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At-sea NATO operational experimentation with interoperable underwater assets using different robotic middlewares

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Autonomous Underwater Vehicles (AUVs) are offering new capabilities for a wide range of military and civilian applications. The interoperability of heterogeneous AUVs with different skills is critical to accomplish such complex tasks. Indeed, the proliferation of AUVs with their own mission control interface and communications protocol makes it difficult to operate them within operational experimentations, which requires joint management and coordination.

This problem was approached during the ASW-ODC17 (Operational Deployment of Concepts) sea trial, which aimed to demonstrate the interoperability of an external AUV (the Folaga WAVE [1]) within the CMRE heterogeneous ASW network [2] during a NATO operational exercise. WAVE vehicle and CMRE network use respectively ROS and MOOS as middleware, therefore a ROS-MOOS bridge was installed on a buoy acting as a gateway between underwater assets. The gateway was equipped with acoustic modems working on different frequencies, due to the different AUVs equipments.

Remarkable recent bridging works can be found in [3] and [4]. To the authors' knowledge, no national interoperable approach has been fully demonstrated in an operational exercise. All the AUVs were successfully operated during the joint NATO exercise through the same mission control station, unconcerned by differences in acoustic modems and middleware.

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