

THE 'SILENT HUNT': TURKEY EYES STRATEGIC ROLES FOR ITS NEW ATTACK SUBMARINES

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Executive Summary

➤ Between 2022 and 2027, Turkey is set to receive six Reis-class submarines (based on Germany's advanced Type-214-class) with air-independent propulsion (AIP) systems that combine long endurance and silent navigation. The new platforms will boost the nation's military capacity, most notably as to land-attack capabilities in littoral settings along with other signature advantages in submarine warfare.

➤ In the long-run, however, Turkey's emerging undersea fleet can be assigned to a more strategic role. Turkish defense planners aim to build a long-range & high-precision conventional deep strike capability through sea-launched cruise missiles (with submarine-launched variants) based

on the *Gezgin* (the Voyager) project, mimicking those of the US and Russia with the Tomahawk and *Kalibr* missiles respectively. If successful, the integration of submarine-launched cruise missiles and submarines with AIP systems would be tantamount to a breakthrough for the Turkish military's strategic weapons arsenal.

➤ The Reis-class will not only benefit the Turkish Navy but also Turkey's defense technological and industrial base. Leading companies are playing critical roles in the project, generating cumulative know-how which can be transferred to the *Milli Denizalti* (the national submarine) plans in the coming years.

Geopolitics of Submarine Warfare

Submarines are geopolitical chess-pieces in a broad-array of struggles ranging from great power competition to regional military balance calculus of flashpoints situated in different corners of the world. Throughout military history, these boats have proven to be game-changers at strategic, operational, and tactical levels. World War 2 offers invaluable lessons in this respect. The US-led allied submarine campaign in the Pacific, for example, devastated Imperial Japan's merchant fleet, constituting one of the leading causes behind the collapse of the Japanese war-economy. Likewise, the German U-boat activity during both of the world wars posed great challenges¹.

Submarines are valuable assets due to their ability to combine advanced features in concepts of operations (CONOPS) and weaponry. Underwater boats can run silent, dive deep, and hide from the adversary's eyes. Besides, they are platforms that carry game-changer weapons, such as nuclear arms and conventional high-precision missiles, as well as complex sensors and electronics. Last but not least, following the nuclear technologies introduced to the battle-space, submarines play critical roles in great power rivalry in the world's oceans².

Having left its port and dived, a submarine can only be detected by the application of a complex search effort in a relatively large area. The very element of uncertainty introduces a significant multiplier-effect when it comes to

the deterrence factor that submarines bring to the seas. An adversary would theoretically know the range and endurance of the submarine, yet, within these parameters, the platform can be anywhere at any time³. The longer a boat can navigate without surfacing – and the more silent it can proceed –, the more it would pose deterrence through ambiguity. Moreover, with adequate numbers, a fleet of submarines can sustain a long, even continuous presence in an area of strategic interest with one platform relieving another systematically.

Military-futuristic studies suggest more ambitious roles along with challenges to submarines. Some experts anticipate that manned submarines will need to shift from their front-line tactical roles – resembling combat aircraft – to more coordination hub roles like aircraft carriers. In the meantime, anti-submarine warfare networks will have an increasing reliance on more complex sources other than radiated noise, thus, making acoustic silencing not adequate to maintain an undersea boat's stealth. In return, manned submarines *“will have incentives to reduce their exposure to risks in hostile littorals while maximizing their use of a growing array of deployable acoustic and non-acoustic decoys and jammers to prevent detection”*⁴. Also, large unmanned underwater vehicles are likely to take part in tactical operations, such as intelligence gathering, land-attack, and anti-ship tasks, in the future, especially in hostile littoral settings.

¹ Robert Farly, “These 5 Submarines Redefine What It Means To Be “Silent But Deadly”, The National Interest, September 9, 2020, <https://nationalinterest.org/blog/reboot/these-5-submarines-redefine-what-it-means-be-%E2%80%9Csilent-deadly%E2%80%9D-168663>, Accessed on: September 22, 2020.

² For a detailed assessment, see: James F Dunnigan, *How to Make War*, 2003.

³ Janis Cocking, *Australia's Requirement for Submarines*, Australian Government Department of Defence Science and Technology, 2016, pp.3-4.

⁴ For a good military-futuristic study, see: Bryan Clark, *The Emerging Era in Undersea Warfare*, CSBA, 2015, p.17.

AIP System Equipped Submarines

When it comes to Turkey's *Reis*-class case, analytical focus needs to take into consideration two specific aspects, air-independent propulsion systems and submarine-launched cruise missiles with conventional roles.

