

# INCREASE HF Radar Experts Workshop Minutes

Organizer team: AZTI, CNR-ISMAR, ETT

## FINAL ATTENDANTS LIST

NAME	INSTITUTION
Simone Cosoli	ACORN (Australian COastal Radar Network )
Julien Mader	AZTI
Anna Rubio	AZTI
Jose Luis Asensio	AZTI
Angélique Melet	CMEMS / Mercator Océan
Bruno Levier	CMEMS / Mercator Océan
Loic Petit De La Villeon	CMEMS instac / IFREMER
Stéphane Tarot	CMEMS instac / IFREMER
Carlo Brandini	CNR Ibimet & LaMMA Consortium
Carlo Mantovani	CNR-ISMAR
Lorenzo Corgnati	CNR-ISMAR
Annalisa Griffa	CNR-ISMAR
Maristella Berta	CNR-ISMAR
Marcello Magaldi	CNR-ISMAR
Roberta Sciascia	CNR-ISMAR
Laura Barbieri	CNR-ISMAR
Stefano Taddei	Consorzio LaMMA - Laboratorio di Monitoraggio e Modellistica Ambientale per lo sviluppo sostenibile
Lohitzune Solabarrieta	DeustoTech
Enrico Zambianchi	DiST, Università Parthenope and CoNISMa
Pierpaolo Falco	Dpt. Science and Technology, University of Naples "Parthenope"
Marco Uttieri	Dpt. Science and Technology, University of Naples "Parthenope"
Antonio Novellino	ETT
Marco Alba	ETT
Patrick Gorringer	EuroGOOS
Leif Petersen	Helzel/WERA
Johannes Schultz-stellenfleth	HZG
Jochen Horstmann	HZG
Alejandro Orfila	IMEDEA
Carlos Fernandes	Instituto Hidrografico
Maurizio Demarte	Italian Hydrographic Office
Marta Pratellesi	Italian Hydrographic Office
Cosmo Peluso	Italian Hydrographic Office
Céline Quentin	MIO
Michael Hartnett	National University of Ireland
Vlado Malacic	NIB
Branko Cermelj	NIB
Pablo Lorente	Puertos del Estado
Andrés Alonso-Martirena	Qualitas/CODAR
Jorge Sánchez	Qualitas/CODAR
Pia Andersson	SMHI
Emma Reyes	SOCIB
Adam Gauci	University of Malta (CALYPSO)
Giuseppe Ciraolo	University of Palermo (CALYPSO)
Fulvio Capodici	University of Palermo (CALYPSO)
Lucy Wyatt	University of Sheffield
Jeff Paduan	USA/IOOS, NPS
Mark Otero	USA/IOOS, Scripps

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**Dates**  
13th-15th  
September  
2016

**Venue:**  
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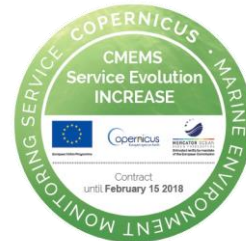
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**Lot5: INCREASE project**

Innovation and Networking for the integration of Coastal Radars into European mARine SERVICES



## Day 1: 13th September 2016

### INTRODUCTION

Opening of the WS with:

- **INTRO DAY1- CNR-ISMAR presentation** Hosting institution presentation (**C. Mantovani-CNR-ISMAR**)
- Round of presentations
- **INTRO DAY1-0** Presentation on INCREASE project, other initiatives and workshop objectives (**J.Mader-AZTI**)

### TECHNICAL PRESENTATION (TP):

#### TP DAY1-1: HFR Principles of operation (**C. Quentin-MIO**)

Céline Quentin presents HFR principles of operation. She describes the technology focusing on phase array antenna and compact antenna. On the Operation and maintenance one key recommendation is to register a digital diary of all the events to assess the data processing and QA/QC. She presents briefly the TOSCA Med Program as an example of applications.

E. Reyes comments about the utility of the online tool:

[http://www.ccpo.odu.edu/~tgarner/wrocks/reportoutage\\_copy.php](http://www.ccpo.odu.edu/~tgarner/wrocks/reportoutage_copy.php)

#### TP DAY1-2: Overview on the HF Radars in Europe (**A. Rubio-AZTI**)

Several questions arise on some aspects of the presented results. L. Wyatt suggests transferring the info to GEO. P.Gorringe highlights the importance of the survey outputs as a strategic tool to increase the visibility of the community.

