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## **Enhancing the Indonesia Air Defense System. The immediate and urgent application of GCI Radar in safeguarding the airspace sovereignty of the Republic of Indonesia**

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**Abstract.** This journal is prepared as a sequel to the first journal with title Enhancing the Indonesia Air Defence Systems: **Confronting the challenges and military build-up In the Indo Pacific region**. The first journal was focused on the threat faced by the Indo-Pacific region with the rise of Chinese military dominance, and the study to counter the threats through effective effectors such as the Air Defence Missile. Further to this background, this journal subtitled, **The immediate and urgent application of GCI Radar in safeguarding the airspace sovereignty of the Republic of Indonesia**, will focus on the supplement systems to safeguard the aerial sovereignty of the Republic of Indonesia through the additional fielding of Ground Control Interceptor Radar Complex. 21st century battlefield landscape have much changed since the last World War, and again it has proven so dramatically important to keep the air dominance over defended territory. Therefore, not only the ability to defend and to neutralise a target, it is imperative that in order to defend, there must be a modern systems that can object, discriminate, and track an aggressor to guide military decision makers in any given operation. This journal is prepared to supplement a comprehensive study of future possible conventional military engagements over the Indo-Pacific region with China and Indonesia at its main focus.

**Keywords.** Indo-Pacific, China, Indonesia, Air Defence, Radar, GCI, military

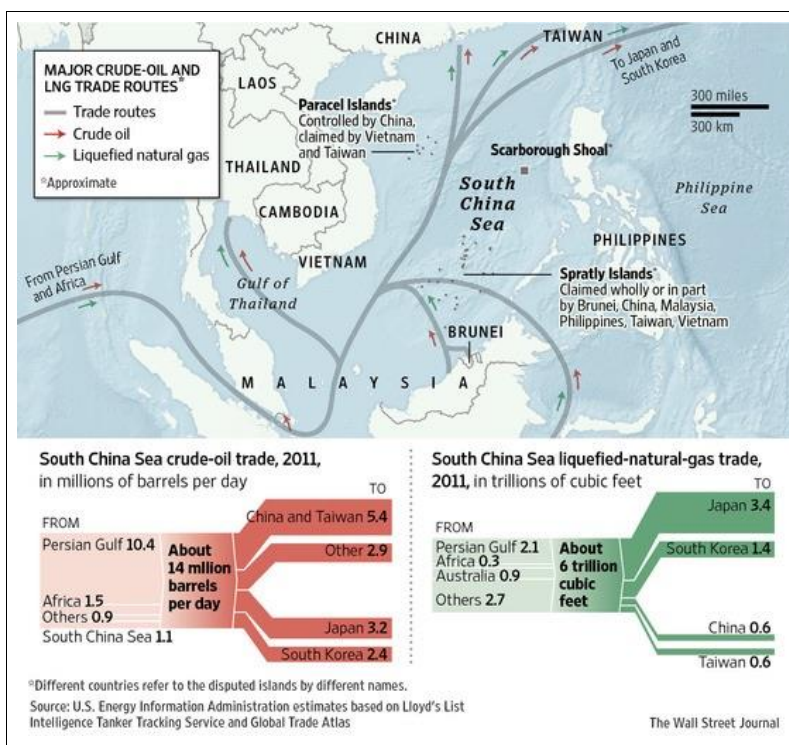
### **1. Introduction to the geopolitical realities**

1.1. Today, in 2022, Indonesia has the most critical geography in the Indo-Pacific region. Hence, Indonesia's foreign policy and defense posture will interest India, China, the United States, Australia, and the rest of ASEAN. Moreover, Indonesia's waterways had always been important to trade and the balance of colonial domination by the British and French. Today, supercargo carriers transport billions of dollars worth of electronic goods, clothing items, cars, and oil and liquified natural gas via the Straits of Malacca to and from the South China Sea. In addition to the valuable cargo, Indonesia has become the geostrategic water and land bridge for current and future superpowers.<sup>1</sup> For example, the United States Navy Pacific Fleet based in Yokosuka, Japan, depends on the freedom of navigation of the South China Sea,

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<sup>1</sup> Jung, S., Lee, J., & Lee, J. (2020). The Indo-Pacific Strategy and US Alliance Network Expandability: Asian Middle Powers' Positions on Sino-US Geostrategic Competition in Indo-Pacific Region. *Journal Of Contemporary China*, 30(127), 53-68. <https://doi.org/10.1080/10670564.2020.1766909>

Straits of Malacca, and other waters in the east near Papua New Guinea to move its blue-water naval assets around the world. Similarly, the Chinese Peoples' Liberation Army (PLA) depends on its bases in the South China Sea and its future acquisition and collaboration partners around ASEAN to develop its posture to defend China's 1st and 2nd anti-denial/anti-access lines. In the coming months or years, the clash of history and the misunderstandings of outdated and unjustified maps from the 1940s will cause a conflict of militaries in the vicinity of Natuna.<sup>2</sup> The primary conflict will occur in the southern South China Sea and involve maritime and airspace over the Straits of Malacca and the Sunda Straits. The secondary zone of contention will likely be around the area of Papua, as its surrounding waters are the gateways into the Southern Pacific Ocean.<sup>3</sup> There will be no land battles in this conflict. Instead, the enemy aircraft and navy will asset their resources to develop dominance of the waterways and airspace, both out of reach of the army's conventional infantry, engineer, and artillery units.<sup>4</sup> All these events will play out in the next ten to twenty years. It is unlikely that it will not happen.



(a) These two maps define the quantity of fuels that traverse the Straits of Malacca and the South China Sea that is destined for China.

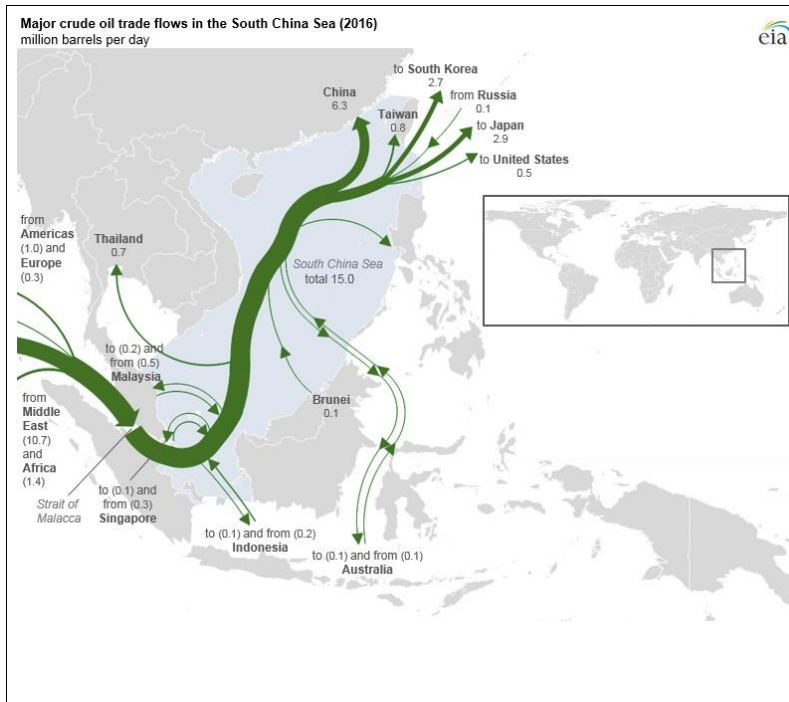
(b) The volume and value of this trade route had changed in the past 200 years. What started as trade in tin, tea and cotton now has transformed to carry energy to the major electric producers in China, Taiwan, Japan, and South Korea.

(c) The security of this route had not been dealt with in the public sphere. Everyone assumed that this route will remain uninterrupted. China

<sup>2</sup> Preventing War in the South China Sea. Air University (AU). (2022). Retrieved from <https://www.airuniversity.af.edu/JIPA/Display/Article/3111133/preventing-war-in-the-south-china-sea/>.

<sup>3</sup> Alp, E. (2021). China's Growing Assertiveness in the South China Sea: An Inevitable Conflict?. Academia Letters. <https://doi.org/10.20935/al1547>

<sup>4</sup> Aamir, O. (2020). Future Warfare (2019-2050): Technologies and Strategies. SSRN Electronic Journal. <https://doi.org/10.2139/ssrn.3529188>



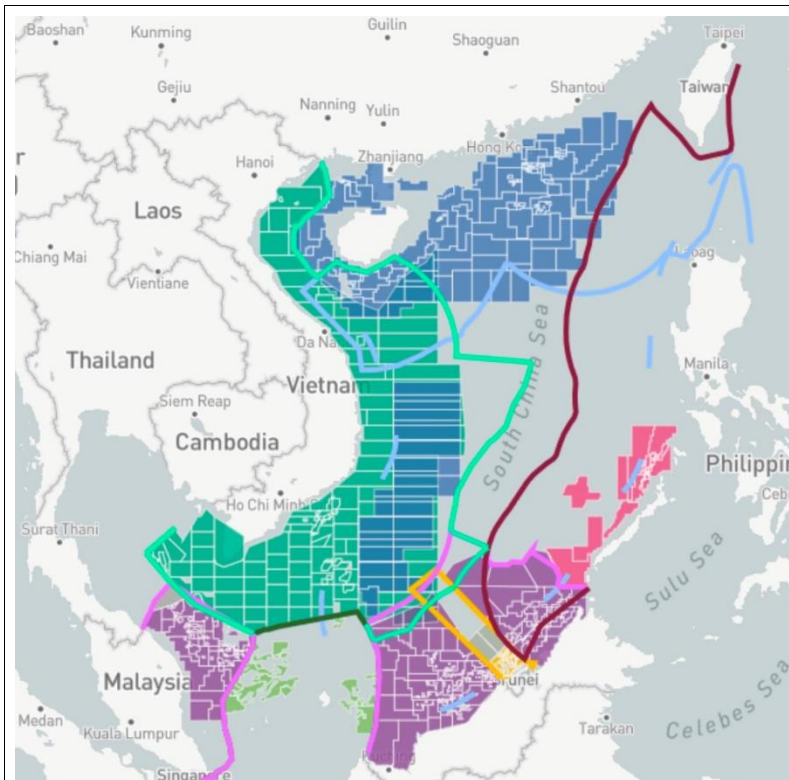
however takes a different perspective. In the context of the growing tensions with India in the shared border in the Himalayas, China wants to secure its energy and trade route so that it could sustain commercial and military operations in an all out war situation.

(d) At the end of the Covid pandemic, an all-out war seemed impossible. However, after Russia's invasion of Ukraine, nothing is impossible.

1.2. Indonesia's balance of relations between the United States, Australia, China, ASEAN, and India will signal all stakeholders keen on maintaining the economic and political stability of the region. Therefore, Indonesia's military posture is more critical. While the TNI does not want to look aggressive in dealing with territorial incursions, it has to continue the military upgrading programs at breakneck speed to ensure that the defensive systems have the latest capabilities to face credible threats. While China is a significant trading and investment partner for Jakarta, it is an open secret to all strategic analysts that the PLA is the only threat the TNI will face in the coming decade. No other regional military power has the capacity and intent to carry out sustained incursions into Indonesian waters or airspace to secure a strategic territory like Natuna.<sup>5</sup> No other regional military force has the technological sophistication, financial prowess, economic and political motivation, bag of tricks, and long-term planning vision as the Chinese government. At this point, it is safe to say that no other member of ASEAN can pose a significant and sustainable threat. That leaves Indonesia in a bind. The leaders need to play a balanced role between being tactically militarily prepared for the scale of the challenge in the air and at sea while still being diplomatically palatable with China.<sup>6</sup>

<sup>5</sup> Toruan, G., & Sunaryo, A. (2020). Indonesia's Diplomacy in North Natuna Sea in Confronting China to Protect National Interests. FOCUS, 1(1), 21-27. <https://doi.org/10.37010/fcs.v1i1.270>

<sup>6</sup> Indonesia defence diplomacy strategy in resolving china claims to Indonesia exclusive economic zone in north natuna sea. (2021), 27(02). <https://doi.org/10.47750/cibg.2021.27.02.033>



(a) Aside from the importance of the South China Sea to protect China's energy and trade jugular vein, the seabed holds the energy supplies for the next century to support China's 1.4 billion people. Estimates from the IEA suggest approximately 11 billion barrels (bbl) of oil reserves and 190 trillion cubic feet (Tcf) of natural gas reserves in the South China Sea. Exploration is confirming that information in stages.

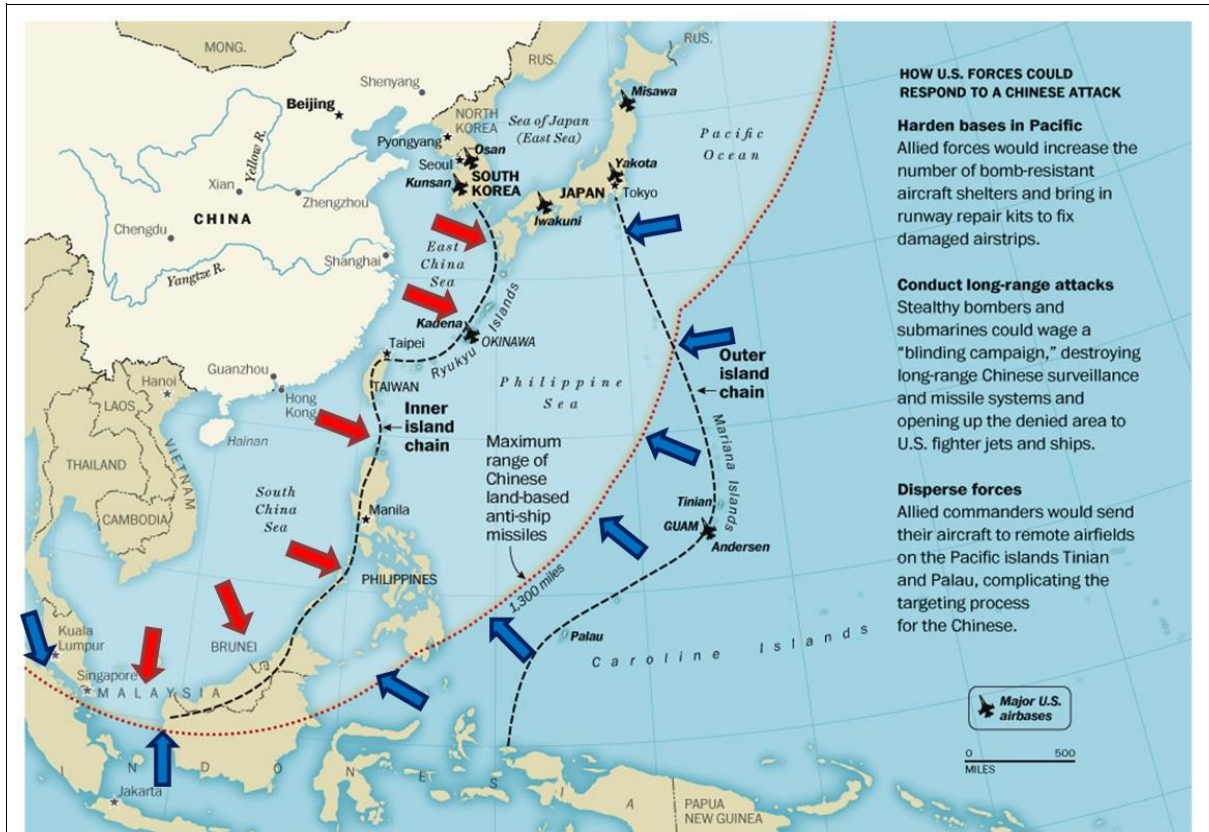
(b) Based on this map, it is clear why China had reclaimed the islands in the South China Sea to become their forward military bases to protect this valuable energy resource.

1.3. Locked in the Chinese mindset is that the South China Sea belongs to China, and nothing anyone will say can change that stance.<sup>7</sup> China today sees itself in a battle for its existence against the values and the bullies presented by the United States. With the start of the Russian invasion of Ukraine on 24 February 2022, China and North Korea had taken sides with Vladimir Putin. There is a political, economic, ideological, and emotional alignment that will have strategic implications in the events in the next five to ten years. These three nuclear states will carefully structure their standoff with the United States and its allies in ASEAN and Indo-Pacific region. While Russia aspires to build a Euro-Asian empire comprising all the Russian-speaking peoples, China will strive to build a similar hegemony across the Indo-Pacific with its military forces and sympathizers littered across the region. What happens in the eastern side of the European Union cannot be divided from the tensions amid ASEAN. China is playing the age-old divide and rule strategy by making economic and military alliances with Cambodia, Myanmar, Timor Leste, Papua New Guinea, the Solomon Islands, and even Malaysia while posturing to standoff with any nation that sides with the United States.<sup>8</sup> The tensions in our midst will not simmer. It will only come to a boil in the coming years as economic hardship from energy, and food insecurity will cause havoc to the global economy. Climate change will

<sup>7</sup> Kościelniak, K. (2018). China in the South China Sea. Can China's presence in the South China Sea lead to war?. *Reality Of Politics*, 9(1), 15-29. <https://doi.org/10.15804/rop201801>

<sup>8</sup> China and strategic competition in a divided Pacific Islands region. (2021), 27(10), i-iii. <https://doi.org/10.1080/13567888.2021.2015182>

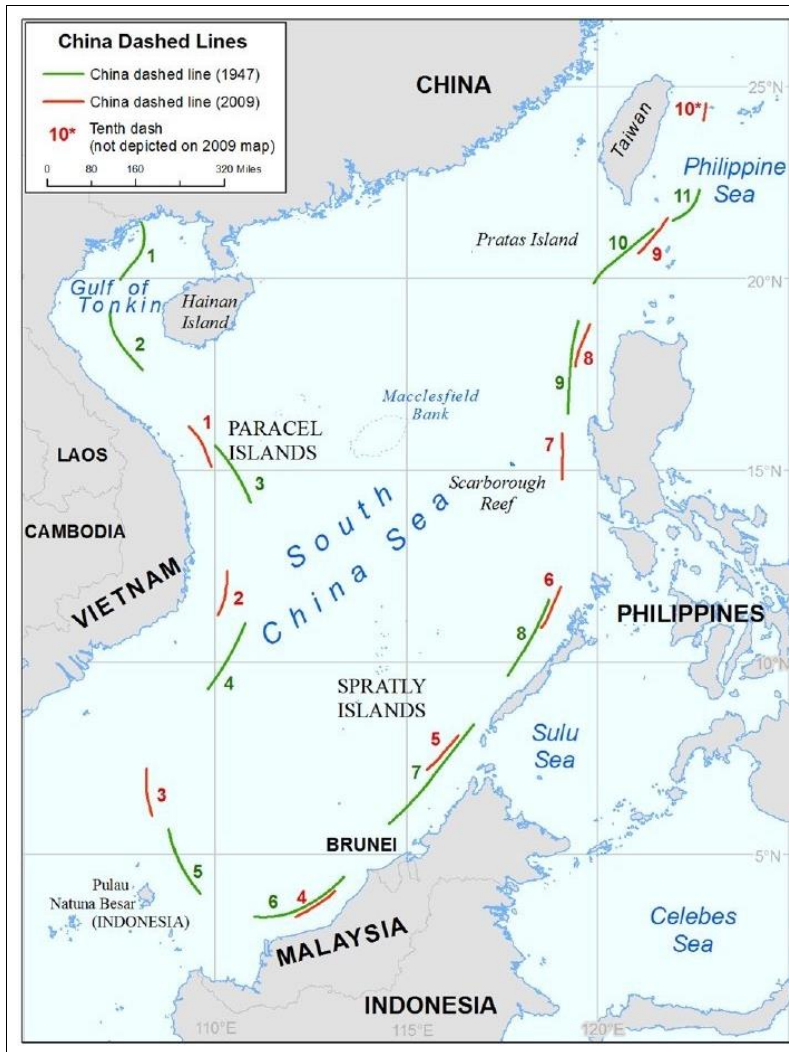
only exacerbate the tensions. To ensure its sustained existence and to thrive as the moral and economic leader of the Indo-Pacific region, China will be left with no other option but to take control of the natural energy assets embedded in the South China Sea. After all, it believes that it owns it.<sup>9</sup>



(a) The map above shows the PLA’s conceptual map of its two lines of defense. The Inner Island Chain includes Natuna and the Straits of Malacca. The Outer Island Chain consists of the location of the new Indonesian capital in Kalimantan and most of the western segment of Indonesia (Sumatra, Java, and Sulawesi).

(b) The PLA had already considered that any response from the United States forces stationed in the airbases in Japan and South Korea could be nullified by the Eastern and Southern Theatre Command. The PLA had considered the US options of conducting long-range strikes to disperse the Chinese forces and have created such an extensive range of aircraft and naval vessels in such large quantities that it simply could not be neutralised. The PLA concept is to respond with overwhelming force to secure the waterways and airspace.

<sup>9</sup> User, M. (2022). Assessing China’s Motives: How the Belt and Road Initiative Threatens US Interests. Air University (AU). Retrieved from <https://www.airuniversity.af.edu/JIPA/Display/Article/3111114/assessing-chinas-motives-how-the-belt-and-road-initiative-threatens-us-interests/source/assessing-chinas-motives-how-the-belt-and-road-initiative-threatens-us-interests/>.



(a) The critical point to note is that in 2009, China had redefined the dashed lines by broadening the loop north of Nature and, by default edging their claim into Indonesia's EEZ. While it had not enforced its Air Defense Identification Zone throughout the South China Sea, it had already done so over the reclaimed Parcel and Spratly islands.

1.4. Based on these general realities that set the context, the Government of Indonesia and the TNI collectively need to focus on interpreting the technological and tactical realities that it will confront. It is true that Indonesia today is more important than it had even been in the history of the Indo-Pacific region. Hence, it is imperative that Indonesia will have to strategize to dominate the threats that it will confront. China has no intent to relinquish control of the territories defined by the dotted lines.<sup>10</sup>

1.5. Indonesia must inevitably invest extensively in maintaining and upgrading its defense posture against semi-symmetric warfare. The TNI needs centralized management of tactical operations with more complex equipment, thus requiring more outstanding expertise, training, flexibility, and decentralization of knowledge and decision-making. The present and future investments must include enhanced GCI radar systems with more locations planned throughout the archipelago, the deployment of AEW&C aircraft to provide air coordination of the battlespace, broader deployment of ground-based missile capabilities and enlarging the

<sup>10</sup> Kazianis, H. (2022). China's 10 Red Lines in the South China Sea. *The Diplomat*. Retrieved 22 August 2022, from <https://thediplomat.com/2014/07/chinas-10-red-lines-in-the-south-china-sea/>.

quantity and capabilities of the TNI AU MRCA aircraft. These investments will make the TNI a credible deterrent against any possible incursions of its territory.

