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ACQUISITIONS OF THE REPUBLIC OF KOREA ARMED FORCES

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FOR CENTURIES, the Korean peninsula has faced a constant tussle of power. Several dynasties and empires have ruled over this land in centuries past. In the ancient ages, the Gojoseon Kingdom in northern Korea was rivalled by the rise of the Jin confederacy of statelets in the south. Strife in the north led to the demise of the Gojoseon, now replaced by the Han dynasty – the Chinese. Around the first-century anno domini, the Peninsula was ruled over by three kingdoms - Goguryeo, Baekje, and Silla – until they were united in the sixth century. However, a consistent decline of influence led the united kingdom into a power vacuum, resulting in the fragmentation of the state and the subsequent return of the three later kingdoms – Balhae/Baekje, Silla, and Goguryeo – for a brief period. Around that time, the Goryeo dynasty was established after uniting the three kingdoms once again, ruling from the tenth century to the fourteenth. During this time, the united kingdom faced several invasions at the behest of the raging Mongol hordes. Several centuries later, the Joseon dynasty would cement itself as the sovereign of Korea. Their reign witnessed the creation of today's Korean alphabet (Hangul), the establishment of codified laws, civil service and the implementation of numerous administrative, social, scientific, and economic reforms. Moving ahead to the sixteenth century, the Joseon kingdom is faced with several Japanese attempts at invading Korea. The Koreans aligned themselves with the Ming dynasty in China to fend off these invasions. While some success is won, the Joseon dynasty, too, begins to crumble, losing power and sovereignty to unequal European treaties, unwilling to modernise alongside the world; eventually, the Joseon dynasty would fall – signing in 1905 a protectorate treaty, ultimately leading to its annexation by the signatory party – the Imperial Japanese.

The Japanese rule over the peninsula and in parts of Manchuria fermented the spread of nationalism, leading in 1919 to the creation of the Provisional Government of the Republic of Korea. The KPG – as it was abbreviated – received support from the likes of the Soviet Union, France and the Kuomintang in China. Post the horrific events and the end of the second world war in Asia, in August 1945, the KPG returned to Korea, after operating for decades from Chinese soil. The Korean Peninsula, while liberated from Japanese rule, had now come under the whelm of the two superpowers of the world who split the region along the 38th parallel – the Americans and the Soviets, with influence in the south and the north, respectively. The KPG was dissolved and in 1948, the Republic of Korea was conceived in the South, under the leadership of President Syngman Rhee. Around the same time, the Soviets and the Chinese had successfully enabled Kim Il-Sung – the leader of the Workers Party of Korea – to cease power through elections in the North, despite UN plans to conduct elections throughout Korea. In 1950, a war to unify the two Koreas would break out, coming to a halt in the summer of 1953 with the signing of an armistice. The three years of bitter fighting saw the deaths of over 5 million people – civilian and military. Peace was only declared in April 2018, as part of the Panmunjom Declaration for Peace, Prosperity and Reunification of the Korean Peninsula, signed and adopted by the leaders of the two countries – Kim Jong Un and Moon Jae In.

BACKGROUND

The heat of war on the Peninsula may have subsided back in 1953, but it never truly faded away. The threat of breaking out of hostilities has always remained high. In the 1960s, North Korea adopted an approach called "all-fortressization," which essentially centres around nationalistic and militaristic sanctity and security of the state[1]. The North's military-first attitude has also made its leadership more hostile towards the South, the Japanese and the Americans, all of whom play an active role in the region. The most lethal variable that is to be fitted into the Korean equation is North Korea's nuclear programme. An attitude that has been prevalent in the country since the 1980s has been that "we (North Koreans) may starve to death, but we will develop nuclear weapons".

In 2003, the six-party talks were launched in a bid to curb the North's nuclear aspirations, but in 2006, that came crashing down with the country's first nuclear test, involving the underground detonation of a plutonium-based device. This test was followed by the unanimous passage of Resolution 1718 by the UN Security Council stipulating the imposition of economic and commercial sanctions – further starving a malnourished nation. Since then, North Korea has conducted several tests – for missiles, nuclear devices, as well as hydrogen bombs – all of which have been followed by further sanctions and embargoes.

Pyongyang's possession of such weapons of mass destruction is and will continue to remain an existential threat to Seoul, lying within minutes' reach of their missiles. Given the unpredictability of the rogue state that the Democratic People's Republic of Korea is, the Republic of Korea in the south barely has any options on its plate other than hoping for the best and preparing for the worst.

The Republic of Korea Armed Forces – with one of the largest standing military forces in the world – is the prime establishment for maintaining the sovereignty and territorial integrity of the state. The military force boasts a strength of around three million personnel, being one of the few countries still enforcing mandatory military service by its citizens. To achieve national security objectives and defence objectives, the Ministry of National Defense defined the basic directions of the national defence policy[2]:

[1] Ramani, S. (2016, February 18). These 5 things help make sense of North Korea's nuclear tests and missile launch. Retrieved from The Washington Post: https://www.washingtonpost.com/news/monkey-cage/wp/2016/02/18/these-5-things-help-make-sense-of-north-koreas-nuclear-tests-and-missile-launch/

[2] Ministry of National Defense, Republic of Korea. (n.d.). About MND. Retrieved from Ministry of National Defense, Republic of Korea: https://www.mnd.go.kr/mbshome/mbs/mndEN/subview.jsp?id=mndEN_010300000000

- Establish firm national defence readiness
- Strengthen future-oriented independent national defence capabilities
- Develop the ROK-US Alliance and strengthen diplomatic cooperation in the field of national defence
- Contribute to the Korean Peninsula Trust Process by fostering military trust
- Innovative national defence management and invigorating the defence industry
- Foster an appropriate environment by instilling pride and value in military service

Despite the permanent American presence on the Peninsula, through the United States Forces Korea (USFK), the ROK Armed Forces began to build up a self-reliant defence and military capabilities in the 1970s, during Park Chung-Hee's Presidency. The South Koreans have also historically depended heavily upon the United States – for military operations, equipment procurement as well as allied aid. However, with Park Chung-Hee's plan for building a self-reliant military force for the Republic, the Defense Procurement Agency was established, which oversaw the transition of the ROK Armed Forces as one dependent on foreign equipment, to a self-sufficient one. Through the 1980s, rapid economic growth and modernisation supplemented the creation of a self-sufficient fighting force. By the 1990s, South Korean industries provided about 70 per cent of the weapons, ammunition, communications and other types of equipment, vehicles, clothing, and other supplies needed by the military[3]. While the indigenous Korean defence industry continues to be the largest contributor of equipment to the ROK Armed Forces, President Moon Jae-In during his state visit to Washington DC in 2019, announced the possible purchase of airborne systems with a price tag reaching USD 8.8 billion over the next five to six years[4]. But this isn't the only instance of modernisation of the ROK Armed Forces; the force will continue to rely heavily upon Korean-made equipment and platforms in the pursuit of the defence of freedom on the Korean Peninsula.

MILITARY MODERNISATION

In the year 2006, the Defense Acquisition Program Administration was established to administer defence acquisition and to carry out business-related activities directed at improving the defence capabilities, procuring military supplies and fostering the defence industry. This executive branch was set up to strengthen the transparency, efficiency, and expertise of the acquisition business, the

[3] Global Security. (2018, August 9). Ministry of National Defense. Retrieved from Global Security: https://www.globalsecurity.org/military/world/rok/mnd.htm

[4] Jeong, J. (2019, April 21). Inside South Korea's military wish list, as it seeks greater control over its forces. Retrieved from DefenseNews: https://www.defensenews.com/global/asia-pacific/2019/04/21/inside-south-koreas-military-wish-list-as-it-seeks-greater-control-over-its-forces/

Ministry of National Defense, Joint Chiefs of Staff, each branch of the military and the Defense Procurement Agency, altogether eight different institutions, closed down their separate defence acquisition structures discontinuing all related activities[5].

However, the Republic of Korea and its vast bureaucratic structures continue to witness a degree of non-transparency in the formulation of laws and regulations, which when combined with still-inadequate institutional "checks and balances" and a societal structure heavily based on personal ties can create opportunities and incentives for corruption and influence peddling[6]. Credit where it is due – since the establishment of DAPA, the efficiency of program management has greatly improved, streamlining processes beginning from determination of requirements to completion of the given program, also including planning and compilation of budget.

An important and probably among the most crucial actors in the modernisation of the ROK Armed Forces is the Korean industry. In the South, the Korea Defense Industry Association (KDIA), established in 1976, has played a centric role in the development, cooperation, and harmonization of the defence industries. The association of defence manufacturing conglomerates seeks to define its place in the global weapons industry by securing higher degrees of competitiveness. Members to the KDIA include, but not only:

- Daeji Precision & Industries
- Daewoo Group
- Dasan Machineries
- Doosan Group
- Hanjin Heavy Industries
- Hanwha Group
- Hyundai Group
- Kia Motors
- Korea Aerospace Industries (KAI)
- Korean Air
- Kovico
- Poongsan Corporation

[5] Defense Acquisition Program Administration. (n.d.). Introduction. Retrieved from Defense Acquisition Program Administration: http://www.dapa.go.kr/dapa_en/sub.do?menuId=412

[6] Global Security. (2011, July 11). Defense Acquisition Program Administration. Retrieved from Global Security: https://www.globalsecurity.org/military/world/rok/dapa.htm

- S&T Group
- Shinjeong Development
- Woonam Marine Craft

As was mentioned before, while the Armed Forces acquire foreign technology as well, predominantly from the United States, much of the equipment and platforms used by the Koreans are of Korean origin. Korean defence manufacturing industries engage in the research, development and production of several platforms in all domains of the modern defence environment – terrestrial, aerial, maritime (both surface & sub-surface) as well as space and cyber. The Republic of Korea Armed Forces have been over the past years and will continue to in the coming years, undergo rapid modernisation, running up to assuming wartime control of their military structure, taking over from the United States Korea Force[7].

