.
13 Feng, H., & He, K. (2020). US-China competition and the South China Sea disputes. Routledge.
There is evidence to show that the ASEAN members are among those who received extensive Belt-Road Initiative loans that have been labelled as ‘investments’. (Source: https://www.marketwatch.com/story/an-emerging-market-debt-crisis-could-be-the-next-front-in-us-china-conflict-2020-05-22)

Those disputed islands and the surrounding waters, in China’s perspectives, are irrevocably today China’s territory. As a fact, Chinese forces in the South China Sea, East China Sea far surpass the US forces deployed in the region. While China is able to concentrate its resources, the US will not mobilise its troops, aircraft and vessels and disband US African Command (AFRICOM), US Central Command (CENTCOM), US European Command (EUCOM), US Northern Command (NORTHCOM) and US Southern Command (SOUTHCOM) just to mass its resources in the US Pacific Command (USPACOM) to face the
PLA. That is unlikely. The US forces have too many commitments around the world to even consider confronting China alone.\textsuperscript{14}

The mix of these factors and the economic and strategic value of the South China Sea will eventually and inevitably bring the PLA into direct conflict with the US and ASEAN, and in the strive to establish its dominance, China will take the initial to lay siege on Indonesia at some point. While Indonesia will not take on the position of being the aggressor in the future, it needs the technical capabilities to thwart an air-led onslaught of the PLA comprising strategic bombers, multirole combat aircraft laded with guided missiles, MALE UAVs leading the reconnaissance and MRBMs and IRBMs that can level the cities of Jakarta, Surabaya, Medan, Yogyakarta, Solo, Banjarmasin, Balikpapan and Makassar in a last ditch effort to break the resistance of Indonesians. To this end of providing a safe airspace for the TNI AD, AL and AU to operate, there is a dire need for a sustained program to procure, locally co-develop and integrate surface-to-air interception capabilities that could dent the stockpile of missiles and aircraft tasked to target critical targets in Indonesia. The absence of short, medium and long range interception capabilities would severely compromise the ability of the TNI to respond to the prospective onslaught of the Chinese PLAN, PLAAF and PLA Rocket Force or any other possible aggressor with missile technology superiority like North Korea. While this assessment does not consider North Korea, there is a global perspective that in the demise of its leader, Kim Jong Un, a rogue government could carry out a random launch as an emotional revenge to the global geopolitical community for regarded the country as a ‘pariah’ all this while.\textsuperscript{15}

While the conclusion seems inevitable, nothing is easy, nor can it get less complicated. The issue of costs will be daunting. To set up credible nationwide air defense and airspace situational awareness systems and keep them operational on 24/7 standby mode is expensive but necessary.\textsuperscript{16} Then there is the matter of the source of the technologies. None exist as domestically-produced items. Indonesia has to realign its geopolitical mindset to decide which technology will offer sustainable support at reasonable prices. There is one certainty. TNI cannot purchase Chinese-made missile defense systems. TNI will have of find technologies that do not come from its prospective aggressor nor under the existing parameters of the International US-led sanctions regime. And finally, there will be the domestic debate. The fact is clear. The nature of future warfare that will take place in cyberspace and airspace with lesser close-quarter combat at sea, and even fewer engagements on land, especially for maritime nations like Indonesia.\textsuperscript{17} Yet, in the TNI, the land-bound Army is the largest component in terms of manpower, budget allocation, and political weight. That was a result of strategic planning in the context of technologies used in the Second World War and the Vietnam War as regional experience. Structuring the combat force to support the sophisticated military engagements of 2025 - 2045 will require rehashing old mindsets. It is difficult and will take decades. At this point, we should remember that China makes decisions on a flip of a coin and endorses it before the sun rises the next morning.\textsuperscript{18} Hence, delays in developing a credible and incisive military

\textsuperscript{14} Retrieved from https://www.pacom.mil/Media/Speeches-Testimony/Article/1231266/challenges-opportunities-and-innovation-in-the-indo-pacific/.

\textsuperscript{15} Taleblu, B., Bowman, B., & Maxwell, D. New Cruise Missile Gives North Korea Lethal Capability. Foreign Policy. Retrieved from https://foreignpolicy.com/2021/09/17/north-korea-cruise-missile-ballistic/.

\textsuperscript{16} Understanding the Extraordinary Cost of Missile Defense. Rand.org. Retrieved from https://www.rand.org/natsec_area/products/missiledefense.html.

\textsuperscript{17} Retrieved from https://www.rand.org/content/dam/rand/pubs/research_reports/RR2800/RR2849z3/RAND_RR2849z3.pdf.

\textsuperscript{18} Chinese democracy: Xi says ‘whole process’ of decision-making is sound. Nikkei Asia. Retrieved from https://asia.nikkei.com/Editor-s-Picks/China-up-close/Chinese-democracy-Xi-says-whole-process-of-decision-making-is-sound.
response will be costly for the governments in the vicinity of the South China Sea. Indonesia’s multilayered air defence system must be a credible deterrent to a credible and visible threat.

Of course, there will always be detractors in any government system asking, ‘What is China capable of doing?’ If China is able to coerce and enforce draconian measures on millions of its Uighur Muslims in Xinjiang, what will it not do in ASEAN to ensure national survival?

**How does China militarily defend its interest in the South China Sea?**

**PLA Army**

On the matter of the threat of the South China Sea, and as far as Xi Jinping and the PLA are concerned, there is no dispute and nothing will stop it from exercising its full rights over the waters and the resources within. Without this reality, no discussion on military technology or strategy will make sense.19

China is capable and willing to support its military voyeurism because it’s homeland is safe. The PLA (Army) is the world’s largest standing ground forces with 915,000 active-duty personnel in combat units built around 13 corp-level groups.20 The comprise the tracked armoured vehicles, wheeled armoured vehicles, and light high mobility armoured vehicles with coverage over artillery, air defense, and army aviation-assault. The main equipment across all PLA (Army) units is the Type 15 Light Tank (Black Panther) which has high mobility on hard and soft terrain. It manoeuvres well in the highlands. At 9.2 metres long, it runs on an electronically controlled diesel engine with fully-automatic transmission giving 1,000 hp (746 kW) to support the main armament, the 105mm rifled gun (38 rounds) with autoloader. With an operational range of 469 kilometres, it is the stalwart to prevent any territorial incursions from India on the western border and can form a wall of fire on the east coast, when needed. This is back up by the ZTZ-99A (Type 98) is a third-generation main battle tank (MBT) which is equal in many ways to the US M1 MBT. Built by Norinco, the Army operates at least 1200 units actively. At 7.6 m long, and with 55 tonnes, it has the ZPT-98 smoothbore gun (38 Rounds) as its main weapon. Any attempt to counterstrike China and lay siege to its cities will face a barrage of fire supported by the SH15 155 mm self propelled howitzer. The situation now is that mainland China almost has no limits to produce its own equipment to defend the homeland. That is the underlying confidence for its overseas foray.21

