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Shifting Tides: India's Blue Water Ambitions and the Traditional Security Challenges for Pakistan

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ABSTRACT

The evolving geopolitical dynamics of the South Asian region have significantly enhanced the strategic importance of the Indian Ocean Region (IOR). Over the past two decades, India has embarked on an ambitious naval modernization program aimed at developing a formidable maritime force. This modernization seeks not only to safeguard India's coastal frontiers but also to project power and exert control across the blue waters of the IOR. India's objectives are being pursued through the expansion of indigenous shipbuilding capabilities, the acquisition of advanced naval platforms, the professional training of its maritime forces, and the enhancement of its strategic presence in the maritime domain. Alongside its conventional military buildup, India has made substantial investments in modernizing its force structure and has successfully advanced its nuclear triad. The completion of this triad signifies that while the development of sophisticated warheads constitutes one dimension of deterrence, their reliable and precise delivery capability completes the strategic equation. Pakistan perceives India's expanding presence and naval ambitions in the IOR as a potential threat to its national security. Accordingly, this study examines the growing significance of the IOR in India's strategic calculus and analyzes the consequent challenges for the littoral states, with a particular focus on Pakistan.

Keywords: *Choke-points, UAVs, PLAN, IOR and LoAC*

INTRODUCTION

Over the past two decades, much has changed in the Indian Ocean Region, which attracts global concerns regarding the deterrence stability of South Asia. China has emerged as a sole regional power with rapidly growing military capabilities. According to the US Department of Defence's 2020 annual report that People's Liberation Army Navy (PLAN) is the largest in the world, equipped with advanced weapons and a powerful blue water fleet (Defence, 2020). The South Asian and Western experts forecast and predict that soon the Chinese navy will have a fleet for the Indian Ocean Region in the near future due to rapidly increasing Chinese interest in the region. The rising military capabilities coincided with the 2020 Indo-Chinese border skirmishes in Galwan near the Line of Actual Control (LoAC) where China has dominated Indian border forces. The ripple of this border clash was later felt in the Indian Ocean Region with increasing Chinese naval presence. India perceived it as a strategic threat to its maritime interests. India increased the pace of its efforts to modernize its maritime posture and shore up its combat capabilities for future threats.

Furthermore, it is a fact that India commands a substantial, and growing economy, which has a consistent and ever-growing rise in its trade volume. In these dynamics, the maritime routes and sea lanes of communication are the most viable and economically cost-effective avenues for trade and merchant activities. India's coastline is stretched to 7500 kilometers, making India essentially a maritime nation. Most of its trade is based on its sea-lanes of communication, and due to China's presence in the IOR and their ambitious plans compelled them to prioritize its naval modernization. It is basically aimed to

strengthen their geostrategic position in the region, and India is ambitious to emerge as a maritime power at the global level. There are several reasons why India is in the pursuit of this modernization to achieve its strategic goals. Firstly, the significance of the Indo-Pacific region has rapidly increased due to the rise of China and its new great game with the USA and other world powers. India views itself as an important player in this region and aims to balance increasing Chinese influence. It wants to protect the maritime trade and energy routes passing through the IOR and beyond, which is crucial due to important strategic chokepoints like the Strait of Hormuz and the Malacca Strait. India also has a strategic goal of deterrence and power projection in the region through naval diplomacy and strategic partnerships with the littoral countries. The technological advancement enables India to achieve these strategic goals, and due to its huge investment, India has managed to commission advanced aircraft carriers, nuclear submarines, and robust surveillance systems to protect its footprint in the IOR (Yap, 2025).

The primary cause of India's maritime development and rapid naval modernization is due to its security; India wants to safeguard its maritime interests from passively increasing Chinese influence. The countries have seen hot pursuits in 2019, and modernizing the naval capabilities is India's response to China. New Delhi wants to attain balance in the region's changing security dynamics. Consequently, India has given special focus to advanced aircraft carriers, Nuclear-powered Submarines (SSBNs) and Attack Submarines (SSNs), the presence of INS Chakra in the blue waters is an example of that. Although Pakistan wants to clean the blue waters of IOR from nuclear and lethal weapons for a better future of making this water body an economic opportunity, India has already taken a step to complicate the situation. (Ashraf, 2020). In quick response to China's growing maritime influence and dominance in the blue waters, India has started an ocean security paradigm and weaponized the IOR.

Likewise, it is also an obvious fact that India has more weapons, a standing military force, economic volume, and a strategic edge over Pakistan, and it poses a substantive threat to Pakistan's maritime security. The nature of the threat is multifaceted and nuanced due to its multiple dimensions. The size and sophistication of the navies, their fleets, technological advancements, and other factors heighten this issue. Although with respect to the strategic and nuclear deterrence, both countries maintain the Mutually Assured Destruction (MAD), which is a major cause of concern for the entire region. Pakistan has tried to attain deterrence by adopting the policy of "first use" if it came to its national security (Syed, 2024). However, India has conventional military superiority over Pakistan, and doctrinal maneuvering has enabled India to launch a swift, limited, and punitive conventional attack to avoid nuclear exchange. It is further reinforced by the employment of a hybrid strategy of proxy war to stage insurgency and terrorism inside Pakistan (Chaudhary, Zaighum, & Ali, 2024). India's economy is substantially larger and more stable than Pakistan's, which enables the country to attain advanced technology for naval modernization. These naval modernizations pose a substantive security threat to Pakistan and raise traditional security challenges for the country.

However, its rapidly increasing conventional capabilities will directly threaten Pakistan's naval interests due to its longstanding strategic conflict and due to Chinese presence in Karachi and Gwadar due to the China-Pakistan Economic Corridor (CPEC). Some of India's naval capabilities are examined and evaluated in this chapter, and how India will increase and modernize its existing traditional/conventional naval competencies by 2035.

Although India has not officially claimed that its naval modernization is aimed at destabilizing the entire region by posing a threat to Pakistan's security. It has not shown any intention of blocking trade routes for Pakistan or creating a security dilemma by adversely influencing the free trade at Karachi and Gwadar ports. As the maritime security and any change in the security paradigm of the region is a part of broader strategic concern for any littoral country, especially Pakistan. The two countries have longstanding unresolved geopolitical issues. Both countries are nuclear-armed and conventionally formidable military

powers. It is factually true that India has not shown any impression of its intention to block the routes for Pakistan. However, the physical prevention of ships or controlling the sea lanes of communication by India can escalate the situation. The powerful navy with advanced capabilities can result in escalation at any stage, like in 2019, immediately after the Pulwama attack, the two countries were engaged significantly. These conflicts ideally remain limited due to the nuclear deterrence, due to the complexity of the relations, the threats of escalation in the blue waters are inevitable.

The concept of traditional security was coined by Barry Buzan, a core concept within international relations and global politics. Barry Buzan's primary concept of international security studies is concerned with the survival of the state, as the anarchic international system is aimed at inflicting harm on other states for their own national interests (Buzan & Hansen, 2009). It mainly focuses on military threats and external aggression as the main security concerns. The key elements of traditional security are as follows,

i. The State is the Primary Referent Object in the sense that security is about protecting the sovereignty and territorial integrity of the state.

ii. The Anarchic International System is based on anarchy, which is a key assumption of realism. This creates a system of self-help that requires every state to do something to safeguard its national integrity and sovereignty from any intervention.

iii. Military Force and Threats are the main factors of concern. The arms race and militarization are a natural response to any security threat.

iv. Power and Balance are an effective tool of traditional security, which can be achieved through strategic alliances and development of conventional military capabilities. The primary objective of joining alliances is to attain deterrence and defence of the national interest.

LITERATURE REVIEW

The author *C. Raja Mohan* (2012), in his book titled *Samundra Manthan: Sino-Indian Rivalry in the Indo-Pacific,* states that both China and India are upcoming major maritime powers in the region (Mohan, 2012). Both countries are flexing their muscles to secure their gradually increasing maritime interests. The book title Samundra Manthan, or "to churn the ocean," refers to a fiction from ancient Hindu mythology that the geopolitical conflict between China and India has shifted from the high mountains of the Himalayas into the deep blue sea of the Indo-Pacific. The book intends to justify and rationalize the modern Indo-China maritime rivalry in a historical and mythological manner.

The book titled *India's Naval Strategy and Asian Security, co-written* by *Anil Mukherjee* and *C. Raja Mohan* (2015), investigates and explores the rapidly growing strategic significance of the Indian Navy (Mukherjee & Mahan, 2015). India is a rising power in South Asia due to the consistent expansion of its military and economic capabilities. This emerging power status has led to new debates on changing the balance of power in Asia. The book provides a thoughtful discourse on the rapidly changing Indian maritime alignments with special reference to its military and defence diplomacy with the other regional countries. The author wants to reflect that today India's naval strategy has gradually floated from the margins of its security strategy to the core of its defence policy, especially after 2015. It reflects New Delhi's security consciousness towards the seas for safeguarding its maritime interests. The book helps in understanding the gap between external maritime challenges and internal equivocation and ambivalences, moreover it observes the gap between the two. The impact of India's naval modernization on global security and its options for consistently changing strategic possibilities, the internal and external dimensions of Indian maritime strategic future is in a dynamic flux.

The author *Geoffrey F. Gresh* (2020), in his famous book titled *To Rule Eurasia's Waves: The Great Power Competition at Sea,* states that Eurasia's rapidly emerging powers like China, Russia and India are progressively focused on new maritime geographies, trade routes and expansionism (Gresh, 2020). They are flexing their muscles in the region to expand economic, political, military, and strategic influence in the region. The maritime routes passing through this region are economically and strategically very important and play an important role in the geopolitical economy of the region. Moreover, maritime Eurasia has a number of very important maritime checkpoints that play a significant role as an energy corridor. The importance of this region is to a degree that it challenges the US and Europe's dominance in the Atlantic world.

The author Dr. Saji Abraham (2015), in the book titled *China's Role in the Indian Ocean: its Implications on India's National Security,* argues that India is located in an "area of instability"; this is due to the reason that most of the nation in the neighbourhood has suffering from economic discrepancies (Abraham, 2016). Most of the smaller nations in the region are striving hard to evolve themselves, developing and modernizing themselves for survival. The region is hosting a giant dragon i.e., China, and the Indian Ocean Region and Indo-Pacific are providing a maritime route to transport oil from the Gulf region. Due to the US presence in the region and its engagements with regional countries, China is also developing and modernizing its naval capabilities to strengthen its position in the region. On the other side, the Indo-US nexus is working to counterbalance China, and India has started rapid modernization in its naval capabilities that may lead to some limited confrontation in the future. Moreover, the clash of interests in the Indian Ocean Region is also showing some fire underneath because India wants this region to be its area of influence. The book also provides a comprehensive account of recent modernization of China's military capabilities with special focus on its strategy of power projection. It also provides an understanding of Indian naval interests and the strategies and methodologies employed by the Chinese policymakers for the strategic encirclement of India.

The author *Harsh V. Pant* (2016) in his book titled *the Rise of the Indian Navy* argues that India is using its military power especially the naval capabilities as an important tool for regional and international diplomacy (Pant, 2012). The Indian strategists and naval thinkers have started considering navy as an important tool of India's modern diplomacy and foreign policy decision making. In recent years, they are developing strong and formidable naval muscle to influence the regional and global countries for regional economic and geostrategic integration. Maritime security has become an important tradition in India's border security paradigm. This book covers detailed account of issues relating to India's security and maritime domain, furthermore, it also causes and impact of Indian naval capability in the region. Harsh V. Pant has a deep analytical understanding of India's strategic thinking and its implication in the security politics of this region.

