

LOOKING TO THE FUTURE

Dr. Jonathan Evans, Chief Engineer, SeeByte, discusses the future of AUV technology

Autonomous Underwater Vehicles have experienced a successful progression over the years becoming the chosen tool for deepwater survey applications, underwater mine hunting and under-ice operations within both the military and oil and gas industry. Their current capabilities provide companies with repeatable, stable, high-resolution data that has made them invaluable for underwater missions.

AUVs are confidently moving past strictly survey applications to inspection, repair and maintenance, construction support, drill support and ship and harbour inspections. Recent advents of high-resolution imaging sensors such as synthetic aperture sonar and acoustic cameras have made target detection and identification possible. The techniques for autonomous mine neutralisation have been demonstrated in simple controlled environments and scenarios. Multiple vehicle collaboration is also being investigated and initial results of collaborative behaviours are available. The question is now raised, where do we go from here?

In order to move forward with AUV technology, we must understand the current challenges that are present. The need for full autonomy and awareness would address the issue being felt by the industry in the man power and operator training needs. The operator would require less training and thus be on-the-job quicker while also expanding the job pool to those previously considered under-qualified. Being able to offer an AUV that has greater vehicle endurance and capable of subsea docking and battery charging would greatly improve mission times and performance, while expanding the communications bandwidth would open up the possibilities for longer missions. These are imminent needs that must be met with future AUV generations.

The next generation of Autonomous Underwater Vehicles must meet industry demands and broaden their marketability across industry sectors. One of the AUVs on the horizon is the "smart" AUV. This AUV will offer operators a fully autonomous vehicle that is able to reason and act based on current conditions. This decision-making vehicle will process and fuse data on-board, understand the world around it, as well as evaluate its own condition and communicate the conditions monitored efficiently. Other solutions on the horizon are the use of AUV "swarms". These provide safety in numbers. With swarms, operations are not compromised by the failure of a vehicle, allowing the operators to experience improved performance and mission times through vehicle collaboration. Smart AUVs working in

a swarm will be able to act as a mobile sensor network capable of tackling complex environments and operations.

As software and vehicle companies continue to work closely together to propel the Autonomous Underwater Vehicle industry to the next level, we will witness the eventual closing of the capability gap and the impending expansion of AUVs into new marketplaces.

Author Dr. Jonathan Evans is the Chief Engineer at SeeByte. He is a Chartered Engineer with experience working on research and development projects for ROVs and AUVs since 1993, and has been technically responsible for a number of key achievements and world-firsts. Dr. Evans earned his PhD. in Evolutionary Pathways for Target Location in Autonomous Robots from the University of Liverpool and is an expert in the integration and de-risking process of introducing new technology.