All personnel, squad, company, and battalion operate integration BMS radio communication with the individual combat system with Identification of Friend or Foe (IFF) being a norm across all ground operations. All PLA troops have the QCW-05 (Light weapon, Assault, Suppressed 05) Suppressed Submachine Gun as standard issue. At 2.2 kg, it fires 5.8 x 21 mm munitions at 900 rounds/minute with a 50-round magazine. As comparison, the TNI standard issue rifle, the SS series fires at 600 rounds/minute. Army aviation operations is supported by the The Harbin Z-9WA reconnaissance and attack helicopter which carries ATGM, rockets, and other airborne weapons. The M171 is the standard logistics helicopter upgraded from the Russian Mi-17. The addition of the Z20 medium lift helicopter which is modelled after the UH60A Black Hawk further offers support to Army operations. By all accounts and analysis, the PLA (Army) is a formidable force to be reckoned with. It keeps the homeland safe while the PLA (Navy) and PLA (Air Force) manage the overseas ventures.22

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19 Saunders, P., & Scobell, A. PLA Influence on China's National Security Policymaking.

20 Blasko, D. (2012). The Chinese Army today. Routledge.

21 China’s PLA: new weapons, new approaches. IISS. (2021). Retrieved from https://www.iiss.org/blogs/military-balance/2019/10/china-national-day-parade-pla.

22 Retrieved from https://www.taipeitimes.com/News/editorials/archives/2021/09/03/2003763702.
PLA Navy (PLAN)

Indonesia however has to prepare itself to deal with the military sophistication of the PLA Navy as the principal force for China’s power projection in the South China Sea. First, let us all register the fact. China has the world’s largest battle-ready navy, far larger than the US, and it is concentrated in the South China Sea and the East China Sea. In plain numbers, the US has 293 ships in its battle force with global operational responsibilities and China has 355 vessels, including submarines, and it can focus all of its operations in a limited area. China had increased its combatant vessels by 55% over the last 15 years. The US added only 2 ships. Admittedly, the US is still leading in aircraft carrier operations but the PLA Navy already has 2 carriers in operations with 2 more to be completed by 2030. And there will be purpose-designed aircraft carriers specially for the Chengdu J-20 Mighty Dragon or Shenyang FC-31 Gyrfalcon fifth-generation stealth fighters, as well as a carrier-based stealth drone.\(^2\)

While the US and UK more or less invented the aircraft carrier in the interim period of the First and Second World War, it is now the Chinese who have become keener students in improving and improvising the carrier to expand its reach beyond the First Island Chain in the South China Sea.\(^2\) While the PLA Navy had always been mocked for starting off with a decommissioned carrier, it now designs the new carriers entirely in the Jiangnan Shipyard in Shanghai with a rumoured electromagnetic Catapult Assisted Take-Off But Arrested Recovery (CATOBAR) launch system. Planes taking off can be slung off with more munitions and fuel. Such innovations are clearly geared to support the fifth generation multirole combat aircraft.

The Aircraft Carrier Shandong is based and operates out of Zhangjiang, the headquarters of the Southern Theatre Navy. It has the following combat vessels. The main Southern Fleet Headquarters is at Zhanjiang with naval assets docked at the coastal cities of Hainan Island, Guangzhou, Haikou, Shantou, Mawei, Beihai. The air support units for the Southern Fleet are in Stonecutters Island, Hong Kong, Lingshui, Haikou, Sanya, Zhanjiang, Guiping. When plotted on a map, there is a concentration of forces for the purpose of supporting a southward expedition. From that pot, the Paracel Islands is 500 km away and the capital of Manila is just 1528 km within range of all of the PLA assets. Jakarta is 3078 km away. That is within direct operational range of all the naval and air assets with the support of the aircraft carriers for power projection.

\(^2\) Retrieved from https://www.defensenews.com/global/asia-pacific/2021/09/29/china-preps-rollout-of-a-new-carrier-based-fighter-jet/.

\(^2\) Retrieved from https://www.defensenews.com/global/asia-pacific/2021/09/29/china-preps-rollout-of-a-new-carrier-based-fighter-jet/.
The latest developments in the last 12 months are more worrisome and confirm the PLA’s orientation to carry out amphibious landings. In the midst of the Covid-19 Pandemic, the Chinese government enhance its commitment and investments in developing and deploying new guided-missile destroyers, and corvettes, and guided-missile frigate with enhanced emphasis on air defense, anti-ship, and anti-submarine capabilities. All existing destroyers had already been upgraded to carry the YJ-83/YJ-83J anto-ship cruise missiles (ASCM) with 97 nm/180 km range, and the the YJ-62 ASCM with 215 nm/400 km range. The Luyang III class guided missile destroyers and the Renhai class guided-missile cruiser have been fitted with a variant of China’s newest ASCM, the YJ-18A with 290 nm/537 km range. Several PLA modernised destroyers have been retrofitted with the supersonic/hypersonic YJ-12A ASCM
250 nm, 463 km. TNI will be faced with the challenge of confronting vessels and aircraft that will be carrying hypersonic weapons.25

From the composition of the Southern Theatre Navy, it is clear that the PLA has the project capability and the political and economic intent to defend the right of passage for trade and to control the natural resources in the South China Sea. Now it needs the staging points. The following information deals with the islands that China had reclaimed and made into military bases. There are about 28 islands in different levels of development. This analysis will review only those that are related to the military technologies used for power projection in the South China Sea.

In the last 10 years, China had sent all of its available dredgers in the private sector to carry out reclamation, shoreline reinforcement, and undersea tunnelling and create 28 islands in the South China Sea. More are being constructed. The images and notes that follow deal with only one of several major military bases that have been reclaimed.