The AIP systems allow conventional submarines to remain underwater longer by enabling them to recharge their batteries without surfacing for air. Present technologies highlight three main types of AIP systems – *Stirling Cycle*, *Closed Cycle Steam Turbines* [MESMA in the French designation], and *Fuel Cell* – of which the latter, necessitating fewer moving parts and using hydrogen and oxygen to generate power, looms large as 'the state-of-the-art' way-forward for the submarines of the class⁵. The Turkish Navy's forthcoming *Reis*-class, based on the German Type 214, will use the fuel cell technology⁶.

AIP system-equipped submarines (SSP in military

abbreviation) come with several advantages. First, when fed with good military intelligence as to the adversary's buildup, they are robust ambush-layers thanks to their quietness and endurance. Besides, the underlying design philosophy behind these advanced boats makes them ideal assets for short and medium-range surveillance tasks too⁷. Available writings suggest that in naval warfare settings favoring maneuverable platforms, such as littoral waters, SSPs can have a clear upper-hand⁸.

AIP submarines can be militarily effective tools, especially in short and medium-range missions by extending the "tactical 'trade-space'" for diesel-electric submarines. Their ability to sustain slow, long, silent patrol is noteworthy in this respect. Finally, future improvements in the AIP technologies can lead to a double, or even triple boost in a typical fuel cell module's power output, in which case, would bring about better trade-offs between underwater speed and endurance⁹.

Submarine's Land-Attack Roles in Context

Apart from the AIP submarines, one has to develop a thorough understanding of these platforms' conventional high-precision land-attack roles to better grasp what the *Reis* class would mean to Turkey.

Today, the world's advanced submarine fleets adopt critical land-attack roles which manifest a new geopolitical reality in their military use. Especially in littoral settings with no assured access ashore, navies' precision land-attack capability from the sea offers interesting options to political decision-makers and military planners¹⁰. The US Navy's punitive strikes with Tomahawk missiles on the Syrian regime following Assad's

forces' chemical warfare activities on civilians, as well as the Russian Navy's Kalibr salvos into the Syrian battleground, remain telling in this respect. Likewise, the conversion of some of the US Navy's Ohio-class nuclear-tipped ballistic missile submarines into nuclear-powered conventional attack platforms – now equipped with Tomahawk Block IV missiles – is a good example. Following the START II Strategic Arms Reduction Treaty, limiting the number of strategic missile submarines to 14 from 2002, instead of decommissioning four excess boats, the US Navy has converted them for conventional long-range precision strike roles along with SEAL special operation troops delivery¹¹.

⁵ Robert Farley, "The Navy Is Overlooking Air-Independent Propulsion Submarines At Its Own Peril", The National Interest, January 2020, <https://nationalinterest.org/blog/buzz/navy-overlooking-air-independent-propulsion-submarines-its-own-peril-117831>, Accessed on: September 8, 2020.

⁶ The Turkish Navy, https://www.dzkk.tsk.tr/icerik.php?dil=1&icerik_id=75, Accessed on: September 8, 2020.

⁷ Robert Farley, "The Navy Is Overlooking Air-Independent Propulsion Submarines At Its Own Peril", The National Interest, January 2020, <https://nationalinterest.org/blog/buzz/navy-overlooking-air-independent-propulsion-submarines-its-own-peril-117831>, Accessed on: September 8, 2020.

⁸ Ibid.

⁹ Edward, C. Whitman. "Air Independent Propulsion", Undersea Warfare Magazine, https://www.public.navy.mil/subfor/underseawarfaremagazine/Issues/Archives/issue_13/propulsion.htm, Accessed on: September 23, 2020.

¹⁰ For detailed information, see: Owen R. Cote, "Innovation in the Submarine Force: Ensuring Undersea Supremacy", Undersea Warfare Magazine, https://www.public.navy.mil/subfor/underseawarfaremagazine/Issues/Archives/issue_03/innovation.htm, Accessed on: September 23, 2020.

¹¹ Naval-Technology, <https://www.naval-technology.com/projects/ohio-class-submarine/>, Accessed on: September 23, 2020.

Several technologies enabled the conventional land-attack roles of submarines. Miniaturized Global Positioning System (GPS) and Inertial Navigation System (INS) packages-equipped standoff missiles with affordable precision kits are noteworthy in this respect. Besides, cumulative knowledge of satellites and data-links enabled complex precision strikes in network-centric warfare settings¹². Against the backdrop of the abovementioned developments, submarines have a pivotal role in the contemporary littoral warfare environment thanks to their mobility, lethality, endurance, and stealth capabilities¹³.

