NOAA/NDBC, Mississippi, 29 Feb – 2 March 2016

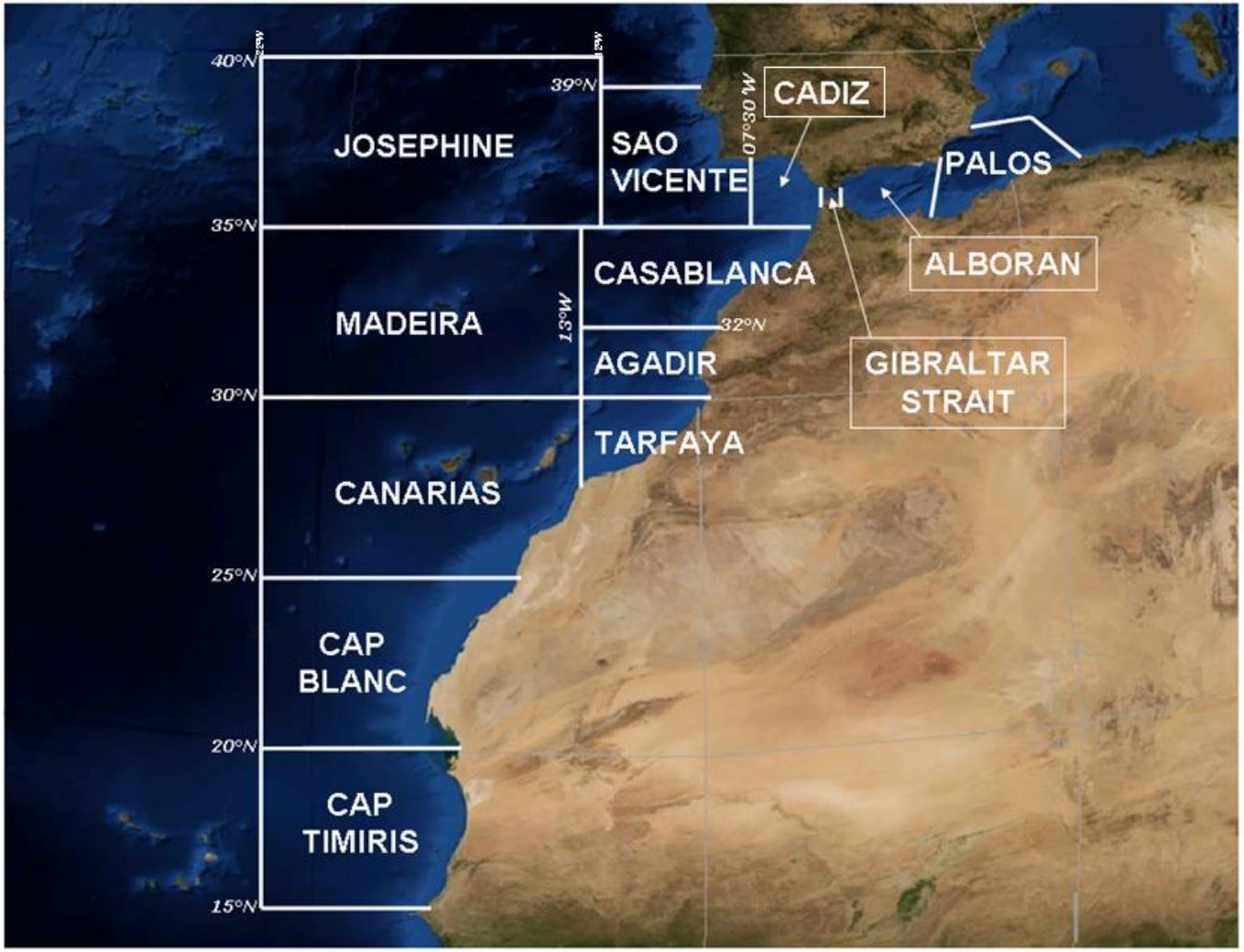
Progress on the implementation of ocean observing systems -MOROCCO-

Ahmed CHERIFI
Head of Technical Affairs and Equipment Division's
at National Direction of Meteorology.
Morocco

Regional Marine Instrumentation Center (Region IV) Workshop 29 Feb – 2 March 2016

