Why PORTUS Marine Information System?

HF coastal radars have evolved over the past 40 years into worldwide operational networks that provide real-time data to a variety of end users. Over 450 such radars are operating today of which about 400 are CODAR SeaSondes®. The primary data products are two-dimensional (2-D) surface current vector maps, which require two or more radars with overlapping coverage.

The expansion of these HF coastal radar networks and ocean models together with the operational integration of new ocean forecasting tools is resulting in a continuous and accumulative growth of ocean data. This is producing some dispersion of the information, creating deficiencies in terms of exploitation capabilities. PORTUS Marine Information System gives an efficient response to the main challenge organizations are facing today: to make information usable.
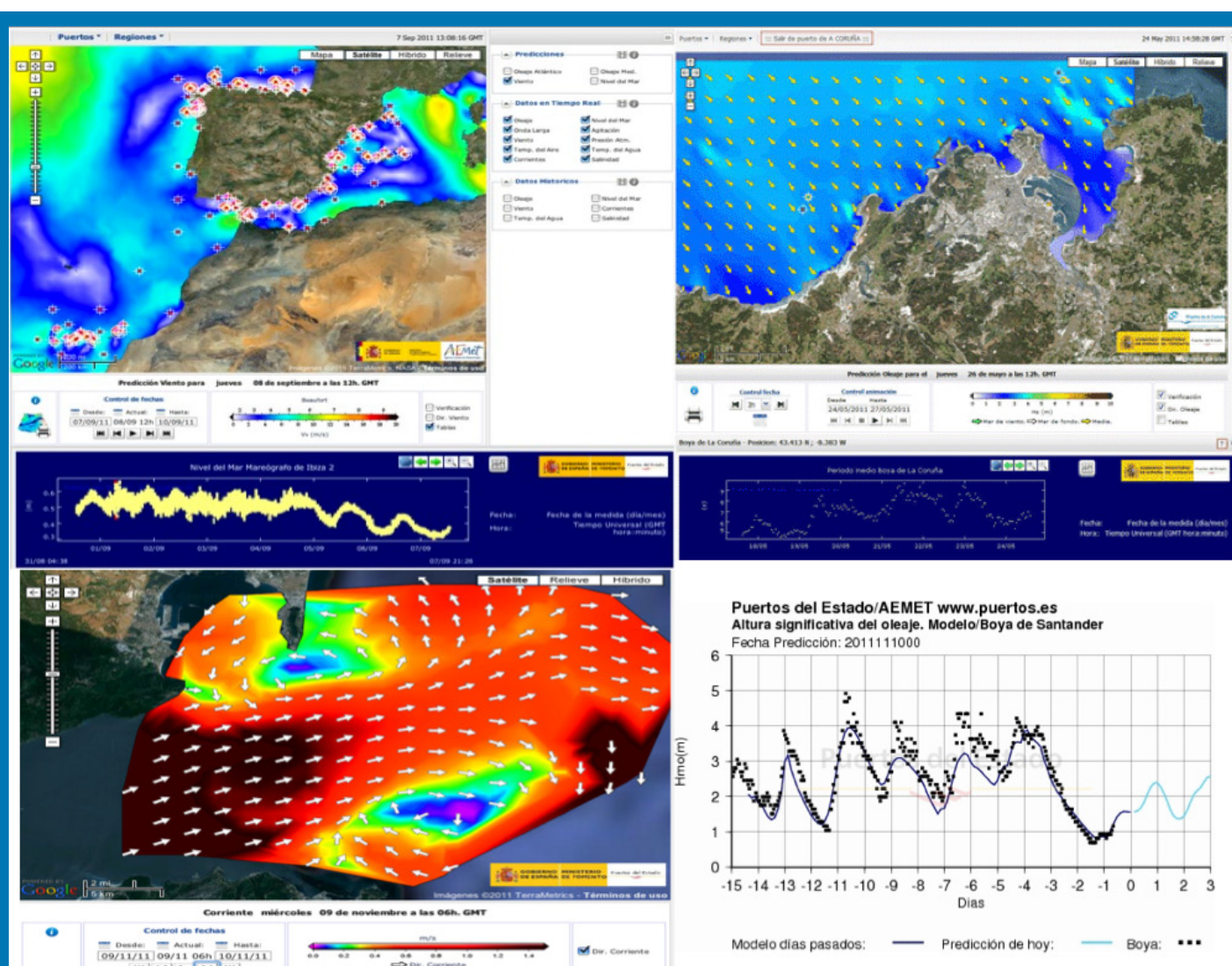

Figure 1: Puertos del Estado (Spanish National Ports Authority) uses PORTUS General Oceanographic Information System to manage, validate and visualise data generated by their modelling tools and real time observation network (including SeaSonde HF radar, wave buoys, tide gauges...)

