



## **Oceanids Command and Control (C2) system: Automating marine robot piloting, data transfer and archiving**

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The National Oceanography Centre's (NOC) Marine Autonomous and Robotic Systems (MARS) group operate the National Environmental Research Council's (NERC) long-range fleet of marine robots for ocean science. The fleet includes underwater gliders, unmanned surface vehicles (USVs), autonomous underwater vehicles (ASVs) and remotely operated vehicles (ROVs). As the fleet grows, the challenges associated with enhanced fleet control/piloting and automatic archiving and processing of near real time oceanographic data collated by the vehicles, become more pressing.

The Oceanids Command and Control (C2) project, aims to provide a unified and consistent infrastructure to control the NERC fleet and automate transfer and archiving of near real time science data collected by the fleet into the British Oceanographic Data Centre (BODC). The infrastructure will allow some piloting automation with the goals of: maximising the quality of data collected; enhancing the safety of the vehicles; whilst increasing the number of assets in the water at the same time.

In this presentation, we illustrate the above-mentioned system, which is currently being developed by MARS, the Scottish Association of Marine Science (SAMS) and BODC using a micro-service architecture, embodying RESTful modular services as APIs, which are harmonized by an API gateway. The APIs aim at providing the means to web-based exchange of sensor and platform data and metadata complying with the OGC SWE (sensorML and O&M) and W3C (RDF/XML, SSN/SOSA ontology) standards and being semantically annotated with controlled vocabularies provided by the NERC Vocabulary Server (NVS). The system will ensure that the mandatory metadata are available to automatically deliver near real time data in various standardised formats, starting with Everyone's Gliding Observatories (EGO) netCDF.