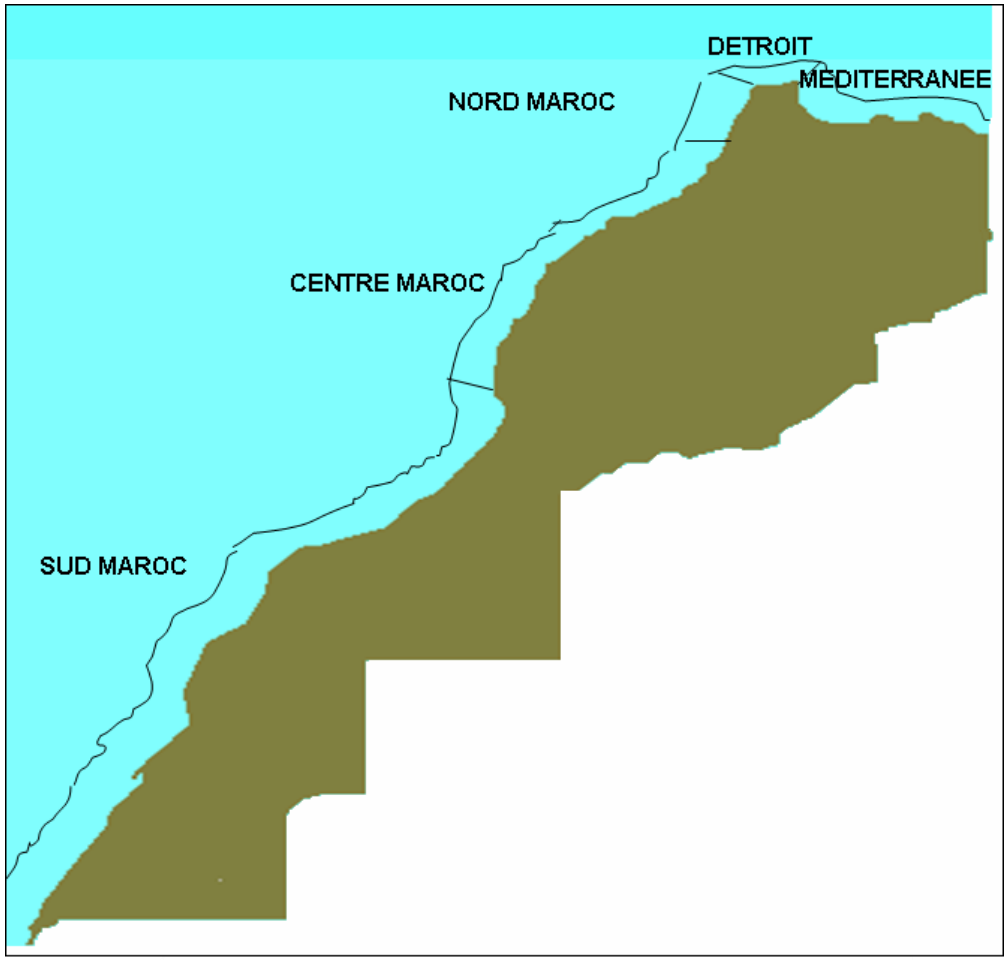
THE AREA OF RESPONSABILITY

Established in coordination with the NMS of Spain, France and Portugal



THE AREA OF RESPONSABILITY

Coastal Area : 3500 Km



The strategic objectives

- **Strengthening marine observations;**
- **Developing marine services based on new technology in observation at sea;**
- **Disseminating all kind of marine measurements to partners;**
- **Improving sea state numerical models by taking into consideration observation at sea;**
- **Improving spatial resolution of the numerical marine models.**

Main requirements for ocean data in the country

- To monitor the surface meteorological parameters for weather forecasts purposes and also harbor activities and climate monitoring,

- To achieve measurements of the marine parameters such as Tide, surface currents and Swell characteristics in near shore areas to provide assistance for marine meteorological customers,

- To contribute to national and to international marine research and socio-economical projects by helping in the determination of SST and oceanographic profiles (current, temperature, salinities…) for area of interests (upwelling area, touristic, fishing , estuaries…).

- To achieve measurements of Swell in the large in order to assess numerical models products and to improve marine forecasts in this area of responsibility .

Marine Products provided

ACTIVITY DOMAIN	PARTENERS	SERVICES PROVIDED
	Ministère de l'Agriculture et pêches maritimes. Agence Nationale des Ports Marsa-Maroc INRH DRAPOR GLOBE MARINE AQUATRA Etc ……	➢ Swell Forecasts; ➢ Tide Predictions; ➢ Meteorological warning (Strong winds, Dangerous swell) ➢ Daily forecats of the sea state in coastal areas and in large; ➢ Warning (Swell> 4m & wind >8); ➢ 67082 bulletins dissemineted per year and more than 150 warning.