In reaction to the growing regional threat that emerged from Beijing and the continued instability of North Korean ties, President Moon Jae-In decreed "Defense Reform 2.0" in July 2017. The reforms stipulate[8]:

- *Strengthen counter-asymmetric capabilities to include the nuclear threat from North Korea;*
- *Early return of wartime operational control based on a strong ROK-U.S. alliance;*
- *Strong drive toward civilian control of military affairs;*
- *Eliminate defence acquisition-related fraud and foster a defence industry in accordance with the fourth-generation industrial revolution;*
- *Marked improvement of addressing human rights issues and service conditions for soldiers.*

These reforms, over the years, are to be reviewed by a special committee formed by the executive, including the reorganisation of higher-command structures to promote a balance among the three branches. Among the core objectives of the plan, and the point of discussion of this paper will also include the modernisation of the equipment and platforms employed by the tri-services of the ROK Armed Forces.

[7] Jeong, J. (2019, April 21). Inside South Korea's military wish list, as it seeks greater control over its forces. Retrieved from DefenseNews: https://www.defensenews.com/global/asia-pacific/2019/04/21/inside-south-koreas-military-wish-list-as-it-seeks-greater-control-over-its-forces/

[8] Chun, I. B. (2017, October 31). Korean defense reform: History and challenges. Retrieved from Brookings: https://www.brookings.edu/research/korean-defense-reform-history-and-challenges/

REPUBLIC OF KOREA ARMY

The ROKA is the land-based operations branch of the Armed Forces. It is the largest among the three main branches of the military, accounting for about 420,000 active-duty personnel, including both conscripts and careerists. It stands guard along the 250 km long Demilitarized Zone (DMZ). While the border – officially the Military Demarcation Line[9] – itself is de-militarised to prevent the breakout of hostilities, the outer limits (4 km from MDL) of the DMZ are among the most heavily guarded borders in the world. The North Koreans, boasting a one million personnel strong ground force, usually have two-thirds of the entirety of its force garrisoned along the northern limit of the DMZ, at any given point of time.

In a bid to attain full wartime operational command and self-reliance in propelling any Northern invasive actions, the ROKA has undergone structural as well as platform modernisations and upgrades. Earlier, the ROKA's first line of defence was divided into two. The First ROK Army and the Third ROK Army protected the Eastern and Western Sections of the DMZ. The Second ROK Army complimented the other two groupings as rear support. The ROKA today has merged the two frontline groups to form only two main sub-organisations. The first is the Ground Operations Command (Formerly the First and Third ROK Armies), which forms the vanguard of defence along the entirety of the 250 km long DMZ. The Second ROK Army today serves as the Second Operations Command, continuing to provide support and operations in the rear lines and the southern coastlines.

The great, growling engine of change is technology, and the ROK is a hub of technological research & development in this part of the world. Technology alone can alter the course of combat. Technology along with skill can be a detrimental factor giving the edge to the holder. The biggest companies in the country are engaging in the rapid modernisation plans of the ROKA. Korean Industry not only manufactures for the needs and requirements of its fighting force but is also a global arms and equipment exporter. Korean industry's globally renowned technological capabilities are only to be matched with their attention to quality. As such, customers of Korean equipment are based in capital cities ranging from Oslo to Jakarta, Warsaw to Istanbul, and even New Delhi. With the modernisation of equipment, the Koreans are also earning a profit by selling units and transferring technologies to friends and strategic partners abroad. To this extent, several land-based combat and non-combat platforms have been developed.

[9] The Military Demarcation Line (MDL), sometimes referred to as the Armistice Line, is the land border or demarcation line between North Korea and South Korea. It intersects the 38th Parallel North, and does not run exactly along it.

K9 Thunder

Figure 1: The K9 Thunder is made in India by L&T as the K9 Vajra (Source: Hanwha Defense)

The K9 is among the world's most advanced self-propelled howitzers, manufactured by Hanwha Defense. It hosts a 52 calibre, 155 mm howitzer made by the Hyundai group, that is capable of firing a burst rate of 3 rounds in less than 15 seconds and a maximum rate of fire of 6 to 8 shells per minute, to a maximum distance of up to 50 km. For longer, sustained fire missions, it can fire 2 to 3 rounds per minute for one hour. At 47 tonnes, the K9 is as heavy as a main battle tank, and houses a 1,000 hp German MTU-made drivetrain, giving the forward artillery strike unit a maximum speed of 67 kmph and an operational range of 480 km[10].

The K9 has also over the years been modernised to the K9A1 variant, which comes with a host of improved features. It includes an auxiliary plant unit, modern GPS receivers and antennae, thermal cameras and digital displayers, surround environment cameras, automated fire control and management systems, as well as improved night-time operations capabilities.

Customers for this platform are global. India manufactures the K9 locally, with L&T Limited as the manufacturing partner. The deal will supply the Indian Army with 100 units of the Vajra, and will play a critical role in enhancing the capabilities of the Army's Strike Corps'. Other customers include Australia, Finland, Egypt, Estonia, Norway, Poland and Turkey.

[10] Hanwha Defense. (2019). K9 THUNDER SELF-PROPELLED HOWITZER. Retrieved from Hanwha Defense: https://www.hanwha-defense.co.kr/eng/products/firearms-system-k9.do

This platform was designed in the 1990s to provide a significant improvement to the South Korean Army's artillery capabilities. Its high mobility proves it to be a suitable platform to manoeuvre through the mountainous terrain of the Korean peninsula. The North has historically maintained an extremely strong presence along the DMZ, especially in terms of artillery, with over 5,000 pieces deployed along the 250 km border. The K9 Thunder gives the South Koreans a capability boost, given its high mobility and highly effective range. It is worthy to note, that the K9 has an effective firing range that is almost 16 km greater than its American counterpart – the M109 designed by BAE Systems.

K21 IFV

Figure 2: The K21 IFV with its airbags (Source: Hanwha Defense)

The K21 is an Infantry Fighting Vehicle designed indigenously in the Republic of Korea by Hanwha Defense. It hosts a 40 mm autocannon made by S&T Dynamics, capable of firing 300 rounds per minute, with rounds capable of penetrating 160-220 mm armour plating. The secondary weapon is a 7.62 mm coaxial machine gun. The IFV also hosts a third-generation indigenously developed Anti-Tank Guided Missile launcher, with performance similar to that of its Israeli counterpart – the Spike ATGM – penetrating up to 1000 mm armour plating. The K21 houses a Korean Doosan-made drivetrain, giving it 750 hp and a maximum speed of 40 kmph off-road and 70 kmph on tarmac, and an operational range of 500 km. The Korean IFV also boasts amphibious capabilities, with a speed of

7 kmph while traversing water bodies, comparable to the American M2 Bradley. It carries a crew of three, along with a troop of 9[11].

While most IFVs globally host amphibious capabilities, the Korean-made K21 has an edge over most competitors. It can deploy inflatable airbags while traversing water bodies to increase its floating stability. This enables the IFV to engage more freely in firing its armaments while amphibious, without the risk of submerging due to instability. This also means that it can carry additional load, compared to competitors. The platform is also integrated with a Battlefield Management System which enables the crew to be notified of developments and their surrounding environment in real-time. The IFV has not been exported to any other countries and is in use with the ROK Armed Forces. However, manufacturers claim the IFV to be "far superior in performance to other equipment of its kind produced in advanced countries, and is competitive in terms of price" and are "actively seek(ing) its export to the Middle East (West Asia), Southeast Asia and Latin America"[12].

The IFV will provide greater amphibious capabilities to the ROK Armed Forces. This platform will replace the K200 Armoured Personnel Carrier, with the K21 having greater combat capabilities. However, the Ministry of National Defense has also announced plans to develop a new platform – the K31 IFV. The current K21 weighs about 25 tonnes, the future K31 is planned to weigh not more than 20 tonnes to develop airborne capabilities.

[11] Hanwha Defense. (2019). K21 (Infantry Fighting Vehicle). Retrieved from Hanwha Defense: https://www.hanwha-defense.co.kr/eng/products/maneuver-k21.do#slide2

[12] Defense Industry Daily staff. (2017, February 27). Korea's K21 KNIFV. Retrieved from Defense Industry Daily: https://www.defenseindustrydaily.com/koreas-k21-knifv-05345/

Figure 3: The K808/806 APC is manufactured by Hyundai Rotem (Source: Hyundai Rotem)

The K808/806 is a family of 8×8 and 6×6 armoured personnel carriers, which entered service with the ROK Army in 2012. Like any other APC, its primary function is to move personnel from A to B under armoured protection. The Scorpion comes with a primary and secondary armament. The Primary weaponry can either be fitted with a 40 mm grenade launcher, or a 12.7 mm machine gun, both of which are operated remotely from within the vehicle. The platform can also support a two-man weapons turret, which can also host a 30 mm cannon in addition to other weapons. The secondary weapon is a standard 7.62 mm calibre machine gun. The K808/806 is powered by a 420 hp Hyundai engine, giving it a speed of more than 100 kmph and an operational range of 700-800 km. The APC also supports amphibious capabilities through its dual water-jet system, giving it a speed of about 10 kmph while traversing water bodies. It can accommodate 3 crew members including the driver, and up to 10 fully armed soldiers in the troop compartment[13].

The K808/806 was acquired by the ROK Army in 2017, to replace the ageing fleet of K200 APCs. Several variants of the Scorpion have been developed for special functional roles. Some such functional roles include medical evacuation, fire support, personnel carrier, self-propelled anti-aircraft gun carrier, command & control post, anti-tank/armour ops, as well as mortar carrier. The vehicle also

[13] Hyundai Rotem. (2014). Project Record: 8x8 WAV(K808, Infantry Combat Vehicle). Retrieved from Hyundai Rotem: https://www.hyundai-rotem.co.kr/Eng/Business/Machine/Business_Record_View.asp?brid=38

provides NBC grade protection, that is, protection in Nuclear, Biological and Chemical warfare environments and scenarios. As of now, no export requests have been received[14].