25 Retrieved from https://www.defense.gov/News/News-Stories/Article/Article/2824060/chinas-capabilities-growth-shows-why-us-sees-nation-as-pacing-challenge/
Using simple dredging techniques and a secretive and tenacious workforce, the Chinese had constructed massive military outposts with airstrips capable of supporting transport and combat aircraft within a matter of years. 

Retrieved from https://www.nytimes.com/interactive/2015/07/30/world/asia/what-china-has-been-building-in-the-south-china-sea-2016.html.

Images credited to C.I.A., Congressional Research Service, CSIS Asia Maritime Transparency Initiative, IHS Jane’s, NASA, China Maritime Safety Administration.
| Date       | Event Description                                                                                                                                                                                                 |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sept 26, 2014 | Fiery Cross Reef is a rock located in the Spratly Islands. China first took possession of the feature in 1988. U.S. Board of Geographic Names: Fiery Cross Reef China: Yongshu Jiao, 永暑礁 Philippines: Kagitingan Reef Taiwan: Yongshu Reef, 永暑礁 Vietnam: Dã Chữ Thập |
| Dec 13, 2014  | Occupied by: China  
Legal Status: Rock  
GPS: 9° 32' 45" N, 112° 53' 15" E  
Total area of reclamation: 677 acres                                                                                                                     |
| Feb 14, 2015  | All of the islands are levelled  
have have poles which are used for high-frequency radars. Several high definition radars are installed as early warning systems for any threats approaching mainland China. |
March 2, 2016

PLA large anti-aircraft guns and probable close-in weapons systems (CIWS), at each of its outposts in the Spratly Islands. The hexagon-shaped structures at Fiery Cross, Mischief, Gaven, Hughes, Johnson, Cuarteron Reef and Subi Reefs are point-defense fortifications. To defend the air operations, the PLA installed the mobile surface-to-air missile (SAM) platforms, such as the HQ-9.

Today, Fiery Reef Cross is regarded by the PLA as one of its forward operations base. These bases are approximately 1900 km from Jakarta. They are 826 km from Natuna. In operational assessment, China has no shortage of capabilities to dominate Natuna with overwhelming naval and air force as its first course of action to hold dominance over the South China Sea in a time of conflict when all diplomacy had failed. There are at the moment 7 runways in the South China Sea that could support China’s navy and airforce expedition southwards.

Retrieved from https://www.uscc.gov/research/chinas-first-airstrip-spratly-islands-likely-fiery-cross-reef.
The PLA Air Force (PLAAF)

The other Chinese force that is the largest in the world is the PLA Air Force and the Navy Aviation. They have a combined asset of 2000 operational combat aircraft including fighters, strategic bombers, tactical bombers, multi-mission tactical, and attack aircraft. Another 500 aircraft are MALE and HALE UAVs. And this does not include the training planes. Led by General Chang Dingqiu, one of Xi Jinping’s most trusted comrades, an active fighter pilot and fighter division commander, he seeks to make the PLAAF a world-class strategic strike force. He is actively involved in the design of future aircraft technologies and is consistently reviewing flight training protocols to push Chinese combat pilots to perform in the toughest conditions against tough adversaries.  

Most importantly, he was one of the prime persons involved in conceptualising the islands as forward support and maintenance bases for aircraft on distant missions where they have to be constantly on operational mode. There is suggestion from intelligence sources that he was one of the officers who implemented the ideas for the deployment of the PLAAF on the reclaimed islands to maintain sorties in enemy territory so that the Chinese planes will only be serviced on ‘Chinese soil’ and never subject to security variables and sabotage.

This table offers a brief outline of China’s air force capabilities according to the report that the US DOD gave to Congress in 2021.

| Aircraft with capabilities of being deployed across all theatre. |       |
|---------------------------------------------------------------|-------|
| Multirole Combat Aircraft | 1600  |
| Trainer aircraft | 1200  |
| Bombers | 450   |
| Transport Aircraft | 400   |
| Special Mission Reconnaissance | 150   |

The map below shows the deployment of the aircraft across the different operational theatres. The bases in the Southern Theatre have direct support and deployment links to the PLA Southern Theatre Fleet and have been acclimatised for operations on the South China Sea islands.

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26 Retrieved from https://thediplomat.com/2021/09/star-general-chang-dingqiu-takes-command-of-chinas-air-force/.
27 Ji, Y. (1998). China’s Air Force Enters the 21st Century. Kenneth Allen, Glenn Krumel, Jonathan Pollack. The China Journal, 40, 219-220.
At this point, this paper states categorically that in terms of military technology and capability, China is a daunting prospective adversary for Indonesia. And China is never going to be politically or militarily an ally in combat. This is a reality that we have to accept.

The PLA Rocket Force (PLARF)

The PLAAF has advanced missile systems that have extensive reach globally. It has never been used in any conflict but it has can be used to change the balance in the battlefield with ease and with consequences. The PLARF is now integrated actively into the operational and battle planning for all operational theatres. And it takes its command direct from the Central Command, bypassing all the chiefs of the army, air force and navy. It is, in essence, an autonomous aspect of the China’s strike capability that could be called upon at any stage of conflict. China’s missile inventory includes the following which have been deployed in the South China Sea and in the Southern Theatre Command region.

1. CSS-6 (DF-15) short-range ballistic missile (SRBM) (range 725-850 km)
2. CSS-7 (DF-11) SRBM (600 km)
3. CSS-11 (DF-16) SRBM (more than 700 km)
4. CSS-5 (DF-21) land-attack and anti-ship medium-range ballistic missile (MRBM) (approximately 1,500 km)
5. DF-26 IRBM (approximately 4,000 km)
6. CJ-10 (DH-10) ground-launched cruise missile (GLCM) (approximately 1,500 km)

In terms of Short-Range Ballistic Missiles (300-1,000 km), the PLARF has approximately 200 SRBM launchers and over 600 SRBMs. For the Medium-Range Ballistic Missiles (1,000-3,000 km), the PLA operates approximately 150 conventional MRBMs launchers and more than 150 missiles. For the Intermediate-Range Ballistic Missiles (3,000-5,500 km), the PLA operates 200 IRBM launchers and more than 200 missiles. The PLAAF actively deploys 100 Land-Attack Cruise Missiles with 300 missiles for standoff precision strikes. These are not the entire stockpile. These are only the missile systems that have been categorically confirmed across various sources.²⁸

| System | Launchers | Missiles | Estimated Range           |
|--------|-----------|----------|---------------------------|
| ICBM   | 100       | 150      | > 5,500 km                |
| IRBM   | 200       | 300      | 3000 - 5500 km           |
| MRBM   | 250       | 600      | 1000 - 3000 km           |
| SRBM   | 250       | 1000     | 300 - 1000 km            |
| GLCM   | 100       | 300      | > 1500 km                |

²⁸ Integrating the PLA Rocket Force into Conventional Theater Operations. Jamestown. (2021). Retrieved from https://jamestown.org/program/integrating-the-pla-rocket-force-into-conventional-theater-operations/.
It is evident that the China’s missile capability represents its aspiration of power projection.