The book titled *India's Evolving Deterrent Force Posturing in South Asia: Temptation for Pre-emptive Strikes, Power Projection, and Escalation Dominance*, co-write by *Zulfiqar Khan* and *Zafar Khan* (2020) discusses that India's rapidly increasing deterrent force posturing and a substantial military force posing strategic impact in the region (Khan & Khan, 2020). These implications and India's strategic deliberations are affecting the defence and foreign policy decision making of the neighbouring countries especially for those who already are in a state of conflict with India. The book also reflects India's military capabilities, its nuclear strategy and rapidly expanding designs are causing threat perceptions in India's adversaries i.e., China and Pakistan.

The author Masood ur Rehman Khattak (2019) in the research article titled *Indian Military Modernization: Implications for Pakistan,* argues that Indian military capabilities and its modernization will affect the current deterrence stability of the South Asian region (Khattak, 2019). The current conventional asymmetries and military posturing are manageable for the balance of power in the region.

However, in the future, it seems that the overwhelming changes and modernization of India's conventional force posturing and weapons capabilities will be difficult for Pakistan to manage. This is due to long-term conventional disproportion since India is developing long-range air defence systems, nuclear submarines, UAVs, and advanced equipment for maritime domain awareness.

The author *Siraj Nizamani* (2014) in his research article titled *India's Emerging Indian Ocean Strategy* argues that the India is in the pursuit of increasing its role in the Indian Ocean Region (IOR) (Nizamani, 2014). The maritime doctrine of 2015 reflects that India intends to increase its naval capabilities, peace and rescue operations, maritime policing and controlling the illegal trafficking in the Indian Ocean and Indo-Pacific. In this connection, India is giving special importance to the modernization of its naval capabilities. It will give India a leadership role in the region and capability to counter China's increasing role.

The author *Colonel Dr. Raja Muhammad Khan* (2010) in his research article titled *Strategic and Regional Implications of Indian Naval Expansion* states that the Indian naval expansion has serious implications for all the regional littoral states and especially for Pakistan (Khan C. M., 2010). This is due to the reason that no other country of the Indian Ocean region, Bay of Bengal littoral or Arabian Sea littoral is posing any sort of a threat to Indian dominance and hegemonic designs. The Indian naval expansion is very fast and this is drastically affecting Pakistan's maritime security and interests because the country lags behind this development.

The author *David Brewster* (2010) in the research article titled *an Indian Sphere of Influence in the Indian Ocean* sheds light on India's strategic ambitions in the Indian Ocean Region (Brewster, 2010). It also explains the maritime perspectives of Indian strategic thinking in the post 9/11 era. The main driving force for the review of India's maritime strategy is due to its security from Chinese dominance. However, besides this official stance, there are many untold facts of India's modernization campaign and one of them is its expansionist designs for dominance in the region. New Delhi wants to establish a new Indian sphere of influence across the Indian Ocean Region for futuristic perspective.

The author *Sufianullah* (2019) in a research article titled *Analyzing India's Naval Development Strategy* argues that India is eager to attain great-power status in international politics and that a strong and formidable maritime strategy is a prerequisite to achieving this status (Sufian Ullah, 2019). The growing naval power aims to flex its naval muscle in the Indian Ocean and Indo-Pacific to dominate the entire region. In the pursuit of achieving this objective, India is engaging with the regional countries with trade and military diplomacy. The offensive naval doctrine reflects that India wants to be the regional policeman. The modernization and weaponization of the Indian Navy will not only disturb the current balance of power in the region, but it will also lead to escalation and intensification. The constant increase in the naval power, offensive doctrines, modern equipment and naval exercises with regional countries shows a threat to Pakistan's maritime security.

The author *Ghazala Yasmin Jalil* (2016) in her research article titled *Analysis of Indian Naval Capabilities: Implications for Pakistan* argues that India's naval modernization, extensive transformation in its weapons and nuclear capabilities are drastically disturbing the balance of power of this region (Jalil, 2016). The instability in the Indian Ocean due to India's growing influence will lead to a new naval arms race and strategic adventurism. India is nuclearizing the Indian Ocean region with its new nuclear submarines and modern stealth destroyers. The Indian Ocean is already an epicenter of new great games among the great powers of the world. US are already present in the region to spy on Chinese activities, whereas China is also rapidly reinforcing its navy for the security of its maritime trade routes and energy supplies.

The research article titled *India's Naval Expansion and Strategic Partnership with the US in the Indian Ocean Region: Implications for Pakistan* co-write by *Maira Afzazze Saeed* and *Umbreen Javaid* (2020) establishes the argument that US want to halt increasing political and economic influence of China in Asia and beyond (Saeed & U, 2020). In this connection, they are backing India to counterbalance Chinese influence in the Indian Ocean and Indo-Pacific region. Indo-US nexus is helping India to become an emerging maritime power in the region because India wants to attain the status of sole security provider in the IOR. The growing naval influence is raising questions to the strategic stability of the region. India's maritime aims will not remain limited to China rather; India will obviously pursue a strategy to achieve its own interests in the region. They would obviously be eager to deploy their capabilities against their arch-rivals by employing asymmetrical strategies. This situation will fuel a new arms race in the region.

THEORETICAL FRAMEWORK

This research article is theoretically based on the theory of Offensive Realism expounded by the famous American Scholar Professor John Mearsheimer. The offensive realism assumes that the international system is based on anarchy, and the offensive military doctrines adopted by states have the power to perpetrate and inflict harm on other states. This capability not only varies with respect to the deterrence capability of belligerent states, but it also changes with the passage of time; the deterrence policy prescribes preventive policies (Mearsheimer, 2001). Furthermore, the intentions of the states are always unsure and unpredictable. The state can use force to alter the balance of power in its interest.

RESEARCH METHODOLOGY

This research is based on a qualitative investigation, and discourse analysis research methodology is employed to understand the changing geo-strategic landscape of the Indian Ocean Region and the implications of weaponization of the blue waters. This research article is based on the secondary resources, including published books, research publications, and new articles. Only the most authentic and reliable sources are utilized for research purposes.

Aircraft Carrier

An aircraft carrier is a kind of warship that is used as an oceangoing and floating air base that is typically equipped with all the facilities and necessary gear required for carrying, arming, deploying, recovering, and repairing aircraft. It does have a full-length surface that serves as a flight deck, weapons, and a fuel depot in a war situation. The aircraft carrier contains a long deck for landing and taking off fighter jets, with a hangar deck that is used for storage, maintenance, and other facilities. Principally, it is the chief battleship and a sea elephant that allows a naval force to dominate the sea and aerial warfare without having an air base on land. It is an alternative to staging a full fleet of fighter jets on an air base near the war zone. The aircraft carriers started being commissioned in the Navy a decade before World War I. The first-ever launch of an aircraft from a stationary ship having a full-length surface took place on the 14th of November 1910 in Virginia, United States of America. However, on September 5, 1914, during the Battle of Tsingtao, the Imperial Japanese Navy (IJN) seaplane carrier *Wakamiya* carried out the world's first naval-launched air raids from Kiaochow Bay during the Siege of Tsingtao (Macdonald, 2021). Aircraft carriers played a strategic role during World War II and the US carried out decisive operations against Japan and the Indo-Pacific, whereas the Royal Japanese Navy had also carried out numerous operations against the USA by using them. Later, the development and modernization of aircraft carriers become rapid. The US especially deployed its forces in the conflict areas to counter the Soviet Union during the Cold War. They stationed their forces near Greece, Turkey, and Ukraine to deter Soviet invasion. Even besides that, in the non-Cold War conflicts, including the Cuban Missile Crisis in 1962, the Anglo-French invasion of Egypt in 1956, the Arab-Israel Conflicts, the Korean and Vietnam Crisis, the airstrikes against

Libya in 1986, the Iraq war in 1991, and almost every conflict in the Middle East, Africa, or elsewhere. After the September 11 attacks, most of the United States aerial strikes in Afghanistan and Iraq were launched from its aircraft carriers deployed in the Arabian Sea. The missiles and fighter jets flew from those carriers, crossed the aerial space of Pakistan, and targeted the enemy positions. It is often truly recounted since the 1970s that whenever a world crisis arose anywhere in the world, in the white house's situation room, the question was asked, "Where are the carriers?" (Polmar, 2008).

Although all the major maritime powers of the world have commissioned aircraft carriers for their strategic needs. The issue appears to be ostensibly interesting since the modern history of naval warfare shows that aircraft carriers have not been deployed with a major role in the region. However, due to unique geostrategic compulsions of the region and rapidly rising Chinese influence and presence in the Indo-Pacific and Indian Ocean Region, India is planning to increase the operational and tactical role of its aircraft carriers. They played a strategically imperative role in the 1971 Indo-Pakistani war. In that continental war, India deployed *INS Vikrant* to strike strategic targets deep inside eastern Pakistan, which ultimately led to the fall of Dhaka (Khurana, 2018). Moreover, India has a coastline of around 7500 km with a two-million-square-km Exclusive Economic Zone (EEZ), so deployment of aircraft carriers gives India operational swiftness and maneuverability.

India has aimed to build three aircraft carriers named INS Vikramaditya, INS Vikrant, and INS Vishal for the future of its navy. One carrier for the western and eastern seaboard to counter China and Pakistan, and a third to cycle around for maintenance. The brief details of their capability, strength, and strategic significance is described hereunder:

INS Vikramaditya

INS Vikramaditya is a Kiev-class aircraft carrier, which is modified for the Indian Navy. It has been commissioned in the Indian Navy since 2013. This 30-year-old ship, named *Admiral Gorshkov* was first built in Baku and was commissioned in the Soviet Navy. Later, it served in the Russian navy. India negotiated with Russia for the procurement in 1994, and after successful negotiation, an MoU was signed between the two countries. In January 2004, India agreed a $1.5bn deal with Russia for the modernization of that vessel, and the same was delivered to India in 2013 after several combat and navigation tests in the White Sea. It can endure 45 days at sea and can carry 8000 tons of low-sulphur high-speed and quality diesel.

The vessel can carry more than 30 long-range multi-role fighters with anti-ship missiles, air-to-air missiles, guided bombs, and rockets (Chaudhury, 2000). The fighter jets include the modified single seated MiG 29K, off British Aerospace Sea Harrier combat aircraft, which are famous as naval short take off, Sea King helicopter, Chetak helicopters, Kamov 28 naval helicopters, Kamov 31 Airborne Early Warning (AEW) helicopters, and HAL Dhruv utility helicopter. The carrier is equipped with an advanced weaponry system that includes beyond visual range missiles, Barak-8 air defence system, guided bombs, rockets, and a wide range of anti-ship missiles. The vessel is equipped with advance sensor system, a long-range air surveillance system, a state-of-the-art launch, recovery, and radar system, and advance electronic warfare suite to deal with weather warfare situations.