K2 Black Panther MBT

Figure 4: The K2 will eventually replace the K1 of the previous century (Source: Hyundai Rotem)

The South Koreans have been operating the M48 Patton Main Battle Tanks since the days of the cold war. Initially, the K1 was developed and began to roll out of factories in the 1980s to replace these ageing American-origin battle tanks. However, it was decided in the 1990s by the MoND to continue research and further develop a modern MBT to better suit the growing demands and requirements of the ever-evolving battlefield. The K2 Black Panther answered that call, and its production began in 2008. In 2014, the first two K2s were deployed with the ROK Army – 55 tonnes, 3-man operated main battle tank. The initial batch of the Black Panthers began with the German-made MTU engine, but now makes use of the locally-manufactured S&T Dynamics Doosan giving it 1,500 hp and, a maximum speed of 70 kmph on paved surfaces, 50 kmph cross-country and an operational range of about 450 km[15].

[14] Military Today. (2021). Rotem KW1 Scorpion. Retrieved from Military Today: http://www.military-today.com/apc/rotem_scorpion.htm

[15] Hyundai Rotem. (2019). Project Record: K2 MBT. Retrieved from Hyundai Rotem: https://www.hyundai-rotem.co.kr/Eng/Business/Machine/Business_Record_View.asp?brid=32

The Korean MBT comes with a lethal combination of armaments. It hosts a 120 mm 55 calibre smoothbore main gun, firing projectiles at targets up to 9.8 km away. The vast array of sensors, computing processors and technological assistance help the tank attain better accuracy and improve the chances of hitting the target significantly. Automated munition loading reduces the time for reloading shells – giving it a rate of 10 rounds per minute, as well reduces the required manpower. The secondary weapons include a 12.7 mm K6 heavy machine gun, based on the American Browning M2 .50 calibre machine gun. It also has a 7.62 mm standard machine gun for anti-infantry engagement. Like all modern MBTs, the Black Panther also makes use of smoke grenade launchers to use camouflage while engaging combatants[16]. The K2 also hosts an active protection system that can detect and deter incoming threats up to 150 m away from the tank, essentially against ATGMs. It includes both soft and hard kill options. Soft kill generally implies that anti-sensor countermeasures ensure that the ATGM misses the target. Hard kill implies that a computer processes and calculates the path of the incoming projectile and fires munition at it to detonate the incoming ATGM before it hits the MBT.

The ROK Army currently operates a fleet of over 2,000 main battle tanks. The Korean People's Army in the North operates a fleet of over 4,000 main battle tanks. However, much of the equipment used by the North is ageing, and the South's technological primacy gives it a fair chance – if not the edge – in a tank battle. Keeping the large number of tanks in mind, the South has also continuously expressed its interest to procure more of the domestically made Black Panthers to develop its armoured assault and defence capabilities. Other countries that have also expressed their desire to operate the South Korean beast include the Poles, the Turks, the Omanis and the Peruvians. Norway is also evaluating the K2 Black Panther as a competitor to the German-made Leopard A2 for future acquisition.

[16] Military Factory. (2021). Rotem K2 (Black Panther). Retrieved from Military Factory: https://www.militaryfactory.com/armor/detail.php?armor_id=289

KAI LAH (Project)

Figure 5: The KAI LAH is still in development, having made its maiden flight in 2019 (Source: KAI)

The ROK Army's rotary wing is composed of helicopters of American-origin, some from the 1960s and 1970s, such as the Bell UH-1 Huey, the AH-1 Cobra and even the McDonnell Douglas MD500 Defender. While there are more modern rotary-wing aircraft such as the Sikorsky UH-60 Black Hawk, the Boeing CH-47 Chinook, and the AH-64 Apache, the older generation takes up about 70 per cent of the total force. Of the total, ROK Army Aviation operates a minute fraction of attack helicopters – assets which can make a lot of difference in determining the outcome on the battlefield, given their ISR as well as combat capabilities.

Korean Aerospace Industries may have been founded only in 1999, but it has developed its way into becoming a major aerospace company in East Asia. It manufactures a variety of products ranging from transport helicopters such as the 'Korean Utility Helicopter' KUH-1 Surion to the Korea Space Launch Vehicle (KSLV-II). Furthering their abilities to manufacture as well as boosting national demands, KAI joined hands with Airbus to develop the KAI Light Armed Helicopter (LAH), based on the Airbus H155 platform. The LAH project aims to develop a cutting-edge armed helicopter suitable for the modern battlefield. KAI is also developing a civilian version – the LCH – based on the same European platform. Through the synergy of maximising commonality in subsystems and parts with the LCH, a joint manufacturing ecosystem will help support and sustain helicopter maintenance operations as well as spare parts manufacturing, thereby reducing costs[17].

The LAH – while still under development – took to the skies for the first time in 2019, with a high-powered twin turboshaft engine giving it a maximum speed of 325 kmph, an operational range of 985

[17] Korea Aerospace Industries. (2019). LAH: Light Armed Helicopter. Retrieved from Korea Aerospace Industries: https://www.koreaaero.com/EN/Business/LAH.aspx

km and a flight ceiling of 5,800 m[18]. The LAH will be armed with a 20 mm three-barrel Gatling gun and will support 70 mm rocket launcher pods. The four underwing weapons brackets will support pods capable of firing both guided and non-guided air-to-surface missiles with their real-time weapons control and aiming systems[19].

The only adversarial competitor that the North owns and operates is a fleet of roughly 20 ageing Russian-origin Mil Mi-24 Hind attack helicopters[20]. Considering their heavyweight and ageing technology, the South Koreans hold the winning edge in an air-to-air rotary-wing battle, as well as in supporting ground operations, given their superior technology and apparent manoeuvrability advantage (due to both weight and advanced engine technology). It will also give the south increased benefits in Army Aviation, being able to support more ground attack ops, close-air support, transport as well as scouting and ISR roles.

REPUBLIC OF KOREA AIR FORCE

The ROK Air Force serves as the prime aerial defence and warfare agency of the Ministry of National Defense. The ROKAF is operated by an estimated 65,000 active-duty personnel and is mandated with the surveillance of the enemy movement and indications, maintaining utmost combat readiness to ensure deterrence of war, and also ensuring victory during times of war. The Korean Air Defence Identification Zone stretches from the Yellow Sea to the West of the Peninsula to the Sea of Japan in the East, and down South to Socotra Rock at the conjunction points of the Yellow and East China Seas. While the ROKAF covers most of the KADIZ, it does not operate in its entirety. Threats are generally perceived to be predominantly from the Northern communist Air Force, but in 2018, the Chinese Air Force (PLA-AF) was also accused of violating Korean Air Space five times[21].

[18] Military Factory. (2021). KAI / Airbus Helicopters Light Armed Helicopter (LAH). Retrieved from Military Factory: https://www.militaryfactory.com/aircraft/detail.php?aircraft_id=1369

[19] Korea Aerospace Industries. (2019). LAH: Light Armed Helicopter. Retrieved from Korea Aerospace Industries: https://www.koreaaero.com/EN/Business/LAH.aspx

[20] Flight Global. (2021). World Air Forces 2021. Retrieved from Flight Global: https://www.flightglobal.com/download?ac=75345

[21] Panda, A. (2018, February 28). Chinese Fighter Violates South Korea's Air Defense Identification Zone. Retrieved from The Diplomat: https://thediplomat.com/2018/02/chinese-fighter-violates-south-koreas-air-defense-identification-zone/

Again, Seoul is attempting to regain wartime operational command from Washington DC; Korean defence under Korean leadership. All branches of the ROK Armed Forces are undergoing structural as well as fleet modernisation. Over the decades, the ROKAF has undergone several cycles of capabilities enhancement. Its initial operations during the Korean War were undertaken with the North American Aviation P-51 Mustangs. In the latter decades, the ROKAF would go on to procure other American-made models such as the North American Aviation F-86 Sabres and Northrop F-5E Tigers. The ROKAF in the 1960s and 70s also procured the icon of American power in the Vietnam war era – the McDonnel Douglas F4 Phantom, a capable and tested fighter-bomber. The South is continuing the modernisation of its air force. An air force is not only to include combat aircraft but also support aircraft which can enhance the performance of the frontline combatants. For this, several acquisitions are being actively made.

Lockheed Martin F-35 Lightning II

Figure 6: The first ROKAF F-35As were delivered in 2019 (Source: Lockheed Martin)

In the late 1990s, Washington proposed the 'Joint Strike Fighter Programme' (JSF) in a bid to research on and develop a new next-generation aerial combat platform; a programme in which several American allies would contribute. The resulting F-35 is currently among the world's most technologically advanced fighter jets; the crème de la crème of the aviation world. Expectations are high for this platform which is the result of a joint, global partnership in the research and development

of the aircraft. The Lightning II is poised to become the go-to combat jet in the coming decades, replacing several ageing aircraft across the worlds' air forces – whether it is Turkey or the United Kingdom. The ROKAF as of today operates 24 units of the Lightning II with 36 more on order[22]. It is the South's first step into fitting its aerial force with fifth-generation combat aircraft.

The Lockheed Martin F-35A is the variant chosen by the ROKAF – with conventional runway launch and retrieval capabilities. While the F-35B with VTOL capabilities, it was ultimately decided by the MoND and DAPA to go ahead with the conventional variant. Its maximum take-off weight (including fuel and munitions) is rated at 31 tonnes. It is powered by a Pratt & Whitney turbofan enabling it to reach supersonic speeds of up to 1,930 kmph, a flight ceiling of 15,000 m and an operational range of 2,200 km. Unlike most fourth-generation fighters, and like many designs of future, fifth-generation fighters, the Lightning II's munitions are all stored inside an internal bay, in the underbelly of the nimble aircraft, to house internally held weapons brackets and special mission equipment. This removes the need for external weapons brackets, which reduces its radar cross-section and improves the chances of conducting stealthy sorties. However, the F-35 can also support the installation of external pylons for mounting additional weapons if those carried within the internal bay do not meet mission requirements. The JSF can carry a vast array of munitions. It is fitted with an internal 25 mm automatic cannon, as well as support a similar frame on an external pod. It can support the launch of several missiles, such as anti-aircraft, air-to-air, air-to-surface, cruise missiles, as well as, glide bombs, guided and unguided (drop) bombs[23].

