PHOENIX INTERNATIONAL®

UNDERWATER SOLUTIONS WORLDWIDE

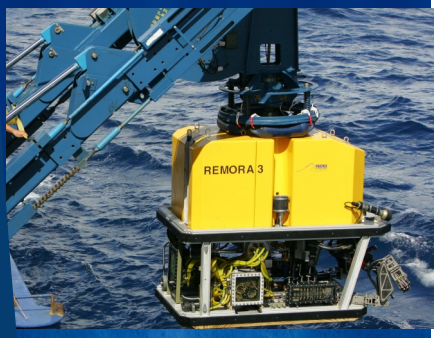
Gamma Radiation Detector Integration and Testing

Remotely Operated Vehicle (ROV) and Autonomous Underwater Vehicle (AUV)

Phoenix has designed, fabricated, and tested separate ROV and AUV payloads capable of detecting radiological emissions from sources lying on or immediately below the seafloor in depths to 20,000 feet of sea water (fsw). Central to both tasks was the use of customer specified Gamma Radiation Detectors (GRDs).

ROV Payload Design

The ROV payload design consisted of a 20-ft x 26-ft frame incorporating 48 GRDs precisely positioned at 1-meter intervals and 6 hydraulically operated thrusters strategically positioned on the frame. The frame was physically attached beneath the Phoenix designed ROV, Remora, and integrated into the ROVs electrical, electronic, and hydraulic systems. The 6 thrusters on the frame complemented those on the ROV to maneuver the sensor package effectively and accurately during operations. These additional thrusters and the large size of the frame required Phoenix engineers to modify the ROV's control system to enhance operator control of the combined ROV and its instrumented payload. Phoenix engineers developed and executed an operational test plan by which the performance and maneuverability of the entire system (ROV with integrated payload) was successfully demonstrated in the David Taylor Model Basin at Naval Surface Warfare Center (NSWC) Carderock.



Contact us to learn more

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AUV Payload Design

The AUV payload was designed for integration on the 29-inch diameter International Submarine Engineering (ISE) Explorer AUV. This payload included 6 GRD sensors, a 600-1,600 kHz, dual-frequency Side Scan Sonar (SSS), and a 4-24 KHz Sub-Bottom Profiler (SBP). Because the performance of the GRD sensors would be negatively affected if they were placed in metallic housings, the GRD sensors for deep-water operations were housed using a novel system developed by Phoenix. This system involved placing the GRD sensors in 20,000 fsw pressure resistant ceramic housings, powering them wirelessly through the walls of the housings, and, in similar fashion, exchanging data with the sensors.

In operation, the AUV instrumentation package was designed to gather target information from the SSS and SBP sensors while the vehicle was traveling above the bottom. When targets of interest were detected, the instrumentation payload communicated with the AUV's main control system to alter the AUV's heading, depth, and speed in order to further investigate the target. The vehicle then performs a localized survey at a speed of 1 knot and an altitude of 1 meter above the bottom while logging timestamped radiation and navigation data. Phoenix received 2 joint R&D 100 Awards for this project.