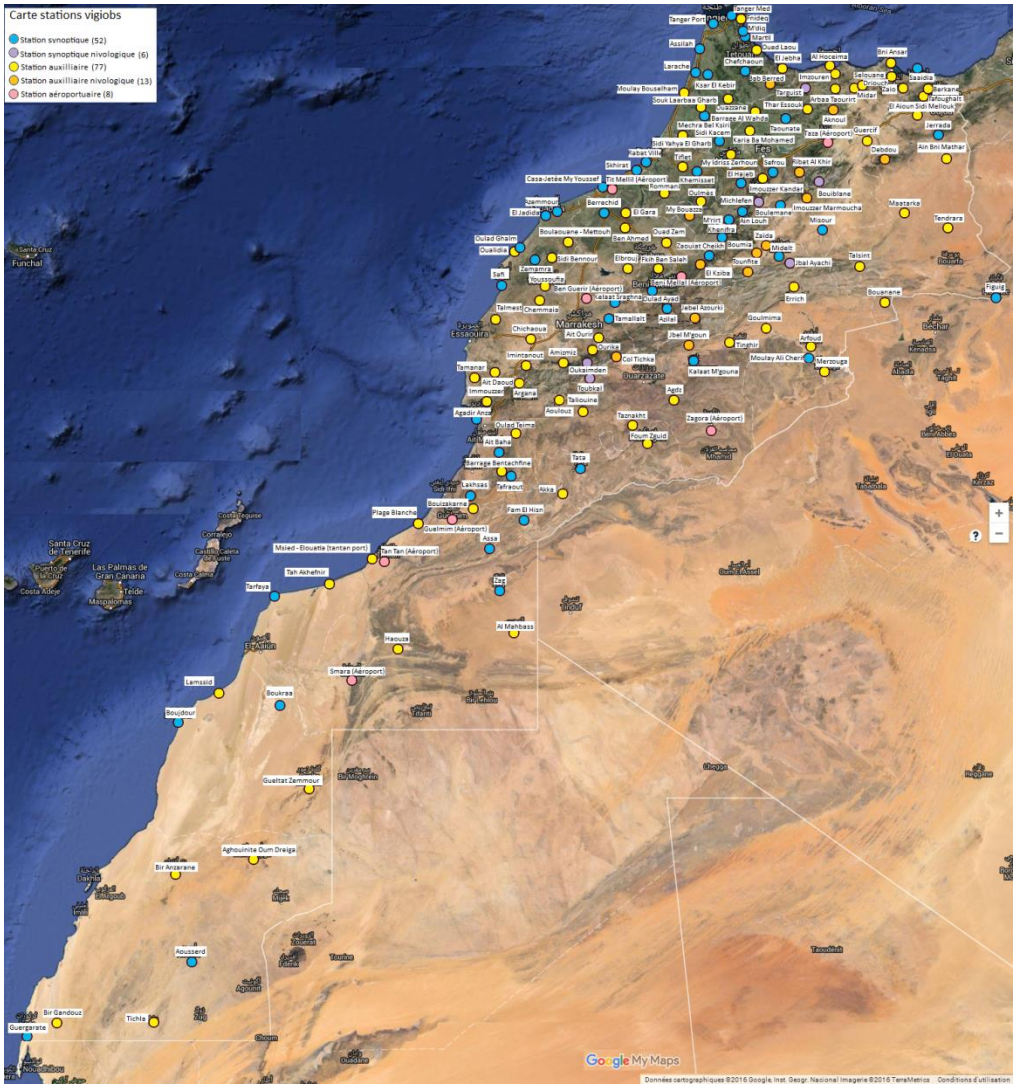
REQUIREMENTS

VARIABLE	Coverage	Frequency	Purposes
Surface meteorological parameters on land	All synoptic and Manned stations	1 hour	Weather and marine meteorological forecasts, Harbor activities, climate monitoring
Surface meteorological parameters @ sea	Large marine responsibility area	1 hour	Marine meteorological forecasts, Numerical models assessment
TIDES	Harbors	30 minutes	assist customers for Harbor and fisheries activities
WAVES	Harbors and critical coastal areas	30 minutes	assist customers for Harbor and fishing activities
WAVES	Large marine responsibility area	30 minutes	Marine meteorological forecasts, Numerical models assessment