The F-35 will greatly enhance the ROKAF's air-to-air combat capabilities while also complimenting ground-attack capabilities with its ability to house most munitions used by the aerial combat force. Its smaller radar cross-section also improves its chances to remain undetected to enemy radar and detection facilities. It has a very good chance of remaining undetected while operating against the north. However, Chinese technological developments over the years in radar detection technologies have greatly improved. News reports are suggesting that the Chinese have developed an advanced radar that can detect stealth aircraft such as the F-35 and smaller drones. At the 2020 World Radar Expo in Nanjing, the YLC-8E was revealed, which is claimed to be able to detect "even the most

[22] Lockheed Martin. (n.d.). The F-35 Lighting II for Republic of Korea. Retrieved from F-35 Lightning II: https://www.f35.com/f35/global-enterprise/republic-of-korea.html

[23] Military Factory. (2019). Lockheed Martin F-35 Lightning II. Retrieved from Military Factory: https://www.militaryfactory.com/aircraft/detail.php?aircraft_id=23

advanced stealth aircraft", and that its high-definition feature is superior to foreign competitors[24]. However, this claim could soon be tested, given that other allied countries such as Singapore and Japan, alongside the United States are equipping themselves with the F-35 in East Asia.

KAI KF-21 Boromae (KF-X)

Figure 7: The KF-X is still under development (Source: KAI)

Korea Aerospace Industries recently unveiled the under-development KF-21 Boromae, which is being developed to replace the ageing fleet of F-4 Phantoms and F-5 Tigers in the ROK Air Force. The aircraft is being designed keeping in mind the future needs and requirements of the ROKAF on the Korean Peninsula, ensuring that the programme releases a platform that is future-ready and future-proof. The research and development project had its needs and requirements determined by the Joint Chiefs of Staff and the MoND back in 2002, and while it was considered to be extremely ambitious, it would play a massive role in advancing the development of the Korean defence industry. In 2015, Korea Aerospace Industries was chosen as the leading company for the project and concluded a

[24] Jain, A. (2021, April 25). China On-Course To Make 'Trillion Dollar' F-35 Jets Useless With Its Stealth Detecting Radars. Retrieved from EurAsian Times: https://eurasiantimes.com/is-chinese-pla-finally-getting-anti-stealth-radars-with-an-eye-on-us-f-35/#:~:text=China%20is%20all%20set%20to,that%20can%20detect%20advanced%20stealth.

contract for EMD (engineering, manufacturing, and development) programme with the MoND and DAPA[25].

Like the JSF, the KF-X project was opened to foreign partners such as Indonesia and Turkey. Each was to contribute to 20% of the cost of development, but Turkey decided to back out. KAI also teamed up with Lockheed Martin – the developer of the F-35 – for technological support. While the performance objectives of the KF-X are meant to be less than those of the F-35, it aims to achieve capabilities superior to those of the F-16 Falcon, the Dassault Rafale as well as the Eurofighter Typhoon. It is evident that the Boromae will be developed not only for the Korean and Indonesian Air Forces but also for export around the world. While several aircraft dominate the mid-range market, the KF-21 has the potential of shaking the industry. It will, however, continue to face competition from several other platforms such as those from Russia (Mig-35, Su-35), from China (J-10, J-11), Sweden (JAS-39), Europe (Rafale, Eurofighter) as well as America (F-16, F-15)[26]. The proposed end of the development period is stated as being June 2026, bringing the first deployments to the ROKAF by 2028.

The KF-X does indeed find design patterns to be similar to those of the F-35, thanks to the technological assistance KAI receives from Lockheed Martin. However, it is smaller in size and is designed to be much cheaper to operate than its American counterpart. The indigenous fifth-generation aircraft will be powered by two General Electric afterburning turbofan engines producing 22,000 lbs of thrust, giving the aircraft a top speed of a supersonic 2,500 kmph, a flight ceiling of 19,800 m and an operational range of 3,800 km – all specs that trump the Lightning II JSF. The Boromae will come with a standard 20 mm Gatling-style automatic cannon. Other munitions such as various missiles (other than cruise missiles) and guided and unguided bombs will be equipped in an internal bay, as well as six external weapons mounting hardpoints[27].

More features and its capabilities are yet to be known, given that the project is still under development. There are also proposals for the development of other variants such as one with a

[25] Korea Aerospace Industries. (n.d.). KF-X. Retrieved from Korea Aerospace Industries: https://www.koreaaero.com/EN/Business/KF_X.aspx

[26] Defense Industry Daily staff. (2017, November 21). KF-X Fighter: Korea's Future Homegrown Jet. Retrieved from Defense Industry Daily: https://archive.is/20180126193017/https://www.defenseindustrydaily.com/kf-x-paper-pushing-or-peer-fighter-program-010647/

[27] Military Factory. (2021). KAI KF-21 Boromae (KF-X). Retrieved from Military Factory: https://www.militaryfactory.com/aircraft/detail.php?aircraft_id=1035

single-engine, and the KF-X C200, which will make use of delta-wing structures and forward canards, similar to the Rafale. The failure of this project, however, could set the South Korean aerial and aerospace industry back several years, given the tremendously high-level state-of-the-art technologies involved, the ground shattering research and production costs with no guarantees of returns. It is important to note that the project is estimated to cost a whopping KRW 5.1 trillion[28].

RQ-4 Global Hawk UAV

Figure 8: Seoul has 4 Global Hawks on order (Source: Northrop Grumman)

As mentioned, the ROKAF is actively looking into further developing its intelligence, surveillance and reconnaissance capabilities. For this purpose, unmanned aerial vehicles (UAVs) are soon becoming the benchmark platform. Their ability to maintain flight for multiple hours at a stretch, without the human factor of fatigue enables them to carry out ISR operations more optimally. UAVs and unmanned combat aerial vehicles (UCAVs) offer a less stressful and safer environment for operators, which can make a world of difference to its remote pilots, improving decision making in times of need. The Global Hawk UAV is a prime platform for such missions. It can sustain flight at high altitude for over 30-hours, capturing real-time imagery and information in all weather conditions,

[28] Defense Industry Daily staff. (2017, November 21). KF-X Fighter: Korea's Future Homegrown Jet. Retrieved from Defense Industry Daily: https://archive.is/20180126193017/https://www.defenseindustrydaily.com/kf-x-paper-pushing-or-peer-fighter-program-010647/

round the clock. The Global Hawk is capable of supporting air and ground users with communications relay support through the Battlefield Airborne Communications Node, built-in in the EQ-4B variant[29].

The Global Hawk has enjoyed successful missions in volatile regions such as West and Central Asia, North Africa, as well as in the Indo-Pacific. It can be altered to suit the mandated requirements and can have various sensor payloads modified to gather the required information and intelligence. It can be used for security as well as scientific purposes, having been used actively by both the US Air Force as well as the National Aeronautics and Space Administration (NASA). For the ROKAF, the Global Hawk is a perfect platform that can be used for ISR sorties as well as extending lines of sight and communications. The Korean Peninsula has a very mountainous terrain which makes it difficult for radar stations to detect enemy movements. As such, ISR and AEW&C both will play a crucial role in the modernisation of the South Korean Air Force.

The RQ-4 is powered by an Allison-Rolls Royce turbofan engine that gives the UAV a respectable 650 kmph, at par with several airliners. It can fly as far as 22,224 km at a ceiling of 19,800 m. While the RQ-4 is the variant that the South has opted for, the Global Hawk has some other notable variants as well. The Germans have shown interest in the past to acquire the Global Hawk, for which the RQ-4E EuroHawk variant was being developed, with European reconnaissance systems. However, only one such unit was delivered, and future acquisitions were scrapped. The US Navy also requested the development of the MQ-4C Triton – the maritime variant of the same platform. In 2019, the first of four RQ-4 Global Hawks arrived at Sacheon Air Base.

[29] Northrop Grumman. (2021). Global Hawk: Vigilance for a Changing World. Retrieved from Northrop Grumman: https://www.northropgrumman.com/what-we-do/air/global-hawk/

AEW&C Aircraft

Figure 9: Boeing E-737 AEW&C aircraft flying with an F-15K, both of the ROKAF (Source: Boeing)

As has been discussed above, the ROKAF finds it to be essential for it to develop and modernise its intelligence, surveillance, target acquisition, and reconnaissance (ISTAR) capabilities. As part of these efforts, the Koreans plan on acquiring an undisclosed number of additional airborne early warning and control (AEW&C) aircraft and signals intelligence (SIGINT) platforms.

The ROKAF currently operates a fleet of four Boeing E-737 Peace Eye AEW&C aircraft – essentially retrofitted Boeing 737s. The DAPA has not made it official as of yet, but reports suggest that the Air Force is seeking to acquire two more of the same platform. Other than this, the South Koreans also make use of two Dassault Aviation Falcon 2000s, equipped with signals intelligence and electronic warfare suites. It could also be a possible contender in the unspecified acquisition plan, given that the ROKAF is already familiar with the French-origin platform. However, Soul could go either way, with the possibility of filing a formal request for proposals, with active competition from other contenders such as Saab, Embraer and Israel Aerospace Industries. The procurement of such platforms comes as

a means to "minimise potential surveillance gaps amid growing security threats by neighbouring countries"[30].

The current Boeing E-737 in service with the ROKAF is capable of acting as a force multiplier for the entire military, across all three services. Its interoperability with various platforms multiplies the effectiveness of the entire force. It is capable of connecting, transmitting information and relaying communications to land forces, maritime assets, theatre missile and aerial defence systems, other aerial assets (including UAVs), through links capable of connecting via satellite-borne wideband global communications systems[31]. Based on the Boeing 737-700 commercial airliner airframe, the Peace Eye delivers a maximum speed of 955 kmph, powered by two CFM International turbofans. It can operate at a flight ceiling of 12,500 m and cover an operational range of 7,000 km[32]. It is used by not only the ROKAF but also by the Royal Air Force, the Royal Australian Air Force (where the platform is called the 'Wedgetail') and the Turkish Air Force.

