

ROBOTIC RISE IN THE SEAS:  
**TURKISH UNMANNED  
NAVAL DETERRENT  
IN THE MAKING**

Dr. Can Kasapoglu  
Sine Ozkarasahin

Director of Defense Research, EDAM  
Analyst, EDAM Defense Program

# ROBOTIC RISE IN THE SEAS: TURKISH UNMANNED NAVAL DETERRENT IN THE MAKING

DECEMBER // 2022

**Dr. Can Kasapoglu**

Director of Defense Research, EDAM

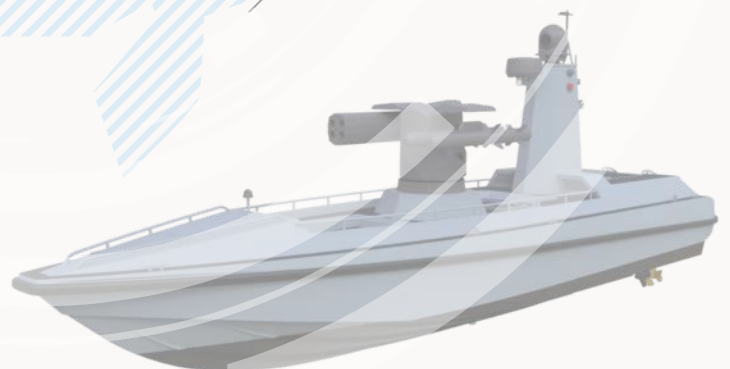
**Sine Ozkarasahin**

Analyst, EDAM Defense Program

## EXECUTIVE SUMMARY

- Turkish unmanned naval systems are set to compete in global defense markets. Türkiye's robotic naval warfighting capacity now includes various systems taking on different missions, providing the navy with flexible operational art preferences. At present, the Turkish defense industrial and technological base is translating the nation's success achieved in the unmanned aerial systems segment to other physical domains of warfare. This is the main driver behind Türkiye's robotic naval platforms proliferation. Likewise, the Turkish defense eco-system has been busy with developing an unmanned ground warfare deterrent for some time.
- Thanks to their ISTAR edge (intelligence, surveillance, target acquisition, and reconnaissance), as well as high-precision strike prospects, unmanned naval systems loom large as critical assets with notable warfighting potential. These assets can foster the Turkish government's paradigm in the seas, manifested with the Blue Homeland (Mavi Vatan) geostrategic concept. Militarily, unmanned naval systems can play a particularly critical role in maritime settings with high risk of casualties.

- Turkish unmanned surface vehicle (USV / UV) capacity will likely set sail to the Black Sea. Given the present naval warfare trends observed in the Russo - Ukrainian War, such a move would be a major vector in the Black Sea military strategic balance. Especially, combined with Turkiye's fast rising anti-ship missile arsenal and high-end aerial combat drones, USVs can make potent assets within a joint architecture.
- With various private and state-owned firms stepping in, intra-industrial competition remains a visible trend in the Turkish USV proliferation landscape.
- As Turkish USVs have started building a reputation in NATO joint exercises, the nation's unmanned naval systems arsenal is gaining a coalition warfare dimension.





## Robotic Naval Warfare: Fighting the Future's Wars

Empowered by emerging defense technologies, smart warfighting assets have already hinted at the prospects of what they can achieve in the future battle-space. On October 29th, 2022, the Ukrainian Armed Forces carried out a large-scale attack on the Russian Black Sea Fleet's grouping in Sevastopol, Crimea. According to the Russian Ministry of Defense, nine aerial drones and seven unmanned surface vessels were involved in the strike, damaging the Black Sea Fleet's flagship, Admiral Makarov frigate, along with Ivan Golubets minesweeper <sup>1</sup>.

Russia accused the US, claiming that an RQ-4B Global Hawk drone coordinated the attack, while highlighting alleged British involvement in Ukraine's unmanned naval capability development efforts <sup>2</sup>. Russia's usual diplomatic maskirovka misses the main point; being the first joint robotic air-sea assault in military history, the incident marked horizons for the future warfare.