1.6. Old arguments must first fall. The notion that no nation can take over Indonesia as the Dutch and Japanese had done is archaic. Warfare in the 21st century does not need infantry troops to take over cities. The prospective enemy, the PLA, does not need to risk its men in urban warfare across the streets of Jakarta and Surabaya. In the context of the Indo-Pacific region, the enemy will neutralize the air force and navy. Then it will block the straits and waterways, jam the trade channels, filter all vessels carrying food and energy, dominate the airspace with no-fly zones, and block satellite signals and 4G and 5G transmissions. All these actions will effectively blind the government, cause widespread dissent, and cut off all communications channels internally. That is enough to give the PLA or any other dominant aggressor the ability to manage its operations in the air space and maritime channels. Warfare in this century will not resemble that in the previous centuries. And China has designed its 21st-century force to sustain such a military campaign.<sup>11</sup>

1.7. No documented evidence has emerged if there were any other prospective enemies that could wage war on such a scale.

1.8. If there is any doubt in this perspective, this statement shall set the matter straight. It comes from the ‘China’s National Defense in the New Era’ published by the State Council Information Office of the People’s Republic of China on July 24, 2019. China has formalized its aggressive posture in the South China Sea in their policy mission.<sup>12</sup>

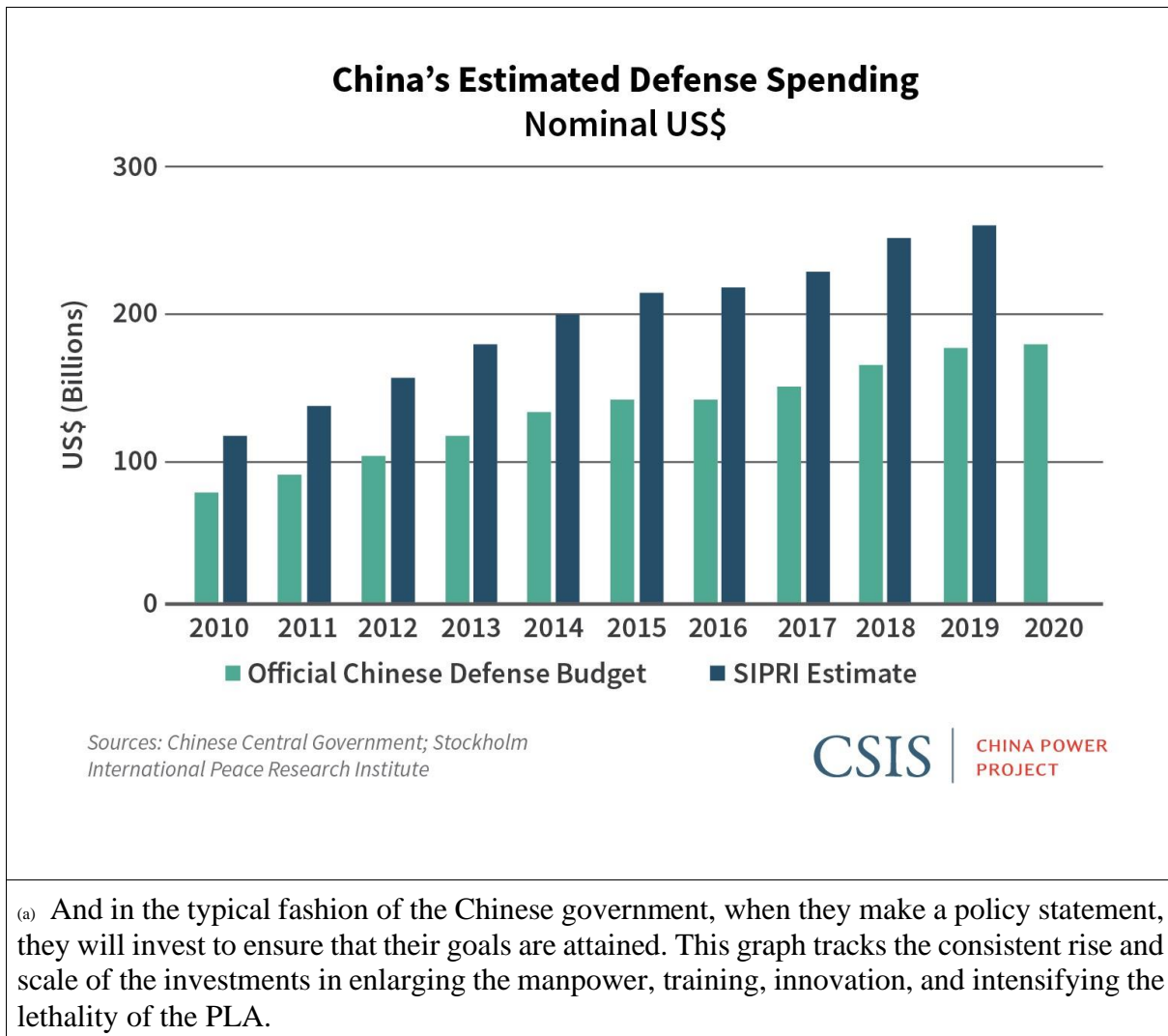
1.8.1. “China resolutely safeguards its national sovereignty and territorial integrity. **The South China Sea islands and Diaoyu Islands are inalienable parts of the Chinese territory.** China exercises its national sovereignty to build infrastructure and deploy necessary defensive capabilities on the islands and reefs in the South China Sea, and to conduct patrols in the waters of Diaoyu Islands in the East China Sea.”

1.8.2. “China’s armed forces defend important waters, islands and reefs in the East China Sea, the South China Sea and the Yellow Sea, acquire full situation awareness of **adjacent waters**, conduct joint rights protection and law enforcement operations, properly handle maritime and air situations, and resolutely respond to security threats, infringements and provocations on the sea.”

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<sup>11</sup> DOD Releases 2021 Report on Military and Security Developments Involving the People’s Repu. U.S. Department of Defense. (2022). Retrieved from <https://www.defense.gov/News/Releases/Release/Article/2831819/dod-releases-2021-report-on-military-and-security-developments-involving-the-pe/>.

<sup>12</sup> China’s National Defense in the New Era | english.scio.gov.cn. English.scio.gov.cn. (2022). Retrieved 23 August 2022, from [http://english.scio.gov.cn/node\\_8013506.html](http://english.scio.gov.cn/node_8013506.html).



1.9. For those who do not comprehend this line of argument around China's dominance, there is one more outstanding matter. Why does China want the South China Sea, the Straits of Malacca, the Sunda Straits, the Java Sea, and the Lombok Straits? Why should China bother? The answer is proven once you understand the deep sea tunnels around Sanya in the Southern Theatre Command. Satellite images of Aug. 18, 2020, appears to show a Chinese submarine using an underground base on Hainan Island on the South China Sea.

1.10. The Yulin Naval Base is a naval base for nuclear submarines along the southern coast of Hainan Island, China. This underground base has been reported by several intelligence agencies. The Shang-class submarine has been documented entering the underground base. The caverns can hide up to 20 nuclear submarines. The harbor houses nuclear ballistic missile submarines and is large enough to accommodate aircraft carriers. The US Department of Defense estimated that China would have five Type 094 nuclear submarines operational by 2010 with each capable of carrying 12 JL-2 intercontinental ballistic missiles. Two 950 metre

piers and three smaller ones would be enough to accommodate two carrier strike groups or amphibious assault ship.<sup>13</sup>



### China's Yulin Naval Fortress

A tunnel-riddled mountain on China's Hainan Island is home to its fleet of nuclear submarines. The heavily protected facility is a strategic power-projection point for Beijing's control over the South China Sea.

- Tunnel entrance/ camouflaged object
- Security asset
- Base administration
- Naval vessel support





Image © 2019 Maxar Technologies  
Image © 2019 CNES / Airbus  
Image © 2019 Maxar Technologies

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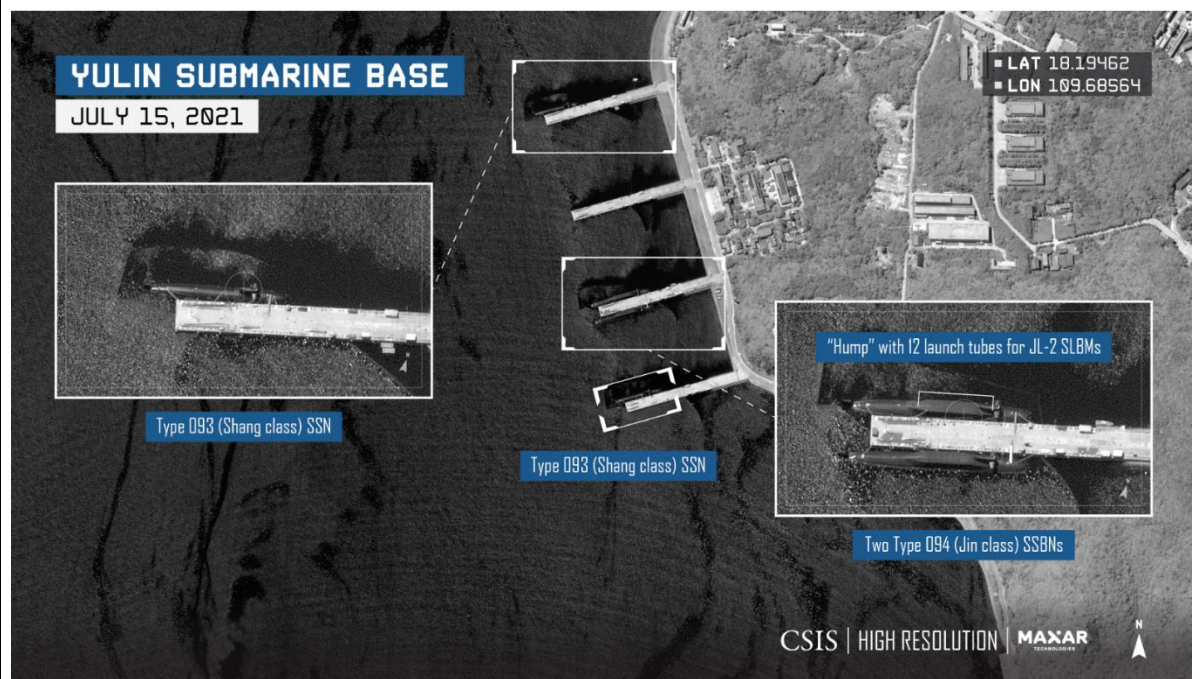
(a) China depends on the water channels around Indonesia to move their nuclear submarines into the Indian Ocean where China will be able to have a direct standoff with the Indian navy in times of military crisis. India and China are already having military standoffs in the periphery of the Himalayas.

1.11. China has built four Type 094 SSBNs, as well as two Type 094A variants, which feature several incremental upgrades. The hulls of the first Type 094s were laid down in the early 2000s and commissioned into the PLAN several years later. The most recent Chinese boomer to enter service was commissioned in April 2021 at a ceremony attended by President Xi Jinping. The same event witnessed a Type 075 landing helicopter dock (LHD) and a Type 055 destroyer—two of the PLAN's most advanced surface combatants—officially join China's growing fleet.

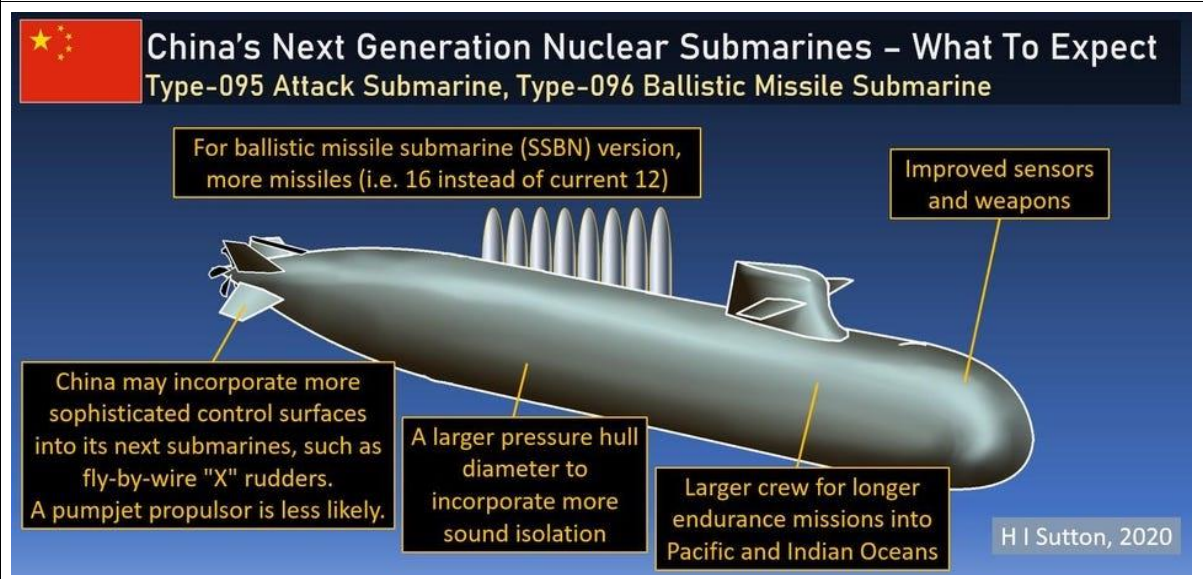
1.12. The Type 094 (and Type 094A) carry up to 12 Julang-2 (JL-2) submarine-launched ballistic missiles (SLBMs), each of which is believed to carry a single nuclear warhead and possess a range of between 7,200 and 9,000 kilometers (km). If launched from waters near

<sup>13</sup> A Glimpse of Chinese Ballistic Missile Submarines. Csis.org. (2022). Retrieved 27 August 2022, from <https://www.csis.org/analysis/glimpse-chinese-ballistic-missile-submarines>.

China, the JL-2 would have sufficient range to strike nuclear states in the region, such as Russia and India, but would be unable to reach the continental United States. It could, however, threaten Guam, Hawaii, and Alaska.



(a) China is currently working on its next generation of SSBNs, the Type 096, which could further strengthen the PLA's sea-based nuclear deterrent. The Type 096 is expected to be armed with the JL-3 SLBM, which is not yet operational. The new SLBM is estimated to have a range exceeding 9,000 km and to potentially carry multiple warheads on multiple independently targetable reentry vehicles (MIRVs). By 2030, the DOD assesses that China could field up to eight SSBNs consisting of Type 094s and Type 096s operating concurrently.





### JL-2 at a Glance

**ORIGINATED FROM**

China

**POSSESSED BY**

China

**LENGTH**

13 m

**LAUNCH WEIGHT**

42,000 kg

**WARHEAD**

Nuclear, 1 MT, or 3-8 MIRV with 20/90/150 kT warheads

**RANGE**

8,000 – 9,000 km

**IN SERVICE**

2015

**CLASS**

Submarine-Launched Ballistic Missile (SLBM)

**BASING**

Jin-Class Nuclear Ballistic Missile Submarine

**DIAMETER**

2 m

**PAYLOAD**

1,050-2,800 kg

**PROPULSION**

Three-stage solid propellant

**STATUS**

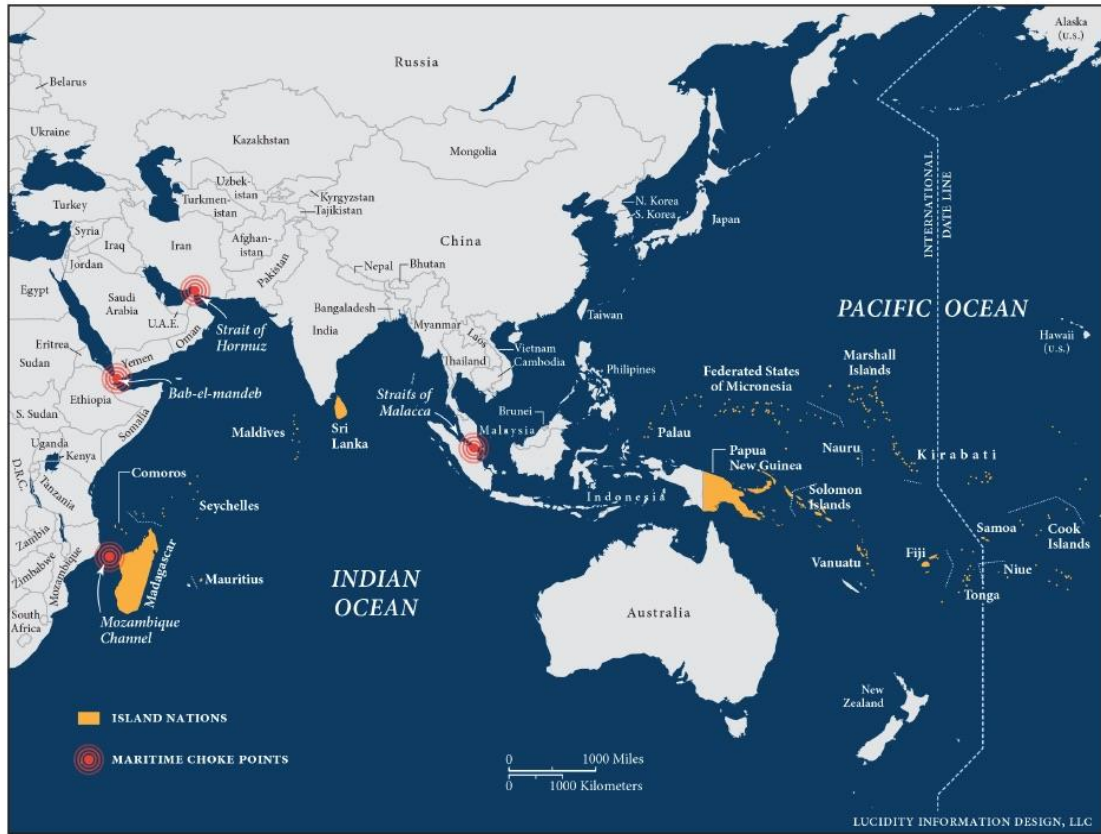
Operational

(b) The SLBM has a minimum range of 2,000 km, a maximum range greater than 8,000 km, and carries a payload of 1,050 to 2,800 kg. Analysts believe the missiles currently carry a single 1-megaton yield nuclear warhead, but may also be capable of delivering 3-8 lower yield MIRVed warheads.

(c) The missile may be equipped with penetration aids and decoys to complicate missile defenses. The missile uses an inertial guidance system with stellar updates and a Global Positioning Satellite (GPS) system.

1.13. This paper hence concludes at this point that China has ample motivation to dominate the South China Sea and it is the judgment of the analysts that in the next decade from today, there is a high likelihood of an incident or trigger that will lead to the Chinese mobilizing the PLA(N) and PLA(NAF) to deploy with the intent of harassing or dominating the TNI. Indonesia's waterways, not its land or its resources, are critical to the operations of China's Blue-water navy. The PLAN(N) and PLA(NAF) will never bother to dominate the lands. It will hold the airspace and maritime space in any wartime scenario and preserve the diplomatic ties with the Indonesian government with no intent to replace it. China basically wants its navy and air force to operate with no opposition.

**Geography of the Indo-Pacific Islands**



- (a) If you draw a line from Hainan through the South China Sea, past Natuna, and through the Sunda Straits, you will see that the Chinese submarines and naval surface vessels will be parked just off the coast of Western Australia.
- (b) If the Chinese submarines go through the Straits of Malacca, they face India. This is the posture that the PLA(N) and PLA(NAF) needs to develop without opposition.



(c) With PLA(N) submarines carried the submarine-launched ballistic missiles through the Straits of Malacca, Sunda Straits, Lombok Straits, China is tending the maximum missile range and accuracy of their ballistic missiles.

(d) The PLA Rocket Force (PLARF) is developing intercontinental ballistic missiles (ICBMs) that will significantly improve its nuclear-capable missile forces with more survivable delivery systems and will require increased nuclear warhead production, partially due to the introduction of multiple independently targetable reentry vehicle (MIRV) capabilities. Already, the PRC is doubling the numbers of launchers in some ICBM units.

“First, South China Sea is important for the strategic patrol of Chinese SSBN [nuclear ballistic missile submarine], which needs to enter west Pacific Ocean for its nuclear deterrence against the US,” he explained.

Secondly, he said, the South China Sea will serve as a buffer zone for China if and when “the US conducts military attack against mainland China.”

Besides, China's maritime transportation needs sea routes, he said. South China Sea accounts for at least a third of the global maritime trade. While huge oil and natural gas reserves are said to lie beneath its seabed, it is also a fishing ground crucial for food security.”<sup>14</sup>

## **2. Considering the tactical realities**

2.1. Like the rest of ASEAN, Indonesia faces only one reality with no likely alternative in the next three to five decades. The threat Indonesia will face will originate from an air-led invasion as the primary thrust to stifle the TNI and the government. Aside from the prospect of any domestic terrorist event that resembles the Bali and Jakarta bombings, the only external aggressor will be China, and their modus operandi is clear.<sup>15</sup> The PLA Rocket Force and the PLA(Naval Air Force) and PLA (Navy) from the Southern Theatre Command will launch a multi-faceted air strike comprising ship-launched and air-launched cruise and hypersonic missiles to neutralize the TNI's air defence systems and multirole aircraft. Once neutralized, the PLA(N) and PLA(NAF) will encircle the island of Natuna and concurrently assert air and sea control over the Straits of Malacca, Sunda Straits, Lombok Straits, Makassar Straits in Phase 1.<sup>16</sup> This chain of well-rehearsed manoeuvres will give the PLA tactical control of the air, and maritime entry points to the South China Sea. In Phase 2, the PLA(N) and PLA(NAF) will encircle Jayapura, Strong, Nabire, and Merauke, provide support for the local separatist movement and then hold control over the Indonesian Provinces in Papua as their main operations base to control the Southern Pacific region. In Phase 3, the PLA will not deploy its troops onto Indonesian soil. Instead, it will carry out an economic blockade and force the Indonesian government to negotiate with the intent of relinquishing control of Natuna and Papua to China's hegemonic regional 'collaboration' grouping that includes Cambodia, Myanmar, Timor Leste, Papua New Guinea and the Pacific Islands.<sup>17</sup> The phenomenal expansion of the PLA Southern Theatre Command suggests that the Chinese government is planning an expeditionary force comprising aircraft carriers, helicopter landing ships, and missile frigates as a blue-water navy with extensive range beyond its territorial waters.<sup>18</sup>

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<sup>14</sup> '3 reasons' China tries to control South China Sea. *Aa.com.tr*. (2022). Retrieved 7 September 2022, from <https://www.aa.com.tr/en/asia-pacific/3-reasons-china-tries-to-control-south-china-sea/2157110>.

