

A LOW-COST SURFACE WIRELESS SENSOR NETWORK FOR POLLUTION MONITORING IN THE IONIAN SEA

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Introduction/Aim: Wireless sensor networks (Akyildiz, 2002) is a low cost and easily deployed technology in hostile environments like the sea. Sensor technology has been used in sea environments, mainly for scientific purposes, since the equipments were costly, not easily repairable or widely deployable. The idea here is the development of a system consisting of low-cost sensor nodes widely deployed on the sea surface taking advantage of recent developments on areas of networking, solar engineering and sensors of organic pollution, e.g., (Stach, 2018). The sensed data are expected to be efficiently collected in terms of energy consumption (Tsoumanis, 2018), while the sensor batteries are replenished accordingly to prolong the network's lifetime (Kavvadia, 2014).

Methods: A set of protocols is developed within low-cost devices (e.g., Arduino) in a way that takes into account the particular environment. It will be tested and evaluated in a close to reality sea surface environment. The focus is on the low-cost requirement, the network lifetime extension and the resilience in the sea environment. The protocol development process will allow for large-scale manufacturing and the subsequent reduced overall cost per node.

Results: The main result is that the developed system satisfies the aforementioned requirements (low-cost, widely deployable, prolonged lifetime) and at the same time adjusts to new technological advancements. For example, in case new sensors emerge in the future, requiring different monitoring procedures, the developed system will be able to seamlessly integrate these changes.

Main Conclusions: A low-cost wireless sensor system for monitoring sea pollution at the surface of the Ionian Sea is designed, tested using simulations and partly developed in a demo environment facing the challenges of being low-cost, prolonging the network lifetime and delivering data within certain time constraints. Such a tool is a necessity for the Ionian Sea since from the ancient times it has been the main sea route between West and East and motivate a large scale project accordingly.

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