



## Sub-bottom detection system

GESMA (Groupe d'Études Sous-Marines de l'Atlantique) is a part of the Direction Générale de l'Armement (DGA). DGA's missions are to prepare the future of defence systems, to equip the armed forces and to promote defence equipment exports. GESMA has been experimenting for several years with transducers and signal generation electronics to detect and classify mines buried under the seabed.

Under contract to ITER (GESMA's contractor and French agent linked with SEA's Offshore Division), SEA is developing a technology upgrade to GESMA's existing equipment. The result will be a technology demonstrator that can be mounted as the payload on the Redermor Autonomous Underwater Vehicle (AUV).

The hardware and software design, and the management of this project, is provided by SEA's Submersibles Systems group, part of SEA's Underwater Systems Division. Additional acoustics expertise is being provided by SEA's Offshore Division and hardware manufacture is being carried out by SEA's Production Department.

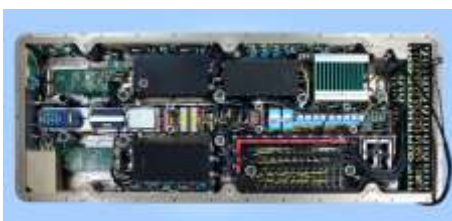
The existing equipment includes an HF transmit array and HF and LF receive arrays together with the signal generation and power amplification necessary to transmit parametric acoustic signals into the water.

SEA is supplying power, control; signal conditioning, digitisation and data capture elements for the technology upgrade. There is no on-board processing of the returned data planned; analysis being undertaken on-shore after the captured data has been downloaded.



*The unit is watertight up to pressures of 7.5 bar (approximately 75 m depth). The equipment enclosure is designed to fit into a rigidly defined envelope beneath the Redermor AUV.*

The SEA design for the technology upgrade successfully addresses both physical and signal processing challenges:



- Other than conduction through the system enclosure, there is no cooling available. The operational environment requires a low noise solution so fans are not appropriate. The SEA design recognises that system elements, particular power amplifiers and portions of the digital electronics, generate considerable heat and delivers a solution that meets the thermal constraints placed upon it.
- In order to design the signal conditioning path prior to digitisation, it is necessary to have a thorough understanding of the acoustic signal strengths likely to be received. The SEA design is thoroughly informed by the significant experience gained by both SEA's Underwater and Offshore Divisions in the development and delivery of military and commercial sonar and sonar data processing systems.