

## *10 years of excellence in Remote Ocean Sensing*

News

The outstanding performance and unique features are the basis for WERA's worldwide success - more than 50 systems installed since 2000

Enjoy reading our December Newsletter Issue 2010.

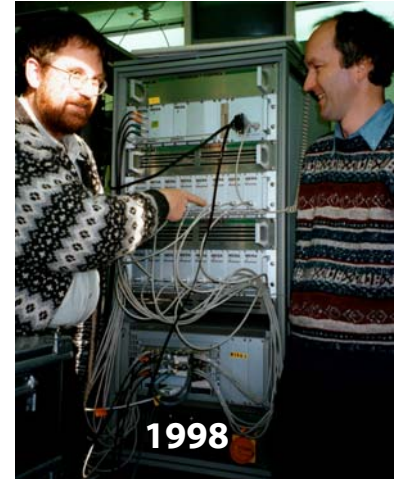
- **WERA History – The past 10 years**
- **WERA Unique Milestones**
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WERA Wave Hub Site, Cornwall, UK  
Tx Antennas with "bull-proof" protection

## WERA History – The past 10 years

The “WERA idea” has its roots at the Institute of Oceanography of the University of Hamburg. Dr. Klaus-Werner Gurgel worked since 1980 on the development of oceanographic radar technology. 1994 he got funds to develop an optimised version avoiding the weak points of already existing radar systems and to integrate his expertise into a completely new system. This was the time when he contacted Helzel Messtechnik GmbH, the hardware development started and lead to the industrial version that was introduced in 2000.

In February 2000 the first industrialised WERA was installed at the Norwegian coast. Helzel Messtechnik developed the required hardware and manufactured the first copies of the Hamburg University WERA for SOEST Hawaii. In the meantime more than 50 WERA systems are installed world wide and are used by the scientific community as well as by commercial users. These users have reported WERAs outstanding accuracy and reliability, e.g. the French navy reported to get 98 % of the time 100 % of the current data within the requested range of 40 km, every 12 minutes a new data set, permanent since 2006.



1998  
Klaus-Werner Gurgel and Thomas Helzel with the WERA laboratory version in 1998



2010  
16 Channel WERA System today

The outstanding reliability was reported by WERA users, e.g. 98.6 % of data availability permanent for more than 3 years



### FAST – RELIABLE - PRECISE

WERA is **very flexible** and can be configured for **Direction Finding** or **Beam Forming** site configurations.

The **outstanding temporal resolution** makes WERA a perfect component for time sensitive applications.

It is easy to install and flexible for various application making it attractive for **scientific experiments** as well as for **permanent installations**.

The **high quality standard** of the instrument and unique noise reduction methods make WERA very reliable, resulting in **highest data availability**.

## WERA Unique Milestones

The **WERA software beam forming method** provides best angular accuracy due to its self calibration feature **without any antenna field calibration**.

This beam forming method in combination with the **non-interrupted FMCW mode** makes WERA the fastest ocean radar.

**Flexible Antenna Array Geometry:** The flexibility to install long antenna arrays is increased by methods to compensate for arbitrary spaced antenna arrays. The angular field of view increased by using curved antenna arrays. Thus, the systems could be easily adopted to site specific conditions.

A fast and flexible acquisition method was implemented. This **"permanent" acquisition method** allows to cut the output data stream into optimised slices for specific applications.

The new and very effective **noise reduction method** for beam forming systems (RFI) is the key to WERA's outstanding data reliability.

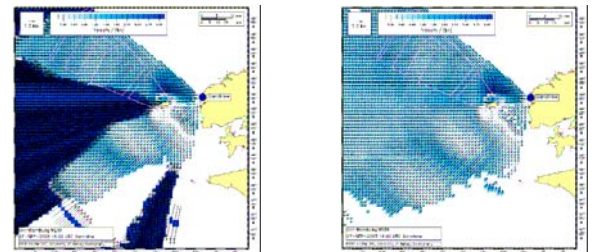
**Frequency sharing for Networks** without GPS synchronisation is implemented to operate networks of stations along a coast using the same frequency spectrum.

The **web based WERA system interface**, available since 2000 to give access to all system parameters, was extended to access **environmental parameters** as well.

