# Advancements in uncrewed maritime systems for 2024



In 2024, the landscape of uncrewed and autonomous maritime systems witnesses significant advancements, driven by the pressing need for operational efficiency and mission capability amidst an evolving geopolitical backdrop. This year has seen a dual narrative focusing on the necessity for sophisticated autonomy while also emphasizing rapid, cost-effective solutions for large-scale deployment of uncrewed undersea vehicles (UUVs).

Major developments in the field have been catalysed by demands tied to the U.S. military’s strategic preparedness for potential conflict with China by 2027. As noted by Chris Haugen, Business Development Manager for Forcys, there is an increasing push towards capabilities that allow independent operations in remote maritime domains. Collaborating with various technology partners like Sonardyne and EIVA, Forcys has been instrumental in advancing these undersea technologies.

Two remarkable entries into the arsenal of UUVs in 2024 are the Australian-built Ghost Shark, developed by Anduril, and the Orca, created by Boeing and Huntington Ingalls Industries. These extra-large uncrewed undersea vehicles (XLUUVs) are designed for extensive missions, capable of carrying various payloads including undersea mines and persistent sensors into contested environments without subjecting human operators to risk. The Ghost Shark will comprise a class of three vehicles, while the Orca remains under evaluation, with a potential fleet size of up to four.

Despite their advancements, challenges remain, especially regarding navigation in environments devoid of Global Navigation Satellite System (GNSS) signals. Solutions are emerging, such as integrated inertial navigation systems (INS) and Doppler velocity logs (DVLs), which have shown promise in providing precise positional tracking when within range of the seafloor.

However, the U.S. and allied strategies also pivot towards the necessity of deploying a larger number of UUVs, particularly in light of successful low-cost implementations observed during the recent conflicts in Ukraine. The asymmetric advantage provided by these vehicles is underscored by the emerging trend of swarming tactics, where multiple units coordinate to perform complex operations effectively. Communication technologies, such as Sonardyne’s BlueComm, are critical for enhancing the connectivity and cooperation between these unmanned systems.

The development of rapidly deployable undersea systems has gained traction. The EIVA’s Containerized Remotely Operated Towed Vehicle (C-ROTV) exemplifies this trend, designed for quick deployment from various vessels and outfitted with mission-specific sensor packages. This 20-foot ISO container system can be operational in a matter of hours, enhancing operational readiness.

Furthermore, as maritime security increasingly depends on undersea asset protection, there is a growing interest in persistent sensor systems capable of detecting and neutralising intruders. Wavefront Systems’ Sentinel 2 sonar system is tailored for these applications, expected to evolve by incorporating artificial intelligence (AI) and automated target recognition capabilities.

Looking ahead, the integration of AI into autonomous undersea vehicles is poised to redefine operational frameworks. With the potential for AI to enhance adaptability in dynamic environments, it is anticipated that future missions will increasingly rely on autonomous systems devoid of human oversight for target identification and engagement. A critical aspect of this evolution lies in striking a balance between sensor resolution, data processing capabilities, and mission endurance—highlighted by the need for advanced technologies like multiple-aperture sonar (MAS).

The U.S. Defence Innovation Unit (DIU) is set to further the development of autonomous systems through its Replicator initiative, aiming to field thousands of these vehicles in the near future. As contracts for large-diameter UUVs are awarded and sensor technology improves, there is widespread anticipation of a shift towards more affordable yet capable unmanned systems.

Technological advancements will be essential, particularly in establishing robust communication networks capable of supporting swarming tactics and real-time data transfer between operators and autonomous vehicles. This evolution will necessitate improvements in long-range, secure acoustic and optical communication technologies to bridge the operations between undersea, aerial, and spatial domains.

As the focus on enhancing maritime capabilities continues to escalate, the utilisation of autonomous undersea systems is expected to play a crucial role in future military and security operations.

Source: [Noah Wire Services](https://www.noahwire.com)

## Bibliography

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2. <https://www.l3harris.com/newsroom/editorial/2024/11/transforming-future-uncrewed-surface-technology> - This article highlights L3Harris's advancements in uncrewed surface technology, including the development of USVs like Shadow Fox, which supports various maritime missions and underscores the trend of autonomous maritime systems.
3. <https://www.sonardyne.com/products/bluecomm/> - This link explains Sonardyne’s BlueComm communication technology, which is crucial for enhancing connectivity and cooperation between unmanned systems, a key aspect mentioned in the article.
4. <https://www.eiva.com/products/containerized-rotv> - This page details EIVA’s Containerized Remotely Operated Towed Vehicle (C-ROTV), which exemplifies the trend of rapidly deployable undersea systems mentioned in the article.
5. <https://www.wavefrontsystems.com/products/sentinel-2-sonar-system> - This link describes Wavefront Systems’ Sentinel 2 sonar system, which is tailored for detecting and neutralizing intruders, aligning with the article’s focus on persistent sensor systems.
6. <https://www.anduril.com/products/ghost-shark> - This page provides information on the Australian-built Ghost Shark, an XLUUV developed by Anduril, which is one of the remarkable entries into the arsenal of UUVs mentioned in the article.
7. <https://www.boeing.com/defense-space/maritime/orca/index.html> - This link details Boeing’s Orca, another XLUUV mentioned in the article, which is designed for extensive missions and carries various payloads.
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