Submarine-launched cruise missiles, even with conventional warheads, are strategic weapons. Open-source intelligence suggests that, for example, China's People's Liberation Army Navy (PLAN) prefers a 3:1 load ratio between cruise missiles and torpedoes in their submarines¹⁴.

Above all, cruise missiles enjoy low-visibility due to their flight

paths, making them hard-to-detect threats. When launched from silent, also hard-to-detect platforms, submarines, their deadly combination produces a true surprise strike. This feature would be multiplied with the AIP systems that gift boats with quietness and endurance at the same time. The Russian Navy's experience with Kalibr cruise missiles – known as the 'Kalibrization'¹⁵ of the Russian Navy – remains valuable in showcasing the advantages of such a capacity.

Back in 2015, a Geperd-class frigate and three Buyen-M-class corvettes of Russia's Caspian Navy launched a volley of Kalibrs to their targets in Syria with an impressive 1,800km flight¹⁶. The incident marked the combat debut of the missile. The same year, in December 2015, this time an Improved Kilo-class submarine, Rostov-on-Don, launched Kalibr missiles into the Syrian battleground from the Mediterranean¹⁷. At present, Kalibr missiles are deployed on the Improved Kilo, Akula, Lada, and Yasen-class submarines of the Russian Navy¹⁸.

Turkey's Submarine Force in Context: Before and After the Reis-Class

The Turkish Navy has a 12-piece submarine fleet consisting of the *Ay-class* (980 tons displacement, four boats), the *Preveze-class* (1,454 tons displacement, four boats), and the *Gür-class* (1,454 tons displacement, four boats), all conventionally-powered attack submarines¹⁹. Current literature anticipates an uptrend for the Turkish sea-power in the horizon with the TCG Anadolu amphibious assault vessel / mini-aircraft carrier (based on the Spanish *Juan Carlos-1-class*), the forthcoming batch of the MILGEM corvettes with anti-air warfare capabilities, and new submarines²⁰.

At present, the Turkish Navy's submarine force has numerical superiority over its regional competitors, Greece and Egypt, in the Mediterranean which refers to the currently most important area of Ankara's sphere of strategic interests²¹. While Turkey's numerical superiority can also be extended to the Israeli undersea fleet, it is of importance to note that Israel's submarine platforms carry out a more strategic role, the nation's reported nuclear deterrent.

The Reis-class AIP submarines will be a novel experience

¹² Owen R. Cote, "Innovation in the Submarine Force: Ensuring Undersea Supremacy, Undersea Warfare Magazine, https://www.public.navy.mil/subfor/underseawarfaremagazine/Issues/Archives/issue_03/innovation.htm, Accessed on: September 23, 2020.

¹³ Ibid.

¹⁴ For a comprehensive report, see: Dennis M. Gormley et.al. *A Low-Visibility Force Multiplier: Assessing China's Cruise Missile Ambitions*, Center for the Study of Chinese Military Affairs, 2014.

¹⁵ Richard Connolly, "The 'Kalibrization' of the Russian Navy: Progress and Prospects, Oxford University Changing Character of War Centre, 2019.

¹⁶ CSIS Missile Threat, <https://missilethreat.csis.org/missile/ss-n-30a/>, Accessed on: September 9, 2020.

¹⁷ Defense News, <https://www.defensenews.com/breaking-news/2015/12/08/russian-submarine-hits-targets-in-syria/>, Accessed on: September 9, 2020.

¹⁸ Sebastien Roblin, "Why Russia's Enemies Fear the Kalibr Cruise Missile?", *The National Interest*, January 2017, <https://nationalinterest.org/blog/the-buzz/why-russias-enemies-fear-the-kalibr-cruise-missile-19129>, Accessed on: September 9, 2020.

¹⁹ Sebastien Roblin, "Why Russia's Enemies Fear the Kalibr Cruise Missile?", *The National Interest*, January 2017, <https://nationalinterest.org/blog/the-buzz/why-russias-enemies-fear-the-kalibr-cruise-missile-19129>, Accessed on: September 9, 2020.

²⁰ Hugo Decis, "Greece's Navy Feels the Mediterranean Heat", *IISS*, August 2020, <https://www.iiss.org/blogs/military-balance/2020/08/greece-navy-mediterranean>, Accessed on: September 10, 2020.