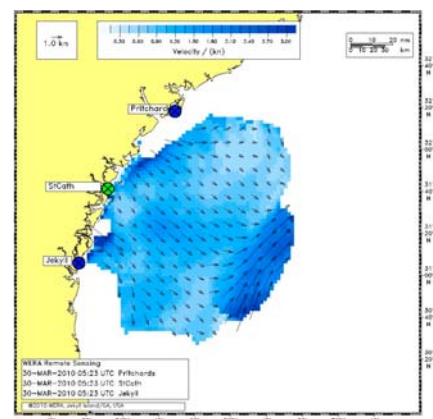
The **listen before talk mode** is used as standard procedure, which scans the allocated band prior to each acquisition cycle to find a free gap with the option to adjust the radar bandwidth to fit into this gap.



2 min for time sensitive applications  
5 min for current mapping  
20 min for wave spectra



Noise reduction method (RFI)



Frequency sharing without GPS synchronisation. Three WERA stations at the coast of South Carolina and Georgia, USA

## WERA Mobile

WERA Mobile could be of interest to you when

- your project tasks require reliable ocean currents, waves and wind data for a certain period of time
- your institute has limited budget to spend on hardware equipment
- short-term measurement campaigns are sufficient for your application
- you are interested to experience the WERA HF radar technology



The WERA Mobile on the way to France

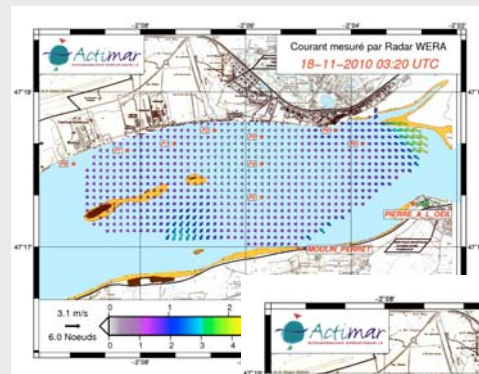


### Our WERA Mobile System is available for short-term installations or leasing within Europe

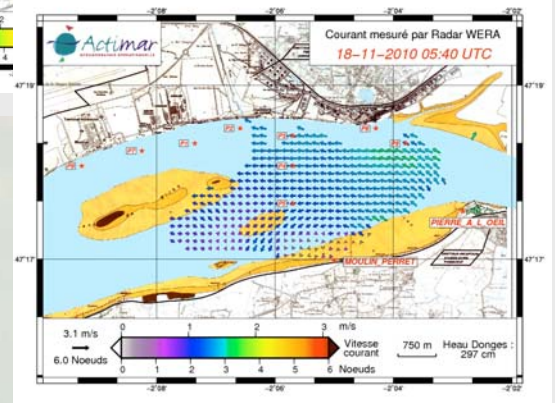
The WERA Mobile was recently installed together with Actimar S. A. for a 2-months scientific measurement campaign at the Loire river near Nantes in France; a dynamic area with changing tides.

Two 12-channel WERA systems could be stored in the van and trailer and are easy to deploy for short-term installations.

Please contact us if you should be interested in terms and conditions for short-term mobile campaigns and leasing options.



Current maps from the Loire Installation November 18, 2010 03:20 am showing clearly the changing tides



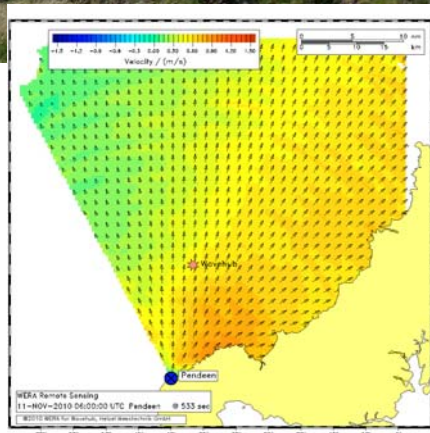
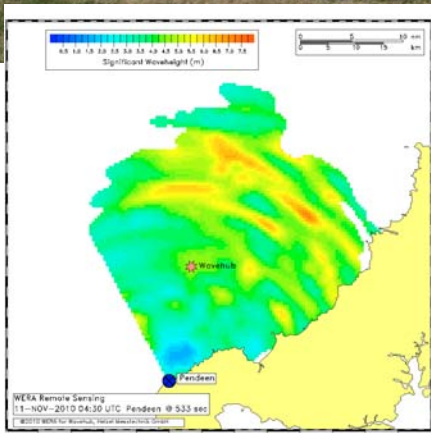
Current map from the Loire Installation November 18, 2010 05:40 am (low tide)



## WERA Monitoring for the Wave Hub Project

In front of the impressive scenery of the north coast of Cornwall near Hayle, the first WERA system has been installed in November 2010 to monitor the environmental influence of the Wave hub project devices on currents, waves and wind.

The Wave hub project is a groundbreaking renewable energy wave power research project to create the UK's first offshore facility to demonstrate the operation of arrays of wave energy generation devices.



