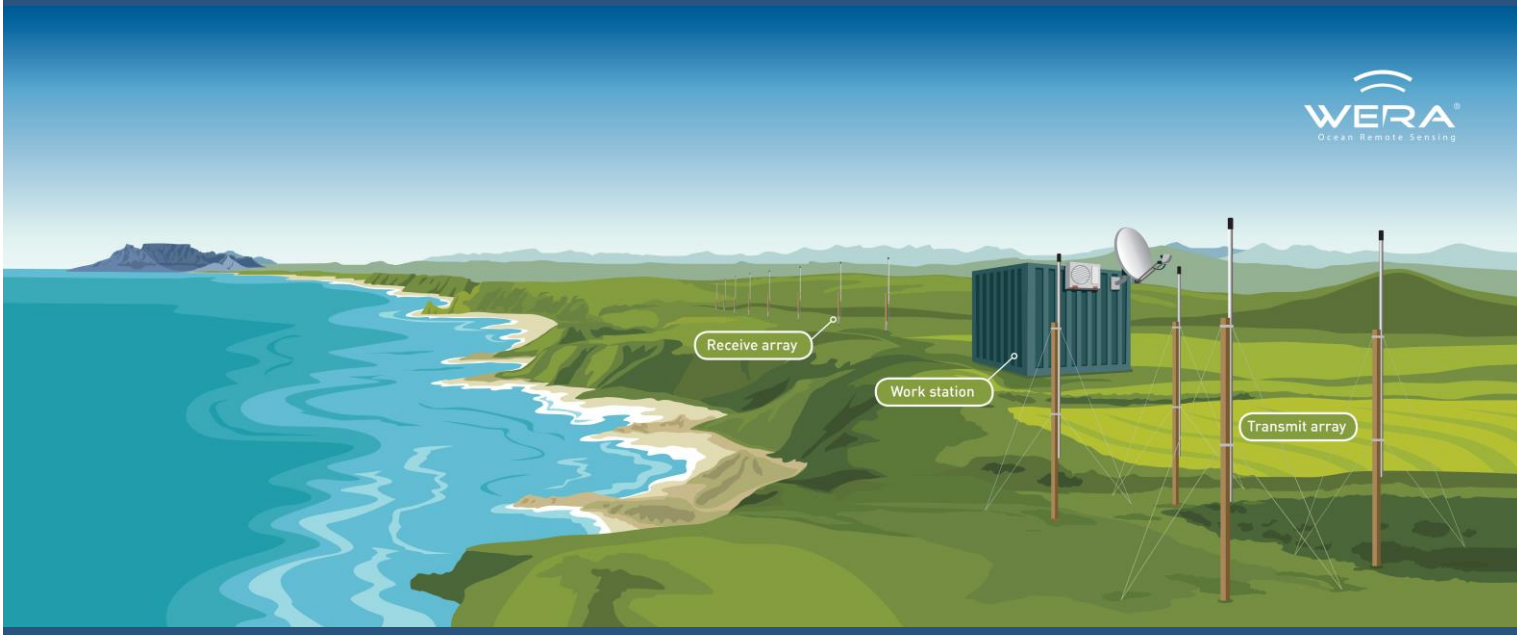
HELZEL Messtechnik

WERA® Ocean Remote Sensing

Newsletter

December 2018



We would like to say thank you for interesting projects together with you and your trust in our technology in 2018! We look forward to a further fruitful cooperation!

- **WERA for Raz Blanchard, Alderney Race, France**
- **WERA Dual Frequency System Solutions and Active Antennas**
- **First WERA Systems in South Africa**
- **Extreme Current Measurements in Philippines**
- **WERA Drift Prediction (WDP)**
- **European Ocean Observing System – EOOS – Conference Call to Action**
- **WERA Operators Seminar - Additionally in March 2019**

Always a wavelength ahead!

