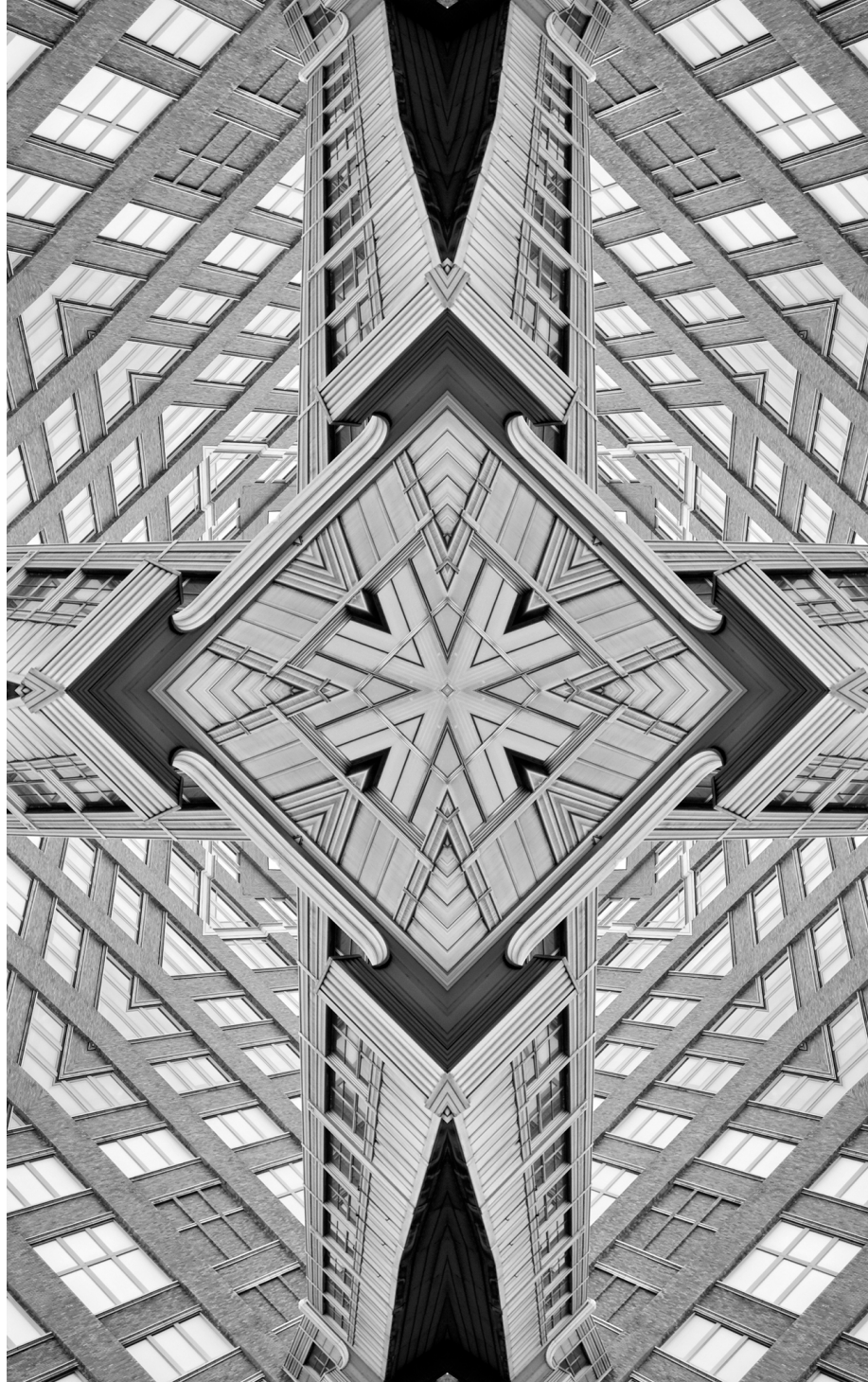


Issue

Brief

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The Role of China-Made Frigates in the Pakistan Navy's Power Projection Matrix

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Abstract

This brief evaluates the capabilities of the Chinese-origin frigates acquired by Pakistan, and explores the potential implications of their induction on the operational approach of the Pakistan Navy. The brief argues that the Pakistan Navy's acquisition of Chinese-origin frigates must be viewed as part of its attempted transformation from a force adopting an offensive sea-denial strategy to one gearing towards enhanced regional power projection. At the same time, the Pakistan Navy's primary strategy will continue to rely on augmenting its A2/AD (Anti-Access/Area Denial) capabilities aimed at restricting and delaying the offensive forces and denying them operational freedom.