REPUBLIC OF KOREA NAVY

The Republic of Korea Navy serves as the premier maritime defence agency of the Ministry of National Defense and the Republic of Korea. The service also commands the Republic of Korea Marine Corps – the amphibious warfare force, also engaged in rapid reaction and strategic reserves, other than littoral combat. The ROK Navy is the second-largest force of the ROK Armed Forces, operating with a personnel strength of roughly 70,000, including about 29,000 in the Marine Corps. The force operates a fleet of 150 commissioned vessels, and 70 fixed-wing and rotary-wing aircraft. The ROKN was established in 1945 and played a key role in the Korean War, having conducted notable and important missions such as Operation Chromite – which would turn the tide of the war in favour of the United Nations Force and the Western allies, resulting in the recapturing of Seoul from the communist North. The Navy has structured itself into three fleets, one each to the seas to the east,

[30] Kim, D. Y. (2020, June 26). South Korea approves plans to acquire more AEW&C and SIGINT platforms. Retrieved from Janes: https://www.janes.com/defence-news/news-detail/south-korea-approves-plans-to-acquire-more-aewc-and-sigint-platforms

[31] Boeing. (2020). Airborne Early Warning & Control. Retrieved from Boeing: https://www.boeing.com/defense/airborne-early-warning-and-control/

[32] Military Factory. (2021, January 6). Boeing E-7 Wedgetail. Retrieved from Military Factory: https://www.militaryfactory.com/aircraft/detail.php?aircraft_id=1852

west and south of the Korean peninsula. The First Fleet operates out of Donghae in the East, along the Sea of Japan. The Second Fleet sails out of Pyeongtaek in the West, along the Yellow Sea. The Third Fleet is headquartered at Mokpo in the South, with the East China Sea, Jeju and Korea Straits its domain of operations. The ROKN in very crisp words defines its mandate of operations into two categories: during peacetime and wartime:

In peacetime, the Navy is mandated to ensure that it conducts show of force through various exercises and patrols to deter enemy aggression, as well as to conduct patrol operations in adjacent maritime domains to prevent enemy unconventional warfare forces from infiltrating ROK territory. It is also given the task of conducting maritime patrols to protect Sea Lane of Communication (SLOC) and navigation of merchant ships, to protect marine resources within the economic zone, and prevent terrorism-at-sea and illicit commercial activities, to conduct all-weather patrol near disputed islands and surveillance and clearance activities to prevent sea contamination within the economic zone. The ROKN also participates in Peace-keeping Operations (PKO) as a member of the United Nations, attend multilateral security cooperation exercises such as RIMPAC, and elevate national prestige through port-visits to friends and strategic partners[33].

During times of war, the ROKN is to strike the enemy in the flank and rear coasts with a strategic landing and conduct naval gunfire, guided-missile attack and special warfare on enemy key command and control facilities and military installations and key strategic targets. It is also to search and destroy enemy combat forces by employing surface combatants, maritime aircraft and submarines to deny enemy maritime activities and secure our maritime activities. For the protection of Koreas SLOCs that are critical to national prosperity, the ROKN must search and destroy enemy submarines and escort shipping with ASW ships, submarines, and ASW aircraft[34].

The ROKN is attempting to develop itself into a world-class naval force, with the capability of not only a brown and green water force but also as a deep-sea going blue navy. For furthering this intent, the Navy has been developing and commissioning several new projects of varying classes and displacements. New vessels of the ROKN have tonnage ranging from as small as 2,300 tons to as big and heavy as 20,000 tons.

[33] Republic of Korea Navy. (2016). Mission & Function. Retrieved from Republic of Korea Navy: http://www.navy.mil.kr/mbshome/mbs/eng/subview.do?id=eng_010300000000
[34] Ibid

Dokdo class Amphibious Assault Ship

Figure 10: ROKS Dokdo docked at the Jeju Naval Base, February 2016 (Source: ROK Navy)

While it does not operate any aircraft carrier, the ROKN inducted into active commission the Landin Platform Helicopter (LPH) vessel ROKS Dokdo, in 2007. Expanding its blue-water forces, the Dokdo-class amplifies the ROKAF's amphibious capabilities for operations on both the Korean peninsula and abroad. The first vessel of the class is named Dokdo, while the second one currently under construction is to be named the Marado, and the third is planned as being Baengnyeong[35].

The Dokdo-class has revolutionised the ROKAF's capabilities in a vast field of operations. It acts as central command and control platform guiding overseas deployments, peacekeeping operations, disaster recovery, counter-terrorism operations and of course the enforcement of national maritime policies and objectives. The Dokdo-class is capable of supporting three-dimensional landing operations, that is, supporting landings through the use of aerial, land (amphibious) and maritime (boats and hovercraft) platforms. The well-deck of the vessel can be submerged to permit the smoother deployment and operation of landing craft from within the belly of the ship. Since the activation of the first vessel of the class in 2007, it has gone on to be designated the flagship of the Rapid Response Fleet. The South Korean Navy plans on further setting up two more similar fleets with the commissioning of its two sister vessels in coming years.

[35] Naval Technology. (2021). Dokdo Class Landing Platform Helicopter (LPH). Retrieved from Naval Technology: https://www.naval-technology.com/projects/dodko-class/

At full load, the largest vessel in the ROKN weighs in at 18,000-ton displacement, carrying with it 700 marines, ten trucks, six tanks, six AAVs, three field artillery pieces, ten helicopters and two LCACs (landing craft air-cushioned - hovercraft). It is supported by a standard crew of 330 sailors and officers[36]. The vessel itself sails at 18-23 knots, with an operational range of a little over 16,000 km. For self-defence, the vessel is armed with standard Goalkeeper Close-In Weapons Systems, and also the RIM-116 Rolling Airframe Missile System, essentially a surface-to-air missile with a nominal range of 9 km radius[37].

Amphibious warfare has historically played a detrimental role on the Korean peninsula, with its hundreds of islands and islets scattered all along its coastline. Operation Chromite, led by General Douglas MacArthur in 1950 has often been referred to as one of the most successful amphibious invasions in military history, resulting in the allied recapture of Incheon and Seoul from the occupying North Korean forces. Both Koreas to this day continue to share tense situations along the DMZ, as well as the several bordering, sometimes disputed, islands and islets. The Korean peninsula is a hilly terrain with several mountains covering a vast area of the peninsula. At times, manoeuvring on land can be a tricky challenge. Optimal military thought and leadership can make use of local topography to their advantage, as natural fortifications. In such cases, maintaining a strong amphibious capability can well pose as a trump card in the eventuality of war, enabling the attacker to use the maritime route instead of terrestrial, thereby broadening the scope of operations.

[36] Naval Technology. (2021). Dokdo Class Landing Platform Helicopter (LPH). Retrieved from Naval Technology: https://www.naval-technology.com/projects/dodko-class/

[37] Military Factory. (2020, April 6). ROKS Dokdo (LPH-6111). Retrieved from Military Factory: https://www.militaryfactory.com/ships/detail.php?ship_id=roks-dokdo-lph6111-amphibious-assault-ship-south-korea

Dosan Ahn Changho class submarine

Figure 11: The Dosan Ahn Changho takes the same name as that of its class (Source: Daewoo Shipbuilding and Marine Engineering)

The South Koreans have historically been importers of submarine technology, having procured several German designs such as the Sohn Wonyil class – the Korean-made German-origin Type 214 Diesel-Electric submarine. However, the transfer of technology has also meant that South Korea's defence industry has for long been involved in the submarine construction business, manufacturing not only for domestic naval requirements but also for export.

The Dosan Ahn Changho class's first submarine of the same name was launched in 2018, as part of the Korean Attack Submarine Programme (KSS). The programme that kicked off in the 1980s can be said to have had three different phases, each of which were designed to meet the determined needs and requirements as defined by the ROK Navy. KSS-I in the early years of the programme saw the acquisition of the Jang-Bogo class – the Korean variant of Type 209 diesel-electric 1,200-ton attack submarine designed and developed by Howaldtswerke-Deutsche Werft (HDW) of Germany. KSS-II saw the commencement of construction of the HDW designed 1,800 ton Type 214 Diesel-Electric attack submarine for the Korean Navy. KSS-III is the last part of the programme and has involved the indigenous development of the 3,000-ton Dosan Ahn Changho-class.

The indigenously designed and developed Korean submarine is the epitome of the efforts of the Korean Attack Submarine Programme; having over the decades helped develop the local industry to engage not only in manufacturing but also in the research and design behind it. Overall expertise in the field of maritime engineering and naval architecture has also brought the Republic of Korea to the top of the charts in shipbuilding in the world. The ROKS Dosan Anh Changho – first of the same class – was launched in 2018 and has been actively undergoing several phases of trials. It will later be joined by sister vessels: the ROKS Son Byong Hi, ROKS Yi Dong Nyeong. There are also plans for the construction of a fourth – the ROKS Lee Bong Chang[38].

The Korean attack submarine is manned by a crew of 50 sailors and officers. Powered by indigenously developed high-performance fuel cells, the air-independent propulsion diesel-electric low noise power plant delivers a surface speed of 12 knots, submerges speed of 20 knots and an operational range of a little over 18,500 km[39], operating without dependence on access to atmospheric oxygen which is usually a necessity for non-nuclear powered submarines. The success of the performance of the fuel cell technology used in the class is said to far exceed the requirements of the ROKN. The fuel cell enables the submarine to stay submerged with enduring stealth and survivability for long durations, bringing its technology to be second only to that of HDW in Germany. Yoo Su-Joon, senior managing director of Daewoo Shipbuilding & Marine Engineering's special ship division is commenting on this key achievement:

"It's a great achievement that the Dosan Ahn Changho has proven its ability to dive underwater for the longest time thanks to the AIP. We hope that the remaining trial runs will be completed successfully, and we will be able to deliver a medium-sized submarine of the world's highest quality, originally designed by Korea, to contribute to national security"[40].