What is at stake for Indonesia in the South China Sea?

Indonesia has everything to lose if its ASEAN partners lose the international use of the South China Sea and China ends up as the dominant power in the region. Indonesia loses even more if China infringes into the undersea gas concessions around Natuna. The East Natuna gas field is part of the Greater Sarawak/East Natuna Basin and it is only about 1100 km north of Jakarta. It holds about 222 trillion cubic feet of proven reserves of natural gas.\textsuperscript{29} With Premier

\textsuperscript{29} International - U.S. Energy Information Administration (EIA). Eia.gov. (2021). Retrieved from https://www.eia.gov/international/analysis/regions-of-interest/South_China_Sea.
Oil, Mitsui Oil, ConocoPhillips, Inpex, and Chevron Corporation involved in different concessions, the production will only start after 2030. That gives China enough time to outmanoeuvre the territorial claims and companies in the bidding to commence production.

Once Indonesia loses control of exploration in the EEZ of Natuna, it would mean that the Chinese Navy and its Maritime Police are already operating with impunity in Indonesia waters and within strike reach of the main islands of Java and Sumatra. For Indonesia, aside from the defending the resources, territorial integrity, and national pride, the quest to keep the South China Sea open to international use and without the dominance of China is blatantly about depriving the PLA of a nearby point for power projection in a conflict.

The reality however is stark. The Chinese aircraft carriers strike groups are already operating in these disputed waters on a regular basis, testing their launch capabilities in simulated combat operations. 30

Is Indonesia able to respond effectively with the current weapons systems and defense procurement scale? (Currently Assessment)

Given the threat profile, can Indonesia respond effectively to deter the dominance of the airspace and maritime space in the South China Sea that will directly impact the Indonesia EEZ around Natuna? The current inventory and status of the equipment that the TNI has suggests that any military response will be short-lived and problematic. The TNI stockpile of armaments are not yet close to the level of technological sophistication of the US, Russia, Australia, China, or Japan. Maintaining these older technologies, getting their operational systems updated and synchronised with the latest technologies and with the guidance of professional overseas support for these equipment will be getting more expensive. And the more Indonesia delays the procurement of sophisticated weapons with more localised support infrastructure and the prospect of localised production of components, the more the purchases will cost simply because of the Rupiah exchange rate. These are several of the matters for consideration.

These graphs are critical in the overall assessment and planning paradigm that will follow. The graphs show the IDR-USD, IDR-EUR, IDR-GBP, and IDR-AED exchange rates over the last ten years. The trend is clear. The downward trend of the rupiah against these main currency of weapon exporters lead to the following recommendations. No one, at this point, can provide any evidence that the Rupiah can restore its value as in the past few years.

30 Retrieved from https://www.scmp.com/news/china/military/article/3160580/chinese-aircraft-carriers-separate-south-china-sea-pacific.
1. Change the procurement strategy and focus on long term joint-maintenance and joint-integration/production. Over the last 10 years, the Rupiah has been on a consistent downward trend against the USD, EUR, Pound Sterling, and Emirati Dirham. Any short term recovery is limited and the decline persists. This directly impacts military procurement and preparedness for operations. Purchases that are benchmarked in these foreign currencies proceed once the exchange rate has been notched by the export credit financing agency and the MOF Indonesia. All is well for the delivery.

1.1. However, since the past contracts did not focus on extensive knowledge transfer and localisation, the equipment usually lacks maintenance and supplies as the exchange rate would have slipped extensively after 5 years. The reality is that the cost of maintaining is extensively higher because the pricing of the technology goes up while the exchange rate of the Rupiah is
always sliding. Worst still, the older the technology, the more expensive it is to maintain.

1.2. And there is not much prospect for a strengthening rupiah according to all market data. Short term market analysts always end the assessment with a positive note because they are looking at short term gains. Military procurement is different. The price at purchase and the price of maintain stretches 20 - 25 years. So the impact of currency depreciation is extensive. The exchange rates of 2000 and 2010 will not be reached again, not in the near future at least. Hence it is important for the TNI to plan the procurement with the prospect and plan for extensive local knowledge transfer and the possibility of domestic production of key components for larger procurements. As long as this criterion is met and there is prospect and plan for local industries to partner with the OEM for joint manufacturing in some ways for the procurement, then the sustainability of the procurement is assured.

2. The military planning paradigms should change to reflect the new threat. The sale of procurement must increase. This is the current budget allocation as presented by the MOF Indonesia as a broad point of discussion. It comes from the Himpunan Rencana Kerja dan Anggaran Kementerian/Lembaga (RKA-K/L) TA 2021.\(^3\) It is small for Indonesia’s needs considering the upgrading needs and the growing threats.

