

COASTAL ENVIRONMENTAL SENSING NETWORKS I- SENSOR DEVICES, NETWORKS, CYBERINFRASTRUCTURE

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In the United States and around the world, human populations are concentrated in coastal areas. From coastal regions people embark to harvest the mineral and biological resources of the sea. Coastal ports serve as major shipping hubs for marine and terrestrial products in the global commerce network. In addition people are drawn to the coast because beach and water environments satisfy some basic aesthetic calling for many of us. As a result, resource extraction, commerce and recreation activities all put a great burden on coastal environments. At the same time, a variety of “homeland security” (e.g., storms and hostile human activities) issues raise additional concerns in coastal communities as well as in the local, state and federal management agencies responsible for addressing those concerns. Accordingly environmental data collection, analysis and communication are crucial elements in efforts to mitigate and/or respond to such issues. Sensor devices, networks and cyberinfrastructure will play a vital role in facilitating such data collection, analysis and communication.

Today a wide variety of commercial enterprises, government agencies and NGOs are working with stakeholders to measure, monitor and manage coastal and ocean resources. Sensor networks capable of assisting in these efforts constitute an active area of research within universities and research departments of engineering firms. As the application of these technologies evolves, five challenges become apparent: 1) limited power and coverage for coastal environmental sensor networks; 2) limited menu of available robust environmental sensors; 3) lack of infrastructure and expertise to design efficient sensor networks; 4) need for linking GIS, land-based models, and ocean-based models to mine environmental sensing data to forecast environmental impacts and share them with the community; and, 5) lack of research on “smart” sensor networks in coastal areas.

A series of three Panel Sessions on Coastal Environmental Sensing Networks will explore sensor network technology, sensor applications, and policy and management-related information and technology needs. This Panel Session (CESN I: Sensor devices, networks, cyberinfrastructure) will explore the applications of a variety of sensor networks in coastal environments and will provide perspective on the network development, deployment, cyberinfrastructure, and scientific processing of data and link those perspectives to coastal management and policy issues. The presentations will provide perspective on the advantages and limitation of the networks they describe as well as certain social, environmental, and economic issues on a variety of scales (local to global). Panelists will discuss the range of expertise that go into developing networks and speak in depth about their particular experiences in contributing to multidisciplinary research and development efforts. The objective is to provide the audience with a better understanding of the wireless sensor networks as new kinds of scientific tools that can be applied to coastal management issues.

Applications presented are expected to include those related to: 1) tidal and coastal weathers data; 2) water chemistry; 3) microbial populations; and 4) marine mammals. These applications will provide examples of a variety of sensors, networks, information processing strategies, feasibility issues and deployment challenges.

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