The class is also being developed in two separate batches. The first batch including the current Dosan Ahn Changho will be succeeded by a second batch, with greater strategic and tactical capabilities as defined by the Navy. Currently, the submarine possesses the ability to launch torpedoes through its six

[38] Military Factory. (2020, July 4). ROKS Dosan Ahn Chang-ho (SS-083). Retrieved from Military Factory: https://www.militaryfactory.com/ships/detail.php?ship_id=roks-dosan-ahn-chang-ho-diesel-electric-submarine-south-korea

[39] Ibid

[40] Gain, N. (2020, December 10). ROK Navy KSS III Submarine Program Reaches Another Milestone. Retrieved from Naval News: https://www.navalnews.com/naval-news/2020/12/rok-navy-kss-iii-submarine-program-reaches-another-milestone/

launch tubes, while also supporting anti-ship missiles from vertical launch tubes, including cruise missiles as well as ballistic missiles[41].

Development in submarine capabilities is critical to advancing South Korean sovereignty and security on the high seas. Modern technologies are increasingly rendering large surface combatants such as aircraft carriers redundant, given the development of carrier-killer missiles. While China is far ahead in the technological race in several fields of weapons technology, the major threat that Seoul faces is from the Korean People's Army's submarine fleet in the North. Like most of its military, the submarines that the North makes use of are also beyond outdated. However, the communists are reported to have a submarine fleet of over 70 sea-going submarines, alongside midget and coastal submarines. As such, in a head-to-head confrontation, the North Korean submarine stands little chance against its technologically superior South Korean counterpart. This gives Seoul reason to believe that the North Koreans are most likely to engage in swarming their large fleet of submarines. Fears of North Korean submarines also remains high due to the 2010 incident in which a North Korean submarine sank the ROK Navy corvette ROKS Cheonan, which led to the death of 46 sailors. Coastal submarines can also be employed by North Korean special forces for behind-the-lines incursions into the Republic of Korea[42]. While submarines are being purchased, the ROKAF is also actively looking into other anti-submarine warfare platforms.

[41] Military Factory. (2020, July 4). ROKS Dosan Ahn Chang-ho (SS-083). Retrieved from Military Factory: https://www.militaryfactory.com/ships/detail.php?ship_id=roks-dosan-ahn-chang-ho-diesel-electric-submarine-south-korea

[42] Fuhrman, E. (2021, June 3). North Korea's Deadly Submarine Fleet Is One Of The World's Largest. Retrieved from 1945: https://www.19fortyfive.com/2021/05/north-koreas-deadly-submarine-fleet-is-one-of-the-worlds-largest/

Daegu class Guided Missile Frigate

Figure 12: The first of class in the FFX-II program – ROKS Daegu - was successfully delivered to the Korean navy and the second ship is under construction in DSME (Source: Daewoo Shipbuilding and Marine Engineering)

While sub-surface combatants can play a key role in maritime operations, surface combatants such as corvettes, frigates and destroyers play a centric role in the assertion of military might and power. These can be engaged in a vast variety of operations, far greater than a submarine. The Future Frigate Experimental Programme (FFX) was launched in the 2000s to replace the existing and ageing fleet of frigates in the Navy, to optimise the South's naval capabilities for future maritime warfare.

Like the KSS programme, the FFX programme also set about two batches of vessels. The first batch that emerged from this programme was the Incheon-class of frigates at a 2,300-ton rating. The second batch – the Daegu-class frigate – is essentially an improvised variant of the existing Incheon class. The hull of the Daegu class is reported as being larger than that of the Incheon class, but its superstructure is designed for minimising radar cross-section[43], reducing chances of detection and increasing stealth capabilities.

At a rating of 3,500 tons, the Daegu is powered by a Rolls-Royce gas turbine, four diesel engines and two electric motors on two shafts. It helps the frigate travel up to 8,000 km at a maximum speed of 30 knots. It is armed with a variety of weapons systems, run by a crew of 140 sailors and officers. The

[43] Naval Technology. (2021). FFX-II (Daegu Class) Multi-Role Frigates. Retrieved from Naval Technology: https://www.naval-technology.com/projects/ffx-ii-daegu-class-multi-role-frigates/

primary deck gun is a 5" 127mm naval gun firing projectile munition. Like all modern warships, it hosts missile capabilities: a 16-cell Korean-vertical launch system (KVLS) that supports cruise missiles, anti-ship missiles and surface-to-air missiles. It also has twin quadruple launchers that can launch anti-ship missiles, along with twin-triple tubed torpedo launchers. The vessel is defended by a 20 mm CIWS Gatling gun[44].

The Ship is designed to engage in a vast variety of operations including anti-air warfare, anti-submarine warfare, patrolling, EEZ protection, search and rescue and transport. Its shallow draught enables it to provide close-to-shore operations capability, which can also be a major boost to the ROKAF's amphibious capabilities. The Daegu like most frigates also hosts a helipad along with a hangar that can support the ROKN's Westland Super Lynx and Augusta Westland AW159 multi-purpose helicopters, which usually serve as ISR and ASW platforms.

DEFENCE SYSTEMS

Seoul – through these aforementioned platforms – has looked into considerably increasing its offensive capabilities. These systems can and will be used in defensive operations as well. However, the major threat that the southern half of the Korean peninsula must focus on countering is the threat of the nuclear-capable ballistic missile.

During President Moon Jae-In's visit to the United States in 2017, President Trump had revealed that the South Koreans were willing to purchase a 'tremendous amount' of military equipment from the Americans. A year before this, former President Park Geun Hye requested the USFK to deploy the reputable Terminal High Altitude Area Defense system – better known as THAAD – on the Korean peninsula. While incoming President Moon Jae In protested the decision, he would be supportive and even accelerate the decision upon entering office. Both the Americans and the South Koreans see eye-to-eye on the fact that the THAAD system remains critical in ensuring peace and prosperity in the region, given North Korea's wavering and turbulent promises, as proven through missile tests from time to time. Seongju County – south of Seoul – currently hosts the THAAD system on the peninsula, operated by USFK personnel. This system, however, is not mandated to defend the largest city and

[44] Military Factory. (2020, June 4). ROKS Daegu (FFG-818). Retrieved from Military Factory: https://www.militaryfactory.com/ships/detail.php?ship_id=roks-daegu-ffg818-guided-missile-frigate-warship-skorea-navy

capital of Seoul. For the defence of Seoul against incoming missiles, the Republic of Korea Army purchased the MIM-104 Patriot (Phased Array Tracking Radar to Intercept On Target) SAM, developed by Raytheon.

KOREA AIR & MISSILE DEFENSE (KAMD)

However, Seoul has also begun the development of an indigenous missile defence system. Masao Dahlgren of the Centre for Strategic & International Studies, in two separate updates from 2019 writes:

"On August 15, South Korea's Ministry of Defense announced it would spend about $240 billion on missile defence in the 2020-2024 period. Under the budget plan, the Blue House would acquire two ground-based early warning radars, three Aegis-equipped destroyers, and the Patriot Advanced Capability 3 Missile Segment Enhancement (PAC-3 MSE) missile defence system, all of which were previously confirmed in earlier procurement decisions. The proposal also called for deeper investment in indigenous systems, with updates and further development planned for the KM-SAM (Cheolmae-II) and L-SAM air defence missiles"[45].

Months after the announcement of the programme, the South Korean government began work on the research and development of a long-range capable missile defence system. In another update, Dahlgren writes:

"On December 4, South Korea began full-scale development of L-SAM, an indigenous surface-to-air missile. According to South Korea's Defense Acquisition Program Administration, the project is valued at $813 million and is scheduled for completion by 2024. Studied since 2014, L-SAM would comprise the long-range arm of Seoul's indigenous Korea Air and Missile Defense (KAMD) architecture, intercepting ballistic missiles in their terminal phase. L-SAM is planned to enter full-rate production by 2028"[46].

[45] Dahlgren, M. (2019, August 15). South Korea Funds Missile Defense Acquisition. Retrieved from Centre for Strategic & International Studies: https://missilethreat.csis.org/south-korea-funds-missile-defense-acquisition/

[46] Dahlgren, M. (2019, December 4). South Korea Begins Missile Interceptor Project. Retrieved from Centre for Strategic & International Studies: https://missilethreat.csis.org/south-korea-begins-missile-interceptor-project/

The KAMD is a three-tier missile defence system that includes the L-SAM, the KM-SAM (medium-range) and the short-range Patriot missiles, integrated into a single umbrella structure. It will consist of an early warning system, command and control system, alongside interception systems as listed above. It is also being nicknamed the "Korean style Iron Dome" by the Ministry of National Defense.

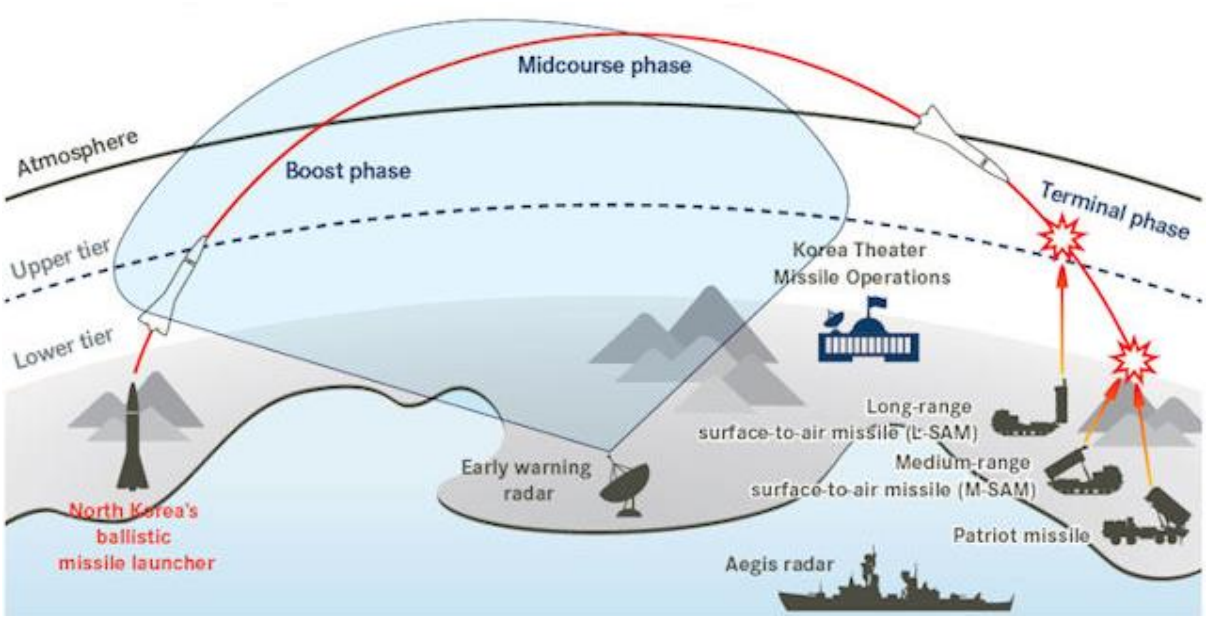

Figure 13: Conceptual layout of the Korea Air and Missile Defense System (Source: Global Security)

The early warning systems will detect enemy launched missiles with advanced radar systems such as the Aegis system and analyse the path, specifications, location and velocity of the missile along with other critical information at the Korea Theatre Missile Operations. The command and control structure will then deliver the mission details to the relevant battery which intercepts and neutralises the threat. Being a firm ally of the United States, KAMD will also receive intelligence reports from American early warning systems and satellites[47].