Just like unmanned aerial systems (UAS), the USVs are set to fight in swarms and conduct complex strike operations. To do so, establishing a wide-spectrum digital architecture for naval robotic systems remains key. This architecture, theoretically, must be based on dynamic network management, decision support nodes, and interoperability tools to allow data in various formats to be integrated across several datalinks <sup>3</sup>.

## 3-D Missions in the Future Maritime Battle-Space: Network-Centric Operations 2.0

In the coming years, maritime battle-space will be shaped by three main drivers. First, the 'hot zone' will be more dispersed than ever. Second, highly capable weapon systems and sensors will dominate the seas, bringing in naval reconnaissance-strike complexes. These new capabilities will enable potent high-precision attack, long-range data transmission, and sophisticated data processing capabilities augmented by artificial intelligence (AI). Finally, network-centric warfare is likely to be replaced by a network-of-networks paradigm, connecting unmanned systems, cross-domain warfare capabilities, air, surface and undersea lines of communications, algorithmic warfare nodes, space-based assets, cyber-electronic warfare deterrents, and multi-domain battle networks all in one mega, dispersed battle network <sup>4</sup>.

Unmanned naval systems are planned to carry out surface and anti-submarine warfare, naval air defense, and covert surveillance and reconnaissance missions. They can also act as sensor nodes for large fleets and task forces. Thanks to their advanced algorithms and autonomous features, robotic warships can operate smartly, and adjust to a rapidly changing battlefield with varying levels of individual / swarming autonomy <sup>5</sup>.

1 "Kiev carried out terrorist attack on Black Sea Fleet in Sevastopol - ministry", TASS, October 29, 2022, <https://tass.com/russia/1529537>

2 "Circumstantial Evidence Points to US RQ-4B Global Hawk Drone For Ukrainian Strike on Sevastopol", Eurasian Times, October 30, 2022, <https://eurasianimes.com/us-rq-4b-global-hawk-drone-coordinated-ukrainian-strike-on-russia/>

3 Brent D. Sadler, To Deter China, the U.S. Navy must Build a Connected Fleet at a Faster Pace, Heritage Foundation, 2022, p.7.

4 For a detailed reference, see: Brent D. Sadler, To Deter China, the U.S. Navy must Build a Connected Fleet at a Faster Pace, Heritage Foundation, 2022.

5 Osborn, Kris. "Navigation Plan 2022: Navy Calls for 150 Unmanned Systems", The National Interest, August 31, 2022, <https://nationalinterest.org/blog/buzz/navigation-plan-2022-navy-calls-150-unmanned-systems-204546>



Unmanned vessels / unmanned surface vehicles (UVs / USVs) can be equipped with various sensors, weapons, and other payloads. They can be designed to operate remotely, semi-autonomously, or even fully autonomously with emerging AI-related technologies, such as neural networks and machine learning. They are generally less expensive to operate compared to traditional manned platforms, as they do not need to incorporate the spaces or the support equipment required for the personnel. UVs can be especially suitable for lengthy missions that exhaust the human operators onboard, or for risky missions with high odds of injury, death, or capture of the onboard personnel. These missions fall under the 'three D' category, indicating that they are dull, dirty, or dangerous tasks <sup>6</sup>.

Unmanned naval systems bear the potential of facilitating cross-domain integration, improving the capabilities of combat platforms and battle networks. Furthermore, they are great assets in overcoming the challenges in anti-access / area denial (A2 / AD) bubbles. USVs reduce risks in high-risk zones through "dispersing capabilities into small, hard-to-target nodes and expanding tactical choices by creating new concepts of employment <sup>7</sup>".

## SAILING TO NEW SEAS: TURKIYE'S USV PORTFOLIO

With its new solutions, Turkish unmanned breakthrough is taking to the seas. At present, Turkiye has several competing efforts to field sophisticated combat USVs. These initiatives are to help Ankara bolster its naval warfighting capabilities, in particular when it comes to littoral settings and A2 / AD bubbles. In addition, these assets will boost Turkiye's intelligence and surveillance edge amid brewing tensions over maritime disputes.

