

Title:

An autonomous solar tracking measurement platform for offshore use

Abstract:

Gathering ground truthing data can be a challenging and costly undertaking. Aiming to create new algorithms for remote sensing of SPM and chlorophyll concentration, the Hypermaq project needs offshore irradiance and water and sky radiance measurements. Coinciding these measurements with selected satellite overpasses adds another layer of complexity. An autonomous measurement system enhances temporal data resolution at reduced costs. Measurement cycles are made at regular intervals throughout the day and consist of a number of measurements in relation to the position of the sun. Deployment in varying environments and conditions demands a high degree of customizability. Additional instruments will be added over time, and component choices will depend on availability and requirements. This calls for a modular approach.

The setup is built around an embedded controller running a Linux operating system, ensuring compatibility with future hardware. Location and time are gathered from a connected GNSS/GPS receiver, and allow calculation of the sun position. A pan/tilt head then rotates the instruments to correct azimuth and elevation angles, based on user defined offsets. Measurement data is stored in a SQLite database and sent to a land-based server every day. Power can be provided by mains supply or batteries. While designed specifically for hyperspectral radiometers, the platform can easily be extended to suit other measurement purposes. A number of these platforms will form a worldwide hyperspectral validation network.