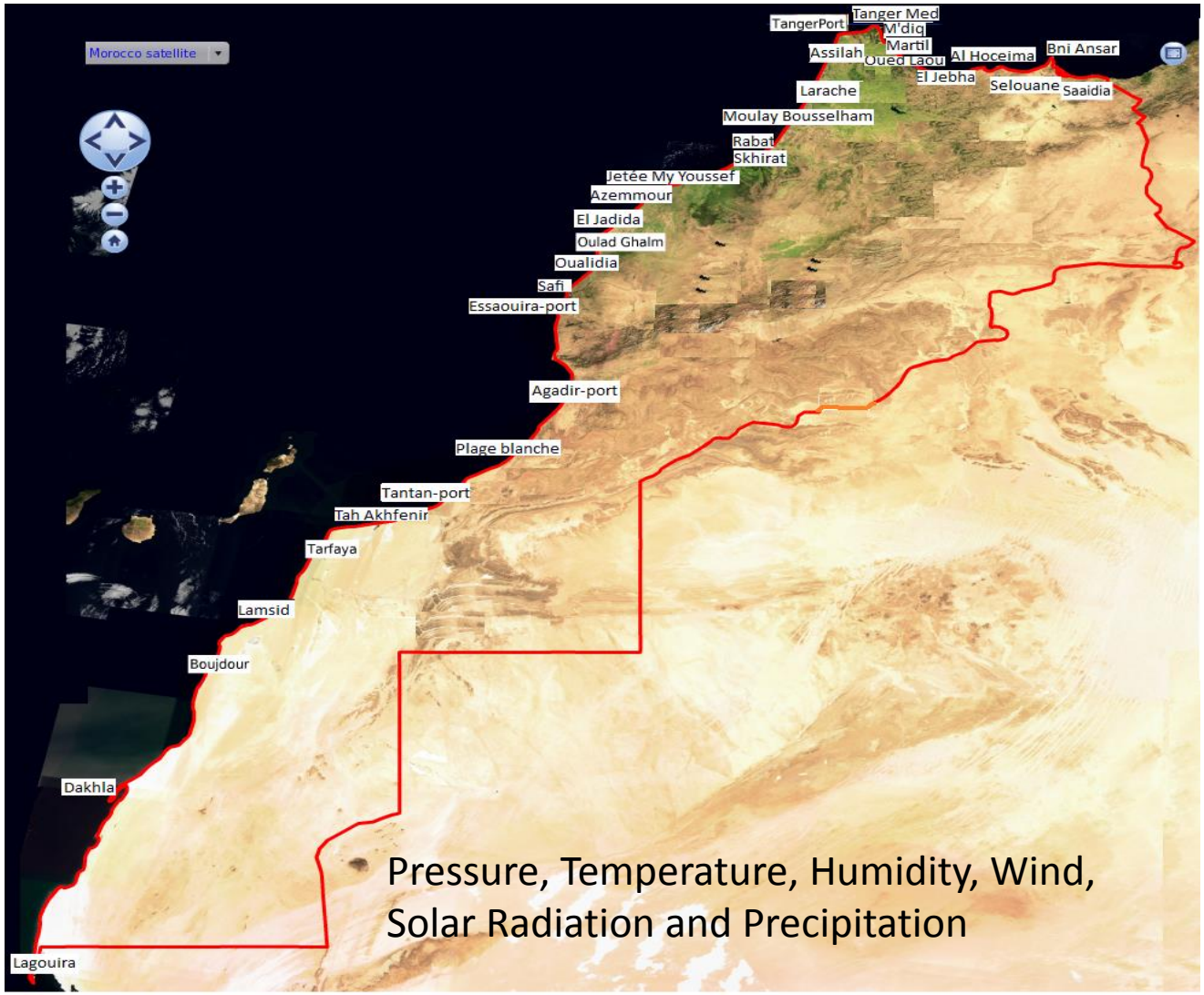
REQUIREMENTS

VARIABLE	Coverage	Frequency	Purposes
Surface Currents	Harbors	30 minutes	assist customers for Harbor and fisheries activities
SST	Harbors	1 hour	research activities, climate monitoring, tourism
Current and temperature profiles	Harbors and areas of interest	30 minutes	upwelling studies, research activities
Salinity	area of interest		research studies

156 automatic weather stations are implemented in Morocco

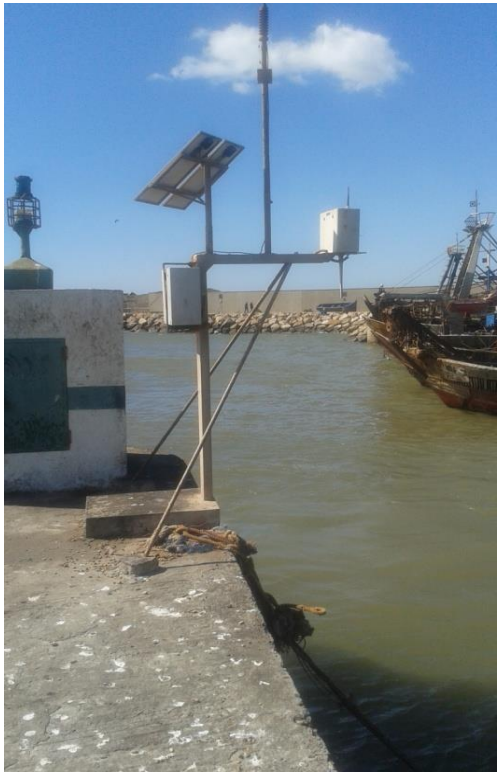


31 automatic weather stations are implemented in ports and coastal cities



Tide Measurements

- Measured in tree locations (*Tanger , Casablanca and Essaouira*)
- Predicted tide tables are made for the other coastal cities and harbors