According to Turkiye's procurement chief Ismail Demir, "unmanned solutions are now at the forefront of Turkiye's defense strategy <sup>8</sup>". Referring to the unmanned surface vehicles segment, Demir hinted at new projects on the horizon, and that Ankara will become a key player in forming the future's "unmanned battle-space <sup>9</sup>".

Turkiye's breakthrough in the unmanned naval systems segment is of special geopolitical importance. The nation's leading edge in robotic warfare across the spectrum pertains to emerging defense technologies capacity as a NATO member.

Turkiye has turned into a leading drone warfare powerhouse. This has not only built a strong warfighting deterrent but also an arms exports vector. Turkish aerial drones are now empowering arsenals in NATO's eastern flank. Soon, its unmanned naval solutions will likely start entering into the Black Sea littoral countries' navies.

Turkiye's USV portfolio is expanding day by day. New systems with different functions are being designed to meet the various needs of the navy. The nation enjoys a balanced roadmap with unmanned naval programs focusing on electronic warfare (EW), anti-submarine warfare, surface strike roles, and intelligence missions. At present, the leading firms in the business seem to agree that the future's naval warfare environment will be characterized by the need to operate in high-risk environments with multiple threats mushrooming simultaneously and swiftly.

6 "Navy Large Unmanned Surface and Undersea Vehicles: Background and Issues for Congress", U.S. Congressional Research Service, September 29, 2022, <https://sgp.fas.org/crs/weapons/R45757.pdf>

7 Scott Savitz et. al, "U.S. Navy Employment Options for Unmanned Surface Vehicles (USVs)", RAND Corporation, 2013, [https://www.rand.org/content/dam/rand/pubs/research\\_reports/RR300/RR384/RAND\\_RR384.pdf](https://www.rand.org/content/dam/rand/pubs/research_reports/RR300/RR384/RAND_RR384.pdf)

8 Anadolu Agency, May 28, 2021, <https://www.aa.com.tr/tr/bilim-teknoloji/savunma-sanayii-baskani-demir-silahli-insansiz-deniz-ustu-aracimiz-hedefi-basariyla-vurdu/2256946>

9 Ibid.

## ULAQ

ULAQ, jointly produced by Meteksan and Ares Shipyard, is Türkiye's first unveiled indigenous USV project. It is expected to be delivered in 2023. ULAQ is 11-meters long and has a range of around 400 kilometers. It features a full load displacement of 6 tons, as well as a 2 tons-payload (which can be increased according to the customer's needs). The system is semi-autonomous, meaning that its operations can be managed remotely by the personnel in charge (human-in-the-loop mode) while leaving some aspects to the vessel's computational edge.

ULAQ can be equipped with a wide range of munitions and comes with flexible concepts of operations (CONOPS)<sup>10</sup> choices. In the naval exercise Denizkurdu-2021 (Sea Wolf 2021), ULAQ successfully conducted its first strike test, using Roketsan's CIRIT, marking the first naval system to launch a laser-guided missile. Taking advantage of Türkiye's military-technological base, the USV can also be geared with heavier L-UMTAS missiles<sup>11</sup>. The USV will likely use the improved version of the UMTAS to boost its lethal capacity, providing an extended range of 16 kilometers<sup>12</sup>.

ULAQ's weapon systems certification incorporates Aselsan's STAMP, a remote-controlled stabilized machine gun platform. STAMP is particularly effective against asymmetric targets, and comes into prominence with automatic target tracking and high-hit probability<sup>13</sup>. Türkiye already started the serial production for ULAQ<sup>14</sup>.