INS Vikrant

INS Vikrant is 262 meters long and 43000 tons heavy, first indigenously built aircraft carrier in the service of the Indian Navy since 2014. The carrier was constructed by a famous Indian company, i.e., Cochin Shipyard Limited, in Kerala. The carrier has around 2300 compartments crewed by around 1700 people, one small hospital, and separate rooms for female crew members and long corridors stretched to a

distance of around eight kilometers. The Vikrant air group forms a strong air muscle for the aircraft carrier. It includes 26 Rafael or MiG-28 fighter aircraft, upto 4 Kamov Ka-31 2 HAL Dhruv utility helicopters, and 4 MH-60R Seahawk helicopters (Raghuvanshi, 2022)..

INS Vikrant is aimed at increasing India's strategic expansion in the IOR and South China Sea. Although New Delhi has kept its eye on Pakistan, China has always been India's increasing focus due to its rapidly modernizing navy. In 2022, China commissioned its third aircraft carrier to the People's Liberation Army Navy (PLA Navy) and its first indigenously built aircraft carrier, named the vessel Fujian. Fujian is one of the world's advanced aircraft carriers with a functioning electromagnetic catapult and arresting devices enabling the planes to land and take off on its deck with ease (Schuster, 2024). It will enable the carrier to keep heavy and fatal fighter jets on its deck. Fujian will be operational with the start of 2025; it has a greater reach than any of the European aircraft carriers in service with an additional strength of its air wing.

INS Vishal

INS Vishal (or IAC-2) is the Indian Navy's third aircraft carrier and second indigenously built carrier, and its manufacture was already planned as soon as the procurement of its first aircraft carrier INS Vikrant (or IAC-1) was started. The size of the aircraft carrier is proposed as around 65000 to 75000 tons. Initially, it was planned that the carrier would be nuclear powered but later it was changed to an integrated electric propulsion system. It is expected that the carrier shall be equipped with electromagnetic catapults for advance landing system; the same type of landing system is in use of Chinese PLA-Navy's aircraft carrier ***Fujian*** (Joe, 2021). It will enable the heavy fighter jets to land smoothly on the deck. The carrier is strategically compatible for both a mix of fixed-wing fighter jets and helicopters. The navy plans to deploy different fighter aircraft on it, including MiG-28, Mikoyan MiG-29K, and HAL Tejas aircraft. In February 2023, as part of operationalizing the deployment of its fighter jets to INS Vikrant, India successfully landed its first fixed-wing fighter aircraft, HAL Tejas, which was followed by a MiG-29K (Sharma R. , 2024).

Submarines

The man has relentlessly been in the pursuit of understanding and conquering nature and its environment, and in doing so, faced several challenging missions. However, the most breathtaking and tormenting challenge was the mastery of the sub-sea world. This new world has been perceived as strewn, imaginary, and fatal since nobody has ever explored or imagined how to control the deep-water waves. The idea of controlling the deep seas was not only for exploration and for movement, but it was also for war and punitive strike capabilities, which was a fanciful dream. Meanwhile, the industrial revolution in the West initiated a new era, and the technological advancement in the later centuries further materialized it. Ultimately, the advent of 20th-century submarines became fully functional in naval warfare.

A submarine is a vessel designed to operate independently deep underwater. They have a cylindrical body shape and a vertical structure specially designed for specific operational needs. They have been used in many navies for over a century and perform strategic roles in naval warfare. Submarines are weapons of stealth and surprise, capable of operating with versatility for attack denial. They act as a force multiplier. They truly serve as a force multiplier and deter all types of adversaries. This is the first weapon of any kind in which stealth technology was introduced due to its clandestine strategic use. The greatest point in favour of a submarine is its invisibility in each of the three positions in which it is designed to maneuver, i.e., on the surface, awash, and submerged (Domville-Fife, 1910).

Conventional Submarines

Conventional submarines are submarines powered by batteries and diesel engines. Most of their basic features have remained the same since the early inception. These include their battery, weapons capabilities, and maneuvering limitations. Most of the deployment time, they remain on the surface and submerge only to attack on the enemy. They are slower than most of the fighter surface ships, but comparatively faster than most of the conventional merchant ships. The conventional submarines are mostly driven by electric motors that are charged and powered by the diesel engine. The conventional diesel engine submarines have a limitation of their endurance underwater due to exhaustion of fuel, which is mostly 24 hours. It has been improved during the past century due to innovative technological advancements like the Air Independent Propulsion (AIP) system. However, the same still has certain functional limitations.

The Indian Navy has commissioned sixteen conventional diesel-powered submarines to its naval force. The Indian submarine fleet is located at Visakhapatnam on the eastern coast and at Mumbai on the western coast (Bisht, 2022). Most of India's agreements for the acquisition of submarines are based on the transfer of technology instead of obtaining the submarines; it helps India to indigenously build those submarines at low cost.

i. **Shishumar Class (Type 209 Submarine)** are diesel electric attack submarine currently active in service with the Indian Navy. India has obtained and deployed these submarines to its navy to augment its strategic capabilities for undersea warfare. These submarines are deployed and stationed in Mumbai. Indian engineers have made necessary modifications in the German Type 209 submarines manufactured by Howaldtswerke-Deutsche Werft and successfully developed/constructed an Indian variant as per needs. India currently has 4 Shishumar Class submarines in service, two of which were manufactured in Kiel, Germany, whereas the remaining two were built in Mazagon Dock Limited, Mumbai (Ramkumar & Panneerselvam, 2023). This submarine provides India not only a strategic presence in the Indian Ocean region in the littoral and open seas, but above that, these submarines provide India with operational flexibility. This flexibility includes information gathering, operationalization of naval missions, security, and defence. The submarine has a displacement weight of around 1,450 tons, and its surface speed is 11 knots (20 kilometers per hour), and submerged speed is 22 knots, i.e., approximately 41 kilometers per hour (Anandan, 2013).

ii. **Sindhughosh class (Kilo-class)** Submarines are diesel-electric attack submarines in service of the Indian Navy since 1986. The Kilo-Class submarines can be used for long-range attacks, and they are outfitted with six 21-inch torpedo tubes, which are used to launch both naval mines and torpedoes (Kass, 2023). These torpedoes usually launch Kalibr/Klub missiles to long-range targets with accuracy and precision. Russia has deployed the same submarines to attack ISIS in 2015 and in its recent attack on Ukraine to hit the targets on land. The submarines were acquired after a bilateral agreement between the Indian Ministry of Defence and Rosvooruzhenie, a Russian agency responsible for imports/exports of Defence goods and equipment. It has a displacement weight of 2,325 tons, and its maximum surface speed is 11 knots (20 kilometers per hour), and submerged speed is 18 knots, i.e., 35 kilometers per hour (Singh & Garg, 2021). The submarine has a capability to stay on a solo mission for 45 days with a crew of 53 people. India has commissioned 10 Sindhughosh-class submarines to its Navy, and 3 have recently been retired, whereas 7 are active in service.

iii. **Kalvari Class** is a diesel-electric attack submarine based on Scorpene-class submarine design and commissioned in the Indian Navy in 2017. The submarines are built by French naval defence

institute DCNS at Mazagon Dock Limited at Mumbai, India. It is 67.5 meters long, and it has 1,615 surface displacements with surface speed 11 knots (20km per hour) and submerged speed around 20 knots (37 km per hour) (Sumeda, 2023)**.** Scorpene-class submarines are one of the deadliest weapons and are called the silent killer. The Kalvari Class submarines are manufactured for offensive operations and invasive attack in a full-spectrum naval warfare. India has currently agreed to commission six Klavari Class submarines to its naval force to fulfil its immediate needs. The cost of six units of Kalvari class submarine is around US$3.6 billion in 2020. The four of them are expected to be commissioned this year. They have opened a new era in the combat capabilities of the Indian Navy.

iv. **Project 75I Class,** is India project aimed to procure highly sophisticated conventional and nuclear submarines to increase its underwater combat capabilities. This is believed to be the largest acquisition of defence equipment by New Delhi that would cost around 43 thousand crores (Sagar, 2023). India would acquire state-of-the-art submarines in collaboration and coordination with foreign countries. These submarines will provide India with exceptional dominance in the Indian Ocean Region (IOR) and will strengthen its naval fleets. The project-75I submarines are equipped with advanced technology, long-range capabilities, punitive strike capabilities, and their Air Independent Propulsion (AIP) provides their sustenance and long endurance underwater. This planned project of India aims to build 6 indigenous conventional diesel electric submarines for its navy. The submarines will be built with advanced capabilities in India and commissioned in the Navy. The capabilities of the submarines shall include conducting Anti-Surface warfare (ASuW), Anti-Submarine Warfare (ASW), Anti-Ship Warfare (AShW), Special Operations Forces (SOF), and supporting operations in open seas and shallow waters.

Nuclear Submarines

The nuclear submarines are those submarines that are powered by nuclear reactors but are not equipped with nuclear weapons. The nuclear submarines have a substantial performance edge over the conventional submarines due to their high power and energy. It gives it maneuverability, endurance, and performance edge in real-time. The US and Britain are the only countries in the world that use Highly Enriched Uranium in the onboard nuclear reactor of their submarines and therefore they do not need replacement of Uranium. Whereas other countries like France need replacement after a specific period because they use a type of uranium that is high-density and low-enriched uranium (Kurmeloves, 2021). The nuclear submarines are quieter, faster, more advanced, and have longer endurance for operational deployment.

In India, the first idea of constructing and deploying nuclear submarines was envisaged and originated in the 1990s. The presence of Chinese nuclear submarines and a strong navy in the Indian Ocean Region and the expansion of Indian trade have further increased the deterrent role of nuclear submarines for India.

i. **Charlie Class Submarines** are India's first nuclear-powered submarines, which were commissioned in the Indian Navy from 1988 to 1991, to give the Indian Navy an experience of operationally handling the nuclear submarine. The submarine was first built between 1968 and 11 in total were built in the next five years by Russia. One Charlie Class, K-43 submarine was leased to India for a period of five years from 1988 to 1992, it was named as Chakra. Later, five more submarines were leased to India for a further period of ten years by Russia (Gady, 2019).

ii. **Arihant class, INS Arihant (S4) submarine** is a class of nuclear-powered ballistic missile submarines; the project is aimed at constructing four advanced nuclear-powered submarines with a budget of US$ 40 billion. Since 2016, two submarines have been built and commissioned in the Indian Navy, whereas the remaining two shall be completed by 2030. The Arihant-class SSBN (Sub

Surface Ballistic Nuclear) Submarines, code-named as S4. The S4 submarines are equipped with K-15 (B-05) short-range SLBM with a target range of 700 kilometers and K-4, an LRBM to target around 3,500 kilometers with a nuclear warhead (Bhattacharjee, 2022). The technologically advanced capabilities and long operational endurance enable India to attain a credible second-strike capability. The second-strike capability is strategically essential, especially when the land-based nuclear assets are completely compromised. These vessels are classified as strategic strike nuclear submarines and are the first indigenously built and commissioned to the Indian Navy. (Bedi, 2021). They additionally supported eight vertically launched ballistic missile tubes that have a long-range strike range of around 35 kilometers.

iii. **Chakra-II or Akula class** submarines are Russian-made 4th-generation nuclear-powered attack submarines. Russians have designated them as Project 971 and they were first constructed and deployed by the Russian navy in 1986. The submarine was named INS Chakra and commissioned in the Indian Navy on April 4, 2012 after a defence agreement and deliberations on bilateral levels. Before its commission in the Indian Navy, more than four hundred Indian naval officers and crew members were trained and provided hands-on experience for smooth functioning and operational understanding. The Russian version of **Akula-II** can be equipped with 28 cruise missiles armed with nuclear warheads and is capable of striking a target at a distance of around 3000 kilometers with accuracy. Whereas, the Indian version is equipped with Cube-S nuclear missiles (Radyuhin, 2006).

iv. **Project 75 Alpha** is India's new project aimed at building and procure nuclear powered submarines for its navy. In 2015, the government of India officially approved the construction of five nuclear-powered submarines at the Navy Shipbuilding Center, Visakhapatnam, for its future needs. Previously, India has procured Russian-made nuclear submarines. They are the third class of nuclear submarines used by the Indian Navy. According to this project, six nuclear submarines shall be built, and the project shall be completed by 2030. The Indian media reports that this project is strategically more important than the project of constructing the third aircraft carrier (Gupta S. , 2021).

v. **Maritime Domain Awareness.** The Maritime Domain Awareness (MDA) is an essential part of law enforcement, internal and international security, and safety. The intelligence is used to ensure any activity in the territorial waters, including piracy, human trafficking, smuggling, unreported and illegal movement, unlawful interventions, and terrorism in the Exclusive Economic Zones (EEZ) that can affect and disrupt the vital national interests of one country. However, the rightful authorities of the states can exercise their sovereign powers to ensure comprehensive security by enforcing laws and implementing them with their physical force against external interventions.