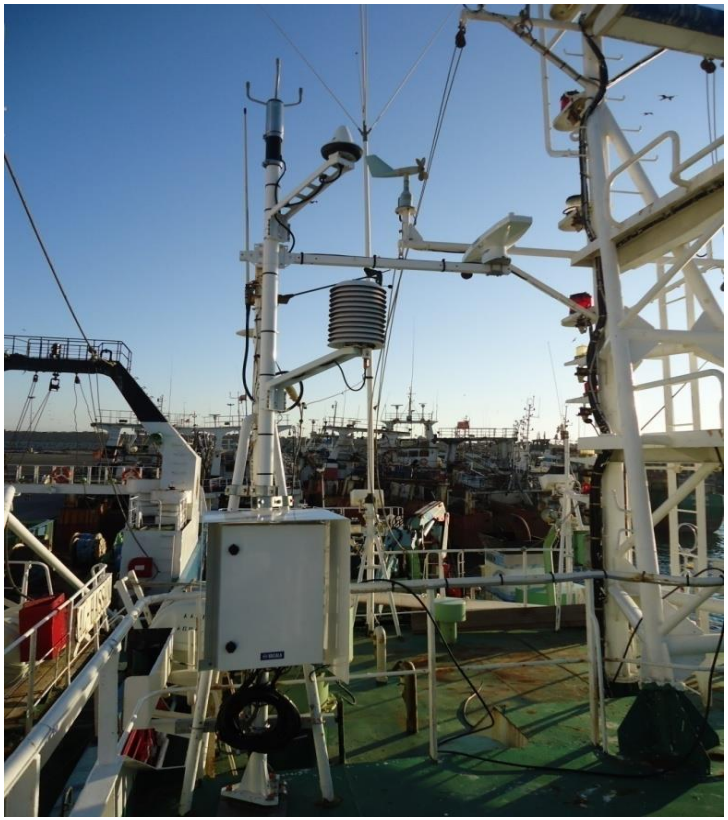


Tide Measurements by partners

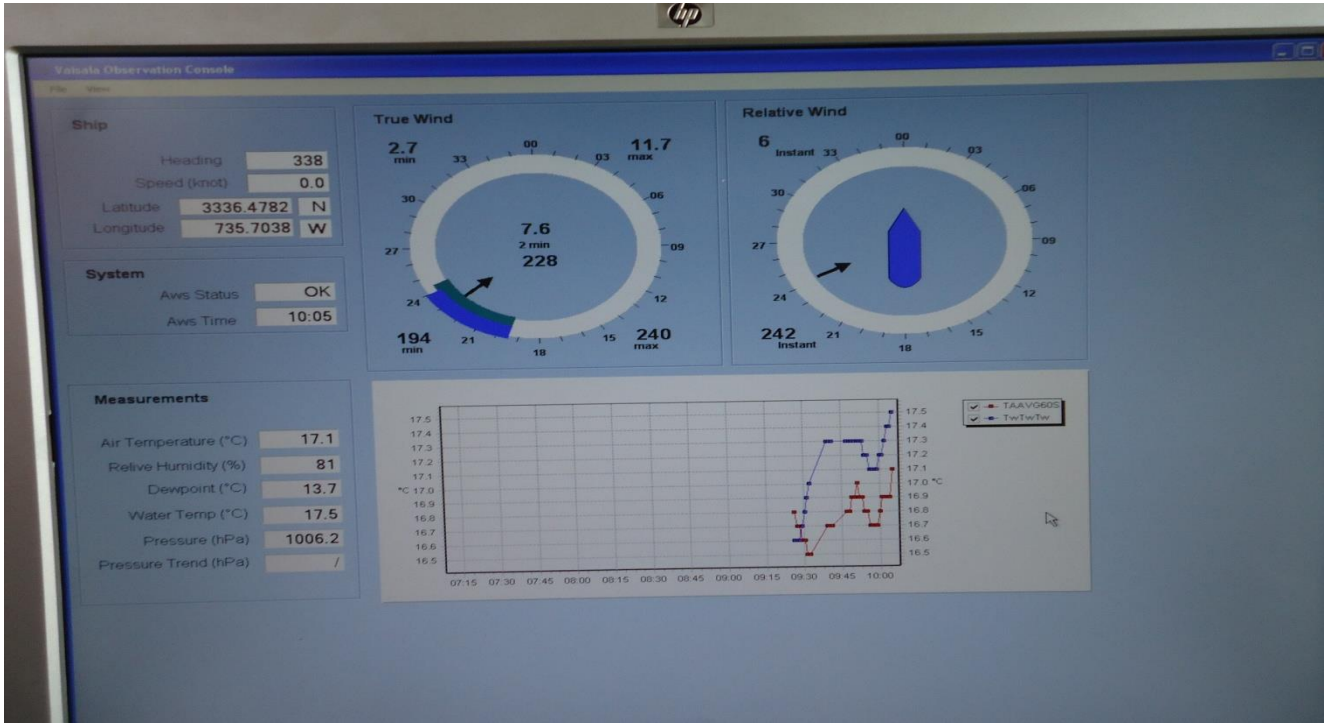
Mohammedia Port Radar Tide Gauge

Agadir Port Radar Tide Gauge

Two stations on the two ships "Kenza“ & "Moulay Abdellah"



- The sensors currently operational:
- - Temperature/humidity: HMP155
- - Pressure : PTB330
- - Temperature of water (SST) : DTS12A
- - Wind sensor Ultrasonic : WS425
- - Datalogger : QML201A
- - Software : VAISALA Observation Console v. 3.2



Pilot Project :
Marine Radar in Morocco

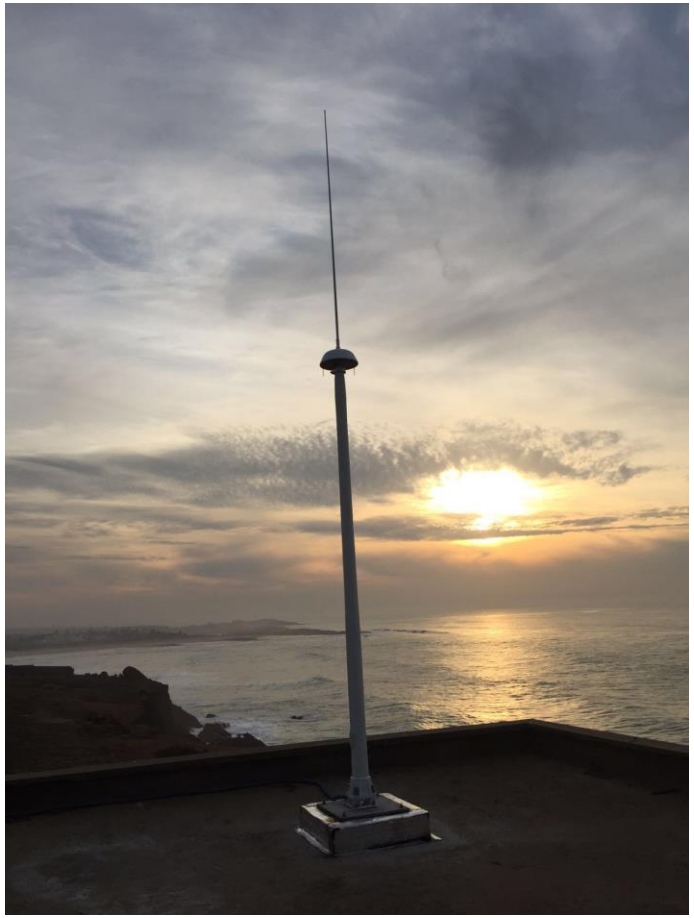
Regional Marine Instrumentation Center (Region IV) Workshop 29 Feb – 2 March 2016