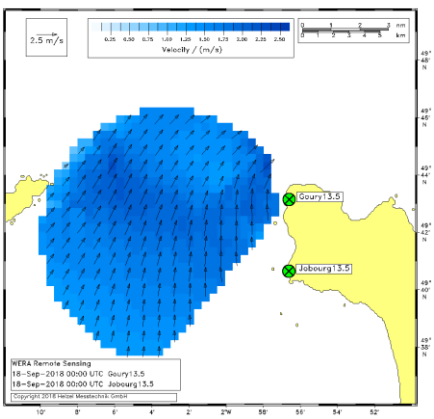
WERA for Raz Blanchard – Alderney Race - France

Université Caen Normandie
2 x 12-channel systems
Dual Frequency: 13.5 MHz / 24.5 MHz
Project: HYD2M

As part of the research project HYD2M (Hydrodynamics of Raz Blanchard, measurement and modeling) led by the continental and coastal morphodynamics unit at the University of Caen (France), two dual frequency WERA oceanographic radars have been installed to measure currents and waves to better understand their interactions.

The zone of strong tidal currents is very favorable for electricity production. The radar systems will make it possible to **evaluate the energy resources and their variability according to the met-ocean conditions**. They may also provide monitoring of the area for the installation and maintenance of turbines. Current and wave height maps will be delivered over the entire area covered by the radars and updated every quarter of an hour.

Wide-Band Receive Antenna Array at Jobourg. User: University of Caen, France



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WERA Dual Frequency Solutions

Increase of electromagnetic noise and permanently changing environment raise a need for better operational radar features. That's why **a WERA radar system is now capable of operating at two different frequencies**, thus enhancing available RFI-reduction implementation.

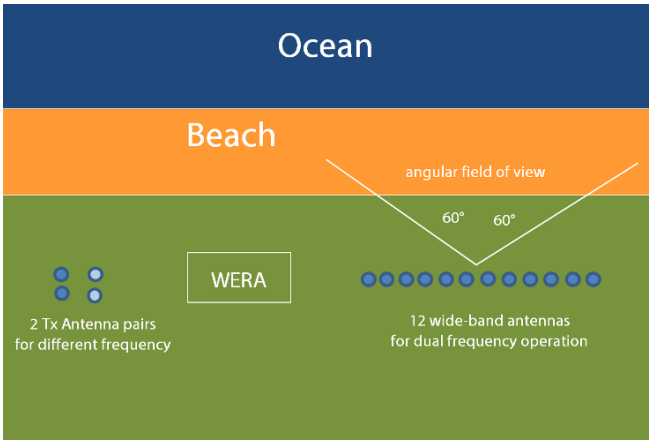
The Dual-Frequency WERA systems have the skill to avoid **man made noise**, adapt to **different sea states** as well as gain **new insights** into the hidden characteristics of the ocean.

There are several options to configure a dual-frequency WERA system. The preferred solution is just **one common receive array composed of broadband active antennas,** which is used for both frequencies running asynchronously.

The transmit antenna system has two independent 2 pole Tx arrays, high antenna efficiency and isolation to Rx array and it's easy to install.

The receive antenna system is configured as one antenna system with wide-band antennas in line. The required length of the receive array and the distance between two antennas is determined by the same rule as for a single-band WERA systems**.** At least 12 antennas are used for both frequencies and the antenna array spacing is designed for the higher frequency. Usually at the higher frequency the system quality is perfect, meanwhile at the lower frequency the radar beam is wider resulting in some smoothing effects in azimuth.

Upgrading an existing WERA system for a dual-frequency use requires operation in a time-sharing mode, meaning that the two frequencies are used alternately. The dynamic switch between frequencies happens after either end of acquisition cycle (for example, 5 min for current mapping or 20 min for wave measurements) or according to changing environmental conditions (sea state).



WERA Active Antennas

Besides the WERA standard monopole antennas, there is a variety of possible antenna constructions which has influence on the performance. The active antennas are optimised for a very wide frequency band. These systems are perfect suited to improve the data availability at no additional costs.

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First WERA Systems in South Africa

Together with its South African partner Lwandle Technologies and French company Actimar, Helzel Messtechnik has deployed a monitoring network of three WERA ocean radars for a private client to measure the sea surface current far off the South African coast.

Very strong temporal and spatial variations of the current has an influence on the client's activities in this area. The service to provide current measurements in real time allows better forecast and planning to reduce the risks of operations.

The 12-antenna systems are operated at 5.25 MHz **with a transmitted power of about 10 Watts** and provide **ranges of up to 350 km offshore**.