### METHODS

#### TP DAY1-3: Focus on Current measurements: Algorithms, QA/QC procedures, Limits and opportunities I (**J. Horstmann-HZG**)

Jochen Horstmann presents HFR QA/QC in German Bight and discusses on sources of error in HFR current retrieval. For current data, flagging is applied to bad data and short-term distortions can be fit with neighbouring data. He shows interesting examples of ship detection (S. Maresca, P. Braca, J. Horstmann et al. TGARS 2014).

Several questions about ship detection arise: L. Wyatt- when detected the ships, can be their signal removed from the Doppler spectra to improve the spectra and the data processing? JH: It is something to be developed. A. Griffa- Which size of ships can be detected? JH- It is a matter of what is the direction of the ships and its speed, since the signal can be lost.

Several questions about HF radar validations with gliders or drifters arise: E. Reyes- How are the glider data used with the HF radar to be compared with HF radar? It is not the ideal to use a glider, results are good but a drifter would be better. L. Petit de la Villeon asks on what are the best options to make these comparisons, what kind of drifters. JH- there are different types of drifters and some of them specifically designed for comparison with HF radar.

Jochen H. announces the next ROW – Luneburg mid-September 2017

#### TP DAY1-4: QA/QC procedures; the importance of an accurate antenna pattern measurement (**E. Reyes-SOCIB**).

E. Reyes highlights that the most important errors in DF systems are coming from the bearing angle errors, and are highly dependent on the antenna pattern calibration. Differences on loop patterns cause different radial coverage and this affects correlation with in-situ current meter data.

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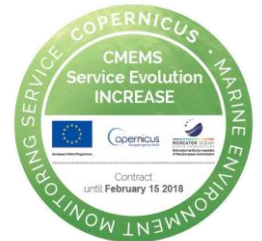
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JH: ask about the need of having more frequent (even in a daily scale or more) APM so we can determine if there are variations of the AP. AAM: highlights the opportunity that vessel detection can offer to study these variations (from their analysis based on vessel detection they did not find high frequency variations)

**TP DAY1-5: Wave and wind measurements: algorithms, QA/QC, limits and opportunities (L. Wyatt-Univ. Sheffield)**

The basic equations for the wave measurements and differences between DF and BF radars for wave measurement are presented. Nice results are shown on comparisons Comparison radar/wave buoy/ SWAN wave model and ACCES (met) model in Australia. The theoretical limitation for these measurements, linked to frequency operation and wavelength, is reminded. Several questions on the approach to get wave data arise.

**DATA SYSTEM**

**TP DAY1-6 Data interoperability: data and metadata formats; Current status in EU (European HF Radar Network Survey) (L. Corgnati-ISMAR, J.L. Asensio-AZTI)**

Several aspects are discussed. L. Wyatt: how much general are the standards, will they be compatible with other types of radar? General comments on the need that manufacturers work on producing their data on NETcdf standard formats. Also on solutions with regard to a central archiving.

**TP DAY1-7 Operational Data Processing in the US IOOS HF-Radar Network (M. Otero-Scripps)**

IOOS Data system. Focus on the interest for data integration. Importance of Quality assessment. Use of a centralized Radial diagnostics tool.

**APPLICATIONS**

**TP DAY1-8 Products and Applications – Overview (J. Paduan-NPS)**

Focus on operational use of data on biology, search and rescue, coastal planning, port and navigation safety, pollutants spill, energy. Success stories in US.

Several short presentations (SP) followed to show European Examples of applications of HFR to different issues:

**SP DAY1-1** J. Sánchez-Qualitas: An operational oil spill trajectory modelling system based on HF Radar currents in the North Sea

**SP DAY1-2** L. Petersen-HELZEL: WERA Data Management and Real-Time Quality Control Implemented for Dutch Rijkswaterstaat for Ship Guidance to the Port of Rotterdam; + Tsunami detection or ship detection/tracking applications

**SP DAY1-3** V. Malacic & B. Cermelj-NIB: Cross-Border Monitoring of Surface Currents & Waves

**SP DAY1-4** A. Gauci-Univ Malta: The CALYPSO HF Radar Network: Data filling techniques for improved services

**SP DAY1-5** G. Ciruolo-Univ Palermo: The CALYPSO HF Radar Network: Data filling and short-term forecasting by means of ARMA models

**SP DAY1-6** P. Falco-Univ Napoli Parthenope: Application and results obtained by an HF radar in the Gulf of Naples

**SP DAY1-7** M. Uttieri-Univ Napoli Parthenope: HF radar derived wave measurements in the Gulf of Naples

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## Day 2: 14th September 2016

The last of the short presentations (SP) show European Examples of applications of HFR is held, followed by technical presentations on advanced products:

**SP –DAY2 -1** A. Rubio, A. Griffa, J. Schultz HFR applications in JERICO-NEXT JRAP4

### *ADVANCED PRODUCTS*

**TP DAY2-1** Data assimilation with HFR data ([J. Schultz-HZG](#))

**TP DAY2-2** Data blending ([M. Berta-ISMAR](#))

MB shows different examples of data blending (eg. Joint use of HFR, drifters and ADCP to estimate residence time in the Gulf of Manfredonia; LAVA results), also presents new experiments to be done in the framework of JERICO\_NEXT

**TP DAY2-3** Short term prediction and new applications using LCS/Lyapunov ([A. Orfila-IMEDEA](#), [L. Solbarrieta-Univ of Deusto](#))

Discussion arisen by AG on how FSLE can represent convergence areas where particles get stuck.