2.1. “Modernisasi dan Harwat Alutsista antara lain sebagai berikut

2.1.1 Dukungan Pengadaan Alutsista sebesar Rp9.305,1 miliar;
   \[\text{Rp 9,305,1 miliar = USD 652,874,931.66}\]

2.1.2 TNI AD sebesar Rp2.651,8 miliar untuk pengadaan material dan alutsista strategis, dan untuk perawatan alutsista Arhanud, overhaul pesawat terbang dan heli angkut sebesar Rp1.236,6 miliar.
   \[\text{Rp 2,651,8 miliar = USD186,058,585.48}\]
   \[\text{Rp 1,236,6 miliar = USD 86,763,725.32}\]

2.1.3. TNI AL sebesar Rp3.751,2 miliar antara lain pengadaan kapal patroli cepat, dan peningkatan pesawat udara matra laut, serta Rp4.281,1 miliar untuk pemeliharaan dan perawatan alutsista dan komponen pendukung alutsista.
   \[\text{Rp 3,751,2 miliar = USD 263,195,929.50}\]
   \[\text{Rp 4,281,1 miliar = USD 300,375,371.56}\]

2.1.4. TNI AU sebesar Rp1.193,5 miliar antara lain pengadaan Penangkal Serangan Udara (PSU) dan material pendukung, serta pemeliharaan dan perawatan pesawat tempur sebesar Rp7.004,7 miliar.”
   \[\text{Rp1,193,5 miliar = USD 83,739,694.46}\]
   \[\text{Rp7,004,7 miliar = USD 491,471,669.71}\]

2.2. These DPR and MOF allocations for TNI are simply too small. It is not possible to carry out any direct and meaningful comparison with any other country but such a comparison is important to understand the scale of defence planning. These are several random comparison to benchmark the decisions that the DPR and the government actions to plan the defence needs based on

\(^{31}\) Kemenkeu.go.id. (2021). Retrieved from https://www.kemenkeu.go.id/media/15867/buku-iii-himpunan-rka-kl-ta-2021.pdf.
the threat assessment. Given the current budget allocation, it is hard to see how Indonesia can respond to the threat now or in the next ten or twenty years. At the end of the day, combat is not about engaging the enemy only, but with the goal of defeating the enemy and maintaining the sovereignty of NKRI. More needs to be allocated to equipment procurement with a high level of localisation in the immediate term.

2.2.1. US “DOD plans to acquire nearly 2,500 F-35 aircraft for about $400 billion. It projects spending another $1.27 trillion to operate and sustain them”.\(^{32}\)

This is one typical citation showing how much is the cost of maintenance compared to procurement. And it also projects how the US plans its long term procurement for military operations across all regions globally. It is a pricey commitment. And since the US wants to maintain that technological advantage, it is committed to spend.

2.2.2. “Taiwan's extra military spending of T$240 billion ($8.6 billion) over the next five years will go mostly toward naval weapons, including missiles and warships, the defence ministry said, warning that the threat from China was worse than ever.”\(^{33}\)

This is another example of a government that is committing to spend to rise to a threat. The Taiwanese ad hoc budget goes on top of existing budget allocation. That is on top of the existing USD 15.1 billion. All that to protect an island of 23 million people in the East China Sea. Singapore, by simple comparison, is a small island of 5.68 million, and it spent USD 11.3 billion in 2021 for defence. These numbers reflect how the government allocates budget for long term defence spending to ensure the safety of their assets and interests. They cannot be compared apple-to-apple but it gives us all a sense of **scale of the commitment**. The TNI needs more, much more. It has to defend territory that stretches 5245 km and with 300 million people in the coming decades. And worst, there are rogue nations with missiles within firing range that are capable of infringing Indonesia’s safety.

2.3. For Indonesia, the financial commitment is barely enough considering the **intensity of the present and future threats** and the **vast changes in the devastation and accuracy in military technology** in the last 10 years.

3. Indonesia must commit to upgrade and perhaps revamp its military stockpile and defence procurement planning to meet up to the new kind of threat.

3.1. We know that the TNI AD has 329,757 personnel on active duty. We know that there are 149 battalions on standby across 317 KODIMS. We know that the presence is seen in 514 provinces, and regencies from east to west. We know that 197 or 38% of Indonesia administration zones do not still have KODIMS which means they are unguarded against localised threats. We know that there is about 261,049, 519 units of 5.56 ammunition. That comes to 791 rounds per soldier. How long can that munition supply support a siege on one

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\(^{32}\) F-35 Sustainment: Enhanced Attention to and Oversight of F-35 Affordability Are Needed. Gao.gov. (2021). Retrieved from https://www.gao.gov/products/gao-21-505t.

\(^{33}\) News, T. (2021). Taiwan Cabinet approves additional defense budget for more weapons systems | Taiwan News | 2021-11-25 14:18:00. Taiwan News. Retrieved from https://www.taiwannews.com.tw/en/news/4356145.
of the landing sites near Jakarta? Can the TNI AD concentrate fire on troops landing at short range when its resources are stretched all over the islands?

3.2. We know that of the 638 MLRS for land combat, 137 are not functioning. We also know that they have low level of accuracy when used at sea and cannot be used to target air threats as they were never designed for interception. They were made to pound artillery. Hence, they have no use for air or naval threats bombarding the Indonesian cities.

3.3. We know that 249 of the 516 existing ARHANUD systems are not working.

3.4. We know that 72 or the 98 attack and logistic helicopters are not flying, or at least they are deemed unsafe to operate.

3.5. For the TNI AU, on the matter of interception, we know that 67 of the multirole combat aircraft are not working, and that 42 are safe and operational. For air-to-air combat, there are only 291 functioning rockets, and the number of air-to-ground is quite useless as the conflict in the South China Sea will take place in the skies over Natuna and Jakarta concurrently.

3.6. The TNI AU helicopters are also not optimal. Only 18 are working and 10 are damaged.

3.7. The TNI AU has 19 operational anti-aircraft guns only which are still not calibrated against the faster and sophisticated 4.5 and 5 G multirole combat aircraft. These planes launch their weapons from a safe zone of at least 30 km away from the target. They won’t get closer to maintain their safe operations.

3.8. The TNI AL do not have anti-aircraft interception missiles and they are still designed for vessel-to-vessel standoff, which will not likely take place in the South China Sea. With such superior air power, the PLAAF and Rocket Force will eliminate the navies first and then proceed to maintain air and sea dominance. The threat is now planning on engagement range of 50 km and beyond. They will not come closer than 50 - 100 km and risk losing their air or naval asset.

3.9. In plain and objective ways, the TNI AU, AL, AU do not have the capacity, and quantity of defensive equipment to fend off any air or naval onslaught. The firing range of the equipment is short and the quantity can be exhausted in a short time because there are no local supplies and channels for quick replenishment. Range, accuracy and sustainable quantity for interception make the difference now.

The Indonesian budget faces its challenges because of its declining value against the countries exporting weapons and munitions.

The Indonesian military faces its challenges as the budget allocation is relatively small as lawmakers do not want to recognise the extent of the threats.