²¹ For a detailed database, see: *IISS, Military Balance 2020*, 2020.

for the Turkish Navy. The first platform, *Piri Reis* – named after the legendary imperial admiral and geographer of the Ottomans – will enter into service in 2022, followed by her five sister boats in five years. By 2027, Turkey will be operating six platforms of the class in total²².

The project deserves attention from two major angles. First, the Reis-class can offer new concepts of operations to the Turkish Navy in league with the branch's ongoing transformation under the Blue Homeland geostrategic concept. Second, the Turkish defense technological and industrial base has already greatly benefited from the know-how in modern submarine systems which can be transferred to Turkey's *Milli Denizaltı* (the national submarine) project in the 2030s.

Turkey's new-coming boats will be a game-changer for the navy in terms of concepts of operations. The Reis-class will be equipped with high-precision, conventional land-attack capabilities. Harpoon Block II will be the first, ready-to-go option with its more than 120km range and 227kg blast warhead married to recent high-precision upgrades²³.

The Harpoon Block II baseline is capable of striking targets in littoral settings²⁴. The missile comes with high-precision thanks to the GPS / INS guidance integration, pursuing Boeing's Joint Direct Attack Munitions (JDAM) program. The new variant of the Harpoon baseline offers robust solutions against a broad target set, including coastal defenses, high-value targets in coastal areas, SAM (surface-to-air) missile sites deployed close to the shore, ported ships, and naval aviation platforms parked within the effective range²⁵. In tandem, Turkish press sources suggest that Turkey's indigenous Atmaca anti-ship cruise missile baseline can enjoy an encapsulated variant in the coming years to equip the Reis-class and the forthcoming national submarines (*MILDEN*, *Milli Denizaltı*)²⁶.

Also, Ankara may have bigger plans for something more than littoral land-attack capabilities. For some time, Ankara has been working on an ambitious plan to develop high-precision conventional deep-strike capacity through the *Gezgin* (the Voyager) sea-launched cruise missile project. If successful, the missile will offer long-range strike capabilities compared to those of the US Tomahawks and the Russian Kalibrs²⁷. Furthermore, according to news stories, Turkish defense planners strive to deploy *Gezgin* missiles on attack submarines²⁸. Such a development would mark a turning point for Turkey.

To put the land-attack capability in context, one should revisit Turkey's military expedition in Libya. Had the Turkish Navy operated a submarine-based conventional long-range precision strike, it could have played a game-changer role at tactical and operational levels in the Libyan battleground. Alternatively, such a submarine & cruise missile combined force could offer a punitive pinpoint strike option against Assad's forces in Syria, say, back in 2012 when the Syrian air defenses downed a Turkish F4 Phantom aircraft.

When it comes to naval planning, with the Reis class, most probably, the Turkish Navy will dispatch long-endurance patrols and permanent submarine presence in the areas of high importance in the Mediterranean. This would build a new era of deterrence based on ambiguity over the fleets of Turkey's rivals.

All in all, in the 2020s the Turkish Navy is to operate silent submarines with longer endurance and littoral land-attack capability. If everything goes as planned, the 2030s could witness Turkey's underwater fleet consisting of the Reis-class and *MILDEN* (*Milli Denizaltı* / the national submarine) platforms sailing together with *Gezgin* submarine-launched cruise missiles in their combat payloads.

²² Anadolu Agency, <https://www.aa.com.tr/tr/libya/cumhurbaskani-erdogan-turkiye-attigi-adimlardan-kesinlikle-geri-donmeyecektir/1680833>, Accessed on: September 8, 2020.

²³ Royal Australian Navy, <https://www.navy.gov.au/weapon/rgm-84-harpoon-block-ii>, Accessed on: September 9, 2020.

²⁴ Boeing, <https://boeing.mediaroom.com/2001-08-08-Boeing-Harpoon-Block-II-Missile-Successfully-Attacks-Land-Target>, Accessed on: September 9, 2020.

²⁵ Ibid.

²⁶ Milliyet, <https://www.milliyet.com.tr/gundem/mavi-vatana-yerli-ve-milli-atmaca-kalkani-6252916>, Accessed on: September 23, 2020.

²⁷ Aksam, <https://www.aksam.com.tr/ekonomi/amerikan-tomahawk-fuzesinin-yerini-alacak-milli-seyir-fuzesi-gezgin/haber-795856>, Accessed on: September 9, 2020.

²⁸ Yeni Safak, <https://www.yenisafak.com/dunya/denizaltilar-seyir-fuzelerinin-entegre-edilmesini-bekliyor-dogu-akdenizde-yeni-bir-sayfa-acilacak-3553849>, Accessed on: September 9, 2020.