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1

PORTUS, a specialized tool to get the most out of SeaSonde HF Radar

The main aim of PORTUS is to get the most out of SeaSonde HF radar data. Firstly, by providing enhanced surface currents data by means of advanced standard and project tailored QA/QC and radial data combining techniques, generating data that is ready to be used in operational third party tools (e.g. Oil Drift Models, Met-Ocean Weather Prediction Systems, Fresh Water Tracking Systems in coastal waters…). Secondly, by feeding this data into Integrated Value Added Products pushing HF radar data value one step forward in its operational use. The integration of an advanced Short Term Prediction System* for currents fields (jointly developed with CODAR Ocean Sensors. Ref: SP-PORTUS-STP-XXX) or the computation and visualization of convergence and divergence fields related to upwelling phenomena and its connection with primary productivity and thus fishery production are an example of the products that are integrated into PORTUS. New Value Added Products are continually being developed and integrated in new releases of PORTUS.

Easy access to all information, data management, secured storage and friendly visualization is provided. Web technologies are used to allow time and location independent access to PORTUS Marine Information System for all stakeholders.

PORTUS, a tool that makes all kind of marine observations and processed data easily accessible

PORTUS was initially conceived and developed as a joint effort of QUALITAS engineering company and the Spanish Ports Authority (Puertos del Estado). The PORTUS is integrated in Puertos del Estado as its main Oceanographic Information System to manage and control its real time measuring network as well as making this information and the output of real-time validation and operational forecasts available to the general public. Therefore PORTUS is also able to acquire, store, process and visualise data from other oceanographic instruments and also from models, becoming a general purpose Marine Information System.

PORTUS, flexible and open IT technology, seamless to integrate

Investment and operation costs are many times shared by various institutions in a leveraged approach, in which different IT technologies and software applications provided by various suppliers cohabitate together. Systems must add value in each part of the information chain. For this reason, PORTUS provides powerful data serving and export tools to all other client's overall information systems (i.e. Integrated Weather Websites, Oil & Gas Vessel Fleet Tracking Systems for Operating Companies…)

Product Description

PORTUS Marine Information System has specially been developed to add even more value to CODAR SeaSonde HF radar systems. PORTUS processes, visualises, stores and exports information of a network with up to 24 SeaSonde HF Radars from one single or various HF Radar networks providing high quality real-time 2D surface currents, waves data as well as sophisticated information products based on multisource data.

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2

Web access

PORTUS makes the information available time and location independent by making use of web technologies. Web access is provided to PORTUS Graphic User Interface. Users can get access to all functionalities from any desktop computer using any major web browser (Firefox, Internet Explorer, Chrome and Safari).

Data Processing and Added value data products

SeaSonde output parameters
that are stored and managed in PORTUS are:

» **Surface currents radial data**
  » Velocity

» **Surface currents 2D maps**
  » Velocity
  » Direction

» **Waves**
  » Significant wave height
  » Period
  » Direction

» **HF radar system metadata**

Additionally, standard and tailored products that help keep the system performance under control such as the "Continuous inter-comparison of HF Radar and point measurement data" are provided.
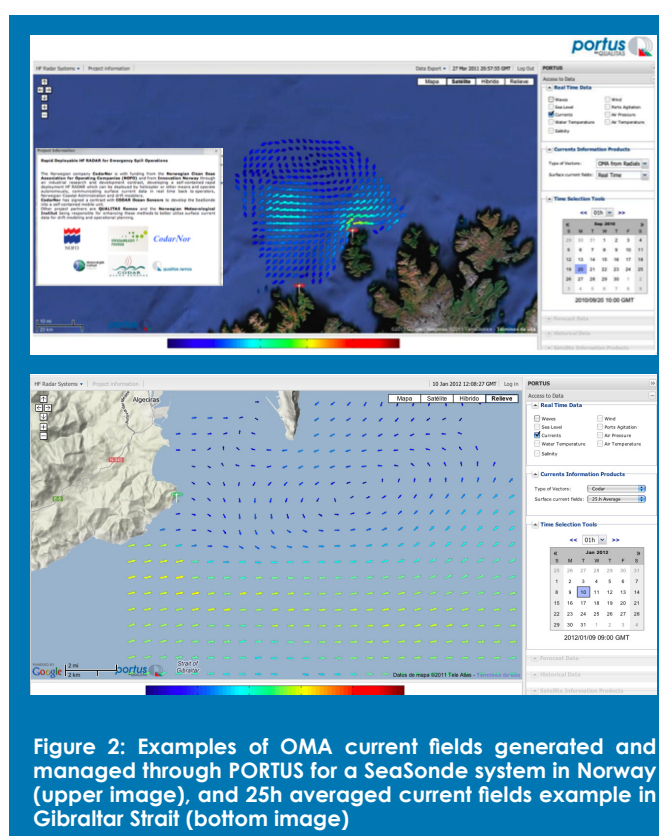