In April 2020, the DAPA announced that the deliveries of the Korean-made KM-SAM Block-1 system, with a range of 40 km, speed of Mach 4.5 and an operational altitude of 15-20 km, had been completed. Named the Cheongung SAM, each battery consists of three types of vehicles: a command-and-control centre, a multifunction radar, and four transporter-erector-launchers[48]. In November of the same year, the first battery of the upgraded KM-SAM Block-2 was completed. It has an increased

[47] Global Security. (2020, August 12). Korea Air and Missile Defense (KAMD). Retrieved from Global Security: https://www.globalsecurity.org/military/world/rok/kamd.htm

[48] Kim, D. Y. (2020, April 28). South Korea completes deliveries of KM-SAM Block-1 system to RoKAF. Retrieved from Janes: https://www.janes.com/defence-news/news-detail/south-korea-completes-deliveries-of-km-sam-block-1-system-to-rokaf

range of up to 50 km and an altitude of up to 20 km. Block 2 was developed with the active assistance of the Russian JSC Concern VKO Almaz-Antey, which assisted in the creation of a multifunctional radar and command post of the complex, as well as an anti-aircraft guided missile[49].

The L-SAM on the other side, being developed by the Hanwha Group will neutralise enemy missiles entering the atmosphere at an altitude of 40-60 km in the terminal phase. Plans are in place to enable future FFX-III batch warships with this anti-ballistic capability.

AEGIS SYSTEM

The KAMD project plans to include the Aegis System as well, which isn't new, but modern all the same. The term 'Aegis' is a Greek word, meaning shield, which as per mythology was carried by the ancient gods Athena and Zeus. Today, Aegis is a modern combat system that integrates a host of sensors, weapons and decoys providing unific command and control, enabling swifter response and reaction. It is a naval system fitted on several frigates and destroyers across Western-allied nations such as the United States, Australia, Japan and South Korea. While it can be used in anti-surface and anti-submarine warfare, it is most famously known for its high-grade anti-air capabilities. The Aegis system operates its radar arrays to scan and process material information. After having calculated the enemy projectile's path, the Aegis system launches 2-3 SAMs to ensure the neutralisation of one threat, both tracking the threat as well as guiding the interceptors at the same time. The system is among the most advanced and effective in the world, however, in extreme cases, some drawbacks may arise.

The Aegis system can support only a limited number of guidance channels. This means that in the case of swarm missile attacks, there might be a fraction of a chance that one missile may not be intercepted by Aegis beforehand. Though, most surface combatants today come equipped with their defence systems – CIWS – firing a Gatling gun with high RPM to destroy the incoming threat before impact at short-range. Several other factors and components come into play, in a war-like scenario. Multiple platforms are engaged in defending each other, while multiple platforms are also engaged in attacking each other. Several platforms are operated together to enhance all-around situational awareness. AEW&Cs systems and other platforms also provide intelligence to ensure the detection of

[49] Global Security. (2020, December 17). Cheolmae II / Cheongung (Iron Hawk) M-SAM Medium Surface to Air Missile. Retrieved from Global Security: https://www.globalsecurity.org/military/world/rok/m-sam.htm

all incoming threats, while computers are used to visualise data and improve electronic warfare capabilities. The Republic of Korea Navy operates the Aegis combat system on the Sejong the Great-class of guided-missile destroyers. It is also interesting to note that the Aegis system has been developed into shore facilities, providing capabilities of defending sovereign territory and airspace against enemy aerial operations. Such a system can act as inspiration for the further design and development of the architecture of the KAMD programme.

Korean operations of Aegis platforms, Patriot systems and THAAD give an edge in inter-operability in the missile and air defence eco-system. American systems and platforms are designed to ensure smooth communication so that each platform complements the other, without there being any major issues in the field of communication and coordination of actionable data and intelligence. This interoperability truly complements and supports the creation of an optimal and efficient Korean Air and Missile Defense system.

CONCLUSION

The Government of the Republic of Korea has made some great strides in working towards national defence. It is commendable how the government at a very early stage – compared to countries such as India – began to provide and better engage the private sector in the defence manufacturing industry. Over the years, the private sector in Korea has gone on to become the major contributor to Korean defence supplies and needs. It began with the transfer of technology and the manufacturing of foreign platforms and equipment in Korea. Today it has gone on to evolve its expertise in the domain to manufacture its forms and engage in the research and design that goes behind advanced systems and technologies.

The Korean government is known to have a difficult bureaucracy and is submerged in red-tapism. Efforts are being made to counter these drawbacks. The Defence Acquisition Program Administration established in 2006 is intended to streamline the process behind defence acquisitions and administering research programmes, with both domestic as well as international partners and agencies. In March 2021, DAPA revealed the Buy Korea Defense (BKD) plan, mandating the evaluation of the benefits that local research, development (R&D), production, and procurement programmes would provide to the domestic economy. The administration said that the plan was a policy directed toward prioritising *"domestic development when determining the acquisition method*

and related comparisons of domestic R&D and overseas purchases"[50]. Officials at DAPA are also quoted saying that the *"possibility of domestic R&D of weapons systems increases and opportunities for excellent domestic small and medium-sized enterprises to enter the global supply chain are expected to expand"*[51].

To sum up, this paper discussed several platforms across the three services of the ROK Armed Forces:

The ROK Army has engaged in the indigenous development and acquisition of platforms such as the K9 Thunder self-propelled artillery, the K21 infantry fighting vehicle, the K808/806 Scorpion armoured personnel carrier, the K2 Black Panther main-battle tank, and the KAI Light Attack Helicopter Project.

The ROK Air Force has engaged in the acquisition of Korean as well as foreign platforms such as the Lockheed Martin F-35 Lightning II as part of the Joint Strike Fighter programme, the KAI KF-21 Boromae (KF-X) project – in development alongside Indonesia, the RQ-4 Global Hawk ISR unmanned aerial vehicle and unspecified AEW&C aircraft, with an existing fleet of Boeing 737 AEW&C aircraft of the Peace Eye Initiative.

The ROK Navy has also engaged in the acquisition of indigenously developed platforms such as the Dokdo class amphibious assault ship, the Dosan Ahn Changho class attack submarine and the advanced Daegu class guided-missile frigate.

These platforms are not the only acquisitions being made by the ROK Armed Forces. There are also several other platforms, many of which the force already possesses, which complement these additions to the service fleets. Each platform discussed in this paper complements the others through optimal employment in joint operations.

The modern battlefield is indeed based on the learnings of the past. But it has also learned to prepare for the wars of the future instead of those of the past. Perhaps that is the reason that militaries across the world focus more on quality and optimal use of platforms, rather than quantity through increased production numbers and reduced durability. The world of warfare has evolved from fleets of hundreds of B-17s engaging in carpet bombing to the introduction of smart bombs, eliminating targets with

[50] Grevatt, J. (2021, March 12). Seoul reveals 'Buy Korea Defense' plan. Retrieved from Janes: https://www.janes.com/defence-news/news-detail/seoul-reveals-buy-korea-defense-plan
[51] Ibid

pinpoint accuracy. It has evolved from waves of infantry swathing objectives to the surgical insertion of fewer highly-trained troops to achieve mission objectives.

On the Korean peninsula too, the Republic of Korea has taken note of these, and many more, changes and developments. Keeping in mind the tough topography of the region, the South has engaged in actively improving its C4ISR[52] capabilities. AEW&C platforms play a detrimental role in the conduct of joint operations in several fields. They can not only detect enemy platforms and movements but also engage as a mobile command and control centre, coordinating in real-time with several other components on the battlefield – be it commanders at headquarters, commanders on the ground, main battle tanks, warships, submarines, other aerial units and even missile & air defence systems. As was mentioned before, every platform can engage in assisting and aiding the other with data and military assistance. All of this helps enable commanders to view every development taking place on a battlefield for which he or she now has the complete picture, in real-time. All of these platforms of today and the future help create this ecosystem that leads to better military planning and the optimised conduct of military operations.

In conclusion, the South has focussed a lot more on the modernisation of its armed forces and the development of futuristic technologies across multiple domains of military operations, needs and necessities. Unlike Seoul, Pyongyang has remained in a concrete position – in its past – continuing to depend upon outdated technology being used by hordes of soldiers – the massive standing army of the Korean People's Army. There are several reasons behind this – economic and human starvation for one, and the heavy price tag that came with the development of nuclear weapons. The nuclear programme is indeed an existential threat to the South. This threat has also motivated those south of the DMZ to engage in research and development, as well as acquire from abroad, technologies to build a three-tier (based on range) 'Korean-style iron dome' – the Korean Air & Missile Defense (KAMD) System. However, in a conventional war, while both sides suffer losses, the South inevitably has a better chance of victory given its advanced technological superiority. The platforms discussed in this paper only boost this capability, and ensure peace and prosperity, ensuring the defence of freedom on the Korean peninsula.