Over the past decade, Pakistan's maritime objectives have occupied an obscure place in New Delhi's naval calculations. While the eastward tilt focusing on the threat from China in the eastern Indian Ocean is understandable, Indian planners appear unconcerned about Pakistan's naval expansion to India's west.

There is reason for concern, however, with the Pakistan Navy poised to acquire eight Chinese Type 39 Yuan-class attack submarines, four of which are slated for delivery by the end of 2023.¹ Four more vessels are to be delivered, one each year, between 2025 and 2028.² The new submarines will be equipped with complex sensors and modern armaments; and their sheer numbers would already provide the Pakistan Navy with an edge over the Indian Navy and tilt the tactical power-balance in favour of Pakistan.³

Indeed, the acquisition of these diesel-electric submarines could be viewed as being aimed at bolstering the Pakistan Navy's decades-old offensive sea denial strategy, which regards the supremacy of submarines and missile-carrying maritime patrol aircraft as the primary means of prosecuting war at sea. New Delhi's own diesel-electric attack submarine acquisition plans are in shambles. However, Islamabad's submarine acquisition plans are frequently discussed in India's maritime circles.⁴ On the other hand, Pakistan's augmentation of its navy's surface fleet has largely eluded the attention of New Delhi's naval mandarins, despite pointing toward the country's new ambition to enhance its navy's power projection capacity in the Indian Ocean Region (IOR).

The Pakistan Navy began commissioning Zulfiqar-class frigates—also known as F-22P frigates—in 2009. These are based on the 2200-2500 tonne-class Chinese Type 053H3 frigates, operated by China's People's Liberation Army Navy (PLAN), which precede the much larger Tughril-class (Chinese Type 054A) frigates produced subsequently for the Pakistan Navy.

The Pakistan Navy currently operates four Zulfiqar-class vessels, with the first three frigates constructed in China and the remaining ship—*PNS Aslat*—manufactured in Pakistan via transfer of technology (ToT).⁵

Not designed for any specific role, these are multi-mission guided missile frigates that can be used for anti-submarine warfare (ASW) as well as for anti-surface warfare (ASUW). They can also be used in an air defence role.

The multi-mission characterisation also holds true for the more advanced Tughril-class stealth frigates, albeit with improved air defence capabilities. Two of these—*PNS Tughril* and *PNS Taimur*—were commissioned into the Pakistan Navy in 2022, and the remaining two—*PNS Tippu Sultan* and *PNS Shah Jahan*—in May 2023.⁶

The Tughril-class—with its long-range missiles, improved radar and electronic warfare (EW) suite, and sensors—are described as a ‘game-changer’ that will provide a quantum-leap to Pakistan’s naval air defences.⁷ These warships—when operated alongside MILGEM/Jinnah class corvettes, offshore patrol vessels (OPV 1900), and CH-4 medium-altitude long-endurance (MALE) drones—were expected to transform the Pakistan Navy.⁸

Given these high expectations, this brief provides an evaluation of Pakistan’s Chinese-origin frigates. It examines their capabilities and the issues they face, and explores the possible implications of their induction on the operational approach of the Pakistan Navy.

Zulfiquar-class: Capability

The primary weapon possessed by Zulfiquar-class frigates is the Chinese YJ-82 (C-802) missile, with a range of 120 km. Each frigate carries eight such missiles for the purpose of ASUW, i.e., for targeting the enemy's surface vessels. For self-defence, the frigates have been equipped with a single 1×8 cell launcher of FM-90N short-range surface-to-air missiles (SRSAMs), with a maximum range of 15 km. These belong to the HQ-7B family of Chinese short-range air defence systems, and can intercept sea-skimming anti-ship missiles.⁹ A total of two 3-cell torpedo tubes have also been provided in each vessel to enable the prosecution of ASW. These enable the firing of small 324 mm Chinese ET-52C torpedoes, which come with a maximum range of 6 km.