<sup>15</sup> Rise of Chinese Military Might and Global Power Shift. (2014), 05(01). <https://doi.org/10.4172/2151-6200.1000e101>

<sup>16</sup> Yin, Y., & Lam, J. (2021). Energy strategies of China and their impacts on energy shipping import through the Straits of Malacca and Singapore. *Maritime Business Review*, 7(2), 145-160. <https://doi.org/10.1108/mabr-12-2020-0070>

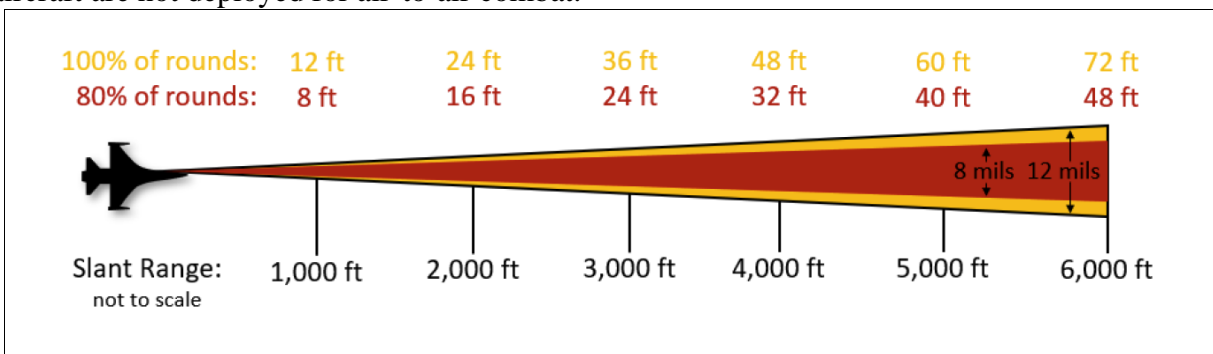
<sup>17</sup> China and strategic competition in a divided Pacific Islands region. (2021), 27(10), i-iii. <https://doi.org/10.1080/13567888.2021.2015182>

<sup>18</sup> Kristensen, H. (2022). (The Other) Red Storm Rising: INDO-PACOM China Military Projection. *Federation Of American Scientists*. Retrieved from <https://fas.org/blogs/security/2020/09/pacom-china-military-projection/>.

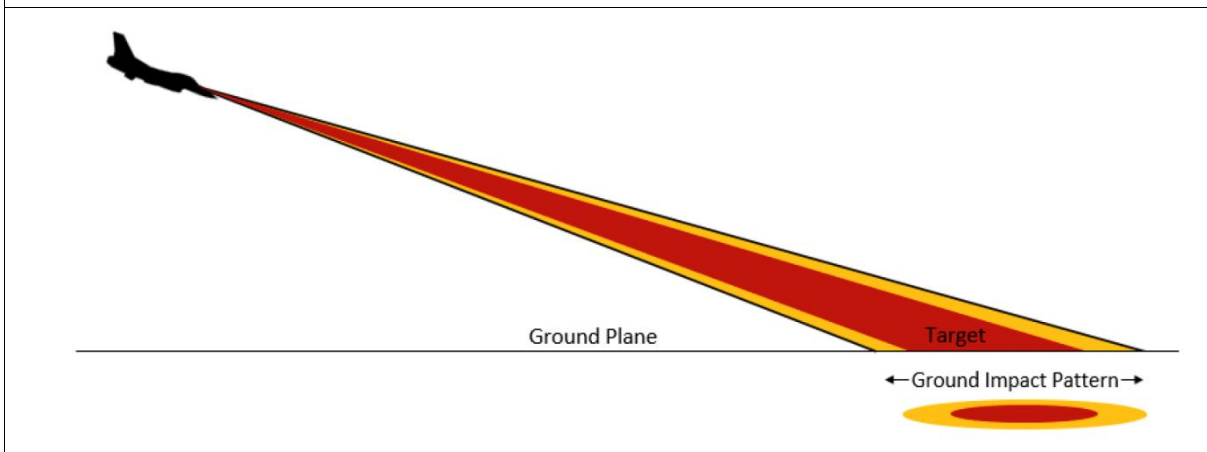


(a) These two marked areas, A and B, are the most likely area of naval and air operations of the PLA(NAF) and the PLA(N). Aside from controlling the strategic island of Natuna and dominating the Straits of Malacca as a primary objective, China would want to dominate the Indonesian provinces of Papua. Tactically, it is the least-defended asset furthest from Jakarta. There are inadequate air force and missile battery assets in Papua and hence there will be the least likely resistance from the TNI AU. From Papua, the PLA will have a staging point to counter the activities of the Australian navy and air force.

2.2. Then there is the matter of the tactical realities. The use of aircraft-mounted guns in air-to-air combat ended in the 1980s. Since 1988, there have not been any multi-role combat aircraft shot down by guns. The flight speed, interception range, and the deployment of guided missiles have nullified the use of guns in air-to-air engagement. Only the Fairchild Republic A-10 Thunderbolt II and the Lockheed AC-130 gunship depend on mounted guns but they are deployed against ground and naval targets only and they are fired from low altitude. These two aircraft are not deployed for air-to-air combat.



- (a) Gun Dispersion. Rounds fired from any gun system do not follow a perfectly straight path but are dispersed in a cone shaped pattern after they leave the gun's muzzle. The dispersion pattern becomes a larger and larger cone as slant range increases. The density of rounds within the cone becomes less and less as the edge of the cone is approached.
- (b) The average dispersion of the M61A1 is 8 mils diameter for 80% of the rounds fired and 12 mils for 100% of the rounds fired.<sup>1</sup> USAF units maintain a boresight program to ensure gun systems installed on aircraft continue to meet these specifications while in operational use.
- (c) One mil is equal to 1/1000 of a radian so 8 mils equals an 8 foot diameter circle at 1,000 feet range and 12 mils equals a 12 foot diameter circle. The size of the circle continues to increase with range.



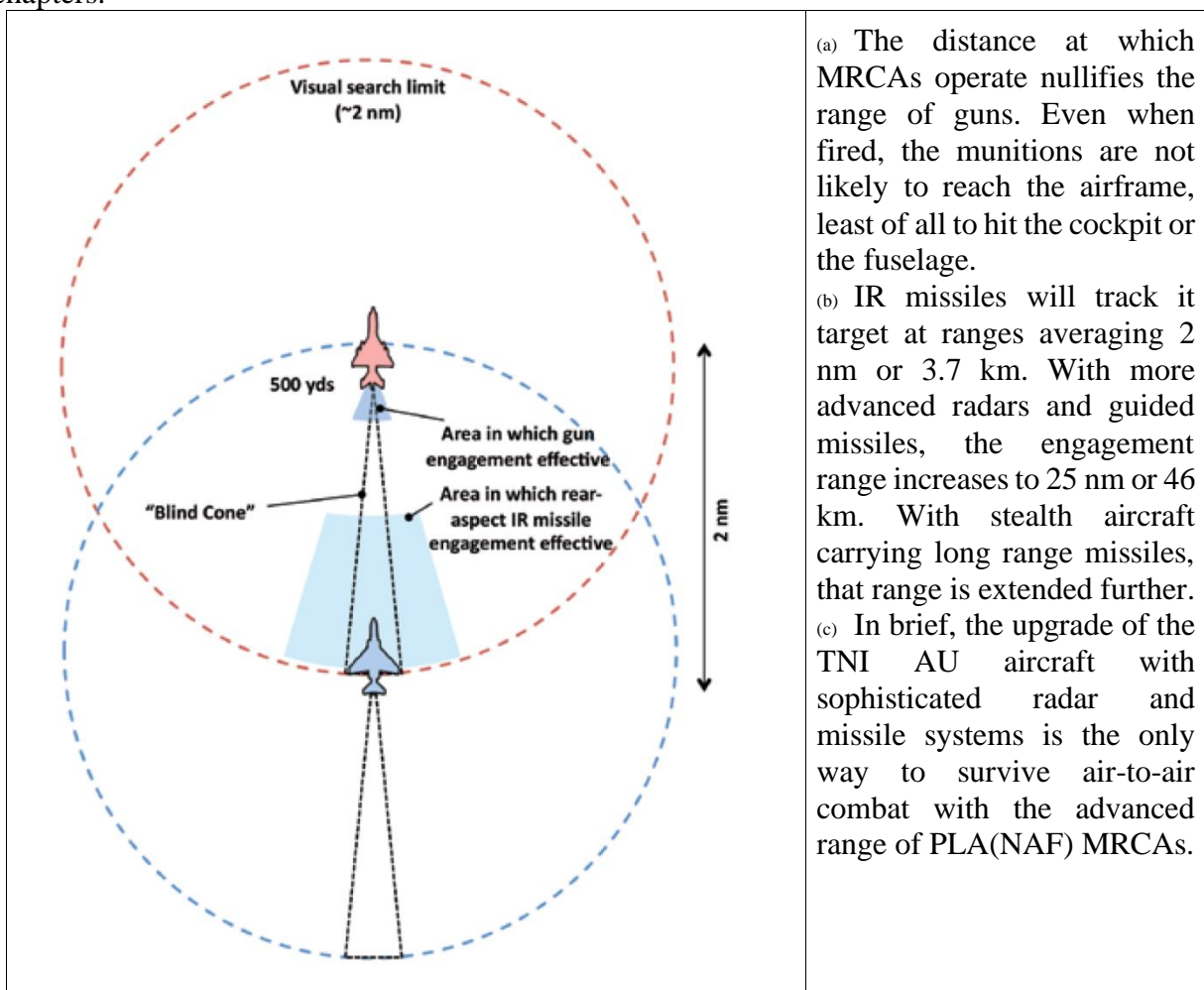
- (d) The dispersion pattern of rounds fired from the gun is a circle only if the target is perpendicular to the flight path. It resembles an ellipse when firing against a horizontal target on the ground.

2.3. Simulated air-to-air combat with the PLA(NAF) will be very different. Guns would be irrelevant as the interception will take place over longer ranges. The PLA(NAF), using medium-range semi-active radar homing air-to-air missiles with high explosive blast-fragmentation warheads and an average strike range of 22 - 85 km at speeds averaging Mach 2.5 means, the enemy aircraft can neutralise the TNI AU MRCA without even visual range operations.<sup>19</sup> China's standard PLA(NAF) Shenyang J-11 MRCA is a toe-to-toe rival of the Lockheed Martin F-16 Fighting Falcon and the Boeing F/A-18 Hornet. The J-11 carries the short-range, infrared-homing air-to-air missile, which hits targets at 22 km at Mach 2 speed. Its 11.8 kg blast frag warhead with the multi-element infrared guidance system efficiently neutralises enemy aircraft. The main issue is that it is locally manufactured, and the PLA(NAF) has an extensive supply to support expeditionary operations in the South China Sea.

2.4. While the TNI AU depends on imported limited supplies of Raytheon AIM-9 Sidewinder and Raytheon AMRAAM missiles for air-to-air engagement, the J-11 can sustain

<sup>19</sup> Rowe, L., & Gehr, S. (2013). The Air Superiority Knowledge Assessment System: Transforming the Way the Warfighter Trains. *Military Psychology*, 25(3), 234-243. <https://doi.org/10.1037/h0094965>

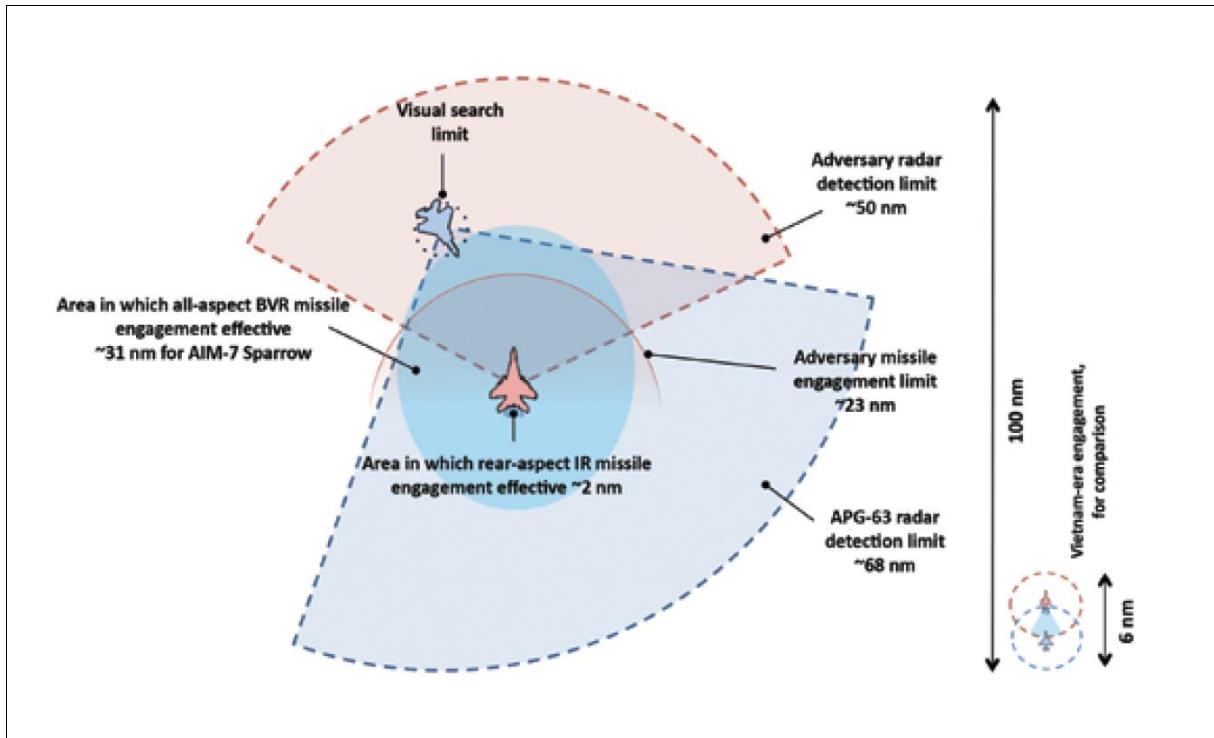
air superiority operations with locally manufactured parts and munitions.<sup>20</sup> To augment its operations, China also deploys the PL-21 active radar-guided long-range beyond-visual-range air-to-air missile. It has a ramjet engine range of 400 km and an active AESA radar guidance system. This lethal and accurate missile with a 500kg warhead is fired from the Chengdu J-20, Shenyang J-31 and the Shenyang J-31.<sup>21</sup> Tactically, air-to-air warfare has changed, and the part that can sustain air superiority operations will win. Ground troops have a limited role now in the opening phases of any conflict between nations in the context of the South China Sea. All engagements will be air-to-air operations. At this point, China possesses the largest stockpile of locally manufactured missiles with much greater technological sophistication than those sold by the US to its regional partners.<sup>22</sup> The technical details will be discussed in subsequent chapters.



<sup>20</sup> Shenyang J-11 Multirole Fighter Aircraft, China. Airforce Technology. (2022). Retrieved from <https://www.airforce-technology.com/projects/shenyang-j11-multirole-fighter-aircraft-china/>.

<sup>21</sup> Kopp, C. (2022). *PLA Air to Air Missiles*. Ausairpower.net. Retrieved from <http://ausairpower.net/APA-PLA-AAM.html>.

<sup>22</sup> Trends in Air-to-Air Combat: Implications for Future Air Superiority | CSBA. CSBA. (2022). Retrieved from <https://csbaonline.org/research/publications/trends-in-air-to-air-combat-implications-for-future-air-superiority/>.



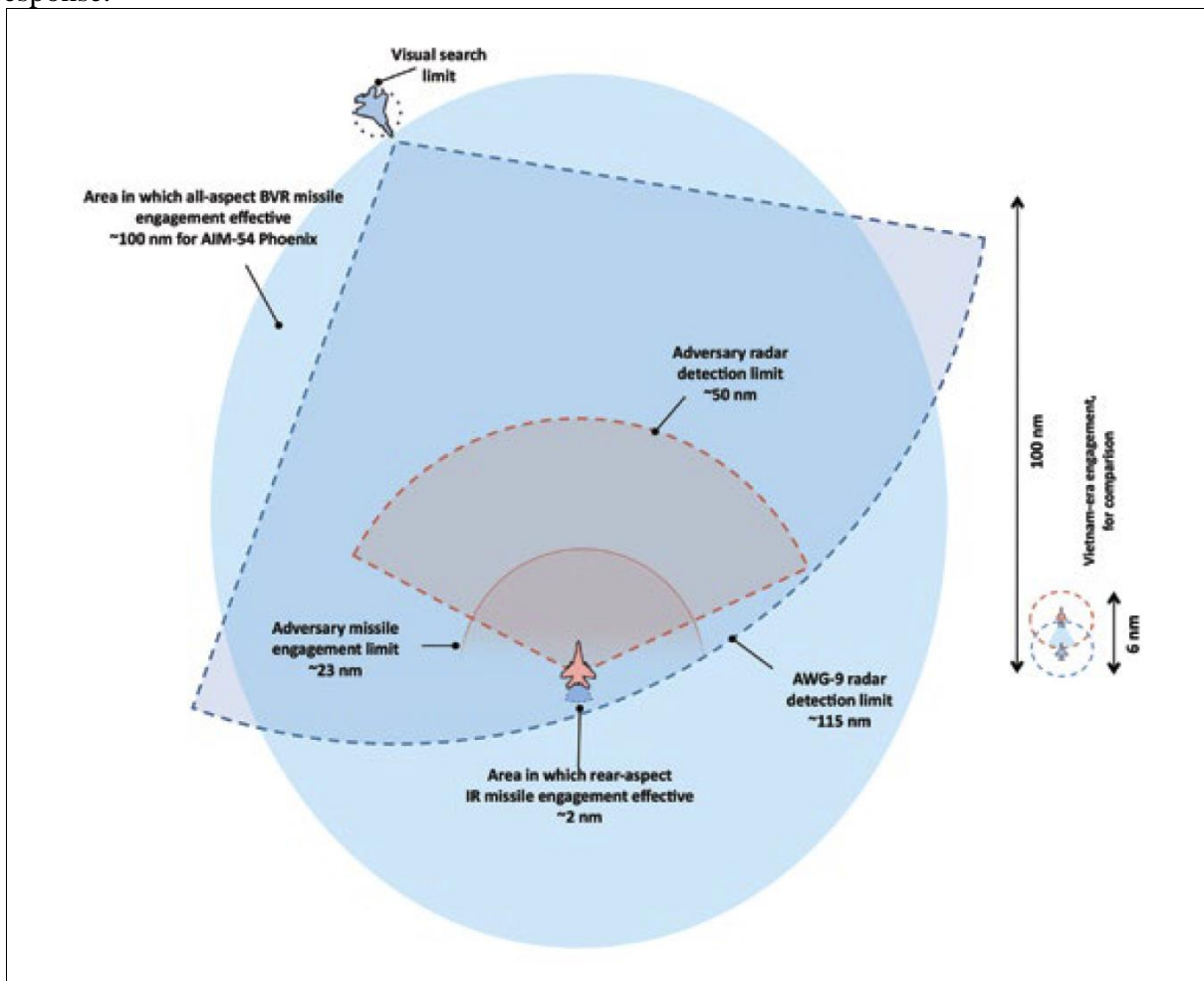
2.5. With advanced air combat sensors and upgrade weapon capabilities, the range of interception and air-to-air combat role to 50 nm on average. That is an air-to-air range of more than 90 km at speeds of 2000 km/h with the pilots facing the risk of blacking from G-force in flight maneuvering. The Shenyang J-11, J-15 as baseline MRCA have radar ranges averaging 100 km for early detection. These PLA(NAF) MRCAs are also supported by AEW&C and the ship-borne radars that give them a multi-dimensional mapping of the battle space.

2.6. With network centric warfare after 2000, the pilots of the PLA(NAF) no longer need to make their decisions in interception. The Chinese AI-linked systems via the satellites, and the Ground Control HQ increased the range of air-to-air monitoring to 350+ km.<sup>23</sup> In plain words, the PLA aircraft will see the TNI planes faster. The PLA(NAF) MRCAs will launch missiles against the TNI AU even when they are outside the TNI radar range. The TNI pilots will have no time to respond to the incoming missile. In terms of detection and identification, statistically, 75% of aerial victories are supported by AEW&C and GCIs that found and mapped the operations of enemy aircraft in Indonesian airspace. In terms of air combat manoeuvring, visual range engagement is almost not relevant given that the enemy will fire the missiles from the furthest possible point based on a shoot-and-scoot tactic. With passive homing and AI guidance technologies, the missiles that would use artificial intelligence to choose their own targets with a high level of accuracy. When fired from 100 NM, the PLA(NAF) pilot could be returning to base when the missile hits its TNI AU target. The key factors for victory are the speed, autonomy, and accuracy of the missiles, the range and accuracy of the radars and the support from GCI radars and AEW&C aircraft and with the enhanced role of AI and network centric warfare.<sup>24</sup> The following diagram shows how the sophisticated technologies have

<sup>23</sup> These are tactical scenarios for discussion and planning.

<sup>24</sup> NATO Science & Technology Organization. (2010). Human Systems Integration for Network Centric Warfare.

opened up the parameters of the battle air space. The battle space is now larger, and with no scope for visual identification without support of GCI and AEW&C technologies. With new TNI GCI radars located throughout Indonesia, the scenario will change. The GCI radars and AEW&C would be able to pinpoint the locations of PLA(NAF) MRCAs while they are still cruising from their northern bases, giving time for the TNI AU to develop an interception response.



(a) How does the TNI strategise to strengthen its air and ground support capabilities against PLA aircraft like the twin-seat Shenyang J-15D that has been designed to operate from the Liaoning Aircraft Carrier carrying the PL12 active radar-guided beyond-visual-range air-to-air missile that has a strike range of 100 km? This is the prospective and real battle scenario where the enemy aircraft and the incoming missile cannot be detected at close range. In short, an TNI AU aircraft can be an easy target without the aircraft upgrading and support from GCI radars.

- Image is a simulation based on the range of equal missile technologies.

2.7. Aside from the change of tactical operations and the advancements of technologies, perhaps the most critical and obvious matter is that of quantity. Quantity and variety count. The PLA (Naval Air Force) Southern Theatre Command operates 72 units of the Shenyang J-11, 50 units of the Shenyang J-15, and 24 units of the Sukhoi Su-30 with about 85% of operational

readiness and deployability at all times. Their forward operations posture is supported by 120 units of the Xian JH-7A bombers, which carry the YJ-82 anti-ship missiles to neutralize the TNI AL or any other regional threats in the operations. The upgraded JH-7A is equipped with domestic Chinese helmet-mounted sight (HMS), an entirely digitized fly-by-wire flight control system, and the Type 232H airborne radar that fires laser-guided bombs and Kh-31P anti-radiation missiles.