We are proud that next to the more than 100 systems installed world-wide for research centers, universities and governmental institutions, these systems are the first ones in use for the private business sector.

HELZEL Messtechnik

lwandle
MARINE ENVIRONMENTAL SERVICES

Actimar
OPERATIONAL OCEANOGRAPHY

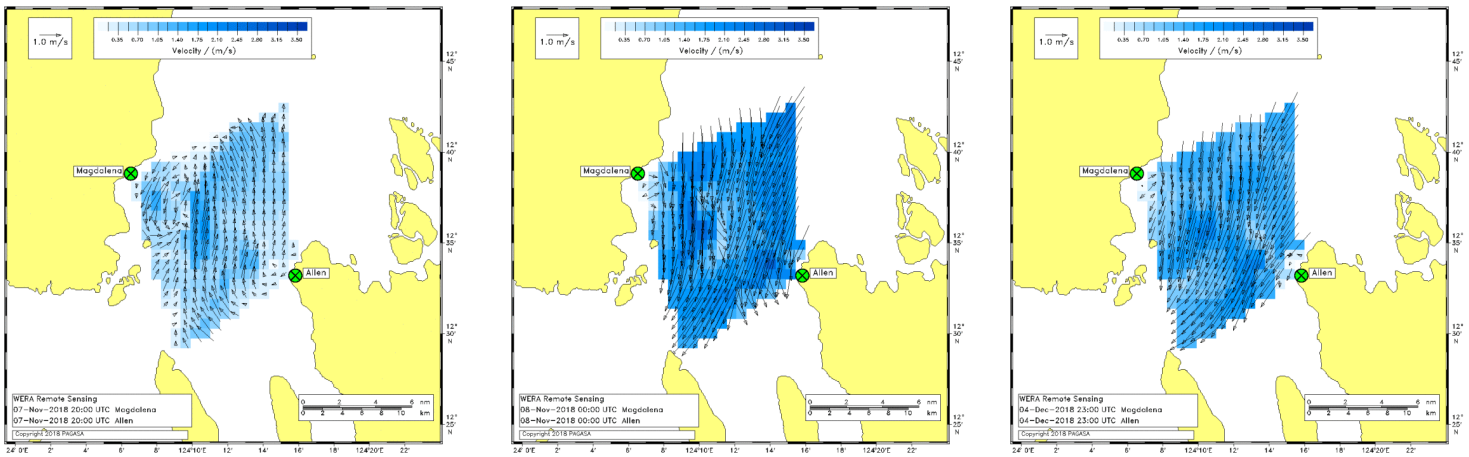
Extreme Currents Measurements in Philippines

Historically, the interior seas of the Philippine archipelago have been relatively underexplored, having only a few in-situ subsurface observations.

San Bernardino Strait is a relatively narrow passage at the northeastern side of the Philippine Archipelago. The strait is about 6.5 km wide at its narrowest point between Luzon and Capul islands where sill depth is about 90 m at the channel's center. A surface current speed of up to 4.5 m/s has been reported close to the southern tip of Capul.

Important seaborne trade passes through the Philippine archipelago from Indian Ocean and East Asia towards Australia. Some of the straits are very narrow. The Philippines also has a complex network of inter-island shipping routes bringing a high risk of shipping disaster. Various incidents at sea are common and ranging from fishermen getting lost at sea due to motor failure to natural disasters such as storm surges and ship accidents due to powerful typhoon-driven waves.

It's very important to have real-time monitoring of the straits for reliable surface current prediction. Since 2017 a national network of 8 WERA systems is active to monitor some of the areas of interest. The establishment of a nationwide High Frequency Radar Network will help the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) to employ real time observations using sea surface remote sensing technology and thus to improve regional marine weather forecast presently based on numerical models. Accurate marine forecasts will contribute to a better disaster preparedness and hazard mitigation both at sea and among coastal communities. The radar data stream will be integrated into the existing weather forecasting system.



Real-time surface current maps from the WERA stations at Magdalena and Allen, the Philippines. San Bernadino Strait is covered by the strong current flow and an eddy. New information is available every 30 minutes.