As far as guns are concerned, the frigates host a 76 mm AK-176M main gun, and two Type 730B close-in weapon systems (CIWSs), which are Chinese imitations of the Dutch Goalkeeper. CIWSs serve as last-resort air defence systems, which come to the fore if an anti-ship missile—fired by the adversary—has survived all prior countermeasures applied against it. The AK-176M is of Soviet origin, and comes mounted in an enclosed turret. It may be used to neutralise sea, coastal, and aerial targets, including low-flying anti-ship missiles. On the other hand, the Type 730B is a Chinese seven-barrelled 30 mm Gatling gun/rotary cannon CIWS, mounted in an enclosed automatic turret, directed by radar and electro-optical tracking systems.

The main radar on board is a pulse doppler air-search radar known as the SR60, also called the Chinese Type 360S radar. It operates in the E and F frequency bands, and has a detection range of about 250 km. The frigate also hosts the Type 517 long-range A-band/VHF air-search radar, with four antennae in two crossed-brace supported pairs—one above the other—mounted in pairs on each side of a single tubular support carried on the turning gear.¹⁰ These radars are meant to serve as enablers of air defence and ASUW.

Finally, the ship carries a single Harbin Z-9EC helicopter equipped with a surface-search radar, radar-warning receiver (RWR), doppler navigation system and two light-weight torpedoes.¹¹ With a maximum range of 427 km and an endurance of 2.27 hours, the helicopter is aimed at enhancing the operational range of the host platform while meeting the challenging requirements of contemporary ASW warfare.

Zulfiquar-class: Problems

The Pakistan Navy has been facing multiple issues with its Zulfiquar-class frigates, which have forced them to operate the vessels with significantly degraded capabilities with respect to their conceived roles—air defence of force operating at sea or in convoy, interdiction of hostile surface combatants, commerce raiding, patrolling, and protection of Pakistan’s exclusive economic zone (EEZ).¹²

Because these are multi-mission frigates, their armaments are geared for both ASW and ASUW. On commissioning these frigates, however, the Pakistan Navy found the imaging devices for FM-90N SRSAMs to be defective and displaying faulty readings. The system was apparently unable to lock-on to targets, thereby compromising the frigates’ air defence capabilities and rendering them vulnerable against incoming anti-ship missiles. Even the infrared sensors (IR17) were found to be defective in multiple cases. Consequently, these had to be forsaken, and replacements are still awaited by the Pakistan Navy.¹³

Further, the ships’ main radar—the SR60—was found defective and plagued by electromagnetic compatibility/interference (EMC/EMI) issues. Because this is an air-search radar, the defect prevents the frigate from launching both surface-to-air missiles (SAMs) as well as surface-to-surface missiles, thereby compromising its air defence and ASUW capabilities, respectively. The issue with the radar was found during high-powered transmissions.

Evaluating the Acquisitions

Each frigate is powered by four diesel engines provided by MTU, a German company. The third and fourth engines in each vessel suffer from low engine speeds resulting from high turbocharger exhaust temperatures. Degradation was also detected in the crankcase and liner of the engines, undermining the coolant chemistry in the vessels. These difficulties have been observed to varying degrees in all three Chinese-made Zulfiqar-class frigates.

Difficulties have also been noted in the Pakistan-built *PNS Aslat*, including the unreliable performance of its ASO-94 sonar and SR47 BG (Chinese Type 364) radar, compromising the vessel's ASW and air defence capabilities, respectively. The SR-47 BG, *PNS Aslat's* main radar, is supposed to mark an improvement over the earlier SR60 fielded by its sister vessels. Yet, its performance has been below the Pakistan Navy's expectations. Components from the sister vessels were utilised for the radar's repairs.