The importance and value of marine radar for Morocco

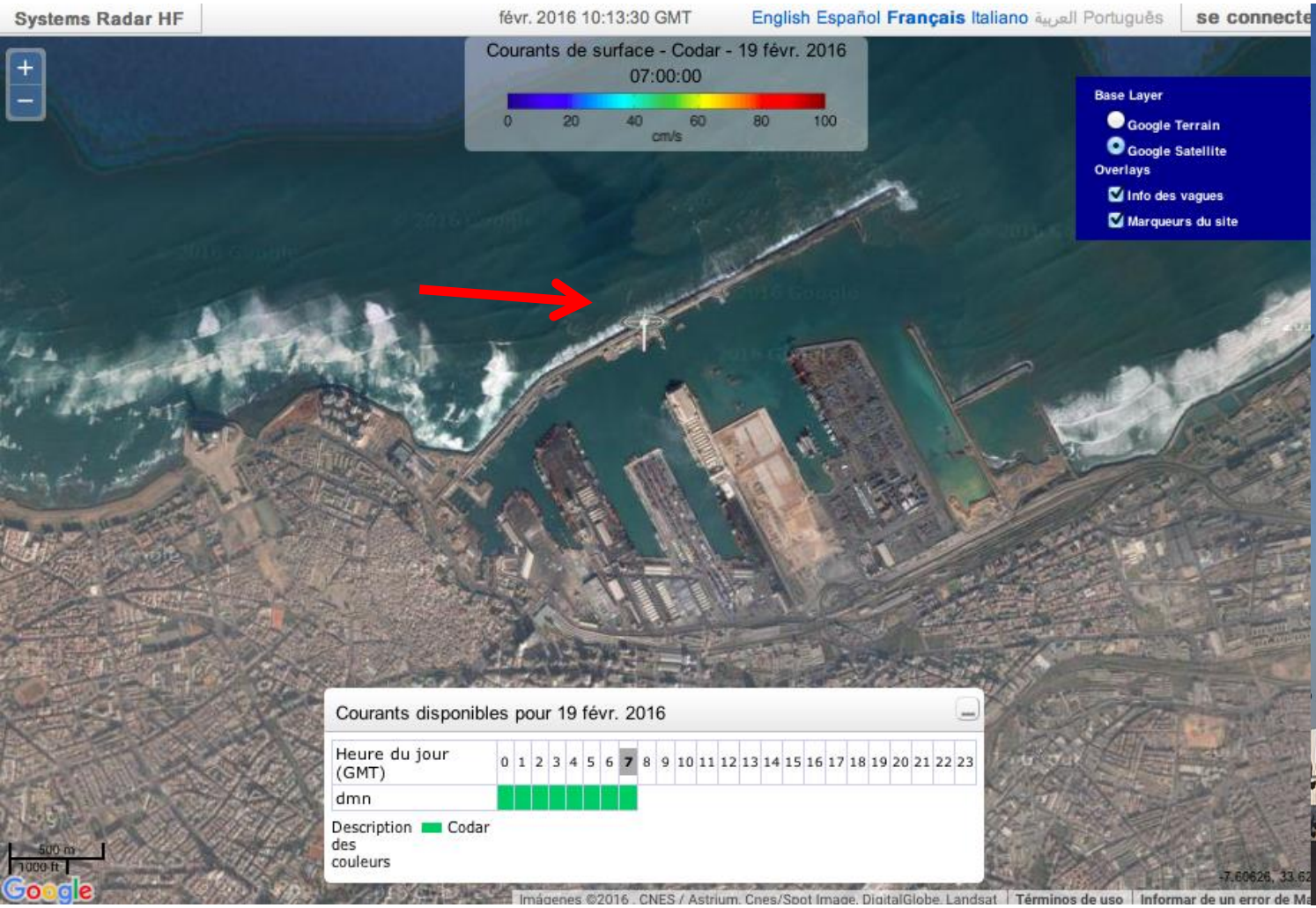
- ✓ Weather Monitoring and Forecasting
- ✓ Pollutant / Oil Spill Planning & Response
- ✓ Coastal Engineering
- ✓ Fishing, Fisheries and Mariculture
- ✓ Marine Sanctuary Protection & Monitoring
- ✓ Ship and Boater Safety
- ✓ Search & Rescue
- ✓ Offshore Renewable Energy
- ✓ … And More

