



Providing ROV Solutions for Security and Military Requirements

In reaction to recent worldwide occurrences of terrorism and war, the US military and its close allies have heightened their security activities by several orders of magnitude. Unlike earlier conflicts, these new threats are acknowledged to be global in nature and require global responses. For economic, political, and practical reasons (not to mention human safety), military personnel cannot handle this threat alone. Rather, advanced remote sensing, reporting, and response technologies are required to augment the efforts of our own military and civil institutions and those of our international allies.

In the underwater arena, security activities now include in-port monitoring, ship tracking and inspection, intelligence gathering, anti-submarine warfare (ASW), mine countermeasures (MCM), and R&D of systems with improved capabilities and performance. Since 1985, Deep Ocean Engineering (DOE), has been a supplier of its products and services to US military and supporting federal law-enforcement agencies, including the Navy, Army, Coast Guard, and FBI and their foreign allied counterparts. DOE's products include the Phantom® remotely operated vehicles (ROV), and associated tools and sensor packages. These vehicles are being used in a wide variety of challenging military applications. Some examples successful applications of DOE's ROV systems are provided below.

DOE recently delivered a Phantom HD2+2 to the Federal Bureau of Investigation (FBI), New York Underwater Evidence Search Team. This NY-based team's scope of operations are worldwide. This vehicle's maiden launch was as a search vehicle to the Cayuga Lake Search Project. The vehicle was also used to recover bodies from the New Melones Lake, evidence in a California crime case. This system incorporates an acoustic positioning system and specialized suite of sensors. The FBI project tasks included survey, monitoring and other initiatives associated with evidence gathering and research. DOE customized the Phantom ROV to address the FBI's specific needs and project initiatives.



The US Navy's EOD MU7 in San Diego uses its fleet of Phantom ROVs, which includes XTL and HD2 models, to assist its divers in locating and identifying submerged mine-like targets. The ROV locates and homes on the target using obstacle avoidance sonar, and inspects it using a high resolution color zoom video camera. Parallel lasers projecting into the video image provide safe stand-off distance and scaling information. EOD Tech Center in Indian Head purchased DOE's Phantom HVS4s in its R&D program to evaluate man-portable ROVs used for MCM. DOE's Phantom ROVs were also used by NCSC at Panama City to evaluate the use of ROVs in airborne mine countermeasure applications. These vehicles continue to be used in US Government-funded R&D programs associated with improving MCM capabilities of ROVs.



EODTC Phantom HVS4 with multibeam sonar



NSWCC Phantom S2 Open Frame

NSWC Carderock has Phantom ROVs for military ship hull inspection. Their fleet includes a 300, S4, and the latest acquisition, an open-frame PIII-S2. In addition to a color video camera, the systems carry ultrasonic metal and paint thickness sensors, as well as a high-precision tracking system. The ROVs have conducted inspections of the Navy's destroyers and aircraft carriers, as well as being used in general-purpose ROV operations. Last year, NSWCC's PIII-S2 ROV system was commissioned by the US Naval Historical Center to document sunken World War II ships off the Normandy coast in France.



NFESC in Port Hueneme has used its Phantom DHD2+2 in a wide variety of applications, both in R&D projects and for real work to 600m depth. One highly successful R&D program involved the ROV being used to deploy fiber optic cable on the ocean floor, and then to find and recover it for maintenance and repair. This kind of technology will be a valuable component of the Navy's ability to increase its remote sensing and monitoring network.

NFESC Phantom HD2+2

As many as 20 foreign military organizations use DOE ROV systems for diverse applications. For example, Phantom ROVs are frequently used by Sweden's Navy and Coast Guard. Spain's Guardia Civil uses Phantom's for general underwater observation and object recovery. The Canadian Defense Fleet Diving Units and Hellenic Air Force both have used their Phantom ROVs to investigate and/or recover spent weapons and downed aircraft. Her Majesty's Customs and Excise (UK) and the Egyptian Border Guard both have acquired fleets of Phantom ROVs for detection and retrieval of contraband being smuggled by underwater means, including ships and divers. Shortly after acquiring their first Phantom 300, HM Customs officials quickly found 25kg of cocaine, (\$9 million street value) in a tube clamped to the hull of a ship in Southampton, and 40kg of cannabis (Value \$290K) beneath a ship at Newport, Gwent.

UK Customs official with a Phantom 300



The Canadian Navy owns a Phantom DS4 and the Canadian Defense Forces own and operate their own Phantom DH2+2. Following the catastrophic crash of Swissair Flt 111 into Peggy's Cove, 40 miles south west of Halifax, Nova Scotia, the Phantom ROVs were deployed immediately to the crash site and used to map the debris field. These ROVs were used to quickly locate and recover large pieces of the aircraft, including wire harnesses from the seabed. Both vehicles were out on location for a period of over two months. They were used to 'video-map' the whole area in order to ensure that as much as possible of the complete aircraft was recovered.



The navies of, Great Britain, Australia, New Zealand, Sweden, Singapore, Brazil and Argentina also operate **DOE** Phantom S2s and S4s in MCM applications as well as in general-purpose ROV operations. The Brazil Navy has installed a Phantom Ultimate ROV onboard the NSS *Felinto Perry* as one of the key tools for submarine rescue.

In summary, DOE is committed to serving the military market in four ways. Its broad range of commercial off-the-shelf products provide robust, field-proven performance, and offer low cost of ownership with easy maintenance and repair, even by technicians with little training. DOE's 20 years of directly related experience allows it to provide complete turnkey system solutions that include responsible selection and top-quality integration of third-party components. For those especially challenging military applications, DOE's experienced team of engineers is able to provide innovative solutions that maximize technology transfer. This in turn generates robust and advanced new capabilities while minimizing development risk, lead-time, and cost. And finally, DOE is dedicated to follow-on service and support of its products through comprehensive factory and field training, stocking of critical spare parts, and ongoing technological improvements and upgrades that are available to every DOE customer.

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