As far as the lead ship of the F-22P class, *PNS Zulfiqar* is concerned, its ASO-94 sonar was reportedly detecting false targets, implying that non-existent targets were detected by the system. The reason behind this was claimed to be the ship's own noise levels, which would imply increased vulnerability to detection and attack by enemy submarines. Another serious issue encountered with *PNS Zulfiqar* pertains to its 76 mm AK-176M main gun, which was malfunctioning due to failure of some of its mechanical and electrical components, thereby *inter alia* compromising the vessel's last-ditch air defence capabilities. These issues have been reported by the Pakistan Navy to the Chinese manufacturer, which has not given any positive response.¹⁴

Meanwhile, the *PNS Saif* has reported issues with its stabiliser gyro since commissioning, impacting the controllability of the ship.¹⁵ The Chinese manufacturer has admitted the flaw and blamed it on the defective Gimball Assembly motors. The ship's berthing operations have been endangered because these motors were yet to be repaired or replaced.¹⁶

Finally, the Harbin Z-9EC ASW helicopter is plagued by problems of its own, the most serious being tail rotor blade-failure. This squarely affects the platform's airworthiness. The main rotor blades of the helicopters also warrant replacement, given that acute levels of corrosion due to seawater have rendered their life spans much shorter than the claimed 3,000 hours. Lastly, the dire state of brake distribution valves had reportedly caused numerous tyre blowouts during the landing stages. These problems are compounded by the poor maintenance capabilities of the Chinese original equipment manufacturer (OEM), which could be expected to result in underwhelming availability rates (see Table 1).¹⁷

Table 1:
Problems with the Pakistan Navy's
Zulfiquar-class Frigates

Performance/Mission	Maintenance	Support/Spares
<ul style="list-style-type: none"> • EMC/EMI issues with SR60 main radar • Unreliable performance of ASO-94 sonar (PNS Zulfiquar and PNS Aslat) and SR47 BG radar (PNS Aslat) 	<ul style="list-style-type: none"> • Low engine speed • Lube oil degradation • Poor maintenance (Harbin Z-9EC ASW helicopter) • Crankcase and liner degradation • Vibration isolator deterioration 	<ul style="list-style-type: none"> • Defective imaging devices for FM-90N SRSAMs • Defective infra-red sensors (IR17) • Malfunction of AK-176M main gun (PNS Zulfiquar) • Stabilizer gyro issues (PNS Saif) • Issues with tail and main rotor blades, as well as the brake distribution valves (Harbin Z-9EC ASW helicopter)

The Tughril-class

The Type 054A frigates, touted as the backbone of the PLAN's fleet of surface combatants, have a length of 134 metres and a beam of 16 metres for a displacement of 4,000 tonnes.¹⁸ With a crew complement of 165 sailors, the vessels are fitted with:

1. A Chinese-origin H/PJ-26 76 mm main gun, instead of the Soviet-origin 76 mm AK-176M main gun featured on the Zulfiqar-class frigates;
2. 2×4 CM302 (YJ-12) anti-ship missiles with a range of 290 km, instead of the Zulfiqar-class's eight 120 km-range YJ-82 (C-802) missiles;
3. 32 vertical-launch cells for 40 km-range HQ-16 medium-range SAM (MRSAM), instead of the Zulfiqar-class's single 1×8 cell launcher of FM-90N (HQ-7B) SRSAMs, with a maximum range of only 15 km;
4. 2 Type 730 30 mm CIWS, same as with the Zulfiqar-class; and
5. 2 triple-torpedo launchers, as with the Zulfiqar-class frigates.

Through the development of the Type 054A frigates, therefore, China has sought to enhance both air defence as well as ASUW capabilities.

The H/PJ-26 76 mm main gun, for instance, is derived from the Soviet-origin 76 mm AK-176M main gun with two principal differences pertaining to the redesign of the turret housing and the ammunition stowage. While the gun, ammunition and loading system retain the Soviet design, the turret housing features a new shape to reduce its radar cross-section (RCS). Moreover, the turret weight has been reduced significantly through the use of a composite material. The below-deck feed system's capacity has also been doubled to 150 rounds from the original 75 of the AK-176. Along with the two Type 730 30 mm CIWS retained from the Zulfiqar-class, the H/PJ-26 is intended to provide the frigates effective last-ditch air defence against incoming projectiles.