GSAT-7 Spy Satellite-Rukmini: Informational Edge| Real Time Information

A spy satellite or reconnaissance satellite is a satellite that is deployed and used for intelligence gathering of the enemy on the ground, air, or sea. It is a kind of satellite that is made for continuous monitoring and observation of the Earth's surface and any changes going on it for any purpose. However, most of this reconnaissance is based on security and strategic purposes. Earlier, as the beginning, the very first generation of spy satellites was capable of only taking photographs and pictures for intelligence gathering of subject areas. The defence ministry of India signed a 3000-crore contract with ISRO's commercial arm, New Space India Ltd (NSIL), for the satellite (Singhh, 2023). However, as a second generation, the videos were filmed for even more advanced and clear observation of movement. Now, the most recent developments include the advanced digital imaging system, and the images are downloaded from encrypted video links.

The GSAT-7 Rukmini is a dedicated satellite of the Indian Air Force for intelligence and surveillance. The primary objective and purpose of this satellite is to connect Indian air units, including fighter jets, helicopters, drones, and airborne units, radars, and other likely gear. India is using two satellites of GSAT-7 for more than 30 percent of its air reconnaissance requirements and is acting as the Indian Navy's eye in the Indian Ocean region and its maritime border with China. It is India's first satellite developed and deployed for military purposes and is currently used by the Indian Navy. Rukmini has been acting as India's eye on both the Arabian Sea and Bay of Bengal, but also helped the force increase its communication and surveillance capabilities from the Persian Gulf to the Malacca Strait, which together is equivalent to almost 70% of the IOR (Vijayakumar, 2017). Due to increasing Chinese presence in the Indian Ocean Region (IOR) and their border conflict over Sikkim, the Rukmini will help India to overcome the problem related to the line of sight. This satellite will assist India in monitoring the land movements of the army and the airborne objects of their enemies.

P8I – anti-Submarine Warfare Aircraft

The Boeing P-8 Orion is a US aircraft for maritime patrol, reconnaissance, and patrol targeting purposes. The aircraft was designed and developed by Boeing Defence, Space and Security; the design and shape have a close resemblance to the civilian Boeing aircraft. The P8 Orion has three main purposes and functions to perform; it is used for anti-submarine warfare, anti-surface warfare, and for surveillance purposes. It is strategically a lethal war machine, which is equipped with torpedoes, Harpoon anti-ship missiles, and can also drop and monitor Sonobuoys (Theberge, 2009). Sonobuoys are used for surveillance purposes, and they are deployed for the detection of underwater submarines. They float underwater and transmit signals to the aircraft after detecting any movement of submarines. This is a force multiplier aircraft that has augmented the Indian naval role in the region.

In 2009, India signed a contract with the United States worth US $3.9 for eight P8 Orion multi-mission aircraft. The first aircraft was delivered to India in December 2012 (Sakhuja, 2013). After this, India became the first country outside the United States to start operating P8 Orion, and after a bilateral agreement between the two countries in 2013, the first three P8 Orion aircraft were commissioned in the Indian Navy's maritime surveillance unit (Kaushik, 2022). India received seven P8 Orion aircraft in 2015. These aircraft have become the Indian Navy's P8I squadron. They are aimed to detect, deter and destroy the enemy ships and submarines in a warlike situation.

Kamov Surveillance and Reconnaissance

Kamov Ka-25 is a naval helicopter made for the former Soviet Union and currently manufactured for the Russian Navy. It is a multirole helicopter, but the primary purpose of its development and deployment was for anti-submarine warfare. The helicopter was first produced in the 1960s due to the increasing role of submarines after World War II. It entered service with the Soviet Navy in 1963. The helicopters have imperative capability to fly from the ship deck and hover in the enemy areas, conduct a surveillance operation. The helicopter has a takeoff weight of around 3.6 tons and can take up to 1 ton of payload for operations and can fly at a top speed of 220 km/h with six people.

In 2015, a bilateral agreement was signed between Russia and India in New Delhi for the joint construction of 200 Ka-226T helicopters over the period of the next 9 years (Gurung, 2016). It was agreed that the first 60 helicopters should be produced in Russia, whereas the remaining 140 helicopters should be produced in India. The agreement further ensures that initially, the repair and overhaul facilities shall be provided in Russia for the initial five years; later on, this joint venture will enable India to establish maintenance facilities in India. It will help in the localization of production, maintenance, and furthering the capabilities of India for the futuristic perspectives.

Romeo Sikorsky Helicopters

Rome Sikorsky is the US Navy's multi-mission helicopter developed for maritime surveillance and targeting. The helicopter is designed for deployment on any type of ship deck, including frigates, corvettes, destroyers, cruisers, amphibious assault ships, or aircraft carriers. It has a maximum speed of 168 mph (270 km/h), a maximum takeoff weight of 10,433 kg, an effective range of 830 km, and it can carry 5 passengers with 3 crew members. The MH-60Rs are equipped with a mission sensor suite and APS-153 multimode radar with long/short range search inverse synthetic aperture radar imaging and periscope detection modes (Kadidal, 2022). The armament of MH-60Rs includes up to three Mark 46 or Mark 50 torpedoes, AGM-114 Hellfire missile (4 in SH-60B and 8 for MH-60S), AGM-119 Penguin missiles, Rapid airborne mine clearance system (RAMICS) using Mark 44 torpedo, and a 7.62 mm M60, M240, GAU-17/A machine gun or 50 caliber GAU-16/A machine gun.

The MH-60R Seahawk Romeo Sikorsky helicopter is the most advanced maritime helicopter. Itis strategically very important and one of the most capable helicopters to counter a threat attack from sea, underwater, and airborne activity (Garg, 2022). The first mission of Romeo Sikorsky helicopters is surveillance and targeting of enemy submarines and surface ships; after that, the second important mission it performs is search and rescue. They are also good for intelligence gathering, logistics, medical evacuation, and combat missions. India has acquired 16 multirole S-70B multirole helicopters to replace the Westland Sea King Fleet. In August 2018, the Indian Ministry of Defence approved the purchase of 24 M-60R helicopters, and then in April 2019, the Pentagon approved the M-60R anti-submarine helicopters to India.

MQ9 Reaper Guardian: Maritime Surveillance and Targeting

The traditional airplanes take off from a particular airfield, cover a huge distance to reach their target position, and drop bombs on their target position. The pilots guide them to their proposed target position in the enemy territory and lead the plane towards the extraction point. This practice is good for well-defined and high-value missions at the time of war. Whereas, the modern advancements in military gear and war strategies have introduced new technologies to carry out such missions. The rapid technological advancements, GPS coordinates, and combat effectiveness have given flight agility to the unmanned aerial vehicles (UAVs) to carry out such missions. MQ-9 Reaper is an example of such remotely piloted aircraft, which is controlled by the units on the ground to carry out surveillance and targeting missions in enemy territory. The MQ-9 Reaper is believed to be one of the world's most sophisticated and highly trusted UAV drones for reconnaissance and targeting.

The Indian Navy has leased two MQ-9 Reaper Sea Guardians from the United States for extended surveillance of the Indian Ocean. The two countries have accorded for further thirty UAV drones for the coming years because India is expanding its naval muscle for maritime domain awareness. The predator is 36 ft (11 m) long, has a wingspan of 65 ft (20 m), a height of 12.6 (3.81 m), an empty weight of 2,223 kg, and a maximum take-off weight is 4,760 kg (Chopra, 2021). It is capable of long endurance and can hover at high altitude with clear targeting capability. It is equipped with an 8-leaser guided missile, one air-to-ground Hellfire missile with anti-armor and pinpoint targeting capability.

The Indian government has announcing a successful bilateral dialogue with the United States, reports that India will procure 30 MQ-9B Reaper drones from the United States at a cost of over $3 billion for surveillance purposes of Chinese activities in the region (PTI, 2023). The MQ-9B Sea Guardian is a variant of Predator B for maritime domain awareness. The aircraft has shown exceptional endurance and operational steadfastness for the maritime missions and covered almost 14 million square miles of sea area. India had procured two Sea Guardians from the US under an emergency procurement lease and is

looking to induct 30 MQ-9 Reaper or Predator B UCAVs as part of a $3 billion tr-service contract (Banerjee, 2021).

Destroyers: INS Visakhapatnam

In naval technology, destroyers are the fast-moving, maneuvering, and combatant ships famous for long endurance of war and escort missions in a fleet. A destroyer is a low, high-speed, and lightly protected vessel developed in 1885 by Fernando Vilaamil during the age of sail for the Spanish Navy (Osborne, 2005). The Indian Navy operates 11 guided missile destroyers out of its total 132 warships. These destroyers are divided into three main classes: Kolkata Class, Delhi Class, and Rajput Class. The destroyers were large, swift, and well-equipped torpedo boats to target other torpedo and warships. The post-World War II era has experienced innovations in conventional warfare and weapon systems. Most importantly, the **Exocet** in the 1960s transformed the entire war strategy and tactics of naval warfare.