Significant waveheight and current map measured from the Pendeen WERA site

Tx-Array with "bull-proof" protection as they love having the material for lunch



Extremely curved Rx-Array

User: Peninsula Research Institute for Marine Renewable Energy PRIMaRE

2 x 16 channels

12 MHz

Range: 110 km for currents

and 50 km for waves

## WERA Network Marketing Meeting



## HF Radar – a tool for understanding a changing world

Considering HF radar as a tool for understanding a changing world, the mission of the WERA Network Marketing Meeting 2010 held at Helzel Messtechnik in Kaltenkirchen, Germany, from September 16 – 17 was clear.

Get the most possible out of the precise WERA data for ocean currents, waves and wind for the benefit of our environment. From observation to forecast – facing a world of climate change.

The influence of the reliable data to oil spill monitoring, search and rescue (SAR) prediction, contribution to tsunami early warning systems, monitoring purposes in the field of renewable offshore energy are immense. WERA's contribution has a variety of applicational aspects which have to be communicated to the customer.

The feedback of the international participants and partners will be implemented into the WERA marketing strategy for the upcoming year.

We would like to thank all participants for being with us in Kaltenkirchen and for the fruitful discussions and international exchange!



As a first result, our WERA Offshore Flyer is already available. We have summarized the important facts on the last page of this newsletter.

Please feel free to contact us if you would like to get the e-copy of the offshore flyer.



## How WERA supports planning, installation and maintenance of your offshore project

### ▪ Feasibility Studies

The **wave climate** can be measured in detail, **significant wave height, wave direction** and **period**.

Accurate and reliable **surface current** data are provided and information about wind direction and **speed** can be derived as well.

All these data can be used to define design parameters such as wave loads etc.

### ▪ Environmental Studies

In particular the surface current data can be used to estimate the influence of **drifting pollutant** in case of an accidents or to estimate the modification of sediment transport caused by the offshore construction.

### ▪ Optimise Site and Device Performance

Coastal waters can be extreme dynamic and hard to predict. HF radar measurements provide reliable real-time data with **high spatial** (100 to 1000 m) and **temporal** (5 min) **resolution**. With these data you can optimise your site and device performance.

### ▪ Optimise Deployment (Cost reduction)

For the construction in open waters you need to get **reliable forecasts** of the ocean parameters at the construction site. The combination of the HF radar data with numerical ocean models (data assimilation) can significantly improve the **prediction quality**. This can make your construction work much **more effective**.

### ▪ Safety (during construction and operation)

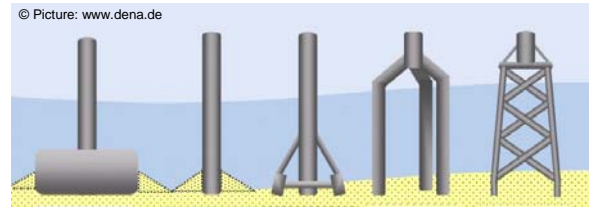
In case of an accident **drifting persons** or material can be found easier by using an HF radar based reliable **drift prediction**.

### ▪ Device Protection

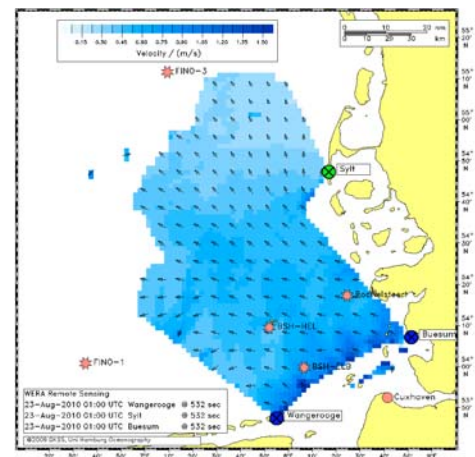
During operation you can use these reliable forecasts to protect your offshore installation **during strong storm** events.

### ▪ Cost Effective Monitoring

The shore based HF radar stations are easy to maintain and will provide permanent reliable data at **low operational costs**.



Reliable data of the current, wind and wave situation in combination with bathymetry data will ease the decision on the choice of the correct installation material.



Surface current map of the WERA sites Wangerooge, Bütsum and Sylt, German Bight operated by Helmholtz-Center Geesthacht GmbH (former GKSS)



WERA is flexible and easy to deploy and available for permanent or short-term installation. A mobile WERA configuration is available as well.

The WERA systems can be purchased or leased.  
Scientific service for specific measurement campaigns are available as well.