The design of marine radar In Morocco

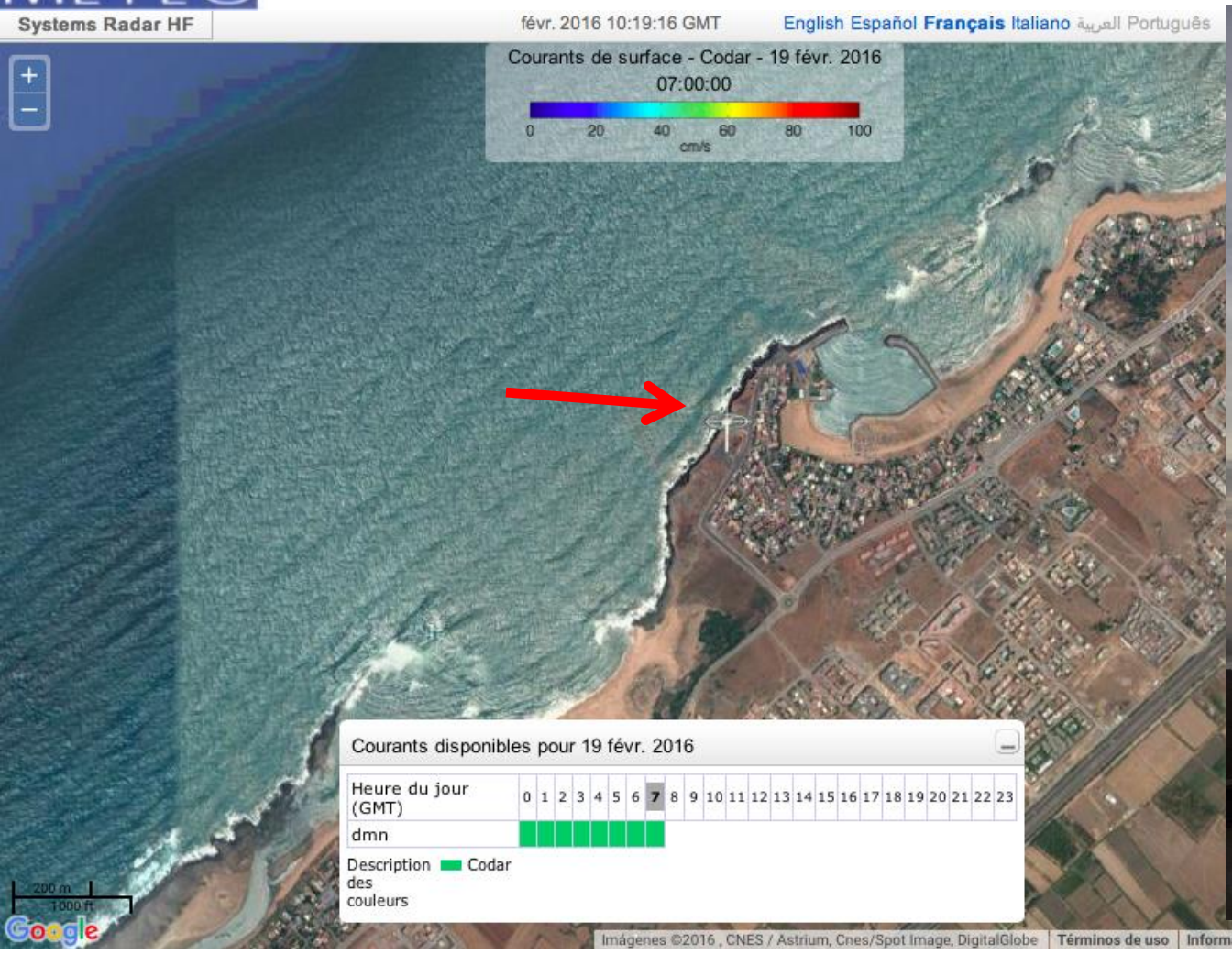
Separate Transmitter & Receiver



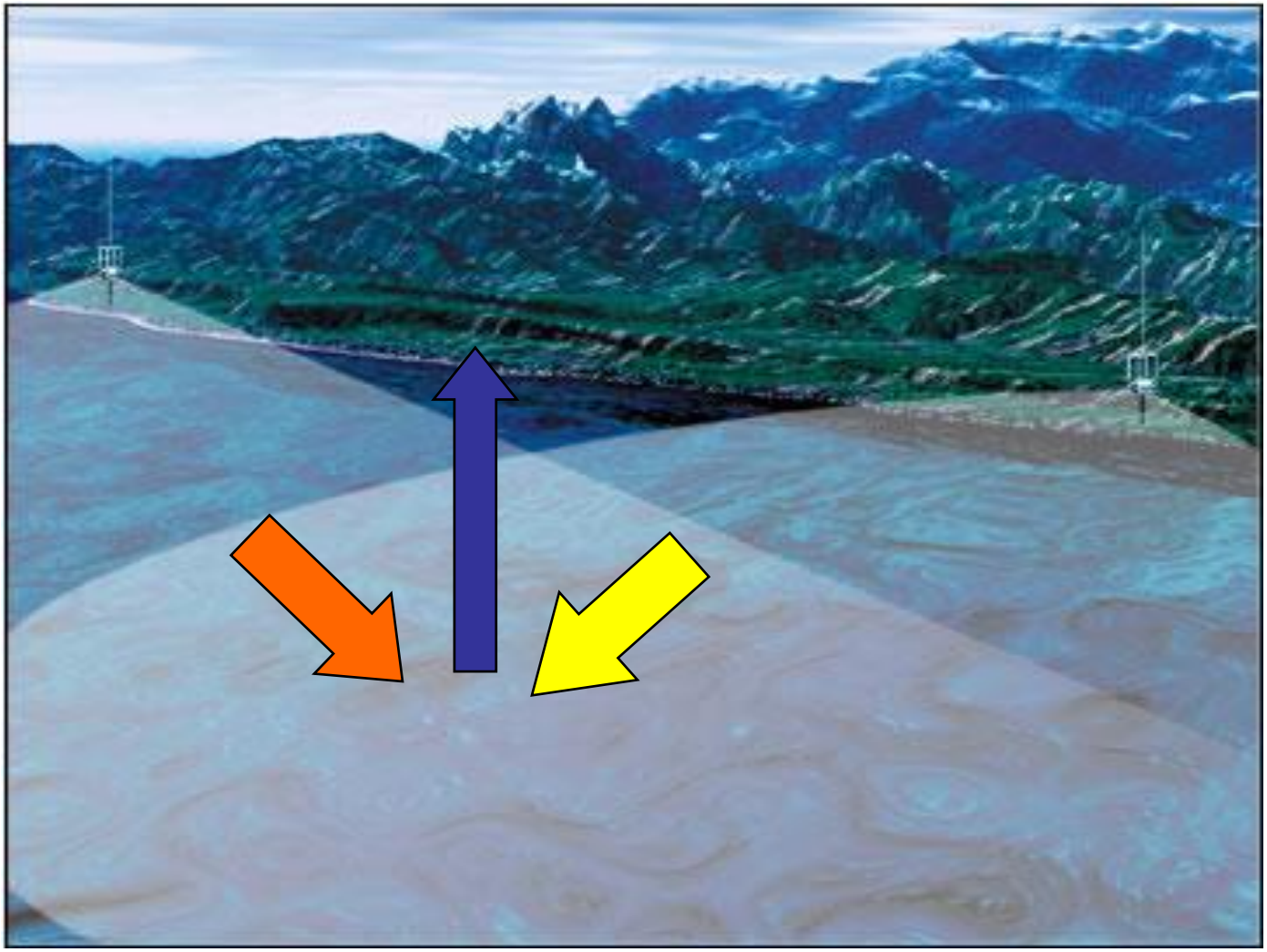
1- Port of Casablanca SeaSonde of maritime radar site



