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A review of approaches towards effective Underwater Sensor Networks

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The still largely unexplored vastness of the ocean, covering about two-third of the surface of earth, has fascinated humans for as long as we have records for. Its currents, chemical composition, and ecosystems are all highly variable at different locations and times.

New paradigms for the monitoring of the undersea environment, based on autonomous underwater sensor nodes organized in ad-hoc coalitions, offer a promising approach towards the development of scalable networks for underwater sensing, monitoring, reconnaissance and surveillance. This promise has however to be balanced against important challenges, which need to properly addressed in order to devise a credible system concept. Some challenges worth mentioning are the difficulty in ensuring a low error-rate end-to-end path between source and destination for the duration of the communications session, the negative impact of communications performance characteristics at applications level, and energy constraints for battery-operated nodes.

The requirement is therefore to design new protocols to provide network flexibility and reliability through self-organization and reconfiguration, as well as new energy-efficient routing schemes, including geographic and data-centric routing, to maximize the operational lifespan of autonomous power-constrained nodes.

In this paper we will present the state of the art and approaches being investigated at NURC.