The threat grows consistently in growing economic and geopolitical competition in the South China Sea and the Asia Pacific region as a whole.
In terms of the technologies available, let us be frank in our assessment.

1. TNI AU uses the Thomson TRS 221SR air defence 3D radars which operate on E/F band. With a range of 335 nm, they are positioned in Lhokseumawe, Dunai, Tanjung Pinang, Natuna, Balikpapan, Tarakan, Gorontalo, Biak Numfor, Mimika, Merauke, Saumlaki, Kupang, Malang, Jombang, Kulon Progo, Sukabumi, Sibolga, and Sabang. First, there are extensive gaps in coverage which the enemy 4.5G and 5G fighters could exploit. Second, the positions of the radars are not linked to interception systems. This means that a simple incoming missile could disarm these radars and blind all defensive actions. And these are the Thomson TRS 2215 radars which are regarded as legacy radars in the industry from the 1980s and 1990s. The Plessey AR 325 is also an E/F band radar that is commonly used as a legacy long range surveillance radar. It is not designed for the high sophisticated evasive capabilities of the plans used by prospective adversaries in the Asia Pacific region. It cannot effectively detect the F35 and the J20 alike. With a mix of radars from Thomson, Plessey United, and the Master T series from TRS, the overall picture is clear. This mix and match of radar systems will be a challenge for long term maintenance because of the variety of components to suit different models. Their age, and bandwidth, as well all aspects of technical specifications are at least two decades behind the technology profile of the threat. They must be replaced with updated LRR and GCI radars that share the same technology platform for interoperability. The new radar locations need to cover the critical operational gaps and cope with targets travelling at higher speeds and with better manoeuvrability.

2. The S60 57 mm guns cannot even intercept 4G fighters as they have low response fire rate, and low range. The operations is largely manual and dependent on line of sight. The same applies to the SU 23 which in theory fires 2000 rpm but can intercept low flying planes. The enemy 4.5 and 5G planes will launch their missiles from a range beyond 20 km. They will be way out of range of these guns. These guns were made in the Soviet Union and used int he Vietnam War, Cambodian Civil War, Iran-Iraq War and many other conflicts with low flying planes which no longer exist in the PLAAF or any other potential threats in the region. These guns are only useful against the dated airforce used in several African countries. For illustration, these are the planes used in those wars. None of them are used in the Asia Pacific region today for active combat. The S60 cannot defend Indonesia against air threats other than possibly low flying surveillance UAVs.

   2.1. Aero L-39 Albatros
   2.2. Aerospatiale SA321 Super Frelon
   2.3. Aerospatiale SA342 Gazelle
   2.4. Bell AH-1 SuperCobra
   2.5. Dassault Mirage F1
   2.6. Dassault Super Etendard

3. The handheld GROM is a versatile weapon. It could or could not intercept at a maximum of 650 m/s. It is light, easy to fire but depends on line-of-sight. It is not directly connected to any tracking or warning radars. And the incoming threat is no longer needing to fly low. It’s range is 5.5 km maximum. Its maximum altitude is 3.5 km. That is limited range. This is better suited for interception low-flying bombers, if any, MALE UAVs and helicopters. The GROM is highly efficient as a tool of sabotage to bring down planes as they are taking off or landing but they are
difficult to use against low flying incoming 4.5G and 5G aircraft simply because they will not flying into the range of the GROM.

4. The RBS 70 is a legacy SHORAD from the 1970s. It has a range of maximum 6 km. It has been operated in many conflicts and had been credited with many effective hits. Those were the days when high accuracy guided missiles were not fully deployed and fighters flew low and close to hit high value targets. That is no longer viable today with ships and planes capable of firing the CJ-10 land-attack missiles that could be fired from 500 - 1500 km away from the target. At the terminal stage it is travelling at Mach 2.5. That is too fast for the weapons cited above. The RBS70 is however useful when connected to a C2 or C4I system that manages the air defence collectively. It is however versatile as it could be launched from vessels so that the interception could take place much further away from the target. There are the upgraded RBS70 NG which could be connected with the recommended RACCOS and RETIA radars.

5. The Mistral SHORAD is also a legacy equipment designed in the 1970s by MBDA. Mistral is a short-range air defence (SHORAD) missile system that can be used from vehicles, surface ships, and helicopters, as well as in a portable configuration. It has been integrated into weapon systems in Austria, the Brazilian Marine Corps, Chile, Colombia, Cyprus, Ecuador, Estonia, Finland, France, Hungary, Indonesia, Morocco, New Zealand, Norway, Oman, Pakistan, Philippines, South Korea, Singapore, Spain, and Venezuela. When used in the MANPADS role the "Mistral" missile is transported in a transport and launch container (MPC) together with "friend or foe" interrogator, power source and tripod with its sighting devices. They are then to be operated by a pair of crew as commander and the shooter. Just like many maenads which are used against UAVs and helicopters, the Mistral cannot intercept 4.5G and 5G fighters. There is no coordinated radar inputs to guide the accurate interception when an incoming missile is at terminal phase. It has its use to stop helicopters and surveillance UAVs that are tasked with the land invasion but not more.

6. The Starstreak is a close-range anti-air guided-weapon system for use against helicopters and high-speed ground attack aircraft. The system is produced by Thales Air Defence Ltd (TADL). The Starstreak self-propelled, high-velocity missile (SP HVM) system has been in service with the British Army since 1997, with the lightweight multiple launcher (LML) and shoulder-launched versions since September 2000. It has its roots in the MBDA system from the 1970s. The Starstreak SP HVM is mounted on a tracked BAE Systems Land Systems Stormer vehicle. The system carries 12 Starstreak missiles, as well as eight rounds of ready-to-fire missiles. These are very short range and are ideal to stop the final assault when enemy planes come close to the targets. They are complementary to the system that has been recommended in this paper. However, the procurement contract does not lead to, at any time in the future, to localised production of the missiles or the components. And no integration takes place in Indonesia. Hence the weapon is purely imported and with contractual room for sustainability in the long term.