Figure 2: Examples of OMA current fields generated and managed through PORTUS for a SeaSonde system in Norway (upper image), and 25h averaged current fields example in Gibraltar Strait (bottom image)

First step in PORTUS data processing

Externally generated CODAR Combine Server as well as internally generated 2D surface currents maps are managed by PORTUS in a standard way. In addition to this, currents fields that are generated by means of special QA/QC enhancing methods can be implemented in the PORTUS such as:

» Open Mode Analysis OMA* (see SP-PORTUS-OMA-100 product description for further details)
» Tailored Processing Methods TPM that are developed and implemented in collaboration with the interested partner

These various 2D surface currents maps are stored and can be displayed through PORTUS

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3

Second step in PORTUS data processing

Added value data products included in PORTUS that make use of outputs generated after first step processing are:

» 25 h averaged currents maps

» 2D surface divergence and convergence maps

» Short Term forecasted surface currents maps* (further details to be found in data sheet SP-PORTUS-STP-XXX)

Storage

All information is reliably and efficiently stored in the system and replicated in a HD external drive for redundancy. Historical data are archived for a period of up to 5 years.

Visualisation

A user friendly GOOGLE Maps interface is provided for visualisation purposes being zoom, pan and scroll some of its basic features. The user will also be able to display satellite and map layers among other well-known functionalities of this technology. Access to information is easy and fast using a calendar based component.

Figure 3: Straightforward calendar based access to information

Individual vector values are displayed just by clicking on any point of the surface currents 2D map. Displayed surface currents point parameters are direction and velocity. Graphical time series can also be displayed for each velocity vector. Wave time series information is also available for each radar site.
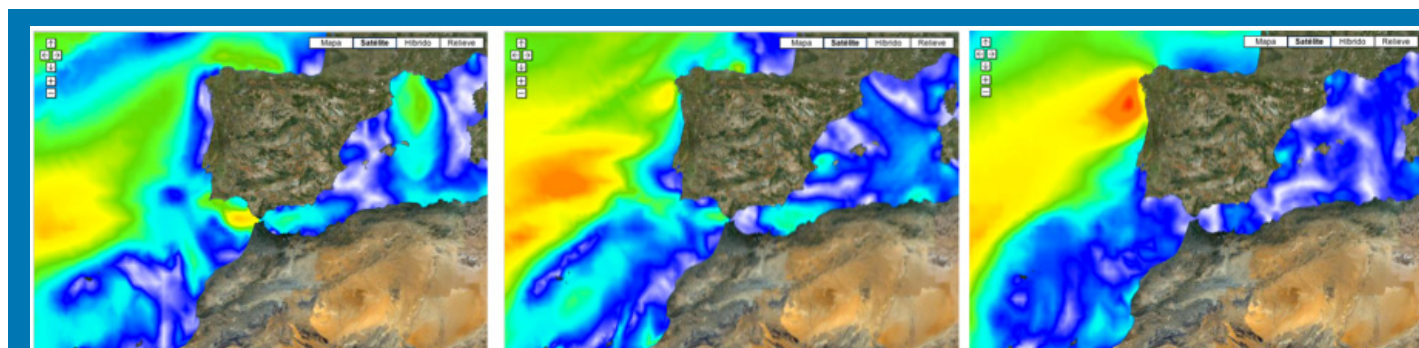

Figure 4: Example of 3 different images from an animation performed inside Puertos del Estado PORTUS system for wave modelled data

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4

Movie making capability is included in order to generate surface currents vector fields or other met-ocean data animation over any period of time for which data were observed. User can easily configure through a visual control panel the time period for which the animation will be generated; last 24 h HF currents movie is available anytime with only one click.