Evaluating the Acquisitions

The endeavour, however, is to neutralise any incoming aerial threats before they arrive within proximity of the vessel. To boost this capability, the Tughril-class replaces the Zulfiqar-class's eight single-launcher based HQ-7B SRSAMs with 32 vertically-launched HQ-16 MRSAMs, thereby increasing both numbers and range, as well as the rate at which the missiles can be launched. The increased size of the Tughril-class frigates enables accommodation of larger number of SAMs. The Pakistan Navy, however, would be hoping that its HQ-16 systems do not perform anywhere quite as poorly as those with the Pakistan Army.¹⁹

On the ASUW front, although the Tughril-class frigates carry the same number of anti-ship missiles as their predecessors, the higher 290 km range of the CM-302 compared to the limited 120 km-range C-802 carried by the Zulfiqar-class, allows Tughril-class vessels to engage targets from greater standoff distances. It is likely, though, that the effective range of CM-302 missiles will be limited by the 250 km range of the frigates' SR2410C main radars, even accounting for the munition's capability of inertial and satellite guidance.²⁰ This is because the Pakistan Navy still lacks the sensors required to target platforms over longer ranges.²¹

As far as ASW capabilities are concerned, there seems to be no noteworthy improvement given that the Tughril-class utilises the same torpedo launching configuration as well as the same ASW helicopter as its predecessor.

While Tughril-class frigates constitute a significant addition to the Pakistan Navy's fleet of surface combatants, their numbers and features are not enough to credibly deter offensive manoeuvres by the Indian Navy. Although the Pakistan Navy's interest in newer technologies and armaments is noteworthy, the Indian Navy enjoys a sizeable numerical advantage and fields superior capabilities.

What the Indian Navy needs to monitor is the shift in the Pakistan Navy's maritime strategy, which has lately begun to aim for enhanced and sustained presence in the Indian Ocean, rather than remaining fully focused on coastal defence and sea denial in the event of war. From a force adopting an offensive sea denial strategy which necessitated the supremacy of submarines and missile-carrying maritime patrol aircraft, it is now gearing toward increased power projection in the IOR with the periodic induction of surface vessels of higher tonnage and possessing requisite capabilities.²²

Promulgated in 2019, Pakistan's first ever maritime doctrine – *Preserving Freedom of Seas* – not only addresses the defence aspect but also emphasises the requirement to fight terrorism, drug and human trafficking in open seas, and piracy, among other issues, regionally and beyond.²³ The Pakistan Navy's acquisition of Chinese-origin frigates must be viewed as part of the overall strategy toward the realisation of these goals.

Also worth mentioning is the multinational naval exercise AMAN, commenced by the Pakistan Navy in 2007 and thereafter conducted biennially to enhance interoperability and galvanise international efforts to boost regional cooperation, but most importantly as a means of power projection under the umbrella of 'blue diplomacy'.²⁴ In the sea phase of the exercise, an international fleet review is conducted alongside numerous other drills to rehearse and strengthen a response to maritime security hazards in a multinational setting. Significantly, the Pakistan Navy intends to host more than 40 countries in AMAN-23.²⁵

Operational Implications

At the same time, New Delhi must remain cognisant of the principal reason behind China's military support to Pakistan. It is well-known that Beijing seeks a formidable and sustained presence in the IOR, and views Pakistan as an enabler of its geostrategic ambitions in the region.²⁶ The former also perceives the latter as a useful tool to inhibit the expansion of India's maritime influence, with the latter most willing to serve as the former's proxy against India.

For all its soaring ambitions, however, the Pakistan Navy has traditionally been a defensive force and will likely remain as such over the foreseeable future.²⁷ With its stated objectives of protecting Pakistan's maritime interests, deterring aggression at and from the sea, providing disaster relief, participating in the development of coastal communities and contributing to international efforts in maintaining good order at sea, the mainstay of the Pakistan Navy's approach will continue to hinge on the augmentation of its anti-area access-denial (A2/AD) capabilities. These would be targeted at limiting and slowing down the offensive forces and denying them a free hand, using platforms such as those belonging to the Tughril-class.²⁸

The A2/AD strategy is favoured by countries facing technologically superior and enterprising adversaries. With its adversarial outlook toward India, the Pakistan Navy views the superior Indian Navy as a force whose influence, aspirations and aims in the Indian Ocean are geared toward becoming the authoritative force in the region. It came as no surprise then, that in the backdrop of the Pakistan Navy disclosing its plan to expand its surface fleet to over 50 ships including 20 'major surface vessels' such as frigates in October 2020, former Chief of Naval Staff Admiral Zafar Mahmood Abbasi indicated an increased focus on A2/AD by revealing the development of the P282 anti-ship ballistic missile.²⁹

Conclusion

Chinese-origin frigates are yet to have the much-touted transformational impact on the Pakistan Navy's operational capabilities. With the Zulfikar-class plagued with a host of performance-related, maintenance and support issues, China sought to enhance both air defence as well as ASUW capabilities through the development of the Type 054A frigates. However, these platforms only partially resolve the problems of the preceding class.