Based on this brief assessment of existing systems, the defense investments need to be extensive and specific to prepare for a fluid geopolitical situation in this decade and beyond. The budget allocation for all categories of air surveillance and defence (interception) should be
prioritised and increased significantly even when it goes against the common commentary of the politicians. They need to know that the threat is defined and that no other prospective threat exists in the coming decade. And even if there were another type of threat from another superpower, Indonesia still does not have the capacity to respond with its current equipment. Even if the readers of this document think the US or AUS would be a threat to Indonesia, then the strategy of purchasing more from independent sources needs to be carried out. Indonesia still does not have any interception capability at the moment for the F15, F22 and F35. These aircrafts are designed for a different type of long range air-warfare. And the US can intercept and nullify all of the assets in the TNI with ease as they are the OEM and know every aspect of the weakness of the equipment.

The supply chain for the nationwide air defense and airspace situational awareness systems must be diversified to include equipment sourced from the EU, Turkey, and possibly even Russia. Russia, as a matter of fact, is one nation that is the least likely to be a direct threat with Indonesia in any way as it is the lowest interest in the Asia Pacific region and ASEAN in a military sense. Depending on China-supplied equipment is improbable and impossible. Depending on NATO-supplied equipment only is expensive and risky for long term military engagement in the Asia Pacific region. Depending on a blended source that is integrated and with localised supply chain cited in the procurement contracts for the upgrading and maintenance is a wise approach to take.

**How must Indonesia respond?**

The trends and evidence show China’s assertion across the political, economic and military sphere. At the end of 2021, China formally protested to Indonesia asking it to stop gas exploration and military exercises in the North Natuna Sea which China claims as its own waters. This diplomatic protests comes on top of numerous incidents of harassment of Indonesian fishing vessels by China Coast Guards which is the only maritime patrol force that has the mandate that rivals its navy.

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34 Retrieved from https://www.reuters.com/world/asia-pacific/exclusive-china-protested-indonesian-drilling-military-exercises-2021-12-01/.
The potential threat posed by China as the prospective aggressor or enemy is clearly defined. It has been qualified and quantified. And at this point in geopolitical considerations, there is no other nation that could become a threat to Indonesia in the next twenty to thirty years. It is, categorically unlikely that the US or Australia could become an aggressor as there is no economic, social or diplomatic motive whatsoever that could make them turn their weapon systems at Indonesia. The Americans and Australians need Indonesia to be a stable and collaborative partner in the Asia Pacific region to ensure that their trade and military have safe passage through Indonesian waters. Singapore and Malaysia do not have the motive, nor military capacity to sustain any attack on Indonesia at any point in the future. Their economic existence dependents on sustained harmonious ties with Indonesia. No other ASEAN member dares to flirt with a military option against Jakarta. Hence, the defense planning for the TNI will need to consider the technological advancement and deployment strategy of the PLA, especially the Southern Theatre Command.

It is no longer about why Indonesia should respond to any possible or imaginary threat? It is now about how to respond in a proportional and sustainable manner.
Recommendations

The establishment of a nationwide air defense and airspace situational awareness systems to maintain the right of passage of aircraft, and vessels in Indonesian and international waters and airspace is the principal decision. The selection however is a complex matter. TNI will have to consider a wide range of equipment with technical and price variances. There will also be the matter of the sustainability and reliability of the supply. In the best of conditions, the popular suppliers will be offering their wares and when political ties sour, they bow to sanctions. Hence, Indonesia has to evaluate and create a diversified source which offers the highest possibilities for localisation and technology transfer so that in the long term, Indonesia will develop the capabilities to excel in domestic sophisticated radar development.

The focus of the recommendations will be the establishment of a nationwide early-warning detection high-accuracy interception system connected by a common C2 and C4I platform.

Indonesia’s comprehensive missile defense system that is being conceptualized and developed will, at some point, tend to resemble that of Israel where the concept of operations and deployment is built entirely on the prioritising of economic, and political assets. In the case of Taiwan the missile defense system is located close to the National Palace Museum, located in Taipei, when 700,000 pieces of ancient Chinese artefacts are kept. Taipei deploys the Tien Kung/Sky Bow and US-made PATRIOT SAMS in fixed silos around the city. For now, the TNI is tasked to defend the following priority locations as its destruction of control by a foreign power could signify a compromise of Indonesia’s sovereignty.

1. The Straits of Malacca, the busiest waterway that supports trade throughout the Asia Pacific economies.
2. The Sunda Straits which is the critical support channel for trade in any crisis even when the Straits of Malacca is closed because of a disaster, siege or terrorist attack.
3. The Lombok Straits which is a critical passage way from the Indian Ocean to the East China Sea bypassing the South China Sea.
4. The Indonesian capital of Jakarta as the seat of government and the business center for the country.
5. The Indonesia city of Surabaya as one of the economic hubs supporting tens of millions of Indonesians on the eastern part of the archipelago.
6. The Capital Airport of Soekarno Hatta and the nearby Halim Perdanakusuma airport as the gateways into Jakarta.
7. The Java Sea, a critical zone for military vessels that could lay siege to Jakarta via ship-to-land missile bombardment.
8. The island and waters of Natuna as it is the furthermost point that defines the Indonesian territorial waters and EEZ in the South China Sea.

The interception missile system should have the following as the operating parameters.

1. Improved guidance and control methods for high g capabilities. The missile should be operational at 60 g force.
2. Missile must be equipped with seeker for target identification prior to detonation.
3. Proximity sensor for efficient end-game neutralising of the target upon interception. The sensor should activate within the last 1 km period to contact with target.