Ten destroyers from three classes are active in the Indian Naval Service. The Kolkata-Class destroyer, Delhi-Class destroyer, and Rajput-Class destroyer.

i. **The INS-Impal (D68)** is a symbol of India's growing naval power and maritime dominance. It bolsters India's new slogan and principle of 'Jalmev Yasya, Balmev Tasya' (One who controls the sea is all powerful) in the Indo-Pacific Region (Peri, 2023). This is the third ship under Project 15B equipped with guided missiles. INS-Imphal is a state-of-the-art warship equipped with stealth technology. The ship is indigenously developed by Mazagon Dock Shipbuilders Ltd. INS-Imphal is one of the deadliest and independent lethal war machines roaring in the Indian Ocean, demonstrating India's thrust for dominating the blue waters. The size of the ship is measured as 163 meters in length, displacing 7,400 tons and with 75% indigenous content, Imphal can rightfully be regarded as one of the most potent warships to have been constructed in India (Mehrotra, 2023). Due to speed, maneuverability, stealth technology, punitive firepower, and an advanced air defence system, the destroyer has an exceptional standing in the Indian naval arsenal. This indigenously built lethal component of the Indian Navy has increased the strategic standing of the Indian Navy in the Indian in Indian Ocean Region and beyond. It also incorporates two multirole, indigenously built American MH-60R helicopters on deck (Mayank, 2023).

ii. **The Delhi-class destroyers** were built from 1987 to 2001 and commissioned in the Indian Navy in 1997. Their displacement weight is around 6,200 tons with a best speed of 32 knots (around 59 kilometers per hour). It has BEL Ajanta Mk2 ESM Electronica TQN-2 Jammer for electronic warfare, and it carries two Sea King Mk 42B helicopters on board (Kulkarni, 2023). The several weapons and sensors of these destroyers are being modernized and upgraded from April 2022. New missile systems, air defence systems, and radar shall be replaced for better maneuverability and performance in war situations. The destroyers are equipped with a variety of weapons for advanced anti-submarine, anti-surface, and anti-air warfare capabilities in all weathers. They are among the most advanced floating war machines capable of engaging threats from all domains.

iii. **The Kolkata-Class or Project 15A** are a class of Indian destroyers which are indigenously built from 2003 to 2015 and commissioned in the Indian Navy since 2014. They are succeeded by the Visakhapatnam class of Indian destroyers, and their estimated cost is US$ 660 million per ship in 2020. India currently has three Kolkata-class destroyers active in its naval fleet. Their displacement weight is 7,400 tons, and their best speed is 30 knots (around 33 kilometers per hour). The first Project 15B destroyer, the Visakhapatnam, was laid down in 2015 and commissioned in 2022 by the Indian Navy (Wertheim, 2024). Each destroyer is equipped with BEL Ellora electronic support

measures for electronic warfare and can carry two Sea King or HAL Dhruv helicopters onboard. The destroyer has blending capabilities across the board to deal with war-like situations.

iv. **The Rajput-Class Destroyers** are a class of Indian destroyers that are the transformed version of the former Soviet Kashin-class destroyers. It was decommissioned by Moscow, and later the same was shifted to India with its new design and modifications. The modifications were mostly made in the design, weapons, and combat system of the ship. India had five Rajput-class destroyers in service, and two destroyers were retired from the destroyer decommissioned from Indian naval service on May 21, 2021. The total displacement weight is 3,950 tons, and its best speed is 35 knots (65 kilometers per hour). The destroyer carries one Kamov Ka-28 or two HAL Cheetah helicopters onboard for operational and escort missions (Janyala, 2021).

Project 17-A: Frigates

The word frigate was initially pronounced or used to describe any fast, lightweight, low-armored and maneuverable warship. In 16th-century Spain, it was a type of galley, whereas in 17th century Dunkirk, it referred to a small sailing privateer, but during the 18th century, the term came to be applied to a very specific type of vessel (Allan, 2023). A frigate is a seagoing escort ship intermediate in size between a destroyer and a corvette. Frigates are the most imperative warships developed and evolved since the age of sails. They were designed and built to act as a formidable opponent in the seas for the outnumbered enemies with firepower. The vessel carries huge supplies and can sail independently for more than six months in the high seas for war and scouting. These ships were not as powerful or swift; rather, they were built for scouting, curbing piracy and defending merchant ships.

India has also commissioned Shivalik Class or Project 17 Frigates to the Indian Navy for defence and scouting purposes. The advanced stealth features and land attack features were introduced, which were not available in the previous **Talwar Class Frigates.** Project 17 was conceived in the 1990s, and the required frigates were indigenously built at Mazagon Dock Limited, Mumbai. The first three stealth frigates of Project 17, Shivalik Class, were started building in 1999 and were commissioned in the Indian Navy by 2012. They have a mix of indigenous, Russian, and western weaponry systems and sensor systems, including the Russian Shtil surface-to-air missile system, Klub anti-ship cruise missiles, and the Israeli Barak-I missile defence system (Technology, 2009). Their stealth features, structure, system, and engines are modified in such a way that they are less detectable to the enemies.

The Nilgiri Class Frigates or Project 17 Alpha Frigates are India's most advanced stealth frigates. They are indigenously built by Mazagon Dock Shipbuilders (MDS) and Garden Reach Shipbuilders & Engineers (GRSE), and two of them, "Surat" and "Udaygiri," which are built by MDS, shall be commissioned in the Indian Navy (Dhar, 2022). The Mazagon Dock Shipbuilders will build 4 ships, while GRSE will build the remaining three. Their integrated modern design will ensure a reduced radar signature and shall give operational maneuverability during escort missions. It is 28kn (52 kilometers per hour). The vessel is equipped with an advanced weaponry system. The forward bow deck is equipped with an Oto Melara 127mm naval gun system that has an effective firing range of 30 km, two AK-630 close-in weapon systems for defence onboard (Deshpande, 2022). The AK-630 to defend the boat from anti-ship missiles and guided weapons, aircraft, vessels, shore-based targets, and floating mines. Each frigate is equipped with eight BrahMos Surface-to-Air Missiles (SAM) and 32 Barak 8 missile systems. BrahMos is a vertically launched medium-range supersonic cruise missile with an effective range of 500 km (Singh R. , 2022). The two RBU-6000 ASW rocket launchers and two triple-torpedo tubes give the Frigate Anti-Submarine-Warfare (ASW) system (Satam, 2024).

Corvettes: ASW

Corvettes are small warships. These are the smallest class of warships that are used for naval warfare. Frigates are known as traditionally bigger warships than Corvettes, whereas sloop-of-war are smaller than Corvettes, which usually have a single gun deck and commonly carry 18 to 20 guns. The Corvettes are primarily used for Coastal patrol, escort missions, piracy, surveillance, and small-scale naval warfare. The traditional corvettes weigh between 500 and 2000 tons; however, the modern corvettes weigh up to 3000 tons with a hangar for helicopter landing. They are also deployed for anti-submarine warfare (ASW) missions.

The Indian ASW Corvettes are a class of anti-submarine Warfare corvettes which are currently built by the Indian Navy. The 16 ASW Corvettes are planned to be built, and 14 are under construction that shall be commissioned in the Indian Navy. The total cost of this project is around US$ 1.6 billion. The corvettes will have a weight of 700 tons with a speed of 25 knots (around 46 km per hour). The vessel shall be equipped with one RBU-6000 anti-submarine rocket launcher and two sets of lightweight torpedo-tube-launchers for anti-submarine torpedoes for hunting down the enemy submarines (Mundhra, 2023). The armament of corvettes is mostly different and varies with respect to its mission requirements and technology. India is strategically focused on indigenous building, maintenance, and production of advanced ammunition. Therefore, the advanced corvettes shall have even more sophisticated weaponry systems and sensors tailored to handle the situation and also to face maritime challenges. The vessels are also equipped with one small caliber cannon (30mm CRN-91) and two 12.7 mm M2 “Stabilized Remote Controlled Gun” Remote-Weapon Stations (RWS) (Maritime, 2021). Indian Navy is currently operating Veera-Class Corvettes, and in the future they are planning to indigenously build and commission advanced Abhay-Class Corvettes with modern firepower and missile capabilities.

Air Defence System for Indian Navy

The countries deploy various types of air Defence Systems to protect their naval assets, fleet, and valued installations from external threats. These threats can be from enemy fighter jets, helicopters, or missiles. The modern navies deploy numerous air defence systems to counter strategic deliberations by the enemy.

The air defence system of the Indian Navy is designed to intercept any airborne threat to its fleet, and it has been technically and tactically modernized over time for increased scope and operational need. The primary objective of the air defence system is to ensure control of airspace from any external intervention, and secondly, to protect the strategically significant units and naval assets at littoral and offshore. The naval air defence system has rapidly modernized after 1958 due to tactical advancements in the war strategies and weapon systems. Some of the recently rationalized Indian Air Defence systems are categorized and described as follows.

Surface-to-Air Missiles (SAMs)

The strong navies use several Surface to Air Missiles (SAM) to defend themselves from external threats. The SAM-based defence system protects the valuable assets from attack with swiftness and accuracy by neutralizing it. India has adopted a number system in collaboration with its foreign allies, including the United States, Russia, France, and Israel. The strategically important air defence system deployed by the Indian Navy is described as follows.

Barak – 8, Medium-Range Surface-to-Air Missile (MR-SAM)

Barak-8, also known as Medium-Range Surface-to-Air Missile (MR-SAM) is an Indo-Israel joint venture. This missile and air defence system was developed in a close collaboration between India's Defence Research & Development Organization (DRDO) and Israel Aerospace Industries (IAI). It is a surface-to-air missile (SAM), designed and developed to deter airborne threats of any type. The missile is versatile, and this feature increases its ability of inclusive fortification of naval assets against all type of airborne threats. The key features and capabilities of Barak-8 includes its long-range interception since its engagement range enables early detection and engagement of airborne threats. It can detect, track, intercept, and neutralize the threats miles away from the perimeter. The advanced surveillance and tracking radar system allows it to track and engage the target with precision and accuracy. The Barak-8 is one of the most flexible air defence system that can easily be deployed on any type of naval fleet unit and provides a multilayered defence system with the ability to intercept sea-skimming missiles. India has equipped its destroyers, aircraft carrier, and other corvettes with Israeli made Barak-8 surface-to-air (SAM) missiles (Zur, Magal, & Kedem, 2012).

BrahMos Supersonic Cruise Missile

BrahMos is a medium-range supersonic cruise missile which can be launched from surface, air, submarine, airborne units, and land. It is believed as the world's fasted moving cruise missile in the world especially at the time it was first tested and introduced. The different versions of land and ship-launched missiles were in use for over a decade; however, the first air-launched version of BrahMos was first successfully tested in 2012 and came in service in 2019. Now the most advanced hypersonic versions are under observation and experimentation phases and expected to be tested by 2024 with a fast and accurate aerial strike capability. BrahMos is a joint venture of India and Russia. The first experience of launching this missile from a submarine was carried out on 20th March, 2013, in the Bay of Bengal by the Visakhapatnam submarine (Singh M. , "India to complete largest defence export deal; BrahMos missiles set to reach Philippines", 2024). India is continuously upgrading the sea-to-sea variant of BrahMos in close collaboration with Russia as well.

VL-SRSAM

VL-SRSAM is a Vertically Launched, Short Ranged Surface to Air Missile system commissioned and used by the Indian Navy. It is a fast, reactive, and vertically launched surface-to-air missile system developed by the Defence Research and Development Organization (DRDO) of India (Rout, 2021). It was expected that the missile will replace the initial Barak-1 surface-to-air missile in the future. The missile is capable of neutralizing a number of diverse aerial threats of short and medium range with punitive accuracy and ensuring 360-degree interception. The advanced technology ensures that this air defence shall be one response to all airborne threats, and its second generation will warrant its maneuverability in all weathers.

