



Autonomous remote wave measurement system



Objective

Wave and current measurement in undisturbed wave field during speed trials or offshore operations.

Problem definition

Wave buoys require separate support vessel for deployment and retrieval → often not viable or high risk.
Result: unreliable visual wave observations.

Remote monitoring by Flying drone:

- ⊖ Mature technology, low cost
- ⊖ Ultrasonic sensors insufficient range
- ⊖ Sensitive to salt, water, wind gusts
- ⊖ Complicated certification, permits, training

Solution Sailing drone:

- ⊖ Wave buoy accuracy when drifting in waves
- ⊖ Seawater proof
- ⊖ Current & wave spectra measurement
- ⊖ Poor radio reception at sea
- ⊖ Poor visibility

Design MARIN C-drone:

- 1 m long remote controlled vessel
- Fully water proof
- 31.5 kg; allowed in commercial airplanes
- Deployment using grabbing hook & line
- Sensors: GPS, Redundant 6-DOF motion sensors
- Autopilot for autonomous operation
- Max speed: 4 m/s

Principle of operation

- Ship brought to standstill
- C-DRONE deployed using rope & hook
- C-DRONE manoeuvred away from ship using remote control
- Switch to Autopilot: C-DRONE sails autonomously 300 m ahead of ship
- Measure vertical motions while drifting to calculate sea spectra & current
- After set time: automatically return to launch position
- Operator takes over control; pick up using rope & hook

Beneficiary

- Crew transfer / W2W operations
- Offshore lifting operations
- EEDI speed trials
- Diffracted wave measurement