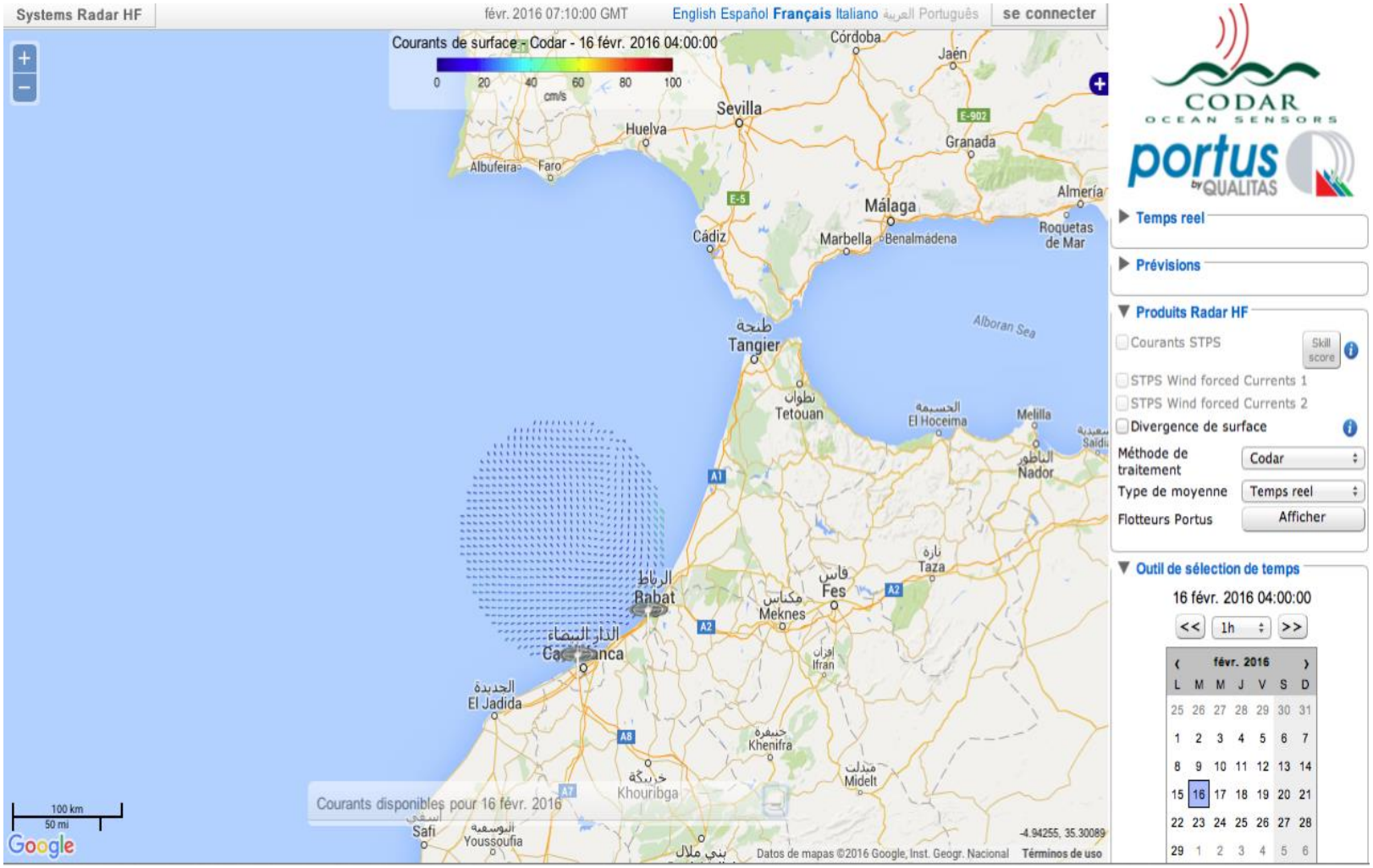
1- Temara SeaSonde of maritime radar site



Atlantic marine radar simulation of the current