MRSAM

The Medium Range Surface to Air Missile (MRSAM) is jointly developed by the Defence Research and Development Organization (DRDO) of India and Aerospace Industries (IAI) of Israel for anti-ship targeting and interception of all the airborne threats, including helicopters, aircrafts, drones and missiles (Rao, 2023). The MRSAM is a medium-range missile covering not more than a distance between 50 to 70 kilometers. The missiles are remotely guided and operated with an advanced radar system enabling them for detection, accuracy, and flawless identification of the target. MRSAM gives versatility to the Indian Navy and other armed services as well. In 2009, India signed a bilateral agreement with Russia for the

development of MRSAM under a Rs. 10,000 crores projects to replace IAF's ageing Soviet-made Pechora SAM missiles (Gross, 2019). The same shallow missiles are planned to be deployed on Project 15B destroyers and other naval ships.

Close-in Weapon System (CIWS)

Close in Weapon System (CIWS) is an air defence system based on an automated gun that is designed with the purpose to provide close-range defence against anti-ship missiles, drones and aircraft. It's a point defence system which contains radars, computers, sensors, and multiple-barrel rotary firing cannons to detect short-range incoming aircraft or missiles and target them.

Kashtan CIWS

Kashtan Close-In Weapon System (CIWS) is a modern Russian naval air defence system based on automatic gun and missile firing systems with swiftness and accuracy. Russia has deployed this advanced air defence system to its aircraft carriers and other main battle ships for its strategic defence. It ensures the instantaneous hunting of airborne units with precision and punitive strikes. It provides defence against the lethal missiles, aircraft, UAVs, guided bombs, aa computer-controlled other imminent airborne objects. It fires 4500 rounds per minute with deadly accuracy, a computer-controlled and radar guided system (Gupta P. , 2023). CIWS is the last line of defence against the airborne units coming near the ship. It fires rounds and missiles at high speed with deadly accuracy. The high speed and precision give this weapon an edge in the air defence system of the navy. It is pronounced as one of the most lethal weapons in the naval arsenal of any country. It helps in defending the objects from any airborne incursions to the ships.

Anti-Aircraft Guns

The primary purpose of anti-aircraft guns is to defend the naval assets from any type of airborne attacks, including missiles and aircraft. These guns are the vital units of the Indian Navy and are designed to quickly respond to the incoming object and deter it with a high-caliber, multiple-barreled rotary cannon, which synchronizes the firing sequence. The modern anti-aircraft guns are connected with radar for accuracy and punitive capabilities. In modern times, anti-aircraft guns are the most strategically important unit of the air defence system. They provide a strategic edge in close combat with the airborne units. They are used for point defence, deterrence, and protection of naval units with reliability and steadfastness.

40 mm Automatic Gun L/70

The 40 mm automatic gun L/70 is a naval anti-aircraft gun used to deter airborne units in close combat. The gun can easily be used on different types of naval vessels to deter attack from helicopters, fighter jets, UAVs, and anti-type missile attacks. The gun has different types of ammunition for armor piercing and also with explosive material as well. The gun is capable of firing rounds in fully automatic and articulated mode and ensures continuous firing until the ammunition is available and the trigger is engaged for firing. The rapid firing capabilities allow this gun to fire thousands of shells in seconds. India has been using this gun on its naval units and also on coastlines for the last two decades, especially after the Mumbai attacks (Vyas, 2009). The guns are installed to counter attacks on the naval vessels and also on the Mumbai coastline. India is also using this gun on its aircraft carriers, destroyers, and other naval units as an air defence system.

Electronic Warfare (EW) System

The electronic warfare (EW) System is based on the technology used to deceive, betray, and disrupt the enemy aircraft, helicopters, and missiles from targeting the vital naval assets. The EW Systems are based on communication and radar systems that control and counter enemy airborne units from taking valuable targets. The Electronic Warfare (EW) System includes a Radar Jamming System to jam the radars of enemy aircraft, Electronic Support Measures (ESM) to detect and identify enemy aircraft, and a Decoy system which confuses the enemy aircraft. The Communication Jamming Systems are also used to block the communication source and channel of the enemy aircraft with its base. India has signed a deal with Bharat Electronics Limited costing 250 crore Indian Rupees for the development and procurement of advanced equipment for naval warfare, including an advanced Electronic Warfare System to ensure naval deterrence, and a sensor-enabled fire detection system to safeguard its naval assets (Rautela, 2022).

Shakti

India has developed an Electronic Warfare (EW) System called ***Shakti.*** It is aimed to provide an electronic layer of protection and is developed with the purpose of interception, detection, classification, identification, and jamming of conventional and modern radars (Negi, 2021). The system is indigenously built by India as part of the Defence Research and Development Organization (DRDO) at the Defence Electronics Research Laboratory in Hyderabad. The program is equipped with one of the most advanced technologies employed by Indian scientists that ensures the recording of data and a close connection with the radar system.

Indian Naval Exercises

Indian Navy conducts naval exercises aimed to hone mobilization, enhance its professional skills, and learn from the experiences of other navies. They help in learning new practices and procedures during warlike situations. Military diplomacy is an important tool of modern political strategy and statecraft. The bilateral and multilateral naval exercises are now going up like leaps and bounds with respect to complexity and quantity.

Malabar Naval Exercises (2015-2023)

The annual Malabar Naval Exercises (2015-2023) are involved and practiced among the United States, India, and Japan as permanent members, which include submarine warfare, maritime interdiction operations, counter piracy, and amphibious assault operations to modernize the combat skills of the navy. All the maritime war machines from corvettes to aircraft carriers, the navy's arm and the navy's air defence system are deployed during the exercises. The primary objective of these naval exercises was to counter the increasing role of Chinese submarines in the Indian Ocean Region (IOR), surface warfare, medical evacuation, and escorting (Iqbal, 2017).

VARUNA-223

The annual VARUNA-2023 is the bilateral naval exercises, which are practiced by India and France on the western seaboard. The exercises continued from 16th to 20th of January 2023 and included tactical maneuvers, air defence exercises, surface to air, and different maritime escort and piracy operations (Anand, 2023). The naval exercises are mostly based on the typically practiced drills, including surface and submarine warfare, escort and evacuation missions, workshops and strategy courses, and medical and rescue missions.

IN-BN CORPAT

IN-BN CORPAT are the joint naval patrolling exercises between India and Bangladesh, which were undertaken along the international Maritime Boundary Line (IMBL) from 22nd May to 23rd May 2022. The exercises are mainly based on patrolling and traversing the coastlines in the Bay of Bengal and India Ocean. The drills increase the functional expertise of guarding and protecting the coastlines from external interventions and piracy.

JIMEX

The sixth edition of bilateral maritime exercises "JIMEX" was conducted from September 11, 2022, between India and Japan. The series of these naval exercises started in 2012, which marked the 50th anniversary of diplomatic relations between the two countries.

AUSINDEX-21

Ausindex 21 is an Indo-Australia joint naval exercise that was practiced from 6th to 10th of September 2021. The naval exercises included the Indian Destroyers, corvettes, and recently commissioned diesel electric submarine of the Scorpene or Kalvari-class. India's deployment of submarines to Australia for naval drills reflects exceptional significance and an extended demonstration of operational capability in that part of the world. India has inked several bilateral memorandums with Australia, from training, joint exercises to transfer of technology and logistics under its comprehensive maritime cooperation (Panditt, 2023).

JGSDF-2023

The Indo-Japan Joint Training Exercise "Dharma Guardian" was conducted from 17th February to 02 March, 2023 in Shiga province, Japan. The troops of the Garhwal Rifles Regiment of the Indian Navy and Japan Ground Self-Defence Force (JGSDF) have participated in the exercises to augment the best practices, strategic tactics, and for integrated surveillance grids (Rajagopalan, 2023).

IMCOR

IMCOR, the bilateral naval exercises (series) between India and Myanmar. The exercises were conducted from 14th to 18th March, 2018, at Port Blair, in the Bay of Bengal. Additionally, the two countries have also agreed to sign the (SOP) for India-Myanmar Coordinated Patrol (IMCOR) at the Tri-Service Headquarters in Port Blair in the Andaman and Nicobar Islands following the fourth iteration of their coordinated patrols (Parameshwaran, 2016).

Naseem Al-Bahar

In 2022, bilateral maritime naval exercises of the series titled Naseem Al Bahr were conducted between the Indian Navy (IN) and the Royal Navy of Oman (RNO). The exercises continued for five days at the coast of Oman from 19th to 24th November 2022. The exercises revealed the close relations of the two countries and the manifestation of bilateral static relations on trust and goodwill. The exercises were conducted to ensure the enhancement of bilateral relations, operations on the harbor, and a biennial report between the two countries (Shah, 2023).

INDRA NAVY

In 2023, joint maritime exercises titled "INDRA NAVY" were conducted between India and Russia. This series of bilateral naval exercises started in 2003 and was tasked to boost bilateral cooperation in naval strategy, security, and to boost cooperation between the two countries. These exercises were carried out in the Indian Ocean Region (IOR).

SLINEX

In 2022, the bilateral naval exercises titled "SLINEX" were conducted between India and Sri Lanka from 7th to 10th March, 2023 at the Bay of Bengal and also at Trincomalee, Sri Lanka. In these exercises, four ships and two aircraft from Sri Lanka, and two ships and one P-8I Orion maritime reconnaissance and domain awareness participated. In these exercises, Sri Lanka fielded an offshore patrol vessel and a training ship while India brought two indigenously built corvettes, along with onboard helicopters and an indigenously built Dornier 228 short-range maritime reconnaissance aircraft (Rej, 2020).

CORPAT

In 2021, the 31st edition of "Indo-Thai CORPAT" took place from 12 to 14 November 2021. The exercises were conducted between the Indian Navy and the Royal Thai Navy. The exercises are three-day, bi-annually Indo-Thai naval patrol exercises in which Indian offshore patrol vessel Saryu and Thailand's Krabi patrol vessel have participated (Sharma R. , 2021). Dornier patrol aircraft also accompanied the patrol ships of two countries. The exercises were aimed at enhancing the professional capabilities of patrolling and guarding the offshore and to learn from the experiences of each other.

KONKAN

"Konkan" exercises are the annual bilateral naval exercises between the Royal Navy of the United Kingdom and the Indian Navy. Multiple naval drills, piracy operations, anti-submarine warfare, and other exercises cover almost all the domains of air, surface, subsurface, and underwater operations. These exercises are aimed at increasing the professional viability of the navies and ensuring maritime security. The two forces integrated within their groups with exercises including replenishment at sea approaches, air direction and strike operations with fighter aircraft (MiG 29Ks and F35Bs and helicopters (Sea King, Chetak, and Wildcat) transiting through war at sea scenarios (Bose, 2021).

CONCLUSION

India's naval modernization is primarily aimed at expanding its influence and dominance in the blue waters of the Indian Ocean Region (IOR). The rapidly modernizing its naval posture is not confine to its coastal defence and safeguarding its maritime trade route, rather it is aimed to dominate the IOR. India's geostrategic conflict with China is driven by its unresolved geographical issues in Aksai Chin (under Chinese but claimed by India) and Arunachal Pradesh (administered by India but claimed by China). Pakistan's 90% trade depends on maritime routes; any disruption or blockade of these sea lines of communication could trigger severe energy, economic, and strategic crises. India's naval modernization, therefore, presents both direct and indirect threats to Pakistan's key maritime interests. The ports of Gwadar and Karachi geostrategic assets for Pakistan which are under direct threat from Indian Navy. Pakistan must enhance its maritime capabilities and prioritize naval modernization to strengthen its navy to safeguard its maritime interests and ensure the security of its coastline. Although Pakistan has achieved strategic parity in land and air power, it must also develop a comprehensive counter-strategy to secure its maritime domain and deter any potential Indian aggression. Additionally, Pakistan should develop a sea-

based nuclear capability. Major nuclear powers, including the United States, Russia, and China, have developed credible sea-based second-strike capabilities that provide them with a robust strategic deterrent and enhance their overall military credibility. This capability ensures the ability to respond to a nuclear attack under adverse circumstances with a guaranteed retaliatory strike. Pakistan should also modernize its naval force to ensure effective deterrence to India and strengthen regional alliances.