WERA Tx array at San Juan, Philippines
picture courtesy: East Asia Solutions Technology Corporation

WERA network - Philippines

WERA receive antenna array at a public beach

WERA systems have been installed at major points of interest to monitor the dynamic surface currents

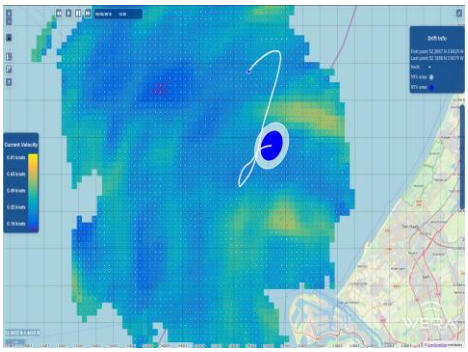
WERA transmit arrays at two different sites integrated into existing structures

WERA Drift Prediction WDP

WERA Drift Prediction (WDP) is as web-based interface that uses combined current measurements of two or more WERA stations to show a trajectory of floating objects. Using overlapping observing areas and wind-data from the NCEP Global Atmospheric Model, the WERA Drift Prediction is able to deliver measured data to the Leeway-drift model to generate the best possible prediction. The Leeway model is an empirical model that employ surface currents and wind to estimate a drift trajectory of an object. It is an approved method in SAR applications. They benefit from a high spatial and temporal resolution and high data availability.

The combined measurements are provided by the WERA Central Server and selected carefully with artifact elimination and interference reduction routines. Further the data are improved by time interpolation and a customized preparation using a WDP-plugin to achieve the desired high spatial and temporal resolution.

To improve calculation speed, the boundary conditions are set individually, depending on a specific scenario. A standard long-term prediction for 48 hours is provided. The Oillibrary is a model that was developed by the National Oceanographic and Atmospheric Administration (NOAA) to simulate the motion of oil particles in the water and is currently one of the best models for prediction of oil drifts. Opendrift is a Monte Carlo simulation and spawns several particles at the beginning of an Oillibrary simulation run. Preparing and configuring the call to Opendrift, WDP displays the results as an ensemble of possible trajectories. Herewith SAR applications are able to define a search area with the highest probability of object occurrence.



An output screen showing object drift prediction

European Ocean Observing System - EOOS Conference Call to Action

Connecting communities for end-to-end solutions!

This was the goal for the EOOS Conference held in Brussels, Belgium, on November 21 – 23, 2018. The conference was about connecting communities and building on progress made at the EOOS Forum. It presented an EOOS strategy and implementation plan, together with a strong call to action. There were constructive presentations and contributions, break-out sessions and interesting discussions among the participants. The WERA technology was presented by a poster on the oceanographic data successfully implemented for the Port of Rotterdam.

We would like to encourage our WERA users to participate in this exciting way towards a sustainable, more integrated, transparent and coordinated approach evolving the European Ocean Observing System. Be part of it! Use your opportunities for funding within the European Union.

Download your Call to Action here!

Picture courtesy: www.eoosconference2018.eu and www.eoos-ocean.eu

European Ocean Observing System

Aligning, integrating and promoting Europe's ocean observing capacity

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WERA Operators Seminar




As usually, a successful WERA Operators Seminar was held in Kaltenkirchen, Germany, on 17 – 20 September 2018. It gathered together operators, who already work with the WERA system on a daily basis, and new users, who had just purchased their WERA systems and wait for the delivery.

In addition to intensive training optimized for the specific needs of the participants, basic knowledge about WERA's physics and technology, the software concept, data handling and applications have been presented.

The whole group visited the COSYNA WERA site in Büsum located at the German North Sea coast.

Due to the high demand on training requests, we are conducting additional WERA training sessions in March 2019. A few more persons may still participate. If you are interested to join us, please send an e-mail to Birgit at hansen@helzel.com

March 4 – 8, 2019

March 11 – 15, 2019

The number of places is limited and will be allocated on a "first come, first serve" basis!

You will be able to meet us again at the upcoming conferences:

OCEANS 2019 Marseille-France MTS/IEEE June 17-20, 2019 Let's sea our future together Marseille Chanot Exhibition and Convention Centre

Meteorological TECHNOLOGY WORLD EXPO 2019

OCEAN OBS'19

ocean BUSINESS 19 9-11 April 2019 Southampton UK

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