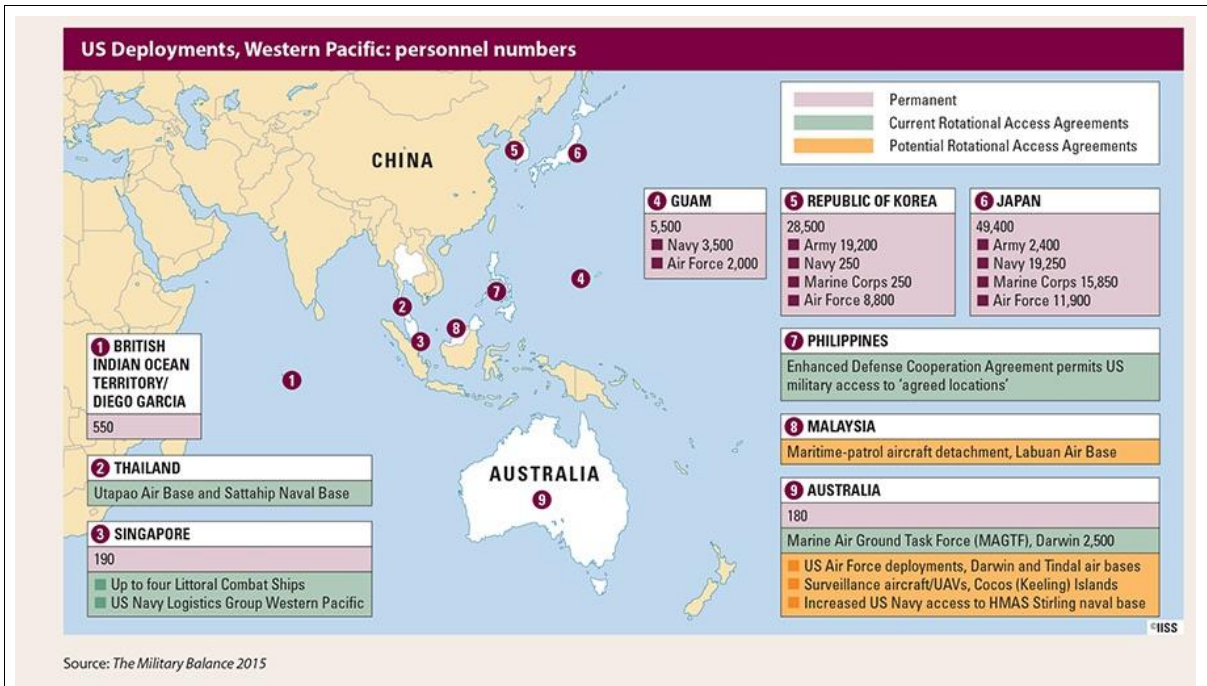
2.8. The intensity of the expeditionary force is further supported by about 200 units of the Xian H-6 long-range bomber with a combat range of 1800 km. It has a maximum range of 6000 km. That puts Natuna and Jakarta within the range of the PLA bases on the Chinese islands in the South China Sea. The H-6 fires this combination of missiles: 6 or 7 KD-88 missiles (anti-ship or air-to-surface), YJ-100 (CJ-10), C-601, YJ-62, C-301, C-101, CM-802A, YJ-12 anti-ship missiles and the DF-21D (H-6N) ballistic missile. Like a well-trained philharmonic orchestra, the PLA can and will deploy a complete range of strike aircraft and bombers to ensure that all air, naval, and land threats can be neutralized from a long range. To offer eye-in-the-sky capabilities for battle coordination, the PLA will deploy the Shaanxi Y-9 AEW with a flight range of 2200 km and an over-the-horizon AESA radar range of 400-500 km at an altitude of 8000 m. To support this expeditionary force across the South China Sea and also from the seas around Papua, the PLA will deploy its Y-8JB: ELINT (Electronic Warfare Jamming Aircraft), Y-8JY MEDEVAC (Medical Evacuation) aircraft, KJ-200 Airborne Early Warning & Control aircraft, and the Y-8E UAV carrier aircraft for launching WZ-5 Chang Hong-1 for reconnaissance. The TNI AU, AD, and AL will face an adversary with overwhelming quantity and air-to-air technological superiority.<sup>25</sup>

2.9. China has larger military capabilities than the US and its allies in this region. The following diagrams will shock many analysts and government officials. At the first impression, there is general consensus that the US deployment through the Indo-Pacific is sustained and significant and the troops will be able to defend such an extensive area. US Military assessment however confirms that by 2025, China will have a total deployable force in the the Indo-Pacific that is larger than the combined forces of the United States, Australia, Japan and South Korea. The PLA has dominance in the number of satellite deployment, MRCAs, long range bombers, missile gunboats and all aspects of deployment munition and logistics support.<sup>26</sup>

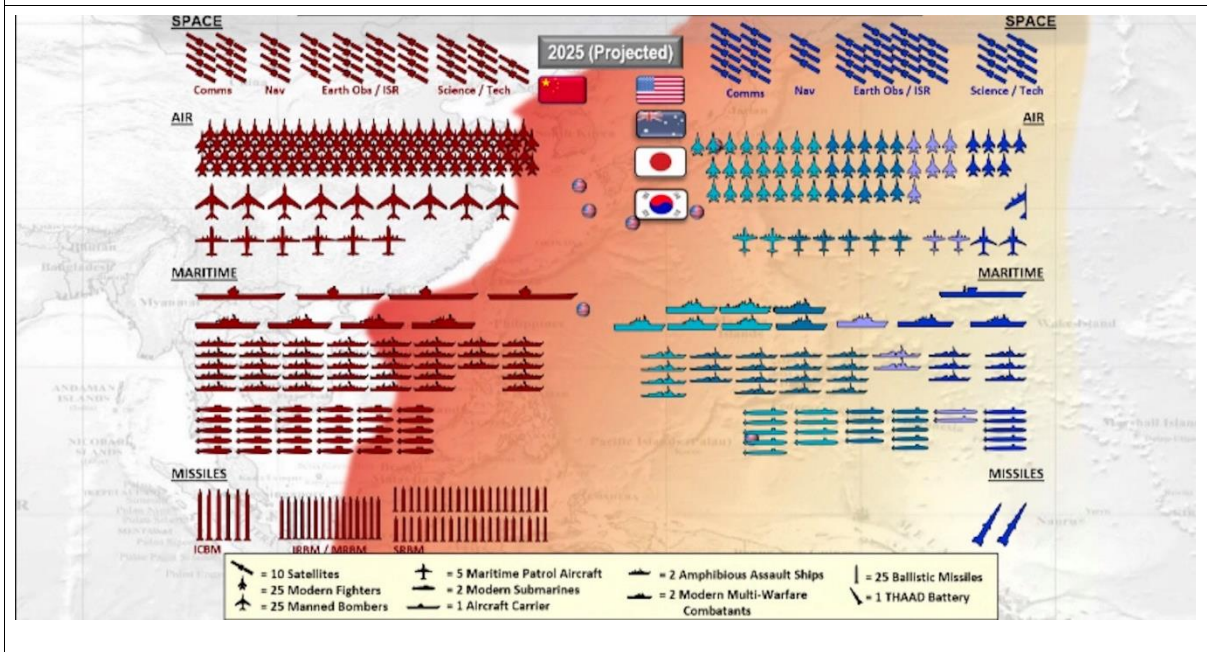
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<sup>25</sup> Breaking Down the Pentagon's 2020 China Military Power Report: A Quest for PLA Parity?. The National Interest. (2022). Retrieved from <https://nationalinterest.org/feature/breaking-down-pentagons-2020-china-military-power-report-quest-pla-parity-168201?page=0%2C1>.

<sup>26</sup> (2022). Retrieved 23 August 2022, from <https://us-iti.bbcollab.com/collab/ui/session/playback/load/7cf6bb5c7aaa4aa9930d7bd7b8df0b00>.



(a) This map often makes analysts confident that the dominance of the United States forces in the region will maintain stability. It suggests that the US forces are well positioned in the region to ensure that any military incident will not escalate to become an all-out conflict.




(b) This tally by the United States military shows that in any Indo-Pacific conflict, if there is total deployment, the forces of the PLA will still be **dominant**. The PLA is operationally **larger** than the forces of the United States, South Korea, Japan and Australia combined. That is a fact.

(c) Based on current geopolitical realities, it is unlikely that Japan, Australia, and South Korea will collectively mobilise their militaries in response to the PLA aggression in the South China Sea. They would be maintaining the integrity of their airspace as a priority. Hence, based on this tactical reality, the TNI has to be independent and technologically suited for the challenge.


- All of the vessels identified below and marked for detection have been confirmed. Their deployment in the South China Sea, East China Sea and the South Pacific near Papua is a common matter in the last 2 years. Most PLA drills now focus on the joint operations between the Navy and the Naval Air Force.

UNCLASSIFIED




**CHINA PEOPLE'S LIBERATION ARMY NAVY (PLAN), COAST GUARD, AND GOVERNMENT MARITIME FORCES**

**2018 RECOGNITION AND IDENTIFICATION GUIDE**



SURFACE COMBATANTS	NAVAL AUXILIARY SHIPS	CHINA COAST GUARD	MARITIME MILITIA

ICOD: July 2018 UNCLASSIFIED 

(d) Based on the United States Navy recognition chart, the tally of maritime vessels that will support the operations of the Southern Theatre Command can be accounted for. These are operational vessels that have been fitted out for blue-water naval operations. This is an expeditionary force. It was never designed to defend the Chinese mainland from the coastal waters.

(e) While any future conflict will be dominated by air superiority missions and strikes, the role of the PLA(N) will be critical in neutralizing the TNI AL forces, jamming coastal radar signals and producing mobile vessel-radar “GCI” capabilities to direct air operations in tandem with the AEW&C. China is operating 2 aircraft carriers to extend its the reach of the PLA(NAF). It is building 3 more in the next 6 years.

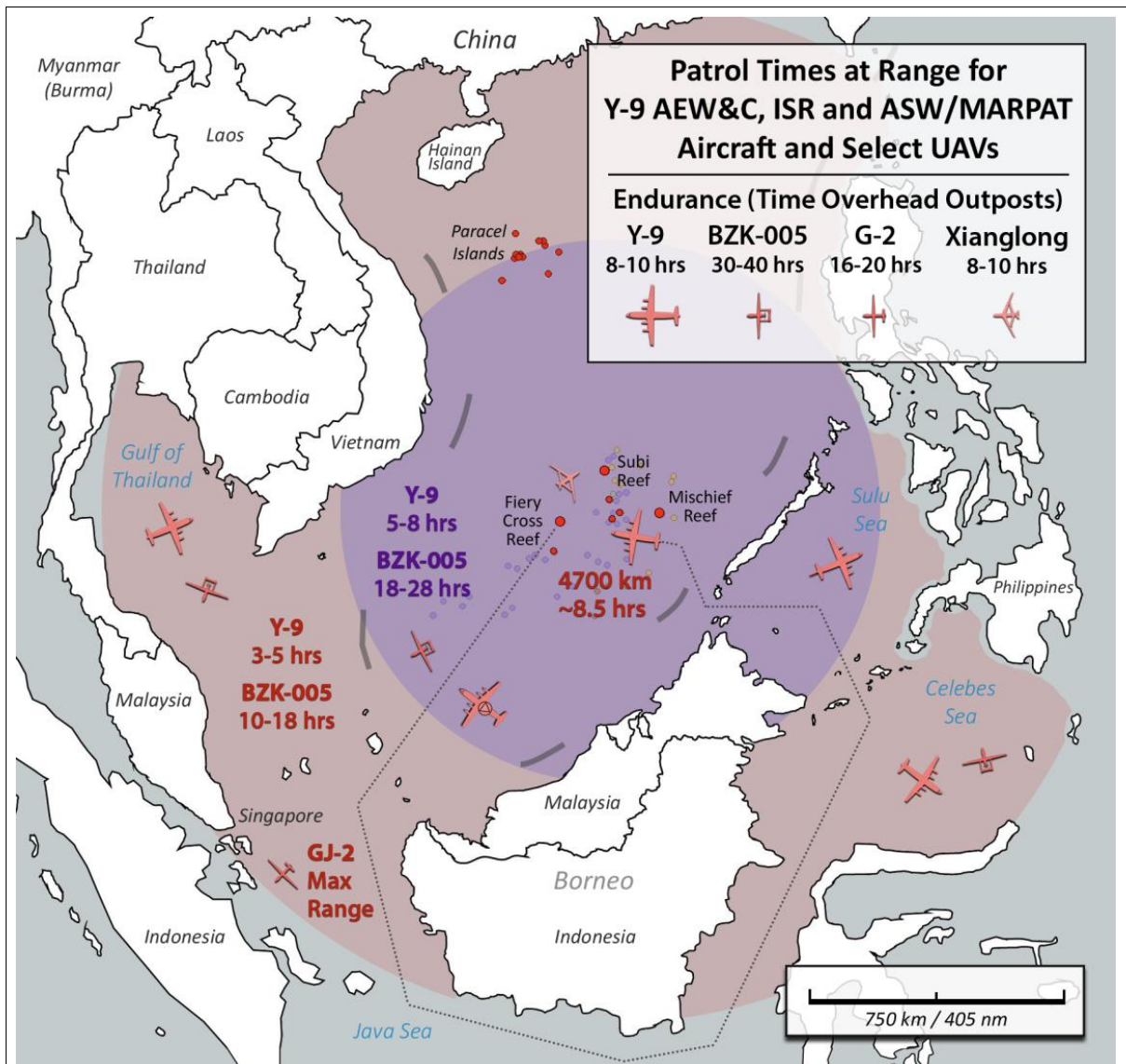
2.10. The foundation of China’s success in expanding its military arsenal is its development of electronics clusters that have been operating as dual-use technologies. These factories with no names in discreet locations are only known by numbers. These technology hubs make micro components that are integrated in military bases and research centers into the final equipment. China had made reverse-engineering its first step and pushing the boundaries of research and technologies into weapon, radar, AI-managed interception systems, and electronic warfare capabilities had made its military stronger in the Indo-Pacific region to the point at the US Pacific Fleet and its allies are not likely to be able to repel any aggressive military activity in the South China Sea.

2.11. China, over twenty years, had been able to make its aircraft and missiles have greater range, accuracy and intensity and now they are a military behemoth. The PLA(NAF) aircraft are supported by UAV ISR operations, AEW&C support and extensive satellite coverage that will track every movement of the TNI on land, sea, and air. With the support of existing Chinese intelligence operatives in Indonesia, there is enough tagging information to know the position of key appoint holders as they are being moved to safe bunker locations.<sup>27</sup> The combination of land ISR and all the technological support from the satellites point to one clear direction. For TNI to manage any response, it needs to develop extensive capabilities by modernizing the GCI radars, other coastal approach radars, and take on the AEW&C platforms that can direct the air-to-air combat and map the interception of incoming missiles. Without the GCI radars and the AEW&C aircraft mapping the battle space from the land and air, the TNI AU aircraft will be outmaneuvered, and easy targets for PLA(NAF) missiles. With the GCI and AEW&C, survivability increases and the prospect of victory remains intact.

2.12. The diagram below originates from US Intelligence monitoring showing the existing operations and coverage of the AEW, and surveillance UAVs that are currently mapping and monitoring movements in the immediate area of interest of the Southern Theatre Command. Natuna is currently the prime area of interest.

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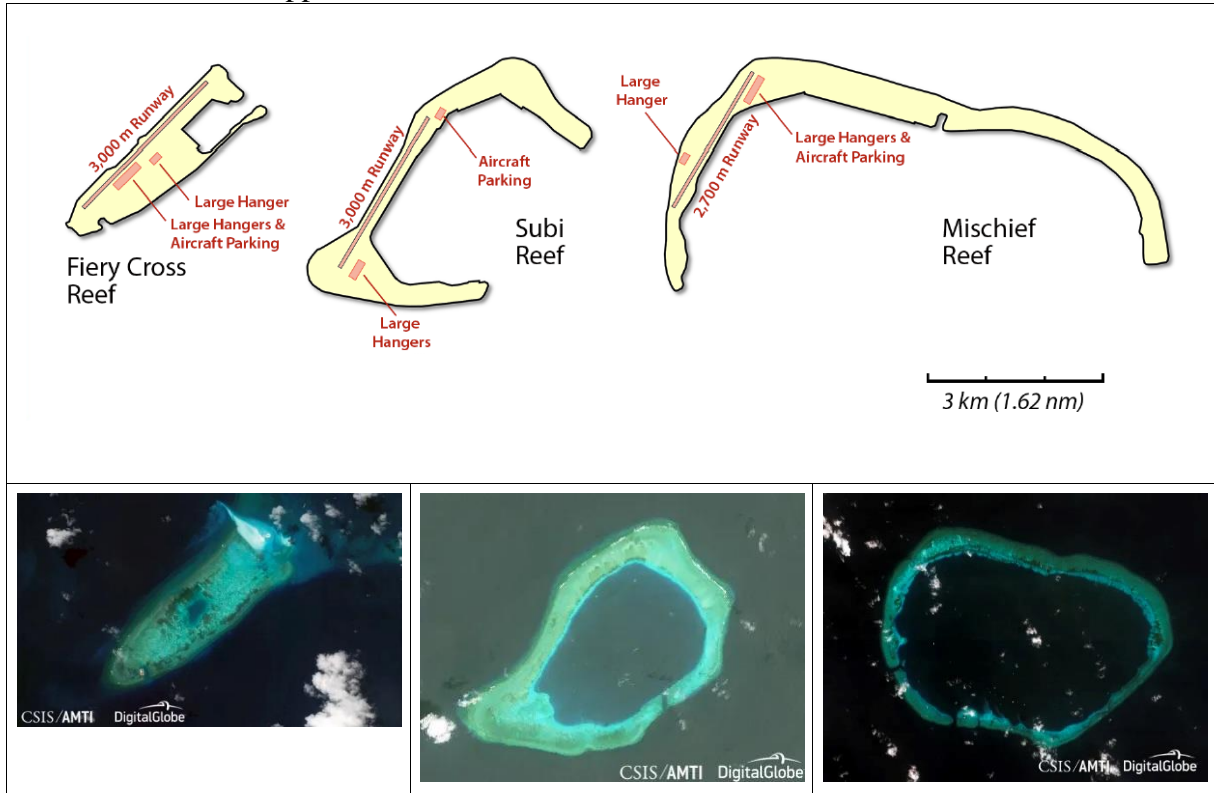
<sup>27</sup> Mattis, P. (2022). A Guide to Chinese Intelligence Operations - War on the Rocks. War on the Rocks. Retrieved from <https://warontherocks.com/2015/08/a-guide-to-chinese-intelligence-operations/>.



(a) This intelligence map shows that the PLA(NAF) is already operating surveillance of air and naval operations and ground radar operations support all civil and military aircraft by using High Altitude Long Endurance (HALE)/ Medium Altitude Long Endurance (MALE) Intelligence Surveillance Reconnaissance (ISR) UAVs and Airborne early warning and control (AEW&C) aircrafts in the airspace over Natuna and the new capital in Kalimantan. These aircraft operate at high altitudes of 9000 m to avoid detection.

(b) These MALE UAVs are now launched from the 2nd aircraft carrier, the Shandong. The HALE UAVs and AEW&C launch from Fiery Cross Reef, Subi Reef, and Mischief Reef. Collectively the UAVs and the AEW&C put together a comprehensive live image of the Indonesian air and maritime space that is cross-referenced with satellite data. In plain words, TNI's tactical movements and manoeuvres are being plotted and fed for AI analysis to process predictable patterns of future deployments.

2.13. China now has a place to jettison its operations into the South China Sea. Intelligence surveillance has confirmed that the Chinese bases on Fiery Cross Reef (09°33'00" N, 112°53'25" E), Subi Reef (10°55'22" N, 114°05'04" E), and Mischief Reef (09°54'10" N, 115°32'13" E) are operating complex equipment to support expeditionary missions. They include SATCOM Earth Stations, over-the-horizon radars, air-to-surface radars, air traffic controller radars, electronic intelligence systems processing hubs, surface-to-surface and surface-to-air missile batteries, and aircraft hangers that hold and support an average of 20 MRCA with missile supplies on site.



(a) Despite diplomatic opposition, for over a few years, China reclaimed the atolls which barely had any soil above the surface into fortresses. With gravel, and sea sand piled up relentlessly from 2014, China was able to build a reinforced surface with runways, missile batteries, radar complexes and complete living and operating facilities for the troops.

(b) These are not resorts. They are fixed “aircraft carriers” capable of extending the range of the PLA Southern Theatre Command. Internal memos suggest that the PLA will target Natuna for its extension of the PLA Rocket Force operations.

(c) Malaysia, Philippines, Brunei, Vietnam and China lay claim to the islands in the South China Sea but disregarding all petitions, the PLA has made them its bases of deployment.

**Chinese construction in the disputed Spratly Islands**

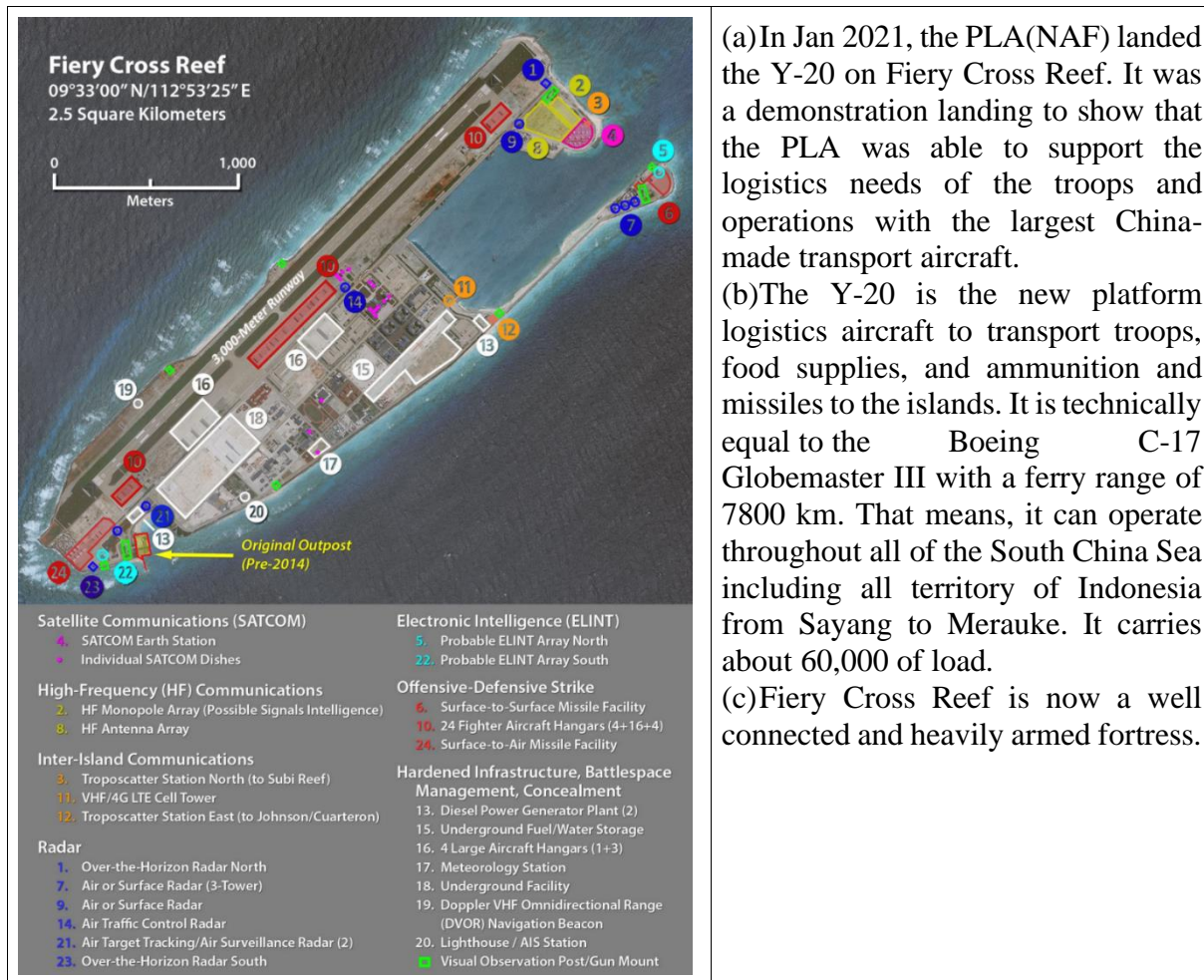


2.14. These islands extend the PLA (NAF) strike range and place almost all of the most populated cities within their strike range. It is impossible and irrational to assume or state that the Chinese reclamation of the islands and its development has been made for peaceful intent in the long term.<sup>28</sup> It is clear that the islands have been fitted for military operations only. Any cursory comparison will show that at the moment, in the mid of 2022, Indonesia does not have

<sup>28</sup> BURGESS, S. (2022). *Confronting China’s Maritime Expansion in the South China Sea: A Collective Action Problem*. Air University (AU). Retrieved from <https://www.airuniversity.af.edu/JIPA/Display/Article/2331176/confronting-chinas-maritime-expansion-in-the-south-china-sea-a-collective-actio/>.

comparable defensive capabilities on the island of Natuna that could ward off any air or maritime military operations.<sup>29</sup>

2.15. The PLA developed substantial infrastructure to support aircraft operations from its South China Sea island-reefs. Fiery Cross and Subi Reefs each feature 3,000-meter (9,842-foot) runways. Mischief Reef features a 2,700-meter (8,858-foot) runway. These long runways and large aircraft hangers on the island-reefs can support any aircraft in the PLA inventory. News reports often speculate that such long runways were constructed to support PLA bomber aircraft. Using the island-reef outposts as a refueling point to extend bomber range is a distinct possibility.<sup>30</sup> US military and intelligence satellite surveys confirm that the islands are now operations bases for PLA intelligence, surveillance and reconnaissance operations to defend the First Island Chain.