REFERENCES

Abraham, D. (2016). *China's Role in the Indian Ocean.* New Delhi: Vij Books India.

Allan, P. K. (2023, April). *The Evolution of Frigates in the Age of Sail*. Retrieved from U.S Naval Institute: https://www.usni.org/magazines/naval-history-magazine/2023/april/evolution-frigates-age-sail

Anand, S. (2023, January 16). *"Varuna 2023: India, France begin joint naval exercises"*. Retrieved from www.livemint.com: https://www.livemint.com/news/india/varuna-2023-india-france-begin-joint-naval-exercises-11673877565889.html

Anandan, S. (2013, December 03). "Navy to extend life of six ageing submarines". *the Hindu*, pp. https://www.thehindu.com/news/navy-to-extend-life-of-six-ageing-submarines/article5418751.ece.

Ashraf, A. (2020, July 31). *Militarization of Indian Ocean and its Implications on Pakistan*. Retrieved from Modern Diplomacy All Views, All Voices: https://moderndiplomacy.eu/2020/07/31/militarization-of-indian-ocean-and-its-implications-on-pakistan/

Banerjee, A. (2021, September 08). "Pakistan 'Races Ahead' Of India In Drone Technology; Is 4th Country To Deploy UCAVs In Combat Ops". *The EurAsian*, pp. https://www.eurasiantimes.com/pakistan-races-ahead-of-india-in-drone-technology-is-4th-country-to-deploy-ucavs-in-combat-ops/.

Bedi, R. (2021, December 30). *"India Quietly Launches Third Arihant-Class Nuclear-Powered Submarine: Report"*. Retrieved from www.thewire.in: https://thewire.in/security/india-quietly-launches-its-third-arihant-class-nuclear-powered-submarine-report

Bhattacharjee, S. (2022, January 4). "Third Arihant class submarine quietly launched in November". *the HIndu*, pp. https://www.thehindu.com/news/national/andhra-pradesh/third-arihant-class-submarine-quietly-launched-in-november/article38103275.ece.

Bisht, I. S. (2022, January 05). *"India Launches Indigenous Nuclear Submarine "*. Retrieved from the Defence Post: https://www.thedefensepost.com/2022/01/05/india-launches-nuclear-submarine/

Bose, M. (2021, October 26). *"Indian, Royal navies participate in Konkan Shakti exercise"*. Retrieved from www.deccanherald.com: https://www.deccanherald.com/india/indian-royal-navies-participate-in-konkan-shakti-exercise-1044326.html

Brewster, D. (2010). An Indian Sphere of Influence in the Indian Ocean? *Security Challenges, Vol. 6, No. 3*, 1-20.

Buzan, B., & Hansen, L. (2009). *The Evolution of International Security Studies.* London: Cambridge University Press.

Chaudhary, M., Zaighum, D., & Ali, M. F. (2024). Information Warfare and Twitter: a Nexus of Indian Shadow Networks on Balochistan Issue. *NDU Journal,*, 16-35.

Chaudhury, R. R. (2000). India's Maritime Security. *India International Centre*, Vol. 26, no. 1 (Winter 1998/Spring 1999), pp. 129-139.

Chopra, A. (2021, August 4). *"The Formidable General Atomics MQ-9 Reaper for Indian Armed Forces"*. Retrieved from the Airpower Asia: https://airpowerasia.com/2021/08/04/the-formidable-general-atomics-mq-9-reaper-for-indian-armed-forces/

Defence, U. (2020). *Military and Security Developments Involving the People's Republic of China: Annual Report to Congress.* Washington D.C: Office of the Secretary of Defence.

Deshpande, A. (2022, September 11). "Third stealth frigate of project 17A 'Taragiri' launched". *the Hindu*, pp. https://www.thehindu.com/news/national/indian-navy-launches-stealth-frigate-taragiri/article65878683.ece.

Dhar, A. (2022, May 17). "Rajnath Singh launches India-made 'Surat' and 'Udaygiri' warships in Mumbai". *the HIndustan Times*, pp. https://www.hindustantimes.com/india-news/rajnath-singh-launches-india-made-surat-and-udaygiri-warships-in-mumbai-101652772792074.html. Retrieved from https://www.hindustantimes.com/india-news/rajnath-singh-launches-india-made-surat-and-udaygiri-warships-in-mumbai-101652772792074.html

Domville-Fife, C. W. (1910). *Submarines of the World's Navies.* London: Francis Griffiths.

Gady, F.-S. (2019, March 05). "India, Russia To Sign $3 Billion Nuclear Sub Deal This Week". *the Diplomat*, pp. https://thediplomat.com/2019/03/india-russia-to-sign-3-billion-nuclear-sub-deal-this-week/.

Garg, A. (2022, August 04). "Meet Indian Navy's MH-60R 'Romeo' SEAHAWK helicopter, world's most advanced maritime chopper: IN PICS". *www.zeenews.com*, pp. https://zeenews.india.com/photos/india/meet-indian-navys-mh-60r-romeo-seahawk-world-s-most-advanced-maritime-helicopter-in-pics-2493315.

Gresh, G. (2020). *To Rule Eurasia's Waves: the New Great Power Competition at Sea.* London: Yale University Press.

Gross, J. (2019, January 25). "India successfully tests ship-borne air defense system created with Israel". *the Times of Israel*, pp. https://www.timesofisrael.com/india-successfully-tests-ship-borne-air-defense-system-created-with-israel/.

Gupta, P. (2023, April 06). "Hi-Tech Defenders". *Force (National Security and Aerospace News Magazine)*, pp. https://forceindia.net/feature-report/hi-tech-defenders/.

Gupta, S. (2021, March 24). "For Navy, 6 nuclear-powered submarines take priority over 3rd aircraft carrier". *the Hindustan Times*, pp. https://www.hindustantimes.com/india-news/for-navy-6-nuclear-powered-submarines-take-priority-over-3rd-aircraft-carrier-101616564522467.html.

Gurung, S. K. (2016, October 15). "Kamov helicopter deal between India and Russia". *the Economic Times*, pp. https://economictimes.indiatimes.com/infrastructure/kamov-helicopter-deal-between-india-and-russia/slideshow/54869777.cms.

Iqbal, A. (2017, July 10). "US terms India, Japan natural partners as naval exercises begin". *the Dawn*, p. https://www.dawn.com/news/1344298.

Jalil, G. Y. (2016). Analysis of Indian Naval Capabilities: Implications for Pakistan. *Islamabad Strategic Studies Institute (ISSI)*, .

Janyala, S. (2021, May 21). "INS Rajput, Indian Navy's first destroyer, to be decommissioned today after 41 years of service". *the Indian Express*, pp. https://indianexpress.com/article/cities/hyderabad/ins-rajput-indian-navys-first-destroyer-to-be-decommissioned-today-after-41-years-of-service-7324232/.

Joe, R. (2021, August 04). A Tale of 2 Navies: India and China's Current Carrier and Escort Procurement. *the Diplomat*, pp. https://thediplomat.com/2021/08/a-tale-of-2-navies-india-and-chinas-current-carrier-and-escort-procurement/.

Kadidal, A. (2022, November 15). *"Six MH-60R multirole helicopters delivered to Indian Navy"*. Retrieved from JANES: https://www.janes.com/defence-news/news-detail/six-mh-60r-multirole-helicopters-delivered-to-indian-navy

Kass, H. (2023, November 16). *"Russia's Kilo-Class Submarine Is Called the 'Black Hole' For a Reason"*. Retrieved from www.nationalinterest.org: https://nationalinterest.org/blog/buzz/russias-kilo-class-submarine-called-black-hole-reason-207318

Kaushik, K. (2022, February 25). "Explained: P-8I, the Indian Navy's frontline multi-mission aircraft". *the Indian Express*, pp. https://indianexpress.com/article/explained/explained-p-8i-indian-navy-boeing-aircraft-7790672/.

Khan, C. M. (2010). Strategic and Regional Implications of Indian Naval Expansion. *NDU Journal*, 104-131.

Khan, Z., & Khan, Z. (2020). *India's Evolving Deterrent Force Posturing in South Asia: Temptation for Pre-emptive Strikes, Power Projection, and Escalation Dominance.* Singapore: Palgrave Macmillan.

Khattak, D. M. (2019). Indian Military Modernisation: Implications for Pakistan. *Strategic Studies, Vol. 39, No. 1*, 20-40.

Khurana, G. (2018). *Relevance of Aircraft Carriers for India: An Assessment.* New Delhi: National Maritime Foundation (NMF).

Kulkarni, S. (2023, December 26). "INS Imphal commissioned: Its capabilities, and the strategic significance of Visakhapatnam class of destroyers". *the Indian Express*, pp. https://indianexpress.com/article/explained/ins-imphal-commission-indian-navy-explained-significance-9082936/.

Kurmeloves, R. (2021, September 16). "What are nuclear-powered submarines, anyway? A guide to Australia's looming military addition". *the Guardian*, pp. https://www.theguardian.com/australia-

news/2021/sep/16/what-are-nuclear-powered-submarines-anyway-a-guide-to-australias-looming-military-addition.

Macdonald, R. (2021). *Task Force 58: The US Navy's Fast Carrier Strike Force that won the war in the Pacific.* London: Frontline Books, p. 1.

Maritime, B. (2021, December 29). *"INDIAN NAVY'S FIRST INDIGENOUSLY BUILT MISSILE CORVETTE RETIRED FROM SERVICE"*. Retrieved from the Barid Maritime: https://www.bairdmaritime.com/security/naval/naval-ships/indian-navys-first-indigenously-built-missile-corvette-retired-from-service/

Mayank. (2023, December 27). "Navy commissions stealth destroyer INS Imphal". *the New Indian Express*, pp. https://www.newindianexpress.com/nation/2023/Dec/27/navy-commissions-stealth-destroyer-ins-imphal-2645286.html.

Mearsheimer, P. (2001). *The Tragedy of Great Power Politics.* New York: Norton.

Mehrotra, V. (2023, December 26). INS Imphal, India's first warship named after a northeastern state, commissioned. *India Today News Desk*, pp. https://www.indiatoday.in/india/story/ins-imphal-commissioned-defence-minister-rajnath-singh-first-to-be-named-after-place-in-northeast-2480604-2023-12-26.

Mohan, C. R. (2012). *Samudra Manthan: Sino-Indian Rivalry in the Indo-Pacific.* Washington: Carnegie Endowment for International Peace.

Mukherjee, A., & Mahan, C. R. (2015). *India's Naval Strategy and Asian Security.* London: Routledge Taylor & Francis Group.

