

# Coral reef monitoring in the Sisters' Islands Marine Park, Singapore

## Using Aanderaa Water Quality Sensors and SeaGuardII Doppler Current Profiler

### Haven for coral reef

Singapore is densely populated with a high level of economic development. It is also one of the largest harbours in the world, putting the surrounding marine environment under stress. In 2015, the National Parks Board of Singapore designated a marine park area (160,000 m<sup>2</sup>) at Sisters' Islands to provide a safe refuge for the coral reef ecosystem. The park has also become a platform for outreach, educational, conservation and research activities related to Singapore's native marine biodiversity. The water must be monitored continuously along with observed changes on the reef to understand how coral species and other reef organisms respond to changes in the water conditions.

### Coral reef monitoring

In a cooperative effort with St. John's Island National Marine Laboratory (TMSI, NUS) and the Friends of the Marine Park (FoMP), an Aanderaa SeaGuardII Doppler with water quality sensors will be deployed on the reef.

### Better monitoring

Before the longer monitoring campaign, a 1-month trial was done, measuring currents, particles, oxygen, salinity, and temperature. Based on results from the trial it was decided that the set-up will be expanded with a wave and tide sensor mounted on the instrument and a cable-connected In-line DCS 5810 with oxygen and turbidity to assess currents closer to the reef structure, as well as gradients of oxygen and particles above the reef. Oxygen gradients will enable calculations of metabolic rates of the reef and particle gradients to better understand particle settling.

(RIGHT) SeaGuardII DCP mounted on In-line frame. Plug and Play AiCAP sensors: Doppler Current Profiler (DCPS 5400), Conductivity 4319A and Oxygen Optode 4835 are mounted on the SeaGuard platform. To reduce bio-fouling, the Oxygen Optode is wrapped with copper tape and vaseline is applied on DCPS 5400. (BACKGROUND) SeaGuardII DCP deployed at 5.7 meters depth.