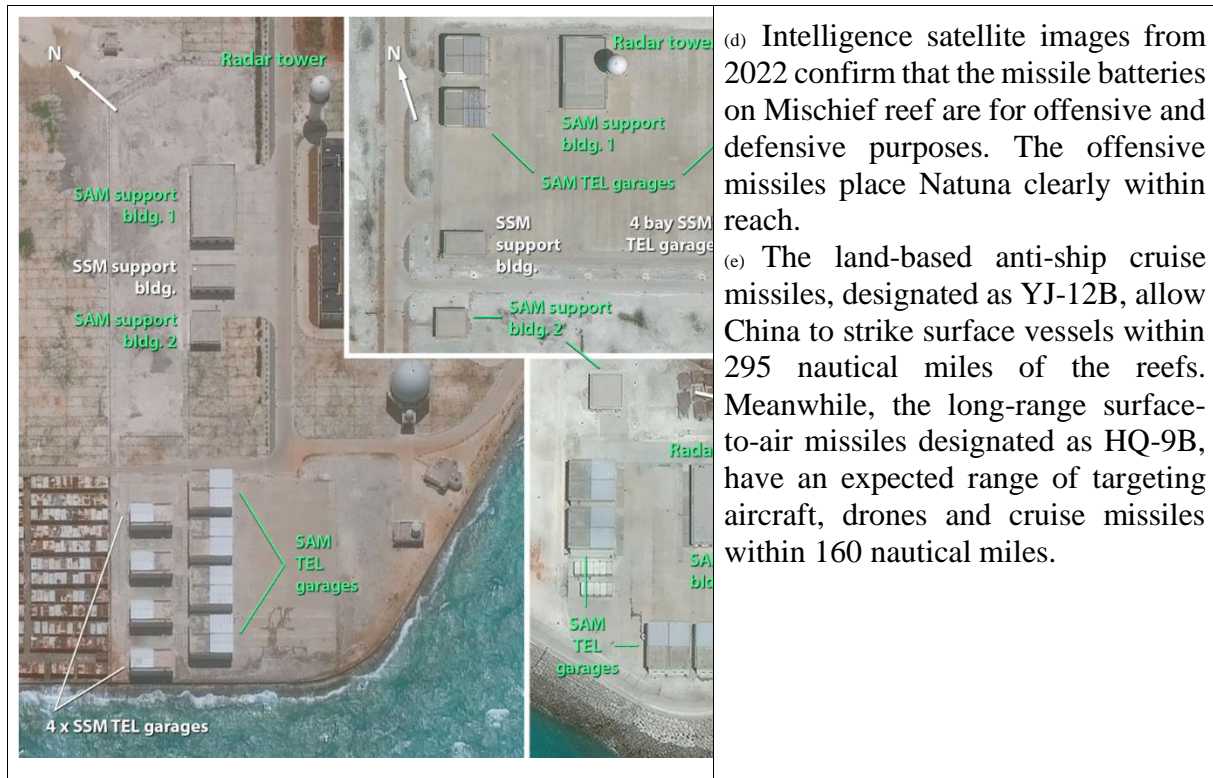
(a) In Jan 2021, the PLA (NAF) landed the Y-20 on Fiery Cross Reef. It was a demonstration landing to show that the PLA was able to support the logistics needs of the troops and operations with the largest China-made transport aircraft.

(b) The Y-20 is the new platform logistics aircraft to transport troops, food supplies, and ammunition and missiles to the islands. It is technically equal to the Boeing C-17 Globemaster III with a ferry range of 7800 km. That means, it can operate throughout all of the South China Sea including all territory of Indonesia from Sayang to Merauke. It carries about 60,000 of load.

(c) Fiery Cross Reef is now a well connected and heavily armed fortress.

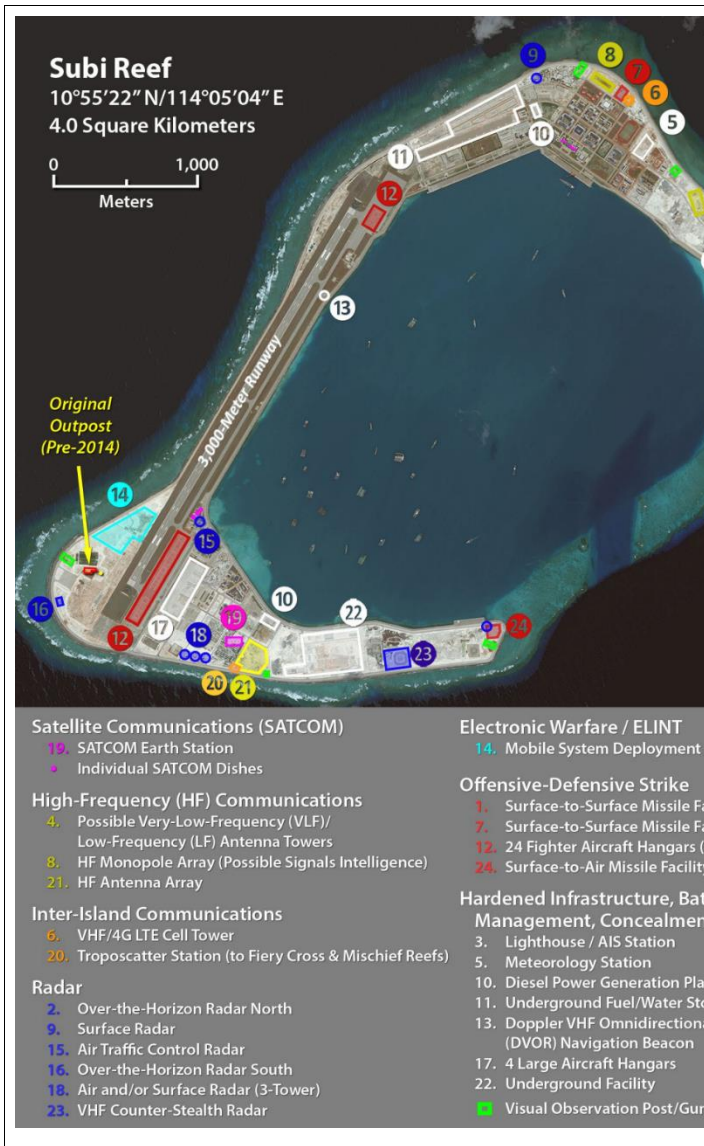
<sup>29</sup> Dahm, J. (2022). South China Sea Military Capability Series: A Survey of Technologies and Capabilities on China's Military Outposts in the South China Sea - Air and Surface Radar. DTIC. Retrieved from <https://apps.dtic.mil/sti/citations/AD1128253>.

<sup>30</sup> 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.



(d) Intelligence satellite images from 2022 confirm that the missile batteries on Mischief reef are for offensive and defensive purposes. The offensive missiles place Natuna clearly within reach.

(e) The land-based anti-ship cruise missiles, designated as YJ-12B, allow China to strike surface vessels within 295 nautical miles of the reefs. Meanwhile, the long-range surface-to-air missiles designated as HQ-9B, have an expected range of targeting aircraft, drones and cruise missiles within 160 nautical miles.



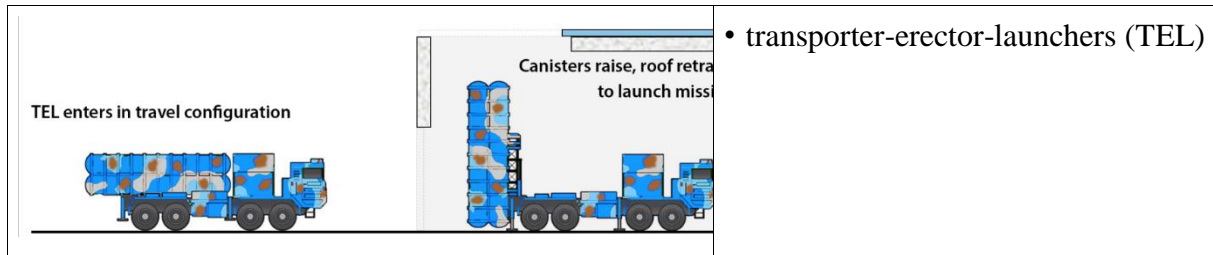
(a) Subi Reef is now the base for China's Anti-Stealth Radars to detect the U.S. Air Force F-117 Nighthawk stealth attack aircraft, B-2 Spirit strategic stealth bomber, and the F-35 Lightning II fifth-generation stealth multi-role fighter. This will be China's first line of defence against aircraft heading to the mainland.

(b) Subi Reef is also the PLA hub for rescue services in support of their military operations. The port has been enlarged to enable long term docking of the hospital ships.

(a) The militarization of the three islands have nothing to do with the possible Chinese invasion of Taiwan. The geography is irrelevant. Despite that, China has invested extensively to fit in SATCOM, ELINT systems, a variety of tactical radars and missile facilities.

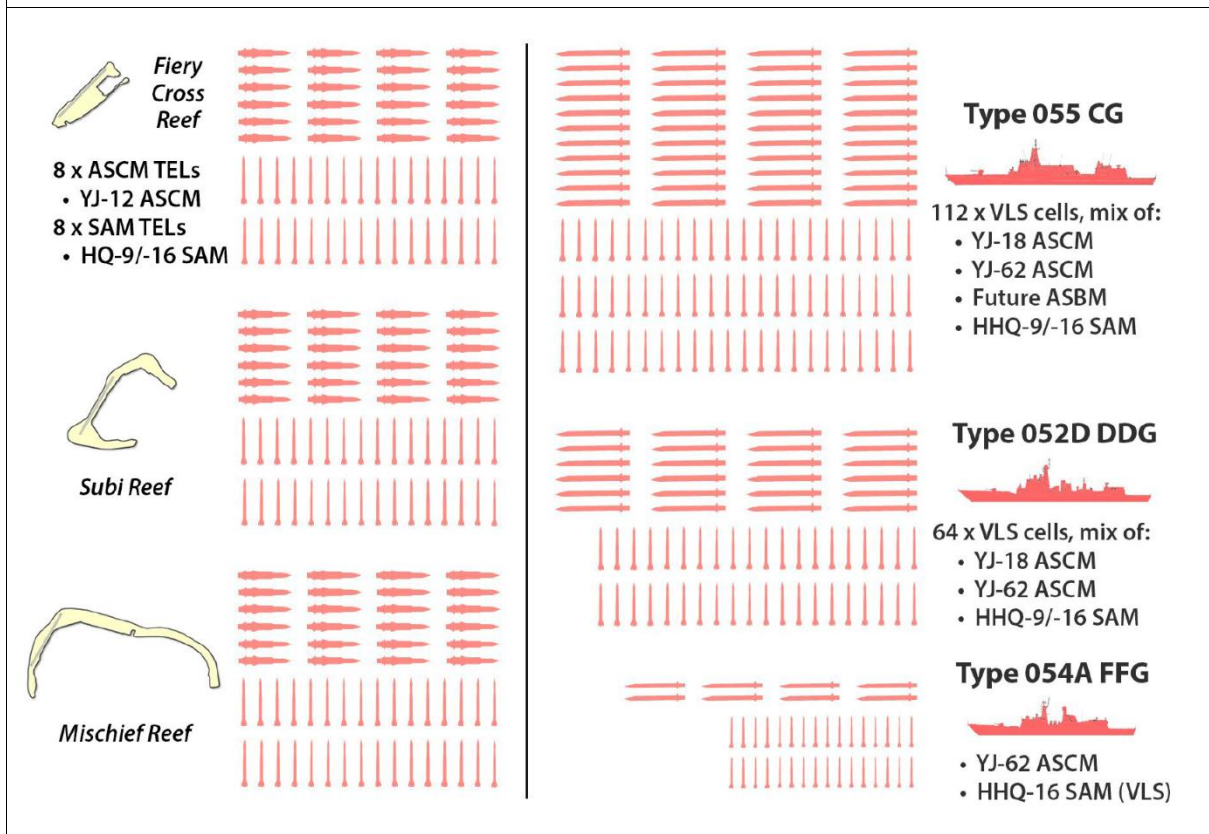
(b) HQ-9 SAMs and YJ-12 anti-ship cruise missiles (ASCMs) were deployed to the Fiery Cross, Subi, and Mischief Reefs together with special mission aircraft, such as the KJ-500 airborne early warning and control (AEW&C) aircraft and KQ-200 anti-submarine warfare (ASW) aircraft.

(c) Fiery Cross, Subi, and Mischief Reefs each have facilities that probably house a typical PLA(NAF) or PLA(N) surface-to-air (SAM) battalion, consisting of eight transporter-erector-launchers (TEL) and associated radar and support vehicles. Each SAM TEL building (20 × 22 meters, 66 × 72 feet) has two drive-in bays. The buildings have retractable roofs that allow a TEL for a vertically launched weapon, such as the HQ-9 long-range SAM or the HQ-16 medium-range SAM, to drive into the garage and elevate its missile tubes inside.



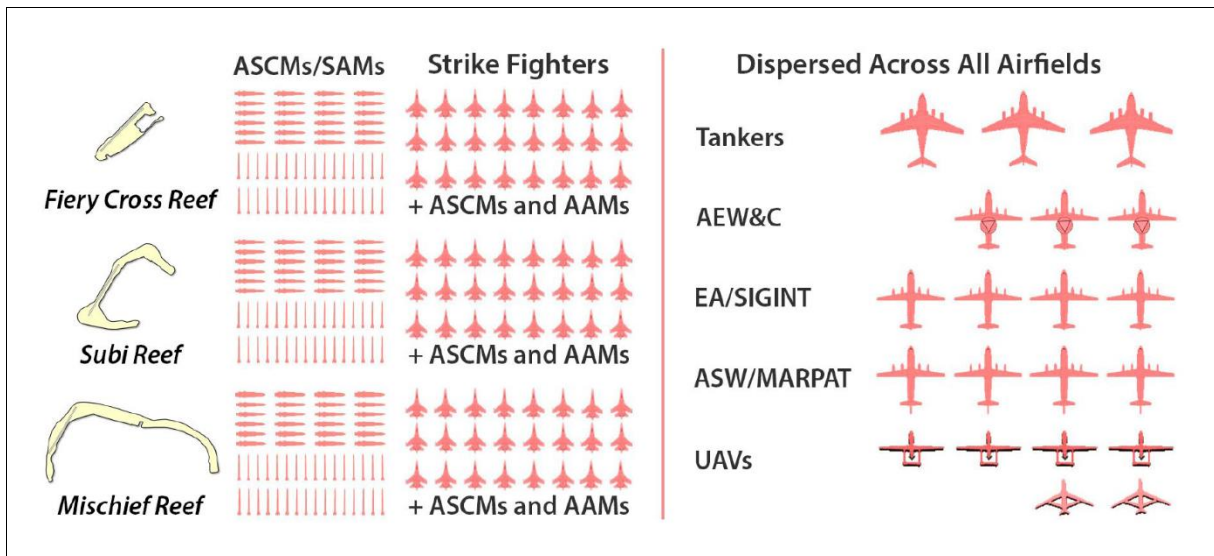
2.16. China's posture is clear. With the Belt-and-Road initiative to garner diplomatic and economic support and resources, and the investments in expanding its footholds in the South China Sea, China is moving towards a military-economic dominance that ensures that all stakeholders know that it is the dominant force globally.<sup>31</sup> While there are criticism and skepticism that China's military is hollow and only strong on paper, the TNI cannot take the risk of assuming that the PLA is incapable of regional dominance. All activities and capabilities fitted onto the islands in the South China Sea point to a probably military conflict that will involve several members of ASEAN at some point in this decade.<sup>32</sup>

(a) The diagram below defines the minimum deployment that satellites had picked up in the three islands.

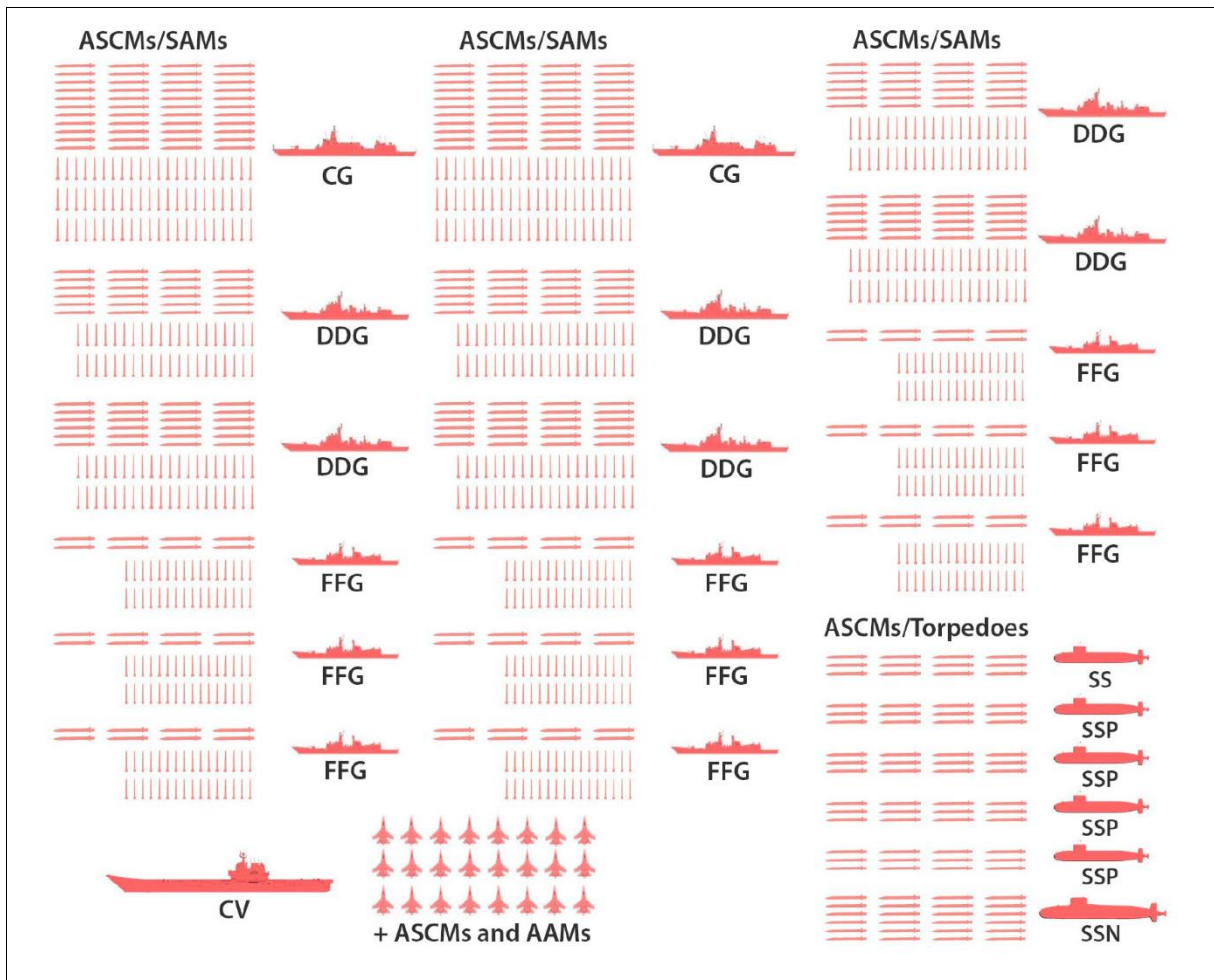


<sup>31</sup> Erickson, A., & Wuthnow, J. (2016). Barriers, Springboards and Benchmarks: China Conceptualizes the Pacific "Island Chains". *The China Quarterly*, 225, 1-22.