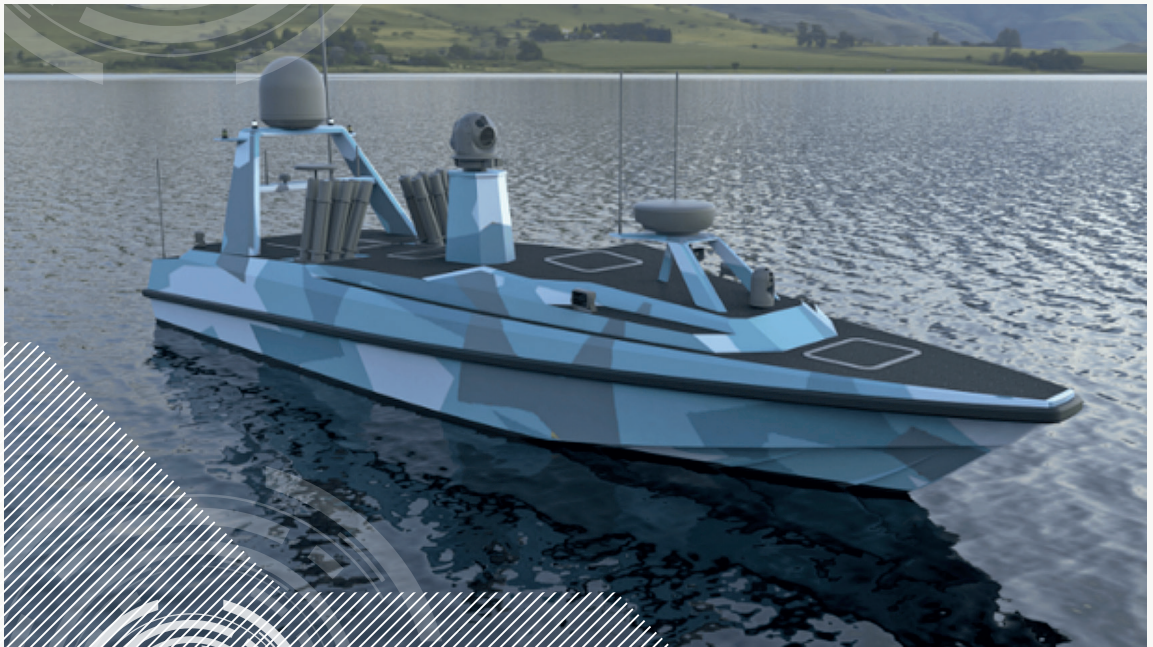
ULAQ FSV (insoluble model)

- 10 ULAQ's series include a range of different solutions, including a port security vessel (PSV), an intelligence, surveillance, reconnaissance & electronic warfare vessel (ISR & EW), an anti-surface warfare vessel (ASuW), a mine countermeasures vessel (MCMV), a firefighting vessel (FIFI) and an anti-submarine warfare vessel (ASW). According to open-source intelligence, the production of the vessels apart from the baseline model are still yet to begin. For more info, see. <https://ares.global/vessels/autonomous-unmanned-systems>
- 11 "World's First Laser Guided Missile System Integrated Armed Unmanned Surface Vehicle "ULAQ" Successfully Hit the Target", Meteksan Savunma, accessed on November 28, 2022, <https://www.meteksan.com/en/news/ulaq-successfully-hit-the-target>
- 12 Defence Turk, March 5, 2022, <https://www.defenceturk.net/menzili-yukseltilen-l-umtas-16-kmden-hedefleri-vuracak>
- 13 "STAMP: Remote Controlled Stabilized Machine Gun Platform", ASELSAN, accessed on November 21, 2022, [https://www.aselsan.com.tr/STAMP\\_Remote\\_Controlled\\_Stabilized\\_Machine\\_Gun\\_Platform\\_6146.pdf](https://www.aselsan.com.tr/STAMP_Remote_Controlled_Stabilized_Machine_Gun_Platform_6146.pdf)
- 14 "Türkiye'nin ilk SIDA'sının, seri üretimine başlandı! 3 farklı özellik", Milliyet, August 10, 2022, <https://www.milliyet.com.tr/ekonomi/turkiyenin-ilk-sidasinin-seri-uretimine-bastandi-3-farkli-ozellik-6805037>
- 15 "Autonomous & Unmanned Vehicles: ULAQ Series", ARES Shipyard, accessed on November 21, 2022, <https://ares.global/vessels/autonomous-unmanned-systems/series/ulaq-series>