Boost for Turkey's Defense Technological and Industrial Base

Turkey's Reis-class submarines, with 1,850-ton displacement, are constructed in Gölcük Naval Shipyard, bringing critical know-how to the nation's shipbuilding capacity. The Turkish Navy aims to capitalize on the experience to further design & produce indigenous boats²⁹.

The Reis-class production involves various actors from Turkey's burgeoning defense technological and industrial base. Just to name a few, Havelsan produces the command & control system³⁰ and the data distribution system of the platforms³¹. Koç Bilgi ve Savunma Teknolojileri produces critical sub-systems including the torpedo counter-measures, sonar beacon, breathing air monitoring system, and the integrated information system³². Aselsan, another Turkish defense giant, also takes part in the project³³. STM, Milsoft, Ayesas, and Tubitak (the national science & technology agency of Turkey) are other stakeholders, which, together, account for more than 80 percent of the submarines' technological composition³⁴. Overall, Turkey's

defense technological and industrial base has gained a critical edge in modern submarine systems through the Reis-class package.

In addition to the national defense eco-system actors' involvement, the Reis-class can offer two more opportunities for Turkey.

First, it can make an export asset, in fact, with the right market strategy, it can make a lucrative one. Notably, even before the Turkish Navy starts operating the platform, Indonesia has shown interest in a potential deal³⁵. Likewise, Turkey has already become an important player in Pakistan's submarine market with sub-system exports and modernization projects³⁶.

Second, the know-how gained from the project will be used in Turkey's next-up, *Milli Denizaltı* (the national submarine) project for the 2030s plans³⁷.

²⁹ The Turkish Navy, https://www.dzkk.tsk.tr/icerik.php?dil=1&icerik_id=75, Accessed on: September 8, 2020.

³⁰ Hurriyet, <https://www.hurriyet.com.tr/teknoloji/hizir-reis-denizaltisinin-beyni-teslim-edildi-41497009>, Accessed on: September 10, 2020.

³¹ Havelsan, <https://www.havelsan.com.tr/haberler/guncel/denizaltilarin-kalbi-milli-sistemle-atacak>, Accessed on: September 9, 2020.

³² Savunma Sanayi, <https://www.savunmasanayi.org/stratejik-tesisler-barindiran-deniz-sinirlarini-korumak-icin-koc-bilgi-ve-savunmadan-stratejik-cozumler/>, Accessed on: September 9, 2020.

³³ Aselsan, <https://www.aselsan.com.tr/tr/cozumlerimiz/deniz-sistemleri>, Accessed on: September 9, 2020.

³⁴ STM Think-Tech, *Denizaltılar ve Geleceğin Sualtı Konseptleri*, 2018, p.11.

³⁵ Anadolu Agency, <https://www.aa.com.tr/tr/dunya/endonezya-turkiye-ya-da-almanyadan-denizalti-almayi-planliyor/1704883>, Accessed on: September 9, 2020.

³⁶ Anadolu Agency, <https://www.aa.com.tr/tr/ekonomi/turkiye-pakistan-denizaltilarina-yeni-yetenekler-kazandiracak/1412647>, Accessed on: September 10, 2020.

³⁷ Euronews, <https://tr.euronews.com/2019/10/23/milli-denizalt-projesi-milden-basladi-ilk-teslimat-2030-da-yapilacak>, Accessed on: September 9, 2020.

Conclusion

- Turkey's submarine warfare capability development agenda is not solely a military modernization effort. In essence, it hints at the Turkish administration's growing geopolitical ambitions.
- Overall, the Reis-class will not only mark a capability boost for the Turkish Navy but also Turkey's defense ecosystem in the submarine warfare segment.
- Should Ankara successfully produce the *Gezgin* cruise missile and modify it for the submarine-launch roles, such an achievement would mark a turning point for the Turkish military's strategic weapons arsenal by introducing a true long-range, high-precision conventional strike regime from underwater platforms.
- As indicated earlier, one should analyze Ankara's submarine modernization roadmap through the prism of the Blue Homeland geostrategic concept. Turkey, to pursue its growing geopolitical ambitions, would need a modern navy that can dominate the regional balance of power in the Mediterranean.
- While the Turkish defense sector has gained a critical edge in serving the abovementioned objective and given the fact that the Turkish Armed Forces enjoy high combat-readiness and robust warfighting experience, Turkey's shrinking economy amidst the coronavirus pandemic remains the biggest caveat which can impede the government's military buildup roadmap.



Foreign Policy & Security 2020/05/EN

September 2020

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