Figure 5: Time series graphics for surface currents and waves and surface currents point measurement display
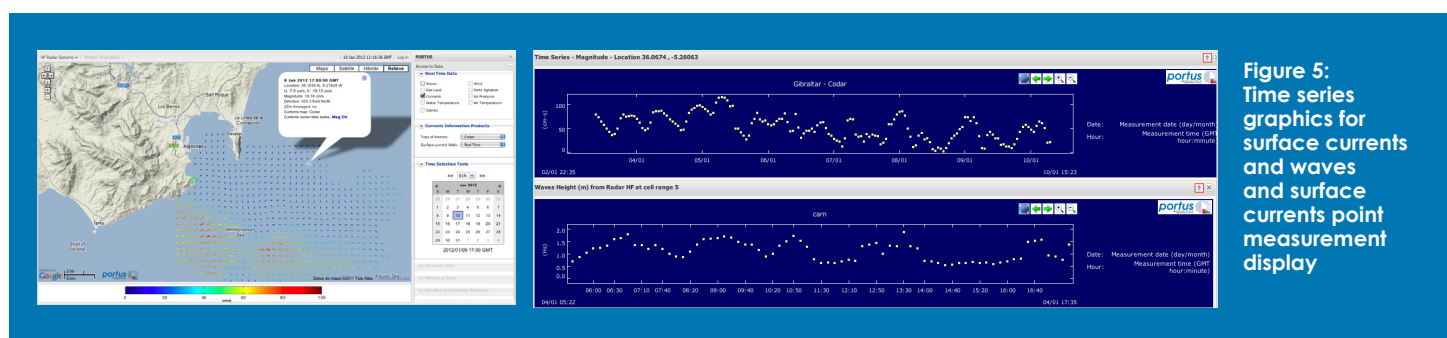
Monitoring

A powerful real-time monitoring and alerting system is provided with the CODAR Combine Station and the PORTUS providing a clear and full real time picture to system operators (see SSDP-100 product description of the SeaSonde Central Site Management / Data Combining Station for further details). Configuration of alarm notification recipients is provided in an easy way

Reporting

A useful automatic report generation tool is also provided with PORTUS to perform tailored, monthly or yearly HF radar system performance reports. These reports are highly useful both for system operators and for system users, providing objective information about the HF radar system behaviour. They also help to identify possible areas of improvement of the system and to evaluate the maintenance service level received.

Basic parameters included in these reports are:

» Total currents map spatial and temporal coverage analysis

» Radial maps spatial and temporal coverage analysis

» Temporal data availability and data latency

» Continuous quantitative comparison with other data sources such as currents and wave measurements provided by buoys.

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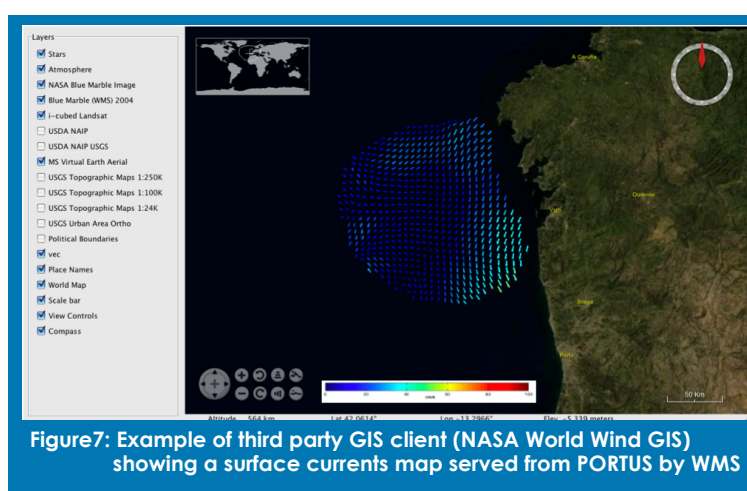
5

Protected export and data serving

PORTUS includes powerful export and data serving capabilities. The idea is to make data exchange as simple as possible across different client's information systems or with other stakeholder's systems.