*ULAQ Anti-Submarine Warfare (ASW) Vessel* <sup>16</sup>



*ULAQ ISR & EW prototype* <sup>17</sup>

16 Ibid.  
17 Ibid.



# MARLIN

The second USV of the burgeoning defense industry is Sefine Shipyard & Aselsan's MARLIN. The project is praised to be the first USV in the world with full-spectrum electronic warfare (EW) capabilities<sup>18</sup>. According to its manufacturers, MARLIN is designed to combine maneuverability, high-speed and stability. The USV is suitable for both surface warfare and anti-submarine warfare, as its weapons certification is centered on guided missiles and torpedoes.

MARLIN carries indigenous electro-optical surveillance systems, KIRLANGIÇ and MARTI. It can embark on different platforms, including amphibious and logistic ships, which makes the USV a force-multiplier. It can be operated either autonomously or in a human-in-the-loop mode. In addition, thanks to its satellite communication features, MARLIN has a wide operational range<sup>19</sup>.

The USV is the first Turkish unmanned naval solution that proved itself in a NATO drill. During the mission, MARLIN was able to successfully conduct its task in a Sea State 5, when other USVs were unable to sail out to the mission area. Of MARLIN's payload, two important features stand out; its sonobuoy<sup>20</sup> certification and its advanced electronic warfare (EW) capacity<sup>21</sup>. MARLIN was the only USV that was able to detect the units mimicking hostile submarines during NATO exercises. Besides, the sophisticated EW suit of the USV helped it detect the red targets right at the outset of the drill,

leading to the repositioning of the targets to a further location.

According to its producing shipyard, MARLIN's first prototype, the 'Surface Warfare Vehicle' will enter the Turkish Navy's arsenal by late 2022. The project's second prototype will be an 'Anti-Submarine Warfare' USV, which will be operational in June 2023<sup>22</sup>.

MARLIN USV<sup>23</sup>

MARLIN USV Participating in NATO's Dynamic Messenger 2022 Drill<sup>24</sup>

18 ASELSAN, aBülten, Ekim 2022, [https://www.aselsan.com.tr/ASELSANabulten52\\_2613.pdf](https://www.aselsan.com.tr/ASELSANabulten52_2613.pdf)

19 "MARLIN SIDA, üstün teknoloji yetenekleriyle sınıfında rakip tanımıyor", Anadolu Agency, September 28, 2022, <https://www.aa.com.tr/tr/bilim-teknoloji/marlin-sida-ustun-teknoloji-yetenekleriyle-sinifinda-rakip-tanimiyor/2696650#:~:text=Uydu%20iletisimi%20yeteneğiyle%20benzerlerine%20göre,sürede%20operasyona%20hazır%20hale%20getirilebiliyor>

20 Sonobuoys are expendable, electro-mechanical anti-submarine warfare acoustic sensors designed to relay underwater sounds of submarines.

21 Ibid.

22 Sunnetçi, İbrahim. "MİR İDA ve MARLIN SIDA", Defence Turkey, November 2, 2022, <https://www.defenceturkey.com/tr/icerik/mir-ida-ve-marlin-sida-5296>

23 ASELSAN, October 2022, [https://www.aselsan.com.tr/ASELSANabulten52\\_2613.pdf](https://www.aselsan.com.tr/ASELSANabulten52_2613.pdf)

24 Ibid.

## SALVO

Another important indigenous project within the segment in question is SALVO by Dearsan Shipyards. Tested in late May, the USV is capable of launching guided munitions <sup>25</sup>. Within the Turkish USV arsenal, SALVO is the fastest and most agile combat platform in its class. It can be equipped with the MILMAST Telescopic Prop, which can be folded out when cruising. The telescopic prop, which assists the USV's intelligence and reconnaissance missions, can be used at speeds up to 45 - 60 <sup>26</sup>kts with a high level of stability. SALVO is equipped with Roketsan-made CIRIT missiles. During the trials, the USV was tested against moving targets.