It is more prudent to view the Pakistan Navy's acquisition of Chinese-origin frigates as part of the mix toward the force's attempted transformation from a force adopting an offensive sea-denial strategy to one gearing toward enhanced power projection in the IOR, with the periodic induction of heavier surface vessels possessing requisite capabilities. However, the mainstay of its approach will continue to rely on augmenting its A2/AD capabilities, aimed at restricting and delaying the offensive forces and denying them operational freedom, utilising platforms such as the Tughril-class frigates. [ORF](#)

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- 1 Franz-Stefan Gady, "China to Supply Pakistan With 8 New Stealth Attack Submarines by 2028," *The Diplomat*, August 30, 2016, <https://thediplomat.com/2016/08/china-to-supply-pakistan-with-8-new-stealth-attack-submarines-by-2028/#:~:text=China%20will%20provide%20the%20Pakistan%20Navy%20with%20eight,on%20August%2026%2C%20according%20to%20local%20media%20reports.>
- 2 Srinjoy Chowdhury, "Germany's Reluctance to Supply Engines Casts Shadow on China's Desire to Make Submarines for Pakistan," *Times Now News*, February 5, 2021, <https://www.timesnownews.com/india/article/germanys-reluctance-to-supply-engines-casts-shadow-on-chinas-desire-to-make-submarines-for-pakistan/716412#:~:text=China%20wants%20to%20make%20eight%20submarines%20for%20the,export%20license%20does%20not%20appear%20to%20be%20forthcoming.>
- 3 Abhijit Singh, "Pakistan's Naval Transformation: Dangerous Delusions, Soaring Ambitions," *War on the Rocks*, December 7, 2016, <https://warontherocks.com/2016/12/pakistans-naval-transformation-dangerous-delusions-soaring-ambitions/>
- 4 Aditya Bhan, "Project-75I Submarine Acquisition: Should the Indian Navy Relax Air-Independent Propulsion Requirement?," Observer Research Foundation, August 30, 2022, <https://www.orfonline.org/expert-speak/project-75i-submarine-acquisition/>
- 5 "F-22P Frigate Inducted into PN Fleet," *DAWN*, April 18, 2013, <https://www.dawn.com/news/803261/f-22p-frigate-inducted-into-pn-fleet>
- 6 "Commissioning Ceremony of Advanced Frigates for PN held at China," *Associated Press Of Pakistan*, May 10, 2023, <https://www.app.com.pk/national/commissioning-ceremony-of-advanced-frigates-for-pn-held-at-china/>
- 7 Sakshi Tiwari, "China's Largest, Most-Advanced Frigate Touted As 'Carrier Killer' To Boost Pakistan's Naval Defense Against India," *The Eurasian Times*, December 23, 2021, <https://eurasianimes.com/chinas-to-boost-pakistans-naval-defense-pak-media/>
- 8 Amjad Bashir Siddiqi, "Tughril Gives Quantum Leap to Pakistan's Naval Air Defence," *The News International*, December 20, 2021, <https://www.thenews.com.pk/print/918258-tughril-gives-quantum-leap-to-pakistan-s-naval-air-defence>
- 9 "HQ-7B Short-Range Air Defense Missile System," *Military-Today.com*, https://www.military-today.com/missiles/hq_7b.htm
- 10 "Type 517 Radar," *Detailed Pedia*, https://www.detailedpedia.com/wiki-Type_517_radar
- 11 "Harbin Z-9C," *Weaponsystems.net*, <https://www.weaponsystems.net/system/572-Harbin%20Z-9C>
- 12 "Sword / F-22P Class Frigates," *Naval Technology*, <https://www.naval-technology.com/projects/sword-f22p/>