### *CMEMS*

**TP DAY2-4** CMEMS products, plans, needs or expectations ([A. Melet & B. Levier - Mercator](#))

Two of the branches where HF radar could fit in are cited:

PRODUCTS → In-situ TAC (Thematic Assembly Centers) and MFC (models)

SCIENCE → CMEMS SERVICE EVOLUTION

Expectations: What is very important for CMEMS is to have a quality assessment and homogenized processing. Also, other variables like wave products or wind direction could be very interesting. Products can be also defined for validation with models. Assimilation in models could be a long term need (for instance new dedicated products for model assimilation, with similar physical contents, i.e. do not offer data with tides if the model does not use tides).

BL explains the products offered as part of MFC. No data assimilation is foreseen in the next 2 years. Interest in the validation of currents using HF radars (as the work already being done in IBI by Puertos del Estado); also part of blended products like ARMOR-3D.

**TP DAY2-5** CMEMS IN SITU TAC: possible links with HF Radar community ([L. Petit de la Villeon & S. Tarot-IFREMER](#))

Loic comments on the Potential of Hf radar for the next phase of CMEMS service evolution and highlights the importance of the catalogue – has to be INSPIRE compliant.

A.Griffa: How would be the data flow organized, directly from local or regional producers and CMEMS or should it be through an operational central node? Loic: the two options are possible, it has to be studied and discussed.

**TP DAY2-6** Ocean models skill assessment in CMEMS ([P. Lorente-Puertos Del Estado](#))

Pablo highlights a special section in NARVAL tool devoted to HF radars, and shows an interesting intercomparison of model solutions and radar in the strait of Gibraltar (example of the benefits of the downscaling via nested models). Pablo points to the interest of extending HFR based validations of models in the framework of CMEMS, only done for the moment in IBI by Puertos.

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### TP DAY2-7 First steps towards HFR data assembling in Europe (EMODnet Physics, INCREASE) (A. Novellino-ETT)

After a brief introduction of the EMODnet program, the 8 thematic portals, the secretariat and central portal roles, the 6 check point projects, Antonio presented the EMODnet Physics goals and how it was designed in coordination and cooperation with the EuroGOOS ROOSs and CMEMS INS TAC and the SeaDataNet NODCs. Portal feature were also introduced before presenting the EMODnet Physics and the EuroGOOS HFR TT role in setting up a pilot action in for connecting HFR systems with a homogenized THREDDS catalogue. The MoU between CMEMS and EMODnet Physics was also discussed to highlight the already existing synergies and common strategies to exploit and integrate the outcome of the INCREASE project.

### DISCUSSION SESSION ON A ROADMAP FOR THE PRODUCTION OF HFR PRODUCTS IN COMPLIANCE WITH CMEMS NEEDS

Discussion in groups are held for the following topics:

- GROUP1: Basic products: Data format and QA/QC  
SEE **GROUP1.pdf** for slides on the discussion and conclusions
- GROUP2: Advanced products and applications  
SEE **GROUP2.pdf** for slides on the discussion and conclusions
- GROUP3: Technical implementation and strategic development  
SEE **GROUP3.pdf** for slides on the discussion and conclusions

## Day 3: 15th September 2016

### *National and international networks: organization, funding, aggregators*

TP DAY3-1 RITMARE project (A. Griffa-ISMAR)

TP DAY3-2 Spanish Network (P. Lorente-Puertos del Estado)

TP DAY3-3 Portuguese Network (C. Fernandes-IH)

TP DAY3-4 French coordination (C. Quentin-MIO)

RENHFOR project- Coordination on French HFR research-related activities

TP DAY3-5 IOOS (M. Otero-Scripps)

TP DAY3-6 IMOS ACORN (S. Cosoli-UWA)

TP DAY3-7 EOOS concept and roadmap (P. Goringe-EuroGOOS)

### *EuroGOOS HFR Task Team meeting*

EUROGOOS HFR TT- Review of roadmap and work plan (J. Mader-AZTI)



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