*SALVO, with its MILMAST Telescopic Prop <sup>28</sup>*

SALVO was also tested with Aselsan-made 12.7 mm weapon station (RWS), hitting designated targets with great accuracy. The USV's planned configuration also extends to surface-to-air guided missile systems, marking naval air defense options. The platform can be deployed to large warships, such as landing helicopter docks (LHDs), frigates, and corvettes <sup>27</sup>.



*SALVO USV's Principal Combat Payload Configuration <sup>29</sup>*

<sup>25</sup> "Turkey Tests yet Another Armed Unmanned Surface Vehicle: DEARSAN's SALVO", Turkish Defence News, May 25, 2022, <https://www.turkishdefencenews.com/turkey-test-yet-another-armed-unmanned-surface-vehicle-dearsans-salvo/>

<sup>26</sup> Yaylali, Cem Devrim. "Dearsan USV Salvo conducts first live-firing trial", Jane's, May 27, 2022, <https://www.janes.com/defence-news/news-detail/dearsan-usv-salvo-conducts-first-live-firing-trial>

<sup>27</sup> "DEARSAN SALVO Silahlı İnsansız Deniz Aracının Atış Töreni İcra Edildi", Defence Turk, <https://www.defenceturk.net/dearsan-salvo-silahlı-insansız-deniz-aracının-atış-töreni-icra-edildi>, Accessed on: November 20, 2022.

<sup>28</sup> "DEARSAN SALVO'nun Atış Töreni Başarıyla İcra Edildi", DEARSAN Shipyard, accessed on November 21, 2022, <https://www.dearsan.com/tr/haberler/dearsan-salvonun-atış-töreni-basariyla-icra-edildi>

<sup>29</sup> Ibid.



# SANCAR

## SANCAR USV<sup>33</sup>

SANCAR, by Havelsan and Yonca-Onuk is another important addition to Ankara's fast-growing USV portfolio. The system is designed for conducting intelligence, reconnaissance, surveillance, maritime patrol, surface warfare, mine sweeping and harbor / naval facility protection tasks. According to Havelsan, the export variant of SANCAR is already in high demand, with a growing interest by the Middle Eastern and Asia-Pacific countries<sup>30</sup>. SANCAR is a modular USV with a cruising endurance of 40 hours, and a 400 nautical mile (around 740-kilometers) cruise range<sup>31</sup>.

Like its counterpart SALVO, it can be equipped with various systems including the MILMAST Telescopic Prop, enhancing its intelligence and reconnaissance capacity. It can be equipped with ASELSAN's 12.7 mm STAMP-2 remote controlled weapon systems, as well as 2x2 indigenous UMTAS or L-UMTAS missiles<sup>32</sup>.



*SANCAR USV's Weapon Configuration (including ASELSAN STAMP-2 and MILMAST Telescopic Prop<sup>34</sup>)*

30 (SAHA Expo Panel)

31 "Sancar SIDA "Mavi Vatan" korumasına hazırlanıyor", Anadolu Agency, September 25, 2022, <https://www.aa.com.tr/bilim-teknoloji/sancar-sida-mavi-vatan-korumasina-hazirlaniyor/2694172>

32 "Türkiye's Yonca Onuk Shipyard Launched SANCAR Armed USV", Naval News, June 8, 2022, <https://www.navalnews.com/naval-news/2022/06/turkiyes-yonca-onuk-shipyard-launched-sancar-armed-usv/>

33 Ibid.

34 "Yonca Onuk & Havelsan'ın SIDA'sı: SANCAR", October 28, 2022, Mavi Vatan, <https://mavivatan.net/yeni-silahli-deniz-araci-sancar-sida/>



# ALBATROS SURFACE TARGET BOAT

ASELSAN's unmanned surface target boat ALBATROS-K is a notable addition into Türkiye's USV portfolio. The high-speed USV is particularly designed to support the unmanned naval systems' drills, by functioning as a moving target for artillery and guided missiles. Featuring 3x3m – 5x5m target boards, a navigation camera and a flasher, ALBATROS-K can be used for detection and tracking<sup>35</sup>. The target boat has an endurance of approximately 6 hours<sup>36</sup>.