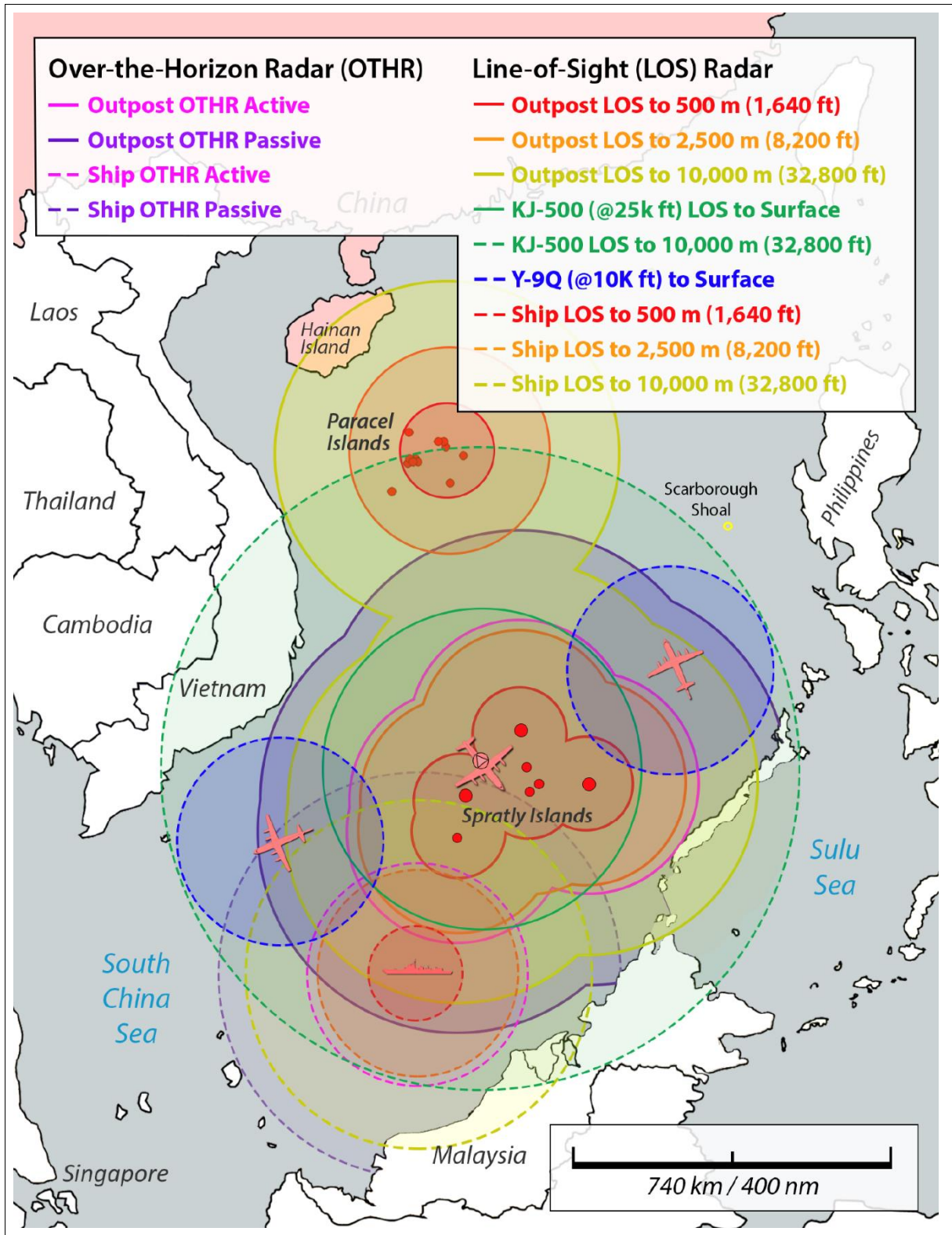
<sup>32</sup> "South China Sea Military Capabilities Series"—Unique, Penetrating Insights from J. Michael Dahm, former Assistant U.S. Naval Attaché in Beijing | Andrew S. Erickson. *andrewerickson.com*. (2022). Retrieved 24 August 2022, from <https://www.andrewerickson.com/2020/08/south-china-sea-military-capabilities-series-unique-penetrating-insights-from-capt-j-michael-dahm-usn-ret-former-assistant-u-s-naval-attache-in-beijing/>.



(b) It is not logical for any analysis to show that China had positioned so much military hardware for military training or for no specific reason. These missiles, strike fighters, frigates and submarines are in forward position and training for an assault to secure the waterways and airspace that are critical to China. It makes no sense to lay out such equipment that can be seen and confirmed via intelligence satellites for 'peaceful' deployment.



(c) No TNI AL vessel or TNI AU can move into the Indonesian EEZ in the South China Sea without being detected by the radar systems in the Spratly Islands. With a combination of aircraft, vessel, and land based radars, China had created a great radar 'wall' that can detect any threat that passes through all parts of the South China Sea. That explains why any air or sea maneuver of the TNI is easily intercepted by the PLA(N) and the PLA(NAF). This situation threatens all of the ASEAN economies. This is China's new Great Wall that blocks 'enemy' navies and aircraft from moving north towards the mainland.



2.17. Based on the following points, there are several conclusions to be made at this point.<sup>33</sup>

2.17.1. Given that the radar, weapon, and maneuvering technologies on present day aircrafts of the TNI and PLA, there is no longer the viability of close range air-to-air combat and that TNI pilots needs long range and board range situational awareness to survive and interception.

2.17.2. Given the extent of the PLA(NAF) operations in the South China Sea, the likelihood of a military engagement in the airspace and maritime zone around Natuna is very high and that the TNI will face the overwhelming brunt of the PLA(NAF) MRCAs, UAVs, bombers and AEW&C aircrafts with satellite support that will orchestra the air superiority operations.

2.17.3. Given the quality of the PLA(NAF) focused in the Southern Theatre Command, and in the South China Sea, the Chinese forces far outsize the US forces in the vicinity.

2.18. Based on these realities, these are the brief conclusions and recommendations that this paper will explore.

2.18.1. The replacement of the GCI radars and the continued expansion of the program throughout different parts of Indonesia will continue to support the information management system in TNI AU aircraft and direct them to MRCAs that could launch long range air-to-air missiles.

2.18.2. The procurement of AEW&C aircrafts that will manage airspace and maritime coordination of the battle space will provide clear definition of the threats and provide a broad proactive strategy to the counter the threats. The pilots in the air need inputs of the boarder battle field from the Operations Commander while they counter the challenges of maneuvering, managing weapon systems and monitoring the radar. All these activities and the glare will lead to pilot fatigue and decrease survivability.

2.18.3. The development and continued enhancement of the Centralized Air Command Post that overseas interception and surveillance operations is critical. The input of AI-led systems that can manage information from various sources and generate well-supported decisions on air combat manoeuvres and targeting will enhance the pilots' survivability.

2.18.4. The operations of the defence satellite and the direct link to the area air defense commander is a critical component of this TNI battle field. The secured SatCom feed provides a common tactical picture with inputs from the GCI and AEW&C that will shape the tactical decisions. With secured and dedicated SatCom connectivity, the area air defense commander can lead autonomous operation and battle management of the fighter engagement zone and mobilize the integrated air and missile defense to establish air superiority over Indonesian territory. With it, the battle command is essentially tactically 'blind'.

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<sup>33</sup> The Threat of PRC Domination in the South China Sea. Air University (AU). (2022). Retrieved from <https://www.airuniversity.af.edu/Wild-Blue-Yonder/Article-Display/Article/2161552/the-threat-of-prc-domination-in-the-south-china-sea/>.



(a) This map is based on intel of what the PLA wants to dominate. This is Phase 1 of their priority operational deployment.

(b) The area around Japan and South Korea will be managed by the Eastern and Northern Theatre Command. The entire area of ASEAN will be managed by the Southern Theatre Command.

(c) For the PLA(NAF) and the PLA(N), the control of the South China Sea, Java Sea and Philippine Sea is an integral aspect of the defense of the motherland. That is their mindset and it cannot be compromised.

2.18.5. China today has a strong and seemingly ‘reasonable’ motivation to deploy its military capabilities to dominate the South China Sea. Xi Jinping has made it clear that China will now bow to any Asian or Western power in the present or future. There would be no repeat of the colonial escapades of past centuries. And more certain, Xi Jinping, like Putin, wants to stitch together a greater nation to unit all territories ‘lost’ in the past. And Xi Jinping will use all economic and military tools at his disposal. And there is no scope for backing down. As it is, China’s economic activities through the belt-and-road programs are mired in bilateral debt. Many of the developing economies like Sri Lanka, Pakistan, Bangladesh are bogged down in long term structured debt with China. And the social pushback in Africa against China’s infrastructure investments is growing. More governments aligned to China are becoming unsteady and Chinese companies operating in the far flung economies of the African continent face regular attacks. Despite any adversity, Xi’s China is bent to be a superpower across all sectors. At the same time, the dynamics in the Indo-Pacific region is changing. India is growing to be the world’s largest economy with a high level of education and young human resources. China is now a rapidly aging society with low birth rate with no growth in sight. In a matter of 20 years, India will surpass China’s economic and military prowess and the Indian Ocean

and Indo-Pacific will be dominated by a new power that is aligned to the US and UK. As China faces challenges inside, it flexes its muscle outwards.<sup>34</sup>

2.18.6. Hence China has a small window now to modernize its military and assert its control on the South China Sea before it loses its momentum. China's "Golden Era" will only last as long as Xi Jinping can hold together the country and minimize any dissent. Once that era ends, the dominant ideology across the Indo-Pacific will be guided by the principles of diplomacy and democracy. Hence China will posture now to dominate the South China Sea while maintaining its One China Policy with regards Taiwan. With such a posture, China will take an aggressive stance in Natuna first and foremost as the island is the crucial location from which China could establish a forward operations base to control the other maritime channels. "Air power may either end war or end civilization."<sup>35</sup>

### 3. "The immediate and urgent application of GCI Radar in safeguarding the airspace sovereignty of the Republic of Indonesia". What will work.

3.1. The PLA(N) and PLA(AF) strategic game plan is predictable. The Chinese navy, air force and coast guards will form a blockage of Natuna and eventually move to engage the local administration to surrender control of the island to the PLA in any conflict or aggressive scenario. This action seeks to trigger the pride of the Indonesian leadership and people to launch an all out mobilization of military and civil resources to oppose the blockade and seizure.

3.1.1. This strategy is not new. China uses it in the border skirmishes with India. Russia is carrying out the same tactical procedure in Ukraine. In 2022, it is possible.

3.2. It would be a fatal decision to mobilize a significant force of the TNI AU into the air space around Natuna to engage any 'invasion' or aggression by the PLA(NAF). The facts are clear.

3.2.1. The PLA(N) blue water navy can mobilize overwhelming force and deploy the PLA(NAF) MRCAs to dominate the air and maritime space around Natuna simply on the basis that the Riau territory is isolated from the rest of Indonesia.

3.2.2. While there is an existing GCI station that will be upgraded, such a single radar unit can be neutralised.

3.2.3. The only defense possible for the island and the GCI station is to bolster the air defence system, and install medium and short range interceptors in the mountain areas of Gunung Bedong such that they are embedded and not easily traceable.

3.2.4. The PLA(NAF) is a technologically superior force compared to the TNI AU. It is also superior in quantity compared to the US forces in the Indo-Pacific.

3.3. The geographical isolation in the midst of the South China Sea makes Natuna difficult to hold and if too much resources in any conflict were dedicated to it, the losses to the TNI AU and TNI AL would leave the rest of the territory vulnerable.

3.4. In a secondary move, the PLA(N) and PLA(NAF) will mobilize its resources from the Solomon Islands and form a blockade of Jayapura or Sorong. And it will also mobile its navy and helicopters station around Timor Leste to capture Kupang. In this quick strategic move, the PLA could take control of Natuna, the major cities or ports of Papua and Timor. These positions will offer the PLA a sustainable operational base against any possible US or

<sup>34</sup> Display, A. (2022). *Xi Jinping: Lines of Authority*. Air University (AU). Retrieved from <https://www.airuniversity.af.edu/CASI/Display/Article/3129172/xi-jinping-lines-of-authority/>.

<sup>35</sup> Bunyan, R. (2022). Putin warns of 'the end of civilization' and a global 'all-out fight'. Mail Online. Retrieved 7 September 2022, from <https://www.dailymail.co.uk/news/article-9193429/Putin-warns-end-civilization-global-fight.html>.

AUS reinforcement to the TNI, if it were coming at all. It is the assessment of this paper that the TNI AU and TNI AL would not receive reinforcements as the US forces would be bogged down in the East Pacific Sea and the South Pacific defending Australia.

3.4.1. In the Pacific War, Japan wanted land, human resources, food supplies, and oil from Indonesia. Today, China only wants the waterways, and airspace. It already controls the space sector with its satellites.

3.5. The TNI response needs to be categoric.

3.5.1. Defending Natuna with all possible resources is not a wise move as the would mean the other territories of Indonesia would be unguarded.

3.5.2. Moving the TNI MRCAs into large scale air-to-air combat in the South China Sea would be deploying the pilots to their deaths. The PLA, using its long range radars and missiles would isolate and target the TNI aircraft one by one till they dominate the airspace.

3.5.3. Sending the TNI AL to intercept the massive PLA(N) force is not sustainable. They TNI AL is outclassed in terms of size and numbers.

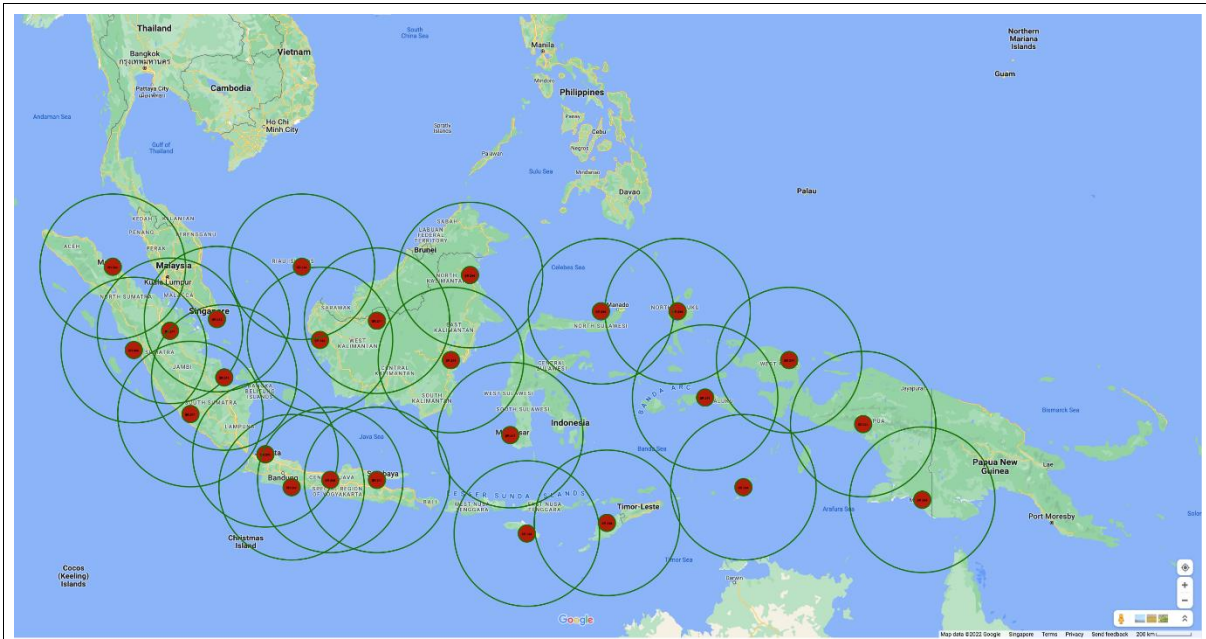
3.6. TNI will need to lure the PLA(N) and PLA(NAF) into Indonesia's airspace where the GCI radars with the range of about 470 km would be able to offer air maneuvering directions to the pilots. Aircraft visibility will be better with the Air Interception Command (AIC) identifying the PLA(NAF) air operations. TNI will use the breadth of Indonesia and the mountainous geography to its advantage in air-to-air combat. Such is a sustainable approach to wear down the PLA(NAF) aircraft and intercept them with GCI guidance.

3.6.1. This strategy will be more effective with the support of TNI AEW&C aircraft. In 2022, there are plans to procure two units of AEW&C. Given the scope of operations and the prospect of military conflict in the next decade, TNI will need to operate a minimum of six AEW&C spread across the equator to support the TNI AL and TNI AU.

(a) The map below shows the location of existing GCI radars which have fixed operational bases. They are operated by TNI AU radar units that come under 4 command sectors. The sectoral headquarters are found in Jakarta, Medan, South Sulawesi and Biak.

(b) The image on the right shows the atypical design of a GCI radar with range of about 470 km.





(c) This map shows the location of the major TNI AU bases with significant MRCA assets. Supadio Air Base in Pontianak will be the nearest base to support Natuna. It is also the most vulnerable air base to any PLA(NAF) and PLA(N) jamming and encirclement. While the TNI is a capable force, the PLA today is known for its overwhelming size and complexity of the Southern Theatre Command.



These 25 existing and partly proposed radar locations are a major asset. They have overlapping sectors in Sumatra and Java to provide coverage of critical areas. The sectoral and operational redundancy also enables certain radars to operate and feed information to the AIC when others have been neutralised by the enemy. All radars emit signals and that makes them easy to target. For accurate strikes, the PLA(NAF) will have to use their medium range air-to-ground missiles. That would be the PL-8, PL-9 which hit are effective for up to 20 km or the PL-12 which has a hit range of 100 km. That would mean the PLA(NAF) would be inside Indonesia's airspace and within coverage of the GCI radars and the TNI AU MRCA assets. The PLA(NAF) would also be in the range of the short and medium range interception surface-to-air missiles. The PLA becomes vulnerable once they are within the GCI coverage.

(a) The Southern Theatre Command is a massive force operating the full spectrum of 4.5G and 5G fly-by-wire MRCAs, long range bombers, special mission aircraft, unmanned aerial vehicles, and the more extensive range of radar and air and missile defence systems spread from Hainan on the mainland to throughout the South China Sea. That is the force that the TNI AU and TNI AL will face.














(b) The tally and assessment by the US Secretary of Defense and all aspects of US intelligence state clearly that China's forces are effective and they are not 'dummies' as normally labelled by skeptics. The PLA pilots and commanders in the South China Sea are trained and motivated to use overwhelming force.



3.7. However, 25 stations are not enough. Indonesia needs more.

3.7.1. As Indonesia is an archipelago, there are blind spots where there is no land or significant population to station the GCI. These blind spots will be zones where the PLA(NAF) will seek to lure the TNI F-16s or Su-27s. In the open, without GCI coverage, the Chinese airborne radars will be dominant in guiding their air-to-air missiles. In areas where there is no radar overlap, once the GCI radar is neutralised, there is no redundancy GCI coverage. Without the GCI or AEW&C, the AIC is 'blind' and any TNI AU operations will be risky. There is a dire need for greater operational overlaps and system redundancies to enable the AIC to continually get GCI radar feeds in the midst of a PLA incursion.

3.7.2. Investing in GCI radars is the key to the survival in any air attack or incursion in the airspace. Indonesia's eastern flank, particularly Papua is vulnerable as China is building its operational base in the waters around the Solomon Islands. The recent China-Solomon pact allows the PLA(N) and the PLA(NAF) to operate and refuel in the EEZ of the Solomon Islands. That places the PLA within operational range over the east of Indonesia. China has been using investments and financial 'aid' to build these alliances that will allow the PLA to have launchpads in the region.

							
Multirole Combat Aircraft Shenyang J-11 570 planes in PLA active service Speed at pursuit : 2,500 km/h Maximum range without refuelling : 3,530 km Operational altitude : 19,000 m	Multirole Stealth Combat Aircraft Chengdu J-20 150 planes in PLA active service Speed at pursuit : 2,100 km/h Maximum range without refuelling : 3,400km Operational altitude : 20,000 m	Multirole Combat Aircraft Su-30MKK/MK2 97 planes in PLA active service Speed at pursuit : 2,120 km/h Maximum range without refuelling : 3,000 km Operational altitude : 17,500 m	Multirole Combat Aircraft Sukhoi Su-35S 24 planes in PLA active service Speed at pursuit : 2,778 km/h Maximum range without refuelling : 3,600 km Operational altitude : 18,000 m	Multirole Combat Aircraft Chengdu J-10 468 planes in PLA active service Speed at pursuit : 2,327 km/h Maximum range without refuelling : 1,850 km Operational altitude : 18,000 m	Multirole Combat Aircraft (Carrier Version) Shenyang J-15 128 planes in PLA active service Modified for Carrier operations Speed at pursuit : 2,551 km/h Maximum range without refuelling : 3,500 km Operational altitude : 20,000 m	Multirole Combat Aircraft Chengdu J-7 388 planes in PLA active service Speed at pursuit : 2,175 km/h Maximum range without refuelling : 2,200 km Operational altitude : 17,800 m	Long range bomber Xian H-6K Xian H-6N/H-6X1 120 planes in PLA active service Speed at pursuit : 1,056 km/h Maximum range without refuelling : 3,500 km Operational altitude : 12,800 m
							
MALE UAV CAIG Wing Loong II 75 MALE UAVs in PLA active service Speed at pursuit : 370 km/h Maximum range without refuelling : 4,000 km Operational altitude : 9,000 m	MALE UAV Harbin BZK-005 84 MALE UAVs in PLA active service Speed at pursuit : 200 km/h Maximum range without refuelling : 4,000 km Operational altitude : 8,000 m	HALE UAV Harbin BZK-005 12 MALE UAVs in PLA active service Speed at pursuit : 620 km/h Maximum range without refuelling : 4,000 km Operational altitude : 15,000 m	Carrier-based Logistics Helicopters Changhe Z-18 120 helicopters in PLA active service Speed at pursuit : 249 km/h Maximum range without refuelling : 1,020 km Operational altitude : 3,150 m	Carrier-based Attack Helicopters Changhe Z-19 186 helicopters in PLA active service Speed at pursuit : 280 km/h Maximum range without refuelling : 700 km Operational altitude : 6,000 m	Carrier-based Attack Helicopters CAIC Z-10 360 helicopters in PLA active service Speed at pursuit : 270 km/h Maximum range without refuelling : 800 km Operational altitude : 6,400 m	Strategic Air Lifter used for final assault support Xi'an Y-20 17 planes in PLA active service Speed at pursuit : 750 km/h Maximum range without refuelling : 4,500 km Operational altitude : 13,000 m	MALE UAV CAIG Wing Loong 60 MALE UAVs in PLA active service Speed at pursuit : 280 km/h Maximum range without refuelling : 4,000 km Operational altitude : 5,000 m

(a) This is the certainty of the currency aviation assets of the PLA that will be mobilized in the South China Sea in the coming decade. There will be lots of hostile activities in Indonesian airspace.

3.8. These are several recommendations that will enhance the operational capabilities of the AIC, the existing and new GCI radars, and ensure the survivability and victory of TNI AU pilots.

3.8.1. There needs to be at least another 25 GCI radars in addition to all existing operating GCI radars to cover the new capital's airspace in Kalimantan and the crucial Straits of Makassar. Once the new capital is in operations, the Straits of Makassar becomes the critical PLA(N) and PLA(NAF) area of operations. Most of these additional GCI radars should also be

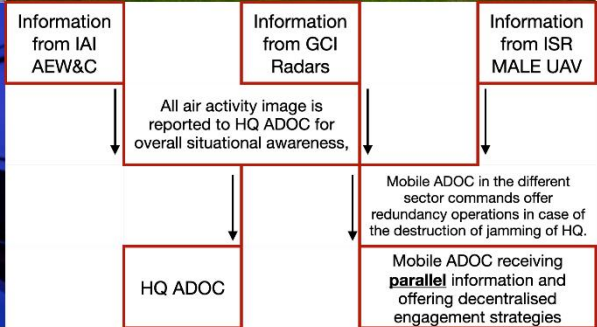
built with mobile platforms so that they could be moved into different locations when there is a sustained incursion. The mobility will enable these GCI radars to evade ‘enemy’ missile strikes.

3.8.2. The other critical area that needs coverage will be Papua. At present, Papua has a low population density, high level of separatist activity, and low radar coverage with limited or no TNI AU assets deployed to defend its airspace. In the tactical perspective of land-based warfare, Papua is supposedly low priority. However, in the context of China’s quest for regional and global dominance, Papua is the resource rich land mass that will allow the PLA to operate in the Southern Pacific Ocean near Australia and New Zealand. The PLA dominance of Papua (Indonesian territory and Papua New Guinea) will give the PLA the strategic outpost for air and sea operations while the Chinese companies take over the mining operations of all of the natural resources there.

