

Uncovering Underwater Communication for Multi-Robot Applications via CORSICA

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Abstract : This paper benchmarks the possible underwater communication technologies that can be integrated into a swarm of underwater robots by proposing an underwater robot simulator named CORSICA (Cross platfORm wireleSs communICation simulator). Underwater exploration relies increasingly on the use of mobile robots, called Autonomous Underwater Vehicles (AUVs). These robots are able to reach goals in harsh underwater environments without resorting to human divers. The introduction of swarm robotics in these scenarios would facilitate the accomplishment of complex tasks with lower costs. However, swarm robotics requires implementation of communication systems to be operational and have a non-deterministic behaviour. Inter-robot communication is one of the key challenges in swarm robotics, especially in underwater scenarios, as communication must cope with severe restrictions and perturbations. This paper starts by presenting a list of the underwater propagation models of acoustic and electromagnetic waves, it also reviews existing transmitters embedded in current robots and simulators. It then proposes CORSICA, which allows validating the choices in terms of protocol and communication strategies, whether they are robot-robot or human-robot interactions. This paper finishes with a presentation of possible integration according to the literature review, and the potential to get CORSICA at an industrial level.

Keywords : underwater simulator, robot-robot underwater communication, swarm robotics, transceiver and communication models

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