Figure 6: PORTUS makes data sharing across systems easy
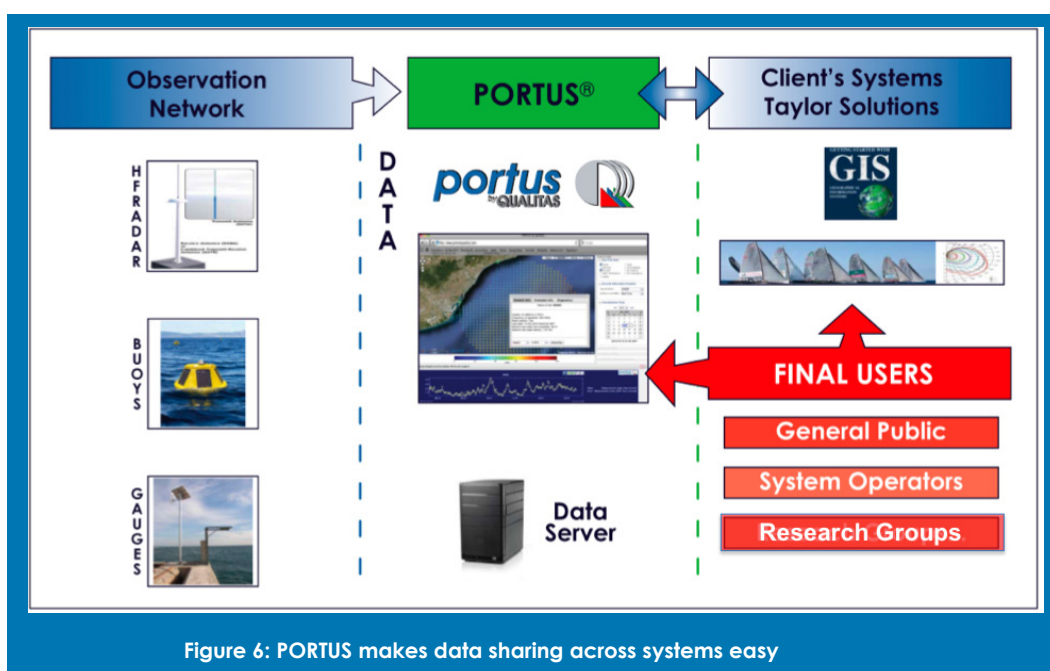
Data can be exported in ASCII format or in the commonly used scientific data format netCDF both through FTP or OpeNDAP protocols. All export capabilities are password protected for its use only by authorised users.

PORTUS integrates a WMS server (for further details about WMS technology, you can refer to OpenGIS® Web Map Server Implementation Specification Document in www.opengeospatial.org) to serve surface currents maps to other GIS based systems. It takes less than one minute to configure your GIS client and start visualising all generated maps.

All export capabilities are login protected for its use only by authorised users. PORTUS administrators can add and configure user permissions easily.

Figure7: Example of third party GIS client (NASA World Wind GIS) showing a surface currents map served from PORTUS by WMS

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6

IS-PORTUS-XX includes

Software

» PORTUS Marine Information Suite software life license

  » For up to 3 SeaSonde Remote Units IS-PORTUS-03

  » For up to 6 SeaSonde Remote Units IS-PORTUS-06

  » For up to 12 SeaSonde Remote Units IS-PORTUS-12

  » For up to 24 SeaSonde Remote Units IS-PORTUS-24

Hardware

» Dell Linux server 2x Xeon series Quad Core 2.4Ghz
8 GB RAM
1 TB HD

Temperature Range

Operating requirements: 10 to 35 °C (50 to 95 °F)

Non-operating requirements: -40 to 65 °C (-40 to 149 °F)

Maximum Humidity

80% non-condensing

Communication Link Requirement

A reliable data communication link is required for:

» Real time data acquisition

» Real time data export

» Real time web access for data visualization

» Real-time system monitoring

» Remote software maintenance

Minimum data bandwidth (upload/download)

1024/512 Kbps

Power supply

Non-Redundant, 480W. The power supply has automatic input voltage detection.

Dimensions

43.0 x 434.0 x 627.1 (mm) (without ear, without bezel)
1.69 x 17.09 x 24.69 (in)

Weight

Max: 35.02lbs (15.9Kg)

Further information about this server is provided in www.dell.es inside PowerEdge R410 Technical Guide

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7

Related Services

Services included in IS-PORTUS-03 are:

» Integration of all SeaSonde data and system configuration to manage up to 3 Radial Sites

Services available from QUALITAS but not included in IS-PORTUS-03 package are:

» Installation, configuration and start-up of PORTUS Marine Information System inside clients data centre

» Remote Service Level Agreement with proactive monitoring and maintenance

» Training for system administrators and users

» Integration of other user's metocean data into PORTUS:

» Other tailored made data integration or developments to be studied individually from user's needs

PORTUS Marine Information System Features

» Secured data storage and management

» Powerful and user friendly visualisation tool by maps, time series, movies…

» Boosts your SeaSonde HF radar data value with Value Added Data Products like Open Mode Analysis, Short Term Prediction System, Divergences Maps or with multiple radial data combining techniques and QA/QC processes

» Web access to all tools

» Advance tools for Monitoring and Reporting to ensure the highest levels of data availability

» Makes data sharing with other Information Systems easy