Marine Autonomous Systems for Marine Mapping
Evening Meeting, London

Thursday, 9 April 2015

By Iain Knight

One of the great things about the SUT is the breadth of its areas of interest. It is not constrained to repeat presentations on the same subjects month after month but has the opportunity to explore a range of subjects as varied as the seas themselves.

In this evening's meeting, Dr Russell Wynn, Chief Scientist of Marine Autonomous and Robotic Systems (MARS) at the National Oceanography Centre provided a presentation on the use of Marine Autonomous Systems for Marine Mapping and how robots can be used to meet the needs of science, business and policy.

The National Oceanography Center (NOC) is located in Southampton and Liverpool. It is owned by the Natural Environment Research Council (NERC) and is responsible for undertaking integrated ocean research from the coast to the oceans. Key activities include ocean observing, seabed mapping and marine survey; data management and scientific advice (for policy making).

At the start of his presentation, Dr Wynn highlighted the increased need for seabed mapping and marine survey data for both scientific and commercial applications. Onshore, we have ordnance survey maps detailing all corners of the UK; offshore there are vast areas of our territorial waters for which there is no reliable survey information.

Historically, most of the NOC's survey activities have been performed from vessels but these are expensive to maintain and operate. Luckily, there is now an alternative, autonomous marine vehicles, and the NOC has one of the largest fleets of these in the public domain.

Dr Wynn went on to describe the range of vehicles operated by the NOC; these include Remotely Operated Vehicles (ROV's) capable of diving to the bottom of the ocean and a depth of 6,000m; torpedo shaped vehicles capable of remote survey operations over extended ranges and durations (including under arctic ice); gliders capable of repeat sawtooth shaped dives through the water column; and some recently designed vessels for monitoring surface conditions.

Dr Wynn highlighted some of the survey operations conducted by the NOC using its autonomous vehicles; these included surveys of deep offshore canyons with walls of fragile coral growths and inspections of protected marine areas to establish whether the protection status has been effective, or not.

Of particular interest was the recently conducted the MASSMO (Marine Autonomous Systems in Support of Marine Observations) project in which a fleet of unmanned robotic vehicles patrolled the seas off southwest UK in October 2014. Phase 1 of the MASSMO project saw a range of vehicles operating for up to three weeks, carrying sensor loads designed to investigate broad-scale oceanographic and biological processes over the continental shelf up to 150 km offshore. Phase 2 saw the vehicles working close inshore off Plymouth for several days, carrying acoustic receivers to detect tagged fish in and around Marine Protected Areas.

The MASSMO project showcased the potential for Unmanned Surface Vehicles to collect high-quality data from the marine environment; the new Autonaut USV travelled 400 km in 12 days

during Phase 1, whilst towing a 25 m-long acoustic array. The USVs had to operate in challenging 'open ocean' conditions, with winds >70 mph and waves >7 m high experienced during Phase 1. Cameras mounted on the USVs captured these stormy conditions, and collected over 3800 still images and videos including seabirds, floating litter, fishing/naval vessels, and a surfacing harbour porpoise.

Dr Wynn concluded his presentation by showing some of the images collected during the MASSMO project. From these, there was no doubting the obvious potential for autonomous vehicles for collecting high quality scientific and environmental data.

After an enthusiastic session of questions from the audience; we adjourned to the foyer to refresh ourselves on a generous supply of cheese and wine kindly sponsored by the Leviathan Facility.