[52] C4ISR is an acronym which stands for Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance.

BIBLIOGRAPHY

Boeing. (2020). *Airborne Early Warning & Control*. Retrieved from Boeing: https://www.boeing.com/defense/airborne-early-warning-and-control/

Chun, I. B. (2017, October 31). *Korean defense reform: History and challenges*. Retrieved from Brookings: https://www.brookings.edu/research/korean-defense-reform-history-and-challenges/

Dahlgren, M. (2019, December 4). *South Korea Begins Missile Interceptor Project*. Retrieved from Centre for Strategic & International Studies: https://missilethreat.csis.org/south-korea-begins-missile-interceptor-project/

Dahlgren, M. (2019, August 15). *South Korea Funds Missile Defense Acquisition*. Retrieved from Centre for Strategic & International Studies: https://missilethreat.csis.org/south-korea-funds-missile-defense-acquisition/

Defense Acquisition Program Administration. (n.d.). *Introduction*. Retrieved from Defense Acquisition Program Administration: http://www.dapa.go.kr/dapa_en/sub.do?menuId=412

Defense Industry Daily staff. (2017, November 21). *KF-X Fighter: Korea's Future Homegrown Jet.* Retrieved from Defense Industry Daily: https://archive.is/20180126193017/https://www.defenseindustrydaily.com/kf-x-paper-pushing-or-peer-fighter-program-010647/

Defense Industry Daily staff. (2017, February 27). *Korea's K21 KNIFV*. Retrieved from Defense Industry Daily: https://www.defenseindustrydaily.com/koreas-k21-knifv-05345/

Flight Global. (2021). *World Air Forces 2021*. Retrieved from Flight Global: https://www.flightglobal.com/download?ac=75345

Fuhrman, E. (2021, June 3). *North Korea's Deadly Submarine Fleet Is One Of The World's Largest*. Retrieved from 1945: https://www.19fortyfive.com/2021/05/north-koreas-deadly-submarine-fleet-is-one-of-the-worlds-largest/

Gain, N. (2020, December 10). *ROK Navy KSS III Submarine Program Reaches Another Milestone*. Retrieved from Naval News: https://www.navalnews.com/naval-news/2020/12/rok-navy-kss-iii-submarine-program-reaches-another-milestone/

Global Security. (2011, July 11). *Defense Acquisition Program Administration*. Retrieved from Global Security: https://www.globalsecurity.org/military/world/rok/dapa.htm

Global Security. (2018, August 9). *Ministry of National Defense*. Retrieved from Global Security: https://www.globalsecurity.org/military/world/rok/mnd.htm

Global Security. (2020, December 17). *Cheolmae II / Cheongung (Iron Hawk) M-SAM Medium Surface to Air Missile*. Retrieved from Global Security: https://www.globalsecurity.org/military/world/rok/m-sam.htm

Global Security. (2020, August 12). *Korea Air and Missile Defense (KAMD)*. Retrieved from Global Security: https://www.globalsecurity.org/military/world/rok/kamd.htm

Grevatt, J. (2021, March 12). *Seoul reveals 'Buy Korea Defense' plan*. Retrieved from Janes: https://www.janes.com/defence-news/news-detail/seoul-reveals-buy-korea-defense-plan

Hanwha Defense. (2019). *K21 (Infantry Fighting Vehicle)*. Retrieved from Hanwha Defense: https://www.hanwha-defense.co.kr/eng/products/maneuver-k21.do#slide2

Hanwha Defense. (2019). *K9 THUNDER SELF-PROPELLED HOWITZER*. Retrieved from Hanwha Defense: https://www.hanwha-defense.co.kr/eng/products/firearms-system-k9.do

Hyundai Rotem. (2014). *Project Record: 8x8 WAV(K808, Infantry Combat Vehicle)*. Retrieved from Hyundai Rotem: https://www.hyundai-rotem.co.kr/Eng/Business/Machine/Business_Record_View.asp?brid=38

Hyundai Rotem. (2019). *Project Record: K2 MBT*. Retrieved from Hyundai Rotem: https://www.hyundai-rotem.co.kr/Eng/Business/Machine/Business_Record_View.asp?brid=32

Jain, A. (2021, April 25). *China On-Course To Make 'Trillion Dollar' F-35 Jets Useless With Its Stealth Detecting Radars.* Retrieved from EurAsian Times: https://eurasiantimes.com/is-chinese-pla-finally-getting-anti-stealth-radars-with-an-eye-on-us-f-35/#:~:text=China%20is%20all%20set%20to,that%20can%20detect%20advanced%20stealth.

Jeong, J. (2019, April 21). *Inside South Korea's military wish list, as it seeks greater control over its forces*. Retrieved from DefenseNews: https://www.defensenews.com/global/asia-pacific/2019/04/21/inside-south-koreas-military-wish-list-as-it-seeks-greater-control-over-its-forces/

Kim, D. Y. (2020, June 26). *South Korea approves plans to acquire more AEW&C and SIGINT platforms*. Retrieved from Janes: https://www.janes.com/defence-news/news-detail/south-korea-approves-plans-to-acquire-more-aewc-and-sigint-platforms

Kim, D. Y. (2020, April 28). *South Korea completes deliveries of KM-SAM Block-1 system to RoKAF*. Retrieved from Janes: https://www.janes.com/defence-news/news-detail/south-korea-completes-deliveries-of-km-sam-block-1-system-to-rokaf

Korea Aerospace Industries. (2019). *LAH: Light Armed Helicopter*. Retrieved from Korea Aerospace Industries: https://www.koreaaero.com/EN/Business/LAH.aspx

Korea Aerospace Industries. (n.d.). *KF-X*. Retrieved from Korea Aerospace Industries: https://www.koreaaero.com/EN/Business/KF_X.aspx

Korea Defense Industry Association. (2021). *Korea Defense Products Guide.* Seoul, Republic of Korea: Korea Defense Industry Association. Retrieved from www.kdia.or.kr/eng

Lockheed Martin. (n.d.). *The F-35 Lighting II for Republic of Korea.* Retrieved from F-35 Lightning II: https://www.f35.com/f35/global-enterprise/republic-of-korea.html

Military Factory. (2019). *Lockheed Martin F-35 Lightning II.* Retrieved from Military Factory: https://www.militaryfactory.com/aircraft/detail.php?aircraft_id=23

Military Factory. (2020, June 4). *ROKS Daegu (FFG-818)*. Retrieved from Military Factory: https://www.militaryfactory.com/ships/detail.php?ship_id=roks-daegu-ffg818-guided-missile-frigate-warship-skorea-navy

Military Factory. (2020, April 6). *ROKS Dokdo (LPH-6111)*. Retrieved from Military Factory: https://www.militaryfactory.com/ships/detail.php?ship_id=roks-dokdo-lph6111-amphibious-assault-ship-south-korea

Military Factory. (2020, July 4). *ROKS Dosan Ahn Chang-ho (SS-083)*. Retrieved from Military Factory: https://www.militaryfactory.com/ships/detail.php?ship_id=roks-dosan-ahn-chang-ho-diesel-electric-submarine-south-korea

Military Factory. (2021, January 6). *Boeing E-7 Wedgetail*. Retrieved from Military Factory: https://www.militaryfactory.com/aircraft/detail.php?aircraft_id=1852

Military Factory. (2021). *KAI / Airbus Helicopters Light Armed Helicopter (LAH)*. Retrieved from Military Factory: https://www.militaryfactory.com/aircraft/detail.php?aircraft_id=1369

Military Factory. (2021). *KAI KF-21 Boromae (KF-X)*. Retrieved from Military Factory: https://www.militaryfactory.com/aircraft/detail.php?aircraft_id=1035

Military Factory. (2021, 16 February). *Northrop Grumman RQ-4 Global Hawk*. Retrieved from Military Factory: https://www.militaryfactory.com/aircraft/detail.php?aircraft_id=40

Military Factory. (2021). *Rotem K2 (Black Panther)*. Retrieved from Military Factory: https://www.militaryfactory.com/armor/detail.php?armor_id=289

Military Today. (2021). *Rotem KW1 Scorpion*. Retrieved from Military Today: http://www.military-today.com/apc/rotem_scorpion.htm

Ministry of National Defense, Republic of Korea. (n.d.). *About MND*. Retrieved from Ministry of National Defense, Republic of Korea: https://www.mnd.go.kr/mbshome/mbs/mndEN/subview.jsp?id=mndEN_010300000000

Naval Technology. (2021). *Dokdo Class Landing Platform Helicopter (LPH)*. Retrieved from Naval Technology: https://www.naval-technology.com/projects/dodko-class/

Naval Technology. (2021). *FFX-II (Daegu Class) Multi-Role Frigates*. Retrieved from Naval Technology: https://www.naval-technology.com/projects/ffx-ii-daegu-class-multi-role-frigates/

Northrop Grumman. (2021). *Global Hawk: Vigilance for a Changing World*. Retrieved from Northrop Grumman: https://www.northropgrumman.com/what-we-do/air/global-hawk/

Panda, A. (2018, February 28). *Chinese Fighter Violates South Korea's Air Defense Identification Zone*. Retrieved from The Diplomat: https://thediplomat.com/2018/02/chinese-fighter-violates-south-koreas-air-defense-identification-zone/

Ramani, S. (2016, February 18). *These 5 things help make sense of North Korea's nuclear tests and missile launch.* Retrieved from The Washington Post: https://www.washingtonpost.com/news/monkey-cage/wp/2016/02/18/these-5-things-help-make-sense-of-north-koreas-nuclear-tests-and-missile-launch/

Republic of Korea Navy. (2016). *Mission & Function*. Retrieved from Republic of Korea Navy: http://www.navy.mil.kr/mbshome/mbs/eng/subview.do?id=eng_010300000000

TABLE OF FIGURES