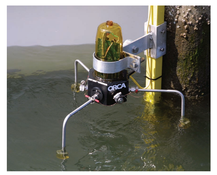
Water Quality Monitoring with the ORCA Kilroy Network

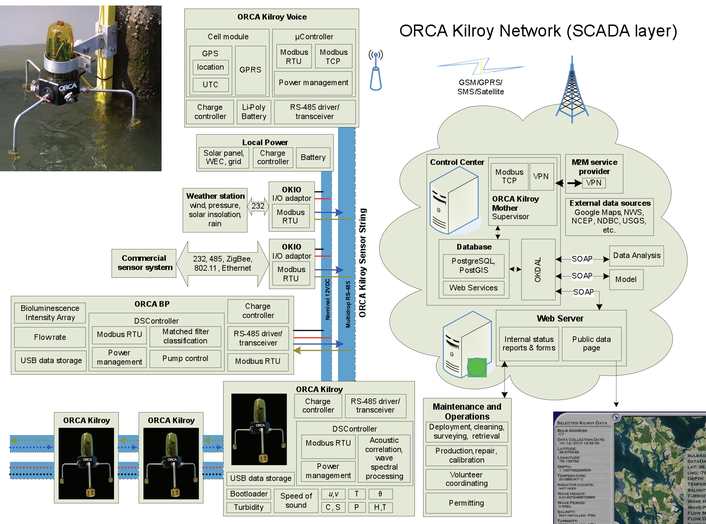
REAL-TIME MONITORING

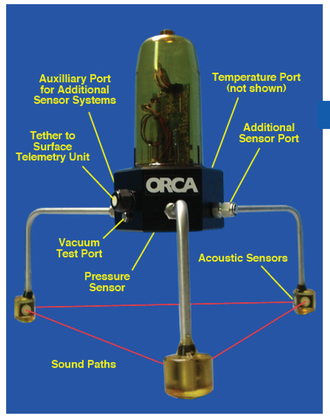
Effective water quality monitoring for ecosystem management requires frequent and spatially dense measurements available in near real time. A transition from hand-sampling to automated monitoring will deliver these improvements while reducing overall cost. In an effort to make automated water quality monitoring accessible to the conservation and resource management communities, the Ocean Research & Conservation Association (ORCA) has developed and is testing the ORCA Kilroy Network.

The ORCA Kilroy Network consists of a wireless network of remote semiautonomous sensor systems. This is coordinated by a central supervisory system that directs operations of the remote systems, collects data, and relays them via the Internet through a standard web service interface to a geospatial database in near real time. The coordination and data transfer are presently over cellular Internet connections on a wide scale and cabled connections at the station scale.

THE KILROY NETWORK







REMOTE SUBSYSTEMS

To date, four remote subsystems of the ORCA Kilroy network are in use:

1) a sensor suite measuring flow speed, flow direction, package orientation, water temperature, water level, wave height and wave period

2) a GPS/power/telemetry unit;

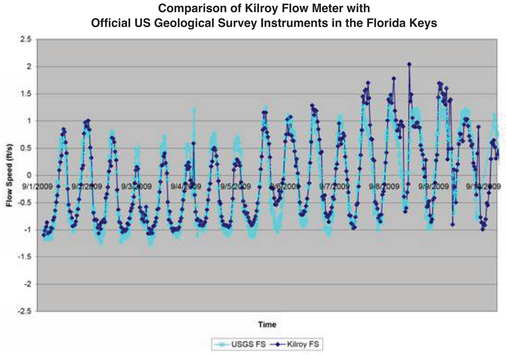
3) a network interface unit to simplify off-the-shelf sensor integration into the network

4) a flow-through bathyphotometer to provide a direct biological measurement of bio-luminescence intensity. Each subsystem is integrated at the component level to lower cost, reduce size, and improve efficiency, sharing the communications infrastructure and power from a solar-charged battery.

SENSOR TESTING

Tests of ORCA's sensor systems and third-party sensor integrations have been conducted in the Florida Keys, north of Key Largo and at several sites along the Indian River Lagoon in Florida. A nine station test is ongoing in the Chesapeake Bay. The latest measurements are broadcast to the web, with click-able color-coded icons positioned on a Google Map, based upon the most recently reported locations.

Correlating measurements of water flow, water quality, biological indicators (through bioluminescence) and local weather conditions (particularly storm water events) can provide resource managers critically needed data 24/7 for effective ecosystem based management.



Eric D. Thosteson[1], Edith A. Widder[1], Charles A. Cimaglia[1], John W. Taylor[1], Benjamin C. Burns[2]

1 Ocean Research & Conservation Association, Fort Pierce, FL, USA
2 Geocent LLC, New Orleans, LA, USA

ORCA™
OCEAN RESEARCH & CONSERVATION ASSOCIATION
Duerr Laboratory for Marine Conservation
1420 Seaway Drive • Fort Pierce, FL 34949
teamorca.org