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35 Lappin, Y. Iron Dome Goes Naval to Defend Gas Rigs. Begin-Sadat Center for Strategic Studies.
36 Taiwan: how the ‘porcupine doctrine’ might help deter armed conflict with China | Feature from King's College London. Kcl.ac.uk. (2021). Retrieved from https://www.kcl.ac.uk/taiwan-how-the-porcupine-doctrine-might-help-deter-armed-conflict-with-china.
4. Vertical Launch for maximum coverage, where possible.
5. Hybrid (Aerodynamic + Jet Vanes) Control for fast manoeuvres, where possible.
6. Dual Pulse Rocket motor for longer range interception and better engagement speed.
7. RF Data Link for target update through radar so that all C2 and C4I stations are aware of the final status of the threat. If the data link is lost, the missile should be able to predict the new location of the target based on the last known data sets.
8. Booster motor for extended range and altitude, where possible, to maximum the range of interception.
9. Missiles must have GPS integration with anti-jamming capabilities.
10. The “single-shot probability of kill (SSPK) >%80
11. The operational reliability must be >%90
12. The nominal safe zone radius is 15-20m for plume effects during firing.
13. The safe radius for unexpected explosion on the launcher should be 50-100m
14. Missiles can be destruct during flight by FCC over the RF data link.
15. Weapon must comply with MIL-STD-810G profiles are used in the validation
16. MIL-STD-461 and 464 profiles are used in the validation for EMI/EMC
17. Quality standards for production must comply to ISO and AQAP-2110
18. The missile must endure High and Low Temperature Test: MIL-STD-810G Method 501.5 and 502.5 Procedure II (-33°C and +44°C).
19. Missile system must comply with Humidity Test: MIL-STD-810G Method 507.5 Procedure II (11 Cycle, combined 60°C and %95 RH)
20. Temperature Shock Test: MIL-STD-810G Method 503.5 Procedure I-C (between -33°C - +63°C)
21. The missile canister must serve as both shipping and storage container and launch tube.

In view of the recommended parameters of the radar systems and the interception vehicle, it is henceforth necessary for TNI to consolidate the procurement of the future systems based on the threat assessment and the geopolitical ties with the suppliers. To depend on a purely US and EU origin product would pose issues as the matter of support for bilateral trade and export financing and the complexity of US-Indonesia and EU-Indonesia ties gets in the way. While relations have been stable, in the last 2 decades, there are indicators that the US and its intelligence operatives through Australia and Singapore have tried to shape Indonesia’s foreign policy with regards China and Russia. Procuring those systems purely from a US source would cause issues whenever Indonesia decides to take a stance against separatists and terrorists operating in regions like Papua. Under the guise of defending human rights, the US often uses defence-related procurement as part of the negotiation chip. Indonesia cannot afford to be tied to such conventional mindset where we are expected to be reliant to the Americans as allies only. The way we plan the nationwide air defense and airspace situational awareness systems has to reflect Indonesia’s foreign policy mantra, ‘Bebas Aktif’ which in essence empowers Indonesia to decide matters in its best long term interests.

This paper recommends sourcing the systems from companies which are aligned to governments that also have an open diplomatic perspective. On this matter, Turkey and the

37 Sekretariat Kabinet Republik Indonesia | Esensi Hubungan Internasional dan Kebijakan Politik Luar Negeri Indonesia. Setkab.go.id. (2021). Retrieved from https://setkab.go.id/esensi-hubungan-internasional-dan-kebijakan-politik-luar-negeri-indonesia/.
Czech Republic come to mind. Both nations are independent, have a long history of maintaining large and active militaries and are known to have comprehensive civil-military technology clusters and they have reliable corporations that have served the needs of the domestic and foreign militaries. Roketsan Roket Sanayii ve Ticaret A.S. is a major Turkish weapons manufacturer and defense contractor based in Ankara and with experience since 1988 in supplying Turkey's defense needs. It is one of Turkey's top 500 industrial corporations. It's range of products range from 122mm Artillery Rocket systems, the J-600T Yildirim ballistic missile (150 km range), Bora ballistic missile (80–280 km), the ALKA Directed Energy Weapon System (YESS), Atmaca anti-ship missile (200 km), L-UMTAS 160 mm Laser Guided Long Range Anti-Tank Missile System and the Hisar Missile Interception Systems with range from 2 - 150 km. Roketsan is also now leading the Turkish Satellite Launch System. The range of technologies and the worldwide client base makes Roketsan on of the leading candidates to design the Indonesia air defence system. And to balance this technological and diplomatic relationship is the Czech company, RETIA, which has been making radars for NATO for decades. Formed in 1993 and operating in Tesla Pardubice, RETIA’s range of expertise include integrating the 3D Mobile Air Defence Radar with Israeli’ ELTA, the Alliance Ground Surveillance to protect NATO troops in the battlefield, C4I2 Command and Control Systems for Air Defense systems, and the RL-3D radars based on AESA (Active Electronically Scanned Antenna) technology. With oversight by the Czechoslovak Group (CSG), the combination of Roketsan, RETIA, the vehicle platform of TATRA, and the credit financing from the Czech Export Bank forms the recommended parameters for the long term development of the air defence system.

**Conclusion**

Given these broad parameters, there are several possible missile interception systems that need to be evaluated and scored one by one for their merits and drawbacks. There are technological, financial and even diplomatic issues to consider. While the systems are seemingly reasonable priced, the OEM may or may not offer the export license because of bilateral or regional considerations. This is a norm in the defense industry. There are matters that the OEM just cannot consider based on its own geopolitical guidelines.

Once Indonesia has decided on collaborative technology partner, supportive financial backing for the procurement, and a bilateral strategy to diversity the procurement with a significant level of comfort and confidence, then it can be certain that the delivery of the missile defense system could reach the implementation stage. Once in place, the physics and military management take control. The ground- or sea-based radars create a monitoring system that contribute to offensive missile detection. The Interceptor missiles carry ‘kill vehicles’, which detach from the missile and eliminate the threat. And the C2 and C4I hubs coordinate the flow of information throughout every second of the interception sequence. The technology will function once the politically-elected decision makers and the TNI evaluators have ascertained the need and role of the missile defense system. The interception procedure is defined in every operational manual for interception and it is a tried and tested solution across many continents. The outstanding matter is the singular and undisputed role of national and military leaders to recognise the impending threat, and have the will to put in place the procurement strategy to ensure that the interception systems are in installed in the soonest possible timeframe across Indonesia.

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38 Joint Chiefs of Staff. (1999). Joint doctrine for countering air and missile threats.
What happens if we ignore the threat and proceed as if there will not be a future military standoff in the South China Sea that will embroil several members of ASEAN? It will be tragic if the TNI is not given the capabilities to respond to a threat emanating from a missile or 5G Fighter aircraft that is heading into Indonesian airspace.

If we fail to plan, then we plan to fail. Perhaps these lines below will be read in our future. It is a fact that many forget. Nations are new entities and they are not made to last forever. It is up to the present generation to recognise the threats and take the steps needed to neutralise the threat before it enters the homeland.

‘Once we had a country and we thought it fair, Look in the atlas and you’ll find it there: We cannot go there now, my dear, we cannot go there now.’

W. H. Auden, Poet. (1907 - 1973)

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