Pushed forward by the SSB's Division of Innovation, the ALBATROS-S project is yet another important initiative within ASELSAN's USV portfolio. What makes the system especially promising is its high-level of autonomy and cooperation with other USVs independent of centralized command-and-control (C2)<sup>37</sup>. It features an operating endurance of at least 10 hours, and a wave-piercing monohull that enables reduced radar and thermal signature<sup>38</sup>.

*ALBATROS – K Unmanned Surface Target Boat*<sup>39</sup>

*ALBATROS – S*<sup>40</sup>

35 ALBATROS-K: Unmanned Surface Target Boat, ASELSAN, accessed on November 21, 2022, [https://www.aselsan.com.tr/ALBATROSK\\_Unmanned\\_Surface\\_Target\\_Boat\\_1661.pdf](https://www.aselsan.com.tr/ALBATROSK_Unmanned_Surface_Target_Boat_1661.pdf)

36 Ibid.

37 Cem Yaylali. "IDEF 2021: Aselsan unveils swarming-capable Albatros-S USV", Jane's, August 23, 2021, <https://www.janes.com/defence-news/news-detail/idef-2021-aselsan-unveils-swarming-capable-albatros-s-usv>

38 Ibid.

39 ALBATROS-K: Unmanned Surface Target Boat, ASELSAN, accessed on November 21, 2022, <https://www.aselsan.com.tr/en/capabilities/unmanned-systems/unmanned-land-and-sea-vehicles/albatros-k-unmanned-surface-target-boat>

40 ALBATROS S İnsansız Deniz Aracı Sürüşü Sistemi, ASELSAN, accessed on November 21, 2022, <https://m.aselsan.com.tr/tr/cozumlerimiz/insansiz-sistemler/insansiz-kara-ve-deniz-araclari/albatros-s-insansiz-deniz-araci-surusu-sistemi>



# MIR

MIR is designed as a sonar-equipped naval surface drone for surface and anti-submarine warfare in heterogeneous swarms, consisting on different variants of the baseline acting together. Produced by Aselsan and Sefine Shipyard, the system will have electronic-warfare capabilities like its counterpart MARLIN. The system's weapon system configuration primarily includes arms produced by indigenous defense firms. It can carry a payload equivalent to one-third of its weight, and can cruise for up to 800 nautical miles <sup>41</sup> (around 1500 kilometers). MIR can be used in search and rescue operations, manned-unmanned teaming in naval settings, as well as intelligence missions to support a larger fleet <sup>42</sup>.



MIR USV <sup>43</sup>

41 Sunnetci, Ibrahim. "MIR USV & MARLIN AUSV", Defence Turkey, November 2, 2022, <https://www.defenceturkey.com/en/content/mir-usv-marlin-ausv-5296>

42 Ibid.

43 Bekdil, Burak Ege. "Turkey unveils MIR naval surface drone for fighting submarines", Defense News, November 3, 2022, <https://www.defensenews.com/global/mideast-africa/2022/11/03/turkey-unveils-mir-naval-surface-drone-for-fighting-submarines/>

## Robotic Navies of the Future: What Next for Turkiye?

Although there are industrial duplications in platform designs, there is a military-strategic consensus among Turkish naval robotic warfare systems makers. At the SAHA EXPO exhibition, chairmen of many leading companies in the USV industry seemed to agree that the end goal for the platforms will be to be able to operate in a network-centric structure, in swarms and in a fully autonomous coordination. These are the key words that depict the strategic direction of the Turkish USV paradigm. Turkiye's unmanned naval strategy roadmap fit for improvements based on the changing imperatives of contemporary warfare. As the war in Ukraine showcased, the USVs can play a critically disruptive role in naval conflict.