Mundhra, S. (2023, March 27). "Touted As 'Game-Changer', What Are Indian Navy's 'Anti-Submarine Warfare Shallow Water Crafts'?". *the Eurasian Tiles*, pp. https://eurasiantimes.com/touted-as-game-changer-what-are-indian-navys-anti-submarine-warfare-shallow-water-crafts/.

Negi, M. (2021, November 19). "PM Modi to hand over DRDO's electronic warfare system 'Shakti' to Indian Navy on Friday". *the India Today*, pp. https://www.indiatoday.in/india/story/pm-modi-drdo-electronic-warfare-system-shakti-indian-navy-1878399-2021-11-18.

Nizamani, S. (2014). India's Emerging Indian Ocean Strategy. *Islamabad Policy Research Institute (IPRI) Journal XIV, No. 1*, 66-80.

Osborne, E. (2005). *Destroyers: an illustrated History of their Impact.* California: ABC-CLIO.

Panditt, R. (2023, August 19). "In a first, Indian submarine deployed all the way to Australia". *the Times of India*, pp. https://m.timesofindia.com/india/in-a-first-indian-submarine-deployed-all-the-way-to-australia/articleshow/102861277.cms.

Pant, H. V. (2012). *The Rise of the Indian Navy: Internal Vulnerabilities, External Challenges.* New Delhi: Routledge.

Parameshwaran, P. (2016, February 23). "India, Myanmar Ink New Naval Patrol Pact". *the Diplomat*, pp. https://thediplomat.com/2016/02/india-myanmar-ink-new-naval-pact-on-coordinated-patrols/.

Peri, D. (2023, December 31). "INS Imphal | Guided missile destroyer". *the Hindu*, pp. https://www.thehindu.com/news/national/ins-imphal-guided-missile-destroyer/article67690931.ece.

Polmar, N. (2008). *Aircraft Carriers: a History of Carrier Aviation and its Influence on World Events, Volume II: 1946-2006.* Wanshington D.C: Potomac Books, Inc.

PTI. (2023, February 15). "HAL to provide MRO support for General Atomics' MQ-9B drone engines". *the Economic Times*, pp. https://economictimes.indiatimes.com/news/defence/hal-to-provide-mro-support-for-general-atomics-mq-9b-drone-engines/articleshow/97938465.cms.

Radyuhin, V. (2006, July 01). "Russia may lease nuclear submarine to India". *the Hindu,* p. https://web.archive.org/web/20060717105158/http://www.hindu.com/2006/07/01/stories/2006070118091800.htm.

Raghuvanshi, V. (2022, May 16). *India halts Ka-31 helicopter deal with Russia*. Retrieved from www.defencenews.com: https://www.defensenews.com/global/asia-pacific/2022/05/16/india-halts-ka-31-helicopter-deal-with-russia/

Rajagopalan, R. P. (2023, February 29). "India-Japan 'Dharma Guardian' Exercise ". *the Diplomat*, pp. https://thediplomat.com/2024/02/india-japan-dharma-guardian-exercise/.

Ramkumar, K., & Panneerselvam, P. (2023). "Indian Navy's Submarine Development Programme: A Critical Assessment. *Journal of Asian Security and Internatinal Affairs, Volume 10, Issue 3*, 395-416.

Rao, L. N. (2023, March 07). "Watch | Indian Navy successfully tests Medium Range Surface-to-Air Missile from INS Visakhapatnam". *the HIndustan Times*, pp. https://www.hindustantimes.com/india-news/watch-indian-navy-successfully-tests-medium-range-surface-to-air-missile-from-ins-visakhapatnam-101678170366178.html.

Rautela, I. (2022, July 22). *"BEL signs ₹250-cr deal with Defence Ministry to supply anti-submarine warfare systems"*. Retrieved from www.thehindubusinessline.com: https://www.thehindubusinessline.com/companies/bel-signs-250-cr-deal-with-defence-ministry-to-supply-anti-submarine-warfare-systems/article65671073.ece

Rej, A. (2020, October 21). "India and Sri Lanka Complete Bilateral Naval Exercise". *the Diplomat*, pp. https://thediplomat.com/2020/10/india-and-sri-lanka-complete-bilateral-naval-exercise/.

Rout, H. K. (2021, February 22). "Maiden test of Vertically Launched SRSAM from ITR off Odisha coast likely today". *the New Indian Express*, pp. https://www.newindianexpress.com/states/odisha/2021/Feb/22/maiden-test-of-vertically-launched-srsam-from-itr-off-odisha-coast-likely-today-2267271.html.

Saeed, M., & U, J. (2020). India's naval expansion and strategic partnership with the us in the Indian ocean region: implications for Pakistan. *Margalla Papers, 24(1)*, 67-80.

Sagar, P. (2023, July 12). "How Spain's entry, after Germany, boosts India's Project 75 submarine programme". *the India Today*, pp. https://www.indiatoday.in/india-today-insight/story/how-spains-entry-after-germany-boosts-indias-project-75-submarine-programme-2405349-2023-07-12.

Sakhuja, V. (2013, April 21). "P-3C vs. P-8I: India, Pakistan and the Naval Balance". *Institute of Peace and Conflict Studies (IPCS)*, p. http://www.ipcs.org/comm_select.php?articleNo=3889.

Satam, P. (2024, May 22). "Innovation Or Desperation? Russia Mounts Anti-Submarine RBU-6000 Rocket Launcher On Tracked Vehicle". *the EurAsian*, pp. https://www.eurasiantimes.com/innovation-or-desperation-russia-mounts-anti-submarine-rbu/.

Schuster, C. O. (2024, May 02). "Aircraft carrier Fujian's sea trials mark China's coming naval challenge". *the Washington Post*, pp. https://www.washingtontimes.com/news/2024/may/2/aircraft-carrier-fujians-sea-trials-mark-chinas-co/#:~:text=The%20Fujian's%20electromagnetic%20aircraft%20launch,Elizabeth%2Dclass%20vessels%20and%20France's.

Shah, R. (2023, September 09). *"Implementation of Major Joint Naval Exercise Naseem Al Bahr-XIV Commences"*. Retrieved from the bnnbreaking.com: https://bnnbreaking.com/breaking-news/implementation-of-major-joint-naval-exercise-naseem-al-bahr-xiv-commences/

Sharma, R. (2021, June 10). "India, Thailand navies' three-day coordinated patrol exercise gets under way in the Andaman Sea". *the Daily Frontline*, pp. https://frontline.thehindu.com/dispatches/india-thailand-navies-three-day-coordinated-patrol-exercise-gets-under-way-in-the-andaman-sea/article34776434.ece.

Sharma, R. (2024, May 23). "Indian Navy's Indigenous Aircraft Carrier – INS Vikrant – Achieves Full Operational Status; India Joins 'Elite Club' Of Nations". *the EurAsian*, pp. https://www.eurasiantimes.com/indian-navys-indigenous-aircraft-carrier-ins-vikrant-becomes/#google_vignette.

Singh, M. (2023, December 27). Navy Commissioins stealth destroyer INS Imphal. *the Times of India*, pp. https://www.newindianexpress.com/india/2023/Dec/27/navy-commissions-stealth-destroyer-ins-imphal-2645286.html.

Singh, M. (2024, April 18). "India to complete largest defence export deal; BrahMos missiles set to reach Philippines". *the New Indian Express*, pp. https://www.newindianexpress.com/nation/2024/Apr/18/india-to-complete-largest-defence-export-deal-brahmos-missiles-set-to-reach-philippines.

Singh, P., & Garg, M. (2021). *"Magbook General Science for Civil Services prelims/State PCS"*. New Delhi: Arihant Publications (India) LTD.

Singh, R. (2022, May 12). "'Game changer': India tests extended-range BrahMos missile from Su-30 fighter". *the Hindustan Times*, pp. https://www.hindustantimes.com/india-news/game-changer-india-tests-extended-range-brahmos-missile-from-su-30-fighter-101652363919577.html.

Singh, S. (2017, July 05). "Amid Stand-Off, India's GSAT-7 Satellite 'Rukmini', Is Keeping An Eye On China's Activities At Sea". *the India Times*, pp. https://www.indiatimes.com/news/india/amid-stand-off-india-s-gsat-7-satellite-rukmini-is-keeping-an-eye-on-china-s-activities-at-sea-325197.html.

Singh, S. (2023, December 25). "'INS Imphal', India's first warship named after a northeast city, to be commissioned on December 26". *the Times of India*, pp. https://azureserv.com/india/ins-imphal-indias-first-warship-named-after-a-northeast-city-to-be-commissioned-on-

tuesday/articleshow/106255700.cms?from=mdr&__cpo=aHR0cHM6Ly90aW1lc29maW5kaWEuaW5kaWF0aW1lcy5jb20.

Singhh, S. (2023, March 31). "After Navy & IAF, Army to get dedicated satellite Gsat-7B as MoD inks Rs 3k cr deal with NSIL". *the Times of India*, pp. https://timesofindia.indiatimes.com/india/after-navy-iaf-army-to-get-dedicated-satellite-gsat-7b-as-mod-inks-rs-3k-cr-deal-with-nsil/articleshow/99129740.cms?from=mdr.

Sufian Ullah. (2019). Analysing India's Naval Development Strategy. *Islamabad Policy Research Institute (IPRI) Journal, XIX (1)*, 86-110.

Sumeda. (2023, January 25). "Explained | Indian-made Scorpène-class 'silent killer' submarine INS Vagir". *the Hindu*, pp. https://www.thehindu.com/news/national/india-defence-navy-scorpene-submarine-ins-vagir-features-explained/article66423390.ece.

Syed, S. (2024, May 30). "Pakistan doesn't have No First Use Policy. *the Dawn*, p. https://www.dawn.com/news/1836578.

Technology, N. (2009, October 11). *"Shivalik Class Frigates"*. Retrieved from the Naval Technology: https://www.naval-technology.com/projects/shivalik-class-friga/

Theberge, A. (2009, February 12). *"System Without Fixed Points"*. Retrieved from www.hydro-international.com: https://www.hydro-international.com/content/article/system-without-fixed-points

Vijayakumar, A. (2017, July 05). *Rukimini: How Indian Navy tracks Chinese movements in Indian Ocean*. Retrieved from www.newsbytesapp.com: https://www.newsbytesapp.com/news/india/rukmini-indian-navy-s-eye-in-the-high-seas/story

Vyas, S. (2009, February 3). "Navy to instal anti-aircraft guns, radars along coastline". *the Times of India*, pp. https://timesofindia.indiatimes.com/city/mumbai/navy-to-instal-anti-aircraft-guns-radars-along-coastline/articleshow/4067229.cms.

Wertheim, E. (2024, February 1). *"India's Project 15A and 15B Destroyers: Blending Capabilities from Across the Globe"*. Retrieved from www.usni.org: https://www.usni.org/magazines/proceedings/2024/february/indias-project-15a-and-15b-destroyers-blending-capabilities

Yap, S. (2025, March 03). *"Light Carriers, Heavy Impact: India's Naval Evolution in the Indo-Pacific"*. Retrieved from Modern Diplomacy All Views All Voices: https://moderndiplomacy.eu/2025/03/03/light-carriers-heavy-impact-indias-naval-evolution-in-the-indo-pacific/

Zur, Y., Magal, T., & Kedem, N. (2012). The Growing Power of the Indin Navy: Westward Bound. *Military and Strategic Affairs, Volume 4, No. 3*, page 101-116.