- 13 “Defective Critical Components, Poor Service from Chinese Manufacturers Give Nightmares to Pakistani Navy,” *The Print*, June 15, 2022, <https://theprint.in/world/defective-critical-components-poor-service-from-chinese-manufacturers-give-nightmares-to-pakistani-navy/996918/>
- 14 Valerio Fabbri, “Chinese Frigates Give Jitters to Pakistani Navy,” *Geopolitica.info*, June 14, 2022, <https://www.geopolitica.info/chinese-frigates-give-jitters-pakistani-navy/>
- 15 Meera Suresh, “Chinese Warships Sold to Pakistan are Duds: Missiles and Gun Won’t Fire, Engines Overheat,” *International Business Times*, June 23, 2022, <https://www.ibtimes.com/chinese-warships-sold-pakistan-are-duds-missiles-gun-wont-fire-engines-overheat-3549216>
- 16 Fabbri, “Chinese Frigates Give Jitters to Pakistani Navy”
- 17 “Pakistan Navy Criticises Chinese-Made Helicopters Over Maintenance,” *ANI*, September 14, 2022, <https://www.aninews.in/news/world/asia/pakistan-navy-criticises-chinese-made-helicopters-over-maintenance20220914141907/>
- 18 “Pakistan Navy Commissions New Type 054 A/P Frigate ‘PNS TUGHRIL,’” *Naval News*, January 24, 2022, <https://www.navalnews.com/naval-news/2022/01/pakistan-navy-commissions-new-type-054-a-p-frigate-pns-tughril/>
- 19 Abhinandan Mishra, “Pak Fails to Intercept India’s Missile, Unease in GHQ,” *The Sunday Guardian*, March 12, 2022, <https://sundayguardianlive.com/news/pak-fails-intercept-indias-missile-unease-ghq>
- 20 “DIMDEX 2022: CASIC Showcases CM-302 Anti-Ship Missile,” *Navy Recognition*, March 21, 2022, <https://www.navyrecognition.com/index.php/naval-news/naval-exhibitions/dimdex-2022-exhibitors-visitors-information/dimdex-2022-news-official-show-daily/11538-dimdex-2022-casic-showcases-cm-302-anti-ship-missile.html>
- 21 Vishnu Som, “Game-Changing Chinese Missile to Pakistan Could Dent Navy’s BrahMos Advantage,” *NDTV*, January 9, 2019, <https://www.ndtv.com/india-news/game-changing-chinese-missile-to-pakistan-could-dent-navys-brahmos-advantage-1975148>
- 22 Vijay Sakhujia, “Pakistan’s Naval Strategy: Past and Future,” *Strategic Analysis* 26, no. 4 (2002): 493-507, <https://www.tandfonline.com/doi/citedby/10.1080/09700160208450064?scroll=top&needAccess=true&role=tab&aria-labelledby=cit>
- 23 Shazia Habib, “New Developments Shaping Naval Strategy of Pakistan,” *Maritime Study Forum*, January 29, 2020, <https://www.maritimestudyforum.org/new-developments-shaping-naval-strategy-of-pakistan/>
- 24 “AMAN Exercise: Developing Naval Cooperation for Maritime Peace,” *Rava.pk*, November 7, 2022, <https://rava.pk/editors-choice/aman-exercise-developing-naval-cooperation-for-maritime-peace/>

Endnotes

- 25 Muhammad Azam Khan, "AMAN-23 Under Focus," *Business Recorder*, December 18, 2022, <https://www.brecorder.com/news/40215092/aman-23-under-focus>
- 26 Lt. Gen P.K. Singh (retd.), "China's Strategic Gateway to the Indian Ocean," *Reconnecting Asia*, May 24, 2017, <https://reconasia.csis.org/chinas-strategic-gateway-indian-ocean/>
- 27 Singh, "Pakistan's Naval Transformation: Dangerous Delusions, Soaring Ambitions"
- 28 Samran Ali, "Anti-Access/AreaDenial Strategy for Pakistan Navy: A Work in Progress," Center for International Strategic Studies, August, 2021, https://www.researchgate.net/publication/353914333_Anti-AccessAreaDenial_Strategy_for_Pakistan_Navy_A_Work_in_Progress
- 29 "Pakistan's A2/AD Efforts: P282 Anti-Ship Ballistic Missile," *South Asian Monitor*, November 5, 2020, <https://southasianmonitor.net/en/pakistan/pakistans-a2ad-efforts-p282-anti-ship-ballistic-missile>



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