At present, one of the primary efforts of the Turkish defense industry is translating the success achieved in the unmanned aerial systems to the other robotic warfare spheres. Thanks to their intelligence, surveillance, target acquisition and reconnaissance (ISTAR) capabilities and high-precision strike roles, Turkish USVs loom large as critical assets for bolstering the Turkish government's firm agenda in the seas, manifested by the Blue Homeland geostrategic concept. Militarily, these systems can play a particularly critical role in narrow maritime settings with high risk of casualties.

In the near future, the Turkish USV deterrent can also set sail to the Black Sea. Given the present naval warfare trends manifested in the Russo - Ukrainian War, such a move would be a major vector in the Black Sea military-strategic balance. Especially, combined with Turkiye's fast rising anti-ship missile capacity and high-end aerial drones, USVs can make potent assets within a network-centric architecture.

With over half a dozen promising projects already set sail to the international weapons market, Turkiye's unmanned naval systems come with great potential. The nation's rich USV portfolio paves the ground for 'robotic navies' of the future. Such a smart breakthrough would bolster Turkiye's maritime capacity in a volatile geopolitical outlook. This emerging technologies-enabled defense affairs agenda has a NATO dimension too. While robotic systems are fostering the Turkish military's warfighting edge, the nation's dynamic USV production capacity would also boost the Transatlantic Alliance's naval posture.

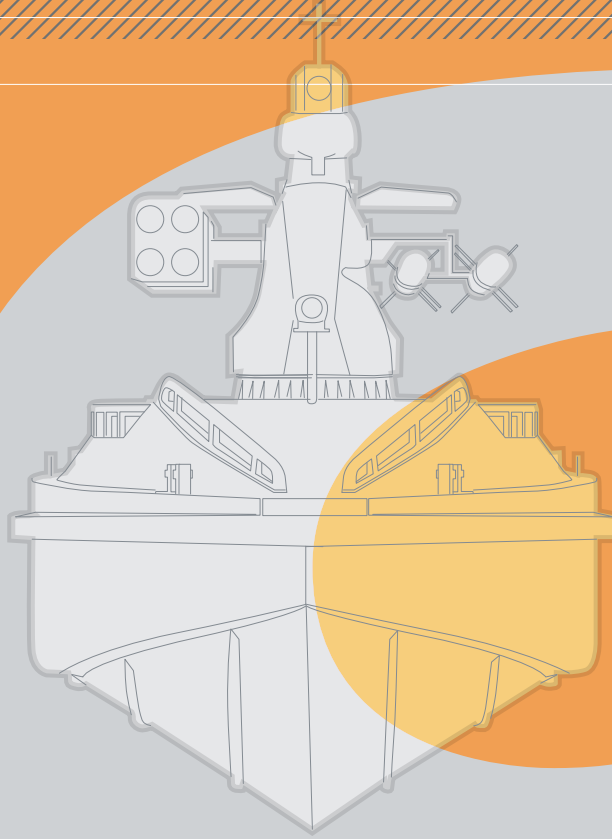
Turkish USVs can also help bolstering NATO's security in a broad spectrum from crisis management to collective defense missions. In terms of USV use in conflict, the lessons learned in Ukraine provide important opportunities for the Alliance. Exploiting the advantages of the Western state-of-the-art technologies at hand, the Ukrainians also demonstrated a real-time, applied use of joint UAV-USV operations. This recent combat record shows the importance of exploiting emerging and disruptive technologies to boost NATO's allied defense technological superiority. In the coming years, the intra-alliance transaction and transfer of critical military technology will come at the forefront for the Alliance's future roadmap<sup>44</sup>.



# 12 // 2022

FOREIGN POLICY & SECURITY 2022/12/EN

## ROBOTIC RISE IN THE SEAS: TURKISH UNMANNED NAVAL DETERRENT IN THE MAKING



Centre for Economics  
and Foreign Policy Studies

# edam

Hare sokak No.16 Akatlar / İstanbul

T. +90 (212) 352 18 54

F. +90 (212) 351 54 65

info@edam.org.tr

f t You Tube in // edam.org