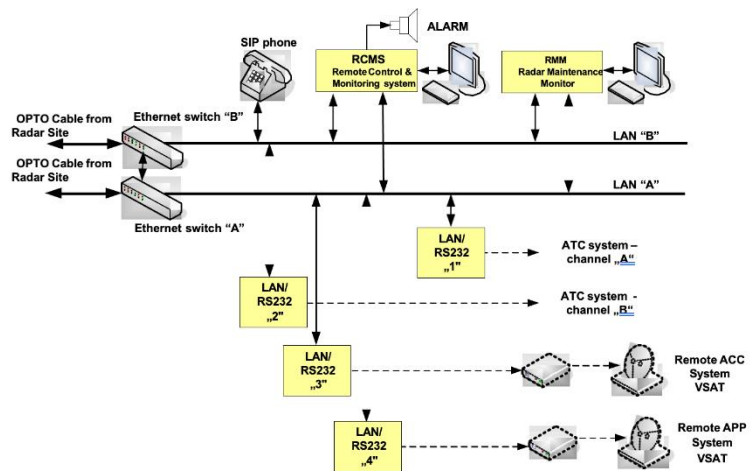
3.8.3. There will also be a need for mobile Air Defence Operation Command (ADOC) posts that will relay information in the different territorial zones to the AIC. In any conflict situation, the air operations will be dynamic across several air corridors. Hence there is a need for diversifying the operations while still maintaining the holistic picture across all Indonesian territory. There should be at least 10 Mobile ADOC that will be linked to the nationwide data link to patch all data feeds from the GCI radars to the AIC. The AIC will also be diversified according to the regional GCI clusters. That set up will enable sectoral operations to continue if any particular region comes under intense PLA(NAF) attack and the radar assets are destroyed.



(a) The deployment of the Mobile Air Defence Operation Command vehicles across different air management sector will parallel the operations of the HQ. The decision making skills will be relegated to the sectoral AIC officers who monitoring the air combat maneuvering at close range.



(b) The diagram below shows the general connectivity of the GCI radars to the existing military datalink network to enable the flow of GCI radar data to the TNI AU GQ Command, MOD HQ Command and to the sectoral AICs.



(c) These are the broad parameters of the GCI radars which are recommended for procurement and deployment. The MSSR-1 is the recommended specification.

(d) The existing, new and future GCI systems should have parallel data-link and satcom connectivity to enable the diverse transmission of secured encrypted information to the TNI AU HQ command post and to the AIC. This dual data transmission with extensive redundancies must enable the AIC to continually support the pilot executing air combat maneuvering.

(e) Based on the data presented the MSSR-1 has a broader range of capabilities than existing GCI radars.

**System Instrumented Coverage**

Parameter	REUNION	MSSR-1
Azimuth (deg.)	360	360
Probability of detection $P_d$	min. 0.8	min. 0.95
Probability of false alarm $P_{fa}$	$10^{-6}$	N.A.
Minimal detection instrumental range	240NM	256NM

<b>System Instrumented Coverage</b>			
<b>Parameter</b>		<b>REUNION</b>	<b>MSSR-1</b>
Azimuth (deg.)		360	360
Elevation angle (deg.)	Minimum	-1 up to -6 in case of electronic beam steering	-1
	Maximum	35	50
Maximum height (ft)		100 000	100 000
Range (NM)	Minimum	2NM	0.5NM
	Maximum	240NM	256NM

(f) The MSSR-1 has Active Jamming, emitting the types of ECM listed below. Active ECM Threat Types is assumed for determining the REUNION Radar System operating conditions. In addition, the REUNION Radar System polarisation similar to the jammer polarisation is assumed.

(g) The REUNION Radar System is capable to operate entirely within the sub-band 2900 to 3100 MHz at frequencies allocated for radars in accordance with International communication regulations and the "National Frequency Table".

(h) The REUNION Radar System is capable of peacetime operation (including exercising of frequency agile modes over at least +/-5 % of the maximum frequency agile bandwidth) entirely within the sub-band 2900 to 3100 MHz to ensure that peace-time frequency allocations for the radars can be obtained irrespective of other spectrum users.

<b>ECM TYPE</b>	<b>Duty Cycle for performance assessment</b>
<u>Noise Jamming</u>	
a. Continuous wave.	100 %
b. Swept frequency modulated narrow band noise.	100 %
c. Spot frequency narrow band (10 MHz) noise.	100 %
d. Barrage/wide band (full radar band coverage).	100 %
<u>Deception ECM (DECM)</u>	
e. Pulse jamming (random timing).	25 %
f. Frequency jump or click jamming.	100 %
g. Synchronous repeater programmed delay matched pulse jamming.	25 %



Parameter	Parameter, Feature	Note
<b>REUNION 3D PSR</b>		
Make and Type	3D phased array stationary radar	Fully coherent digital radar
Operating Frequency	2900-3100 MHz	GaN technology
Peak Transmitted Power	70 kW	Transmitted power adjustable using CAM
Modulations	Frequency/PSK	Configurable
Instrumental Range	2 ÷ 240 NM	
Elevation Coverage	up to 35°	
Altitude Coverage	Up to 100 000ft	
Range Resolution	230 m	
Azimuth Resolution	2.5°	Equal targets, amplitude processing
Azimuth Accuracy	0.2°	
Antenna Type	Active phased array	Stacked beam
Antenna Feed	TR module on antenna row	Direct connection without cable
Antenna Vertical Aperture	47 rows	
Antenna Dimensions	w = 5,9 m; h = 2,9 m	
Signal and Data Processing	CFAR, MTD, narrow pulse/pulsed jamming suppressor	
ECCM Capability	Pseudo random stagger frequency agility, jammer bearing, ...	Automatic features against passive and active jamming
<b>REUNION MSSR</b>		
SSR/IFF system	Modes 1, 2, 3/A, C, 4 and Mode S Level 5 per ICAO Annex 10	Upon customer decision / M4 crypto device shall be delivered by customer
Make and Type	LVA ASSR-35	
Transmitter Frequency	1030 +-0.01 MHz	GaN technology
Instrumental Range	0.2 ÷ 256 NM	



Parameter	<u>Parameter, Feature</u>	Note
Elevation Coverage	Up to 50°	
Altitude Coverage	Up to 100 000ft	
<b>COMMON PARAMATERS</b>		
Rotation Speed	5 - 10 RPM	Adjustable using CMS
Azimuth Coverage	0÷360°	Rotating antenna
Antenna azimuth position information encoder	14 <u>bit</u>	( <u>resolution</u> 360°/16384)
Target Processing Capacity	>1500/revolution	All targets detected while scanning <u>are</u> tracked
MTCBF	>3810 <u>hrs</u>	
MTTR	≤45 min	

- (i) The GCI radars and all of its operating systems must be fully integrated into the existing TNI AU airspace management systems. That will include the interoperability of the operators and the maintenance personnel.
- Transmission of data signals between antenna unit and radar head cabin – opto cables
  - Data interconnection of particular units for signal processing – back up LAN data network
  - Data interconnection with Mode S interrogator of MSSR-1 Radar is realized through duplicated LAN data network.
  - Standard data transmission between radar and remote AF sites (ADOC, SOC, radar stations, airfield and SAM sites) shall be through back up opto cable, transmission on LAN data network level, the method of back up opto cable interconnection between both sites shall be “Ring” one.
  - In case of user’s requirement, it is possible to use other method for data transmission, for example microwave link, VSAT, telephone line etc.
  - VSTAT interconnectivity is an integral part of the GCI system.
- (j) The GCI radar system must be able to transmit information in the following standardised ASTERIX data protocol with data category types specified below:
- I008 category for meteorological information
  - I009 category for meteorological information
  - I240 category for radar video (normal video, MTI video and MTD video)
  - I017, I018 categories for datalink mode S control
  - I008 category for meteo-channel data output
  - I009 category for composite weather reports
  - I021 category for ADS-B messages
  - I062 category for SPSD track messages
- (k) The GCI radar operators will be able to process the following information:
- target location (including target height derived from the REUNION),
  - target Doppler speed if available from the REUNION,
  - track speed and heading data,
  - time of detection,
  - identification data for all IFF/SSR modes that the target has been interrogated in,
  - qualitative plot parameters incl. indication of suspended helicopter,
  - ADS-B data.

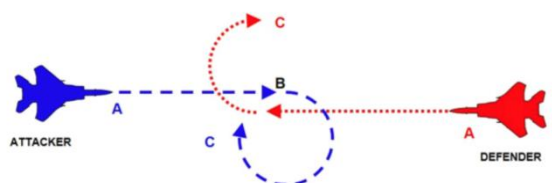
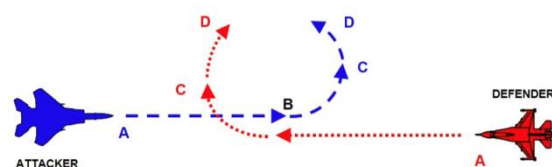
3.9. It is the reliability of the GCI radars and the trained AICs who will guide the pilots to carry out their fighter maneuvers over Indonesian air space. The basic fighter maneuvers (BFM) are tactical movements performed by fighter aircraft during air combat maneuvering, to gain a positional advantage over the opponent or enemy. BFM combines the fundamentals of aerodynamic flight and the geometry of pursuit, with the physics of managing the aircraft's energy-to-weight ratio, called its specific energy. TNI AU pilots are trained well in this matter. However, as discussed in earlier chapters, the PLA(NAF) aircraft and battle management systems are more sophisticated and they have overwhelming air dominance over any enemy. Hence the TNI AU will need greater mastery in BFM with the support of the AIC to neutralize the threat.

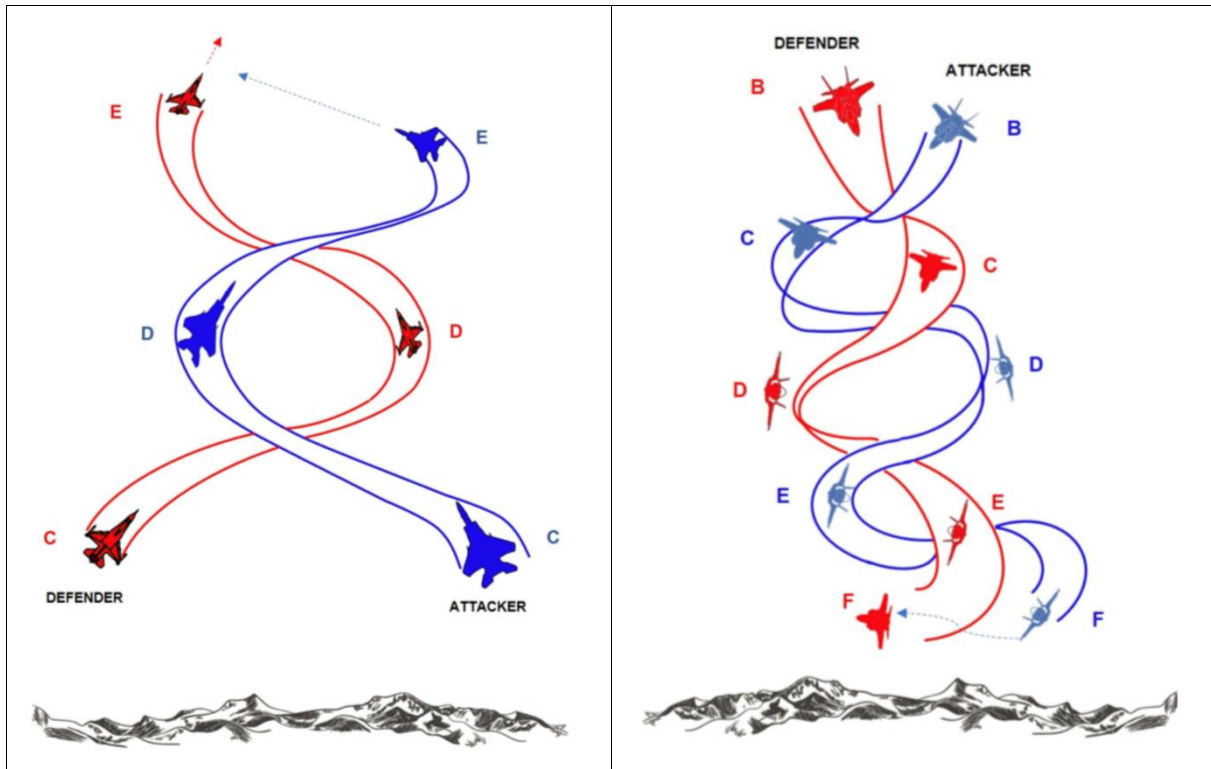
3.10. Two great pillars have always been at the base of basic fighter maneuvers: the ONE CIRCLE FIGHT, also called "radius fight" or "nose to nose fight"; and the TWO CIRCLE FIGHT, also called "rate fight" or "nose to tail fight". These represent two fundamental concepts of the doctrine that has persisted since the birth of aviation and that remain valid today. For this reason, although they have much evolved with the introduction of technological aids such as the HMD (Helmet Mounted Display) or aerodynamic aids such as TV (Thrust Vectoring), fighters pilots are still taught these basic concepts in their IFF (Introduction to Fighter Fundamentals) training. And in this execution the guidance of the AIC on the scope and width of the available airspace and other surrounding threats will be the difference between life and death.

(a) When engaging with the PLA(NAF) MRCAs, the TNI AU can carry out several of these Basic Fighter Maneuvers with the support and guidance of the AIC GCI and AEW&C radars:

(b) This type of fight is decided by the pilot who wants to use the excellent turning radius characteristics of his/her aircraft against a threat that is not as good in turn radius. The pilot will tend to develop the fight upwards to reduce the airspeed to a minimum and, as a consequence, to reduce the turning radius.

(c) While the AIC update the pilot on the airspace context, the will execute such a maneuver based not he advanced calculations of the GCI interception system.





(d) The complexities of this basic fighter maneuvers is supported by the rapid calculation and analysis of the radar information by the GCI systems and the TNI AU Command HQ which gives the pilot the comprehensive information to execute the interception or evade a missile. While the TNI pilot is focused on the PLA(NAF) aircraft in pursuit, the AIC and GCI and AEW&C radars help to map out how many other threats are in the sky. Know the airspace context is critical to survival.

3.11. The GCI radar system with the assistance of the AEW&C will offer the range of air space information to the Air Intercept Command (AIC) and the TNI AU Airborne Battlefield Command and Control Center (ABCCC) which will in turn assist the pilots to carry out complex maneuvers to evade an incoming missile. While the pilot has full control of the aircraft, given the pressure of the moment, the geography, the G-force, and the confusion of facing the enemy in a crucial battle space can cause disorientation. With the support of the AIC and the ABCCC, the senior pilots on the ground can communicate with the pilot and guide his actions based on the broader view of all enemy action on screen. The AIC team will be able to track all incoming aircraft and missile threats and shape the decision with the pilot based on their collective experience. If you depend on the pilot judgment entirely while he or she is in combat mode, it is hard to bet on survivability. The air battle will never be one to one. That era is gone. The TNI AU defensive air formation will face threats from all sides.

3.12. With experienced pilots on the ground assisting the AIC, the pilot in the air could be guided to carry out the following defensive flight manoeuvre. While these appear to be simple pen drawings, the reality is very complex.

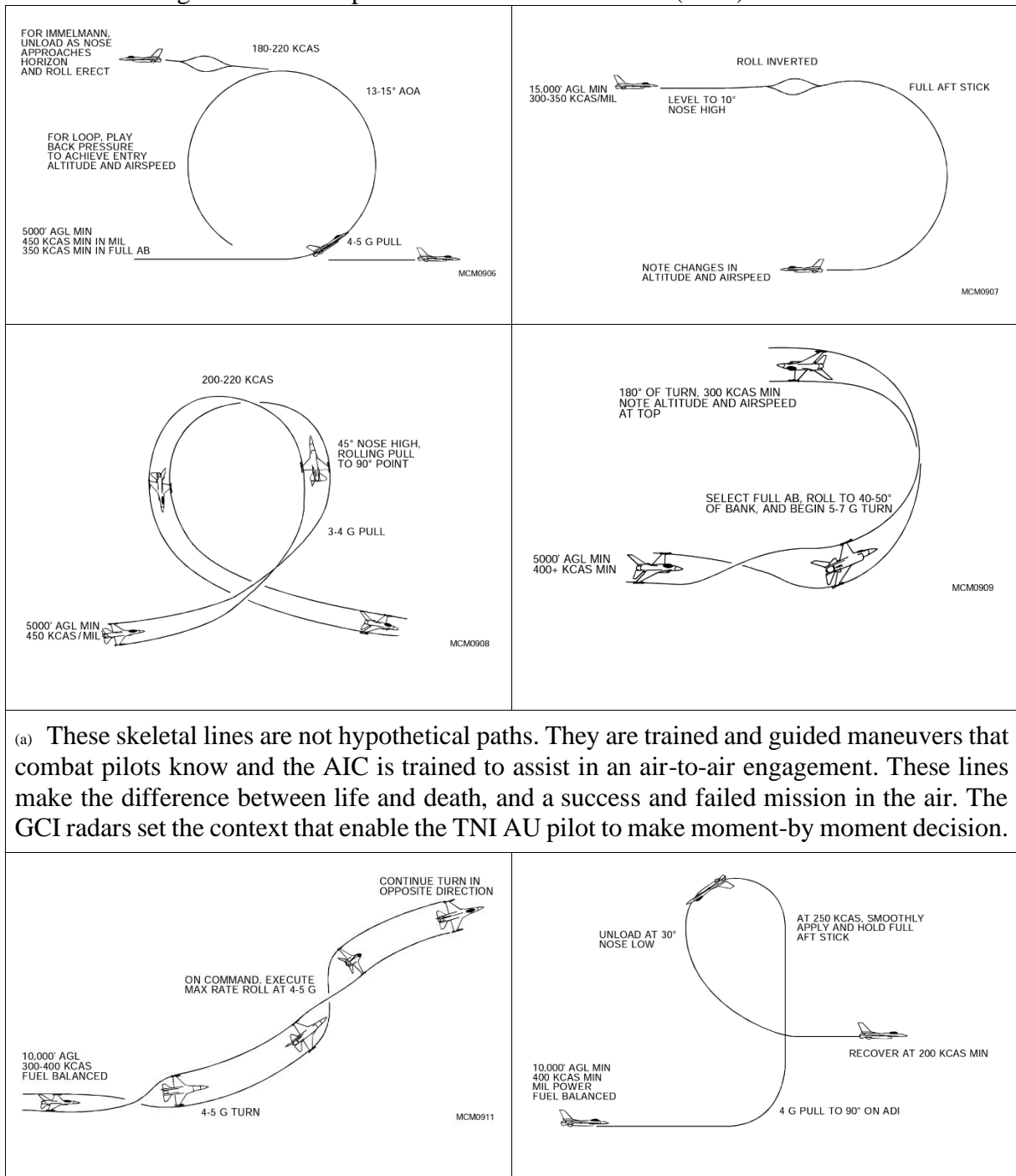
3.12.1. First of all we need to understand that experience in flying any aircraft is critical to the completion of the mission. The more experienced pilots understand what the aircraft can do and they are also aware of what the energy aircraft can achieve.

3.12.2. Second, there are many natural variables as well as technical quirks in flight. Many things can go wrong, and they do.

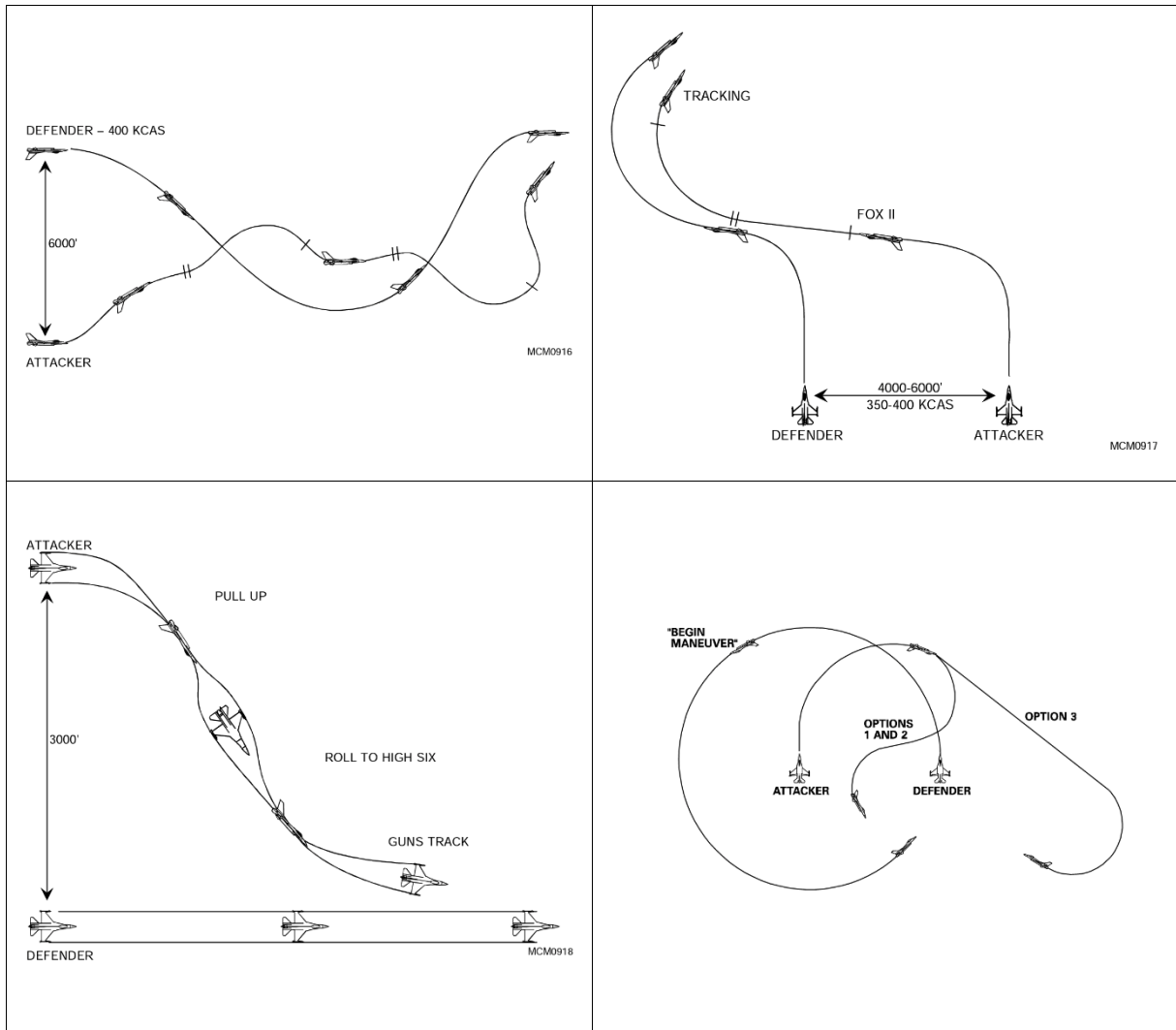
3.12.3. Third, weather is unpredictable. The maneuver that could be done in Spring cannot be replicated in another season.

3.12.4. Fourth, when a missile is locked onto your aircraft, and you know the enemy will fire, then the pilot enters panic mode. The sense of perspective might vanish.

3.13. The audio instructions going to the TNI pilots will enable them to carry out this evasive stunts to get into a better position to neutralize the PLA(NAF) MRCA.



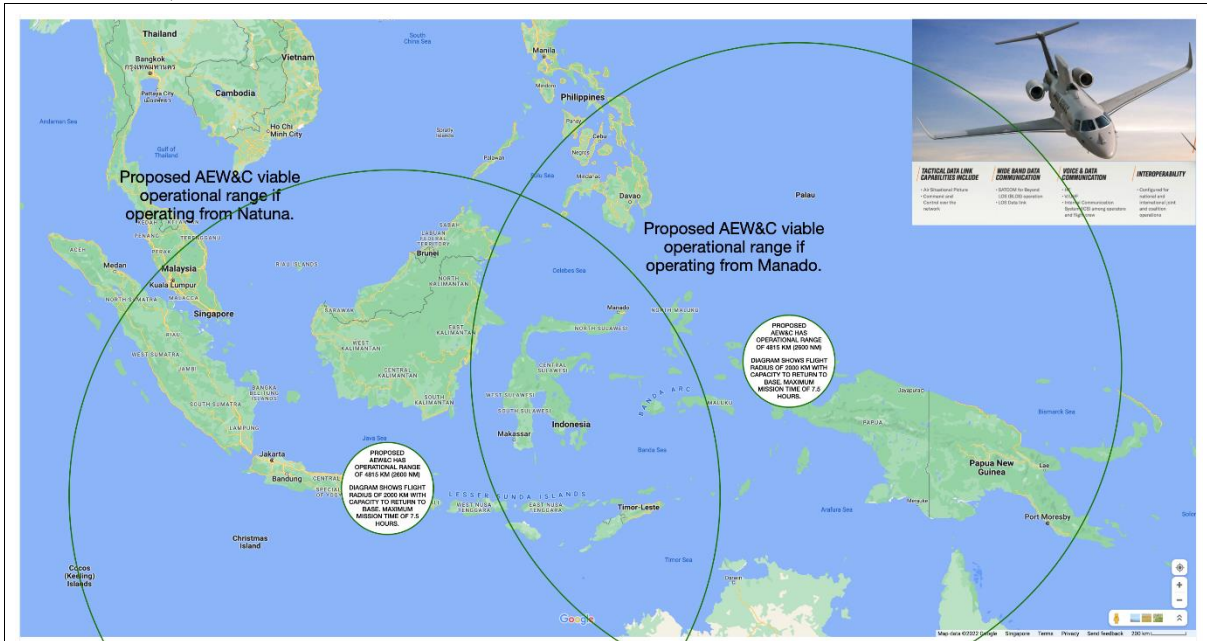
(a) These skeletal lines are not hypothetical paths. They are trained and guided maneuvers that combat pilots know and the AIC is trained to assist in an air-to-air engagement. These lines make the difference between life and death, and a success and failed mission in the air. The GCI radars set the context that enable the TNI AU pilot to make moment-by-moment decision.



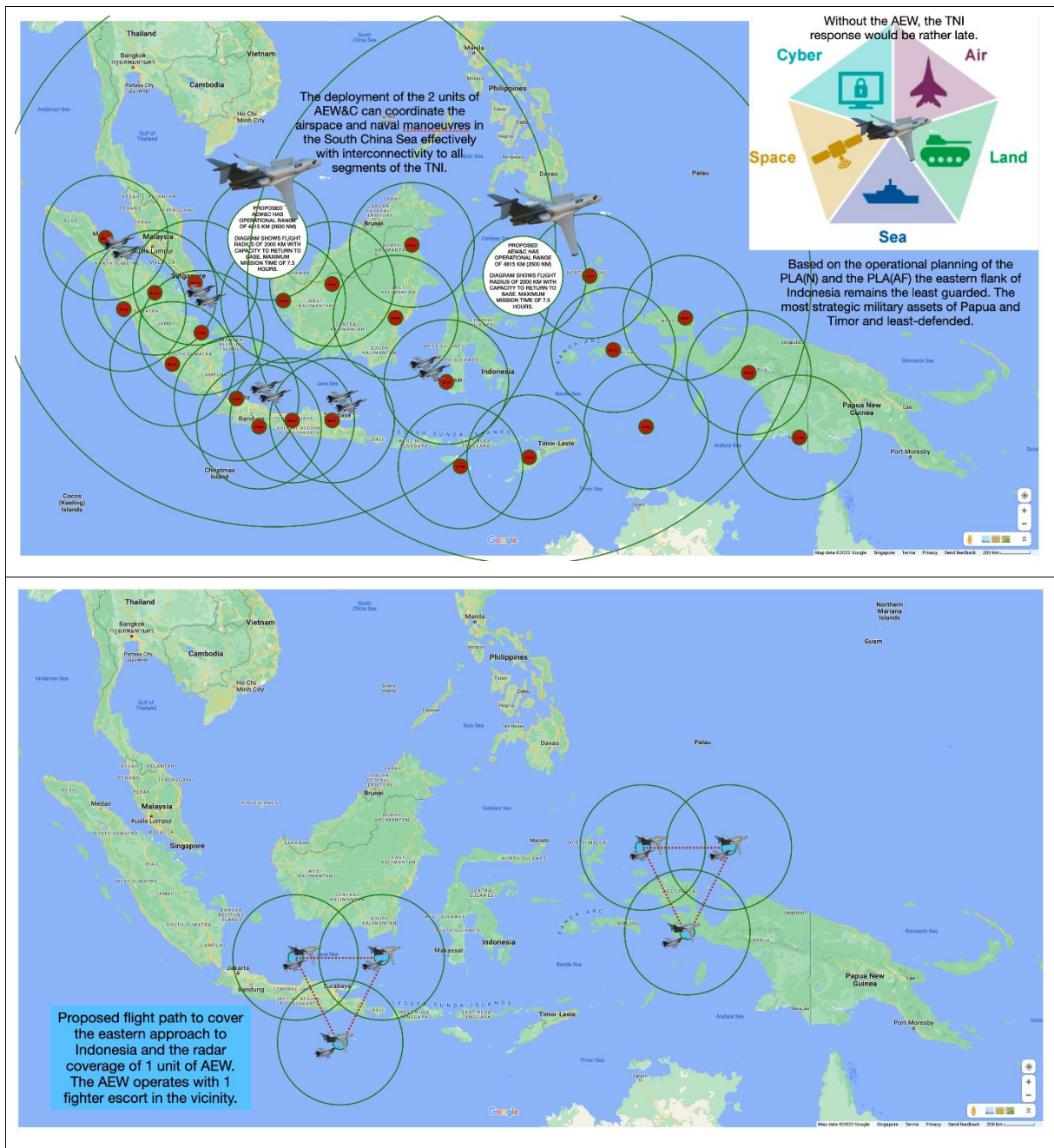
3.14. The GCI radars and the AIC specifically enable the TNI AU pilot to understand the Local Area Of Interest (AOI), External Areas Of Interest (AOI), Local Area Of Responsibility (AOR), External Areas Of Responsibility (AOR), Local Flight Interest Region (FIR), Local Track Continuity Area (TCA), External Track Continuity Area (TCA), and the External Track Evaluation Area (TEA). It also informs the pilot that is on the interception mission the following critical benchmarking information like the location of surface-to-air missile (SAM) batteries, broadcast control beacons, strategic points, and airfields for emergency landing. The AIC through the GCI control makes the decision for the TNI AU pilot to Commit, Recommit, Correlate a mission, Decorrelate a mission, Drop a mission, Cancel assignment of a fighter resource, or Cancel target/fighter pair. The decisions made for the pilot to execute is formulated by the most advanced systems of the GCI. Likewise the AIC controllers will decide the deployment of the SAM interception in coordination with the GCI radars.

3.15. The support of an AEW&C system will further enhance the support operations for the interception. The airborne early warning and control (AEW&C) system is an airborne radar system designed to detect aircraft, ships and vehicles at long ranges and perform control and command of the battle space in an air engagement by directing fighter and attack aircraft strikes. The TNI AEW&C units are also used to carry out surveillance, including over

ground targets and frequently perform C2BM (command and control, battle management) functions similar to an Airport Traffic Controller given military command over other forces. Used at a high altitude, the radars on the aircraft allow the operators to distinguish between friendly and hostile aircraft hundreds of miles away. AEW&C aircraft are used for both defensive and offensive air operations. Modern AEW&C systems can detect aircraft from up to 250 miles (400 km) away, well out of range of most surface-to-air missiles. One AEW&C aircraft flying at 30,000 feet (9,100 m) can cover an area of 120,460 square miles (312,000 km<sup>2</sup>).



- (a) Similar to the flight path plans, these circles represented critical operations zone. The deployment of the AEW&C across the breadth of Indonesia will enable the air visualization across the critical enter points into Indonesian airspace.
- (b) The overlapping circles below shows the location of 25 GCI radars which continually need to be upgraded and with new fixed stations to offer overlapping air coverage on the eastern side of Indonesia. The weak GCI coverage will lead to a weak right flank. The PLA(NAF) operating from the Solomon Islands and Papua New Guinea will be able to exploit the weak air coordination over the Indonesian sector of Papua.

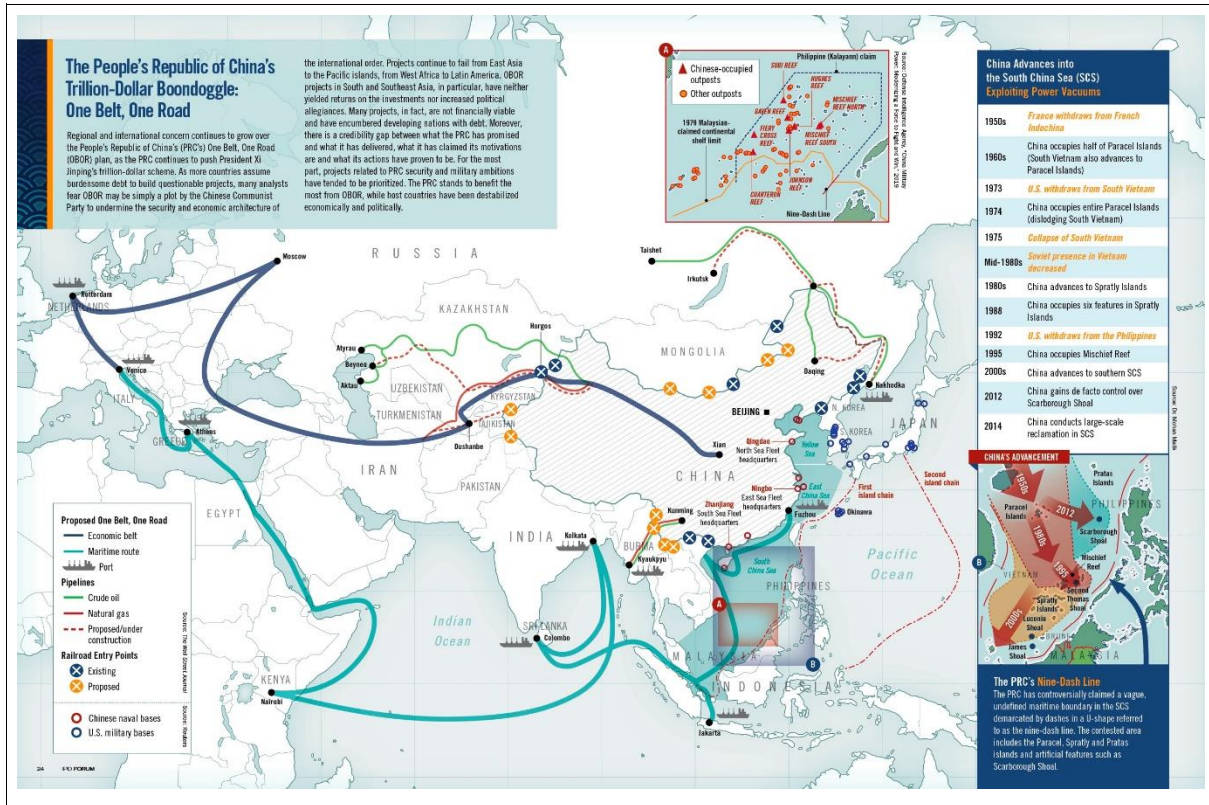


3.16. Deployment of the AEW&C will only enhance the effectiveness of the AIC. The blend of data from the GCI and the AEW&C can form a dimensional understanding of the air battle space that the pilot cannot get based on his onboard radar systems. The combination of the GCI radars and the AEW&C will enable the TNI AU pilots to see the incoming threats at the earliest possible moment, plan the interception, and deploy the more viable interception or evasion plan with the AIC to ensure victory or survivability.

3.17. The TNI AU aircraft cannot function alone. The PLA(NAF) aircraft and pilots have certain capabilities and sophisticated equipment and their deployment in the South China Sea is ongoing. The TNI AU pilots will need significant support from GCI radars and the AEW&C

systems to enhance the operational readiness against this looming threat. There is no other defined and significant threat to date.

#### 4. Conclusion



4.1. This map shows China's long term game plan and nothing is capable of stopping the implementation. It is a multi-faceted, multi-decade plan to build economic, political, social, and military dominance over a significant part of East, South East, and West Asia. With that area of influence, China would have surpassed the global dominance of the US economy. Unlike the previous century, there is no need to control and conquer land. China will hold dominance over global telecommunications, global trade transactions, satellite signal and data collection from space, and have free passage of its military from one combat theatre to the next. China's dominance is built on mobility and the flow of information. It is no longer static in nature.

4.2. Hence, military planners will need to change the planning paradigm that underwrite the procurement processes. Warfare will be, as it had been, based on dominance of the airspace, and maritime space. However, there is now the added dimension of outer space where satellites dominate. China's People's Liberation Army Strategic Support Force already has the mandate to wage Space Warfare, Cyber Warfare, Electronic Warfare, and Psychological Warfare. The PLA Space Force supports the People's Liberation Army Rocket Force which controls all the cruise and Ballistic Missiles.

(a) This table below shows the arsenal of Chinese missiles. They are all actively deployed across all platforms of the PLA. Most of the missiles are modeled after the Russian Legacy series. However, a significant part of them are now based on domestic design and with domestic supply chain. This suggests that there is significant supply to support a sustained military campaign.

(b) This table is based on Pentagon assessment and it shows that in a stand-off situation and to gain a dominant advantage over the enemy, China has the capacity to launch against all of Asia in a bid for its national survival. Aside from India, no other country in the Indo-Pacific have ample ballistic missile capabilities to neutralize China. Russia is not likely to be an adversary in the future.

Surface-to-surface (SSM)	Ballistic	Intercontinental	DF-41 · DF-31AG · DF-31A · <b>DF-31</b> · DF-5B · DF-5 · DF-4
		Intermediate-range	DF-26 · DF-3A · DF-3
		Medium-range	DF-17 · DF-21 · DF-2A · DF-2
		Short-range	B-611 · P-12 · BRE8 · DF-16 · DF-15 (M-9) · DF-11 (M-11) · DF-1 · M-7 · WM-120 · WS-2 series · WS-3 series · WS-15 · WS-22 · WS-32 · WS-33 · WS-35 · WS-43 · WS-63 · WS-64 · WS-600L · A100 · A200 · A300 · SR-5 · SY300 · SY400
		Submarine-launched	JL-3 · JL-2 · JL-1
		Anti-ship	DF-26 · DF-21D · YJ-21 (CM-401)
	Hypersonic glide	DF-ZF	
	Cruise	Long-range land attack	CJ-100/DF-100 · CJ-20 · CJ-10 · DH-2000 · HN-2000 · CF-2 · CF-1 · HN-3 · HN-2 · HN-1
		Short-range land attack	YJ-18 · CX-1 · CM-602G · YJ-62 (C-602) · YJ-22 · KD-88 · YJ-2 · KD-63 · YJ-63 (C-603) · YJ-7 (C-701) · C-703 · C-704KD · C-705KD · YJ-4 · YJ-1 · C-611 · XW-41 · HD-1
		Anti-ship supersonic	YJ-12A · YJ-18A · CX-1 · YJ-22 · YJ-2 · CJ-1 · DH-2000 · HN-2000 · YJ-91 · FL-7 · HY-3 (C-301) · FL-2 (C-101) · 3M-80MBE/E Moskit (SS-N-22) · 3M-54E/E1 Klub (SS-N-27) · C-302 · C-303 · YJ-1 · HD-1
Anti-ship subsonic		YJ-100 · YJ-62 (C-602) · YJ-8 (C-801) · YJ-82 · YJ-83 (C-802) · C-705 · C-704 · C-703 · YJ-7 (C-701) · FL-10 · TL-10A · TL-1A · FL-8 · TL-6 · TL-2 · FL-9 · SY-1 · HY-1 · SY-2 · HY-2 (C-201) · HY-4 (C-401) · XW-41	
Anti-tank guided	CM-501G · CM-501GA · <b>HJ-16</b> · HJ-12 · HJ-11 · HJ-10 · HJ-9 · HJ-8 · HJ-73 · 3UBK23-3 · J-202 · J-201 · 265-1		
Anti-submarine	CY-1 · CY-2 · CY-3 · CY-4 · CY-5 · CJ-1 · WS-3 ASW missile		

Surface-to-air (SAM)	Anti-satellite	DN-3 · DN-2 · HQ-19, SC-19, HQ-29 · HQ-26
	Anti-ballistic	DN-3 · DN-2 · HQ-19, SC-19, HQ-29 · HQ-26 · HQ-22 (FK-3) · S-300PMU-1 (HQ-15) · S-300PMU-2 (HQ-15) · S-300V (HQ-18) · S-400 · HQ-12 · FJ
	Anti-high-radiation emitter platform	FT-2000
	Long-range area defence	HQ-9 (FD-2000) · HQ-22 (FK-3) · S-300PMU-1 (HQ-15) · S-300PMU-2 (HQ-15) · S-300V (HQ-18) · Rif-M · S-400
	Medium-range area defence	HQ-16 (LY-80) · DK-10 · HQ-12 · FM-3000 · FK-1000 · S-75 (SA-2) & HQ-1/2/3/4
	Short-range point defence	HQ-7 (FM-80) · HQ-17 · HQ-10 (FL-3000N) · HQ-6 (LY-60) · HQ-61 · HQ-64 · HQ-6D · DK-9 · TY-90 · FN-6A (FB-6A) · CQW-2 · FLS-1 · FLG-1 · FLV-1 · FL-2000(V) · FL-2000(V2)/FLV-2 · FL-9 · TD-2000 · TD-2000B · TB-1 · <b>LY-70</b> · FB-10A · FB-10
Man-portable (MANPADS)	HN-6 · FN-16 · FN-6 · HN-5C · HN-5B · HN-5 · QW-18 · QW-11 · QW-4 · QW-3 · QW-2 · QW-1	

Air-to-surface (ASM)	Cruise	Long-range land attack	CJ-20 · CJ-10 · HN-1 · HN-2 · HN-3 · CF-2 · CF-1
		Short-range land attack	YJ-12 · YJ-22 · YJ-62 (C-602) · CM-802AKG · YJ-2 · KD-88 · YJ-63 (C-603) · KD-63 · CM-400AKG · CM-501GA · CM-502KG · YJ-1 · <b>AR-1</b> · C-704KD · C-705KD · YJ-7 (C-701) · C-703 · Kh-59 · Kh-29 · YJ-4 · CS/BBC5 · K/YBS500 · TL500 · QW-1 · TB-1 · <b>KD1</b> · <b>KD2</b> · <b>LMD-002</b> · <b>LMD-003</b> · <b>Sky Arrow</b> · <b>Sky Arrow 90</b> · <b>TBI</b>
		Anti-ship supersonic	YJ-12 · YJ-22 · DH-2000 · HN-2000 · YJ-2 · CM-400AKG · CJ-1 · YJ-91 · FL-7 · HY-3 (C-301) · FL-2 (C-101) · C-302 · C-303 · 3M-80MBE/E Moskit (SS-N-22) · 3M-54E/E1 Klub (SS-N-27) · YJ-1
		Anti-ship subsonic	YJ-7 (C-701) · YJ-100 · C-703 · C-704 · C-705 · TL-10 · TL-1 · TL-6 · TL-2 · YJ-6 (C-601) · YJ-61 (C-611) · YJ-8K (C-801K) · YJ-82 · YJ-83 (C-802)
		Anti-radiation	CM400AKG · LD10 · YJ-12 · YJ-91 · FL-7 · YJ-5 (HQ-61) · Kh-31P
	Anti-tank guided	<b>AG300</b> · <b>AR-1</b> · <b>AKD-10 (BA-7/LJ-7)</b> · <b>AKD-9 (BA-9/LJ-9)</b> · CM-502KG · HJ-9 · HJ-8 · HJ-73 · TB-1	
Guided bombs	CM-506KG · FT series · TD series (TD500-ER) · LS series · CS/BBC5 · K/YBS500 · TL500 · YZ-100 series · YZ-102 series · YZ-200 series · LT series · GB-1 · TG-100/250/500/1000-ER · <b>ZD1</b> · KAB-1500Kr · KAB-500Kr		

- (b) The Southern Theater Command has the most missile bases and deploy the latest longer range high accuracy ballistic missiles that are capable of carrying a nuclear warhead.
- (c) Admittedly, GCI radars and all forms of radars can detect a ballistic missile at its terminal phase but by then, the probability of any intercept by a SAM system is near zero. Only certain interception systems like the S400 or S500 could intercept China’s incoming missiles. The S-500 “Prometey” is a Russian hypersonic surface-to-air missile/anti-ballistic missile replacing the A-135 missile system currently in use, and supplement the S-400 interceptors.

Southern Theater Command	62	<b>Headquarters</b>			Kunming, Yunnan
		621	六十二基地621旅	DF-21 or DF-21A	Yibin, Sichuan
		622	六十二基地622旅	DF-31A	Yuxi, Yuannan
		623	六十二基地623旅	CJ-10	Liuzhou, Guangxi
		624	六十二基地624旅	DF-21C/D	Danzhou, Hainan
		625	六十二基地625旅	DF-26 or DF-21	Jianshui, Yunnan
		626	六十二基地626旅	DF-26 or DF-21	Qingyuan, Guangdong
	627	六十二基地627旅	DF-17	Jieyang, Guangdong	
	63	<b>Headquarters</b>			Huaihua, Hunan
		631	六十三基地631旅	DF-5B	Jingzhou, Hubei
		632	六十三基地632旅	DF-31AG	Shaoyang, Hunan
		633	六十三基地633旅	DF-5A	Huitong, Hunan
		634	六十三基地634旅	Potentially DF-41	Tongdao, Hunan
635		六十三基地635旅	CJ-10	Yichun, Jiangxi	
636	六十三基地636旅	DF-16	Shaoguan, Guangdong		

4.3. Given these facts, the investments in the procurement of GCI radars, AEW&C systems, air-defense missiles, and the enlargement of the TNI AU MRCAs and missile stockpile are inevitable for the national survival of Indonesia. While Indonesia maintains a constructive trading relationship with China, there is an unequal relationship in terms of the military. China’s military dominates the region now and the TNI’s capabilities need to be upgraded. There is no other way to see this. The information within this paper has concluded that the only way to fend off the threat from the PLA(N) and PLA(NAF) is to enhance air situational awareness support for the TNI AU pilots.

“If your enemy is secure at all points, be prepared for him. If he is in superior strength, evade him. If your opponent is temperamental, seek to irritate him.”<sup>36</sup>

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