gfai tech unveils HydroVision SeaStar24 passive underwater Acoustic Camera

Berlin technology company introduces emission-free acoustic imaging platform for maritime security and infrastructure monitoring

gfai tech GmbH announces the introduction of HydroVision SeaStar24, a passive underwater acoustic imaging platform designed for security-oriented monitoring in sensitive maritime environments. The system transforms underwater sound into spatial 2D and 3D visualizations without transmitting acoustic signals.

Underwater monitoring has traditionally relied on active sonar systems that emit acoustic pulses to generate echoes, or passive hydrophone systems that provide spectral analysis without spatial visualization. HydroVision SeaStar24 introduces a third approach: passive acoustic imaging that reconstructs acoustic fields spatially in real time.

A new category: passive underwater Acoustic Camera

"We've developed what can be described as a passive underwater acoustic camera," said Philip Höhna, CEO of gfai tech GmbH. "Rather than emitting sonar pulses like conventional systems, SeaStar24 captures existing underwater sound and reconstructs it as intuitive 2D and 3D images. This provides spatial situational awareness without adding to the underwater acoustic environment."

The system uses a 24-channel hydrophone array combined with advanced digital beamforming and phase-coherent signal processing. By analyzing the direction and timing of acoustic waves arriving at multiple hydrophones, the system reconstructs the spatial location of sound sources in real time.

The result is a visual representation of underwater acoustic activity that enables operators to detect, localize, and assess acoustic events – entirely passively.

Emission-free monitoring for sensitive environments

Unlike active sonar, SeaStar24's passive operation offers several distinct advantages.

Environmental compatibility: The system does not introduce additional acoustic energy into marine ecosystems. This makes it suitable for environmentally sensitive areas and aligns with marine protection frameworks.

Discreet operation: Passive systems maintain a low acoustic footprint and do not emit detectable signals. This is particularly relevant in security-oriented contexts where discreet monitoring is essential.

Continuous awareness: Active sonar provides snapshots when pulses are transmitted. Passive imaging provides continuous real-time awareness of the acoustic environment.

Regulatory alignment: In regulated offshore and coastal zones where acoustic emissions are restricted or monitored, passive systems offer a compliant monitoring approach.

Application contexts across maritime sectors

HydroVision SeaStar24 is designed for deployment across multiple maritime contexts.

Security and defence: Underwater situational awareness for ports, harbors, coastal infrastructure, and strategic maritime facilities. Localization of underwater acoustic activity associated with human movement, equipment, or vessels.

Offshore infrastructure: Monitoring of offshore wind farms, subsea pipelines, cables, and energy installations. Detection of acoustic events near critical structures without introducing additional acoustic emissions.

Environmental research: Non-invasive acoustic field visualization for marine research, acoustic source mapping, and eco-sensitive monitoring scenarios.

Maritime domain awareness: Integration into multi-sensor monitoring networks combining surface surveillance, radar systems, and subsea acoustic awareness.

Technology foundation: beamforming expertise

gfai tech brings decades of experience in acoustic beamforming and signal processing to the development of SeaStar24. The company has developed beamforming technologies for industrial noise source localization, automotive acoustic testing, and aerospace applications.

HydroVision SeaStar24 applies this expertise to the underwater domain, where acoustic propagation characteristics, environmental variability, and operational requirements present unique technical challenges.

The system's real-time processing architecture enables immediate visualization of acoustic activity, supporting operational decision-making in dynamic maritime environments.

Pre-series development and project-based deployment

HydroVision SeaStar24 is currently available as a pre-series (zero-series) system intended for project-based deployment and application-specific development. Rather than a standardized mass-produced unit, SeaStar24 is developed in close cooperation with partners and end users.

System parameters such as array configuration, processing architecture, visualization modes, and deployment geometry can be adapted to specific operational requirements. Capabilities depend on project configuration and environmental conditions.

This flexible development approach allows tailored solutions for complex underwater monitoring challenges in cooperation with offshore operators, governmental agencies, port authorities, and research institutions.

Live Webinar and European debut at UDT 2026

gfai tech will present HydroVision SeaStar24 at the live webinar "Seeing Underwater with Sound- Passive Acoustic Imaging with SeaStar24" https://www.gfaitech.com/news-events/news/webinar-seeing-underwater-with-sound on March 26 and publicly for the first time in Europe at Undersea Defence Technology (UDT) 2026, taking place 14–16 April at ExCeL London. Live demonstrations and technical discussions will be available at the gfai tech booth D95.

Engage with gfai tech

Interested parties are invited to discuss project-based deployment, pilot installations, technical specifications, or cooperative development opportunities.

About gfai tech

gfai tech GmbH is a German company specializing in innovative sound and vibration measurement and analysis solutions. We offer advanced Acoustic Cameras, comprehensive analysis software, and cutting-edge structural dynamics solutions. Our expertise spans various industries, helping customers achieve noise reduction, false detection, sound design improvement, and precise vibration monitoring. As a subsidiary of GFaI e.V., we provide unique hardware, software, and customized customer solutions backed by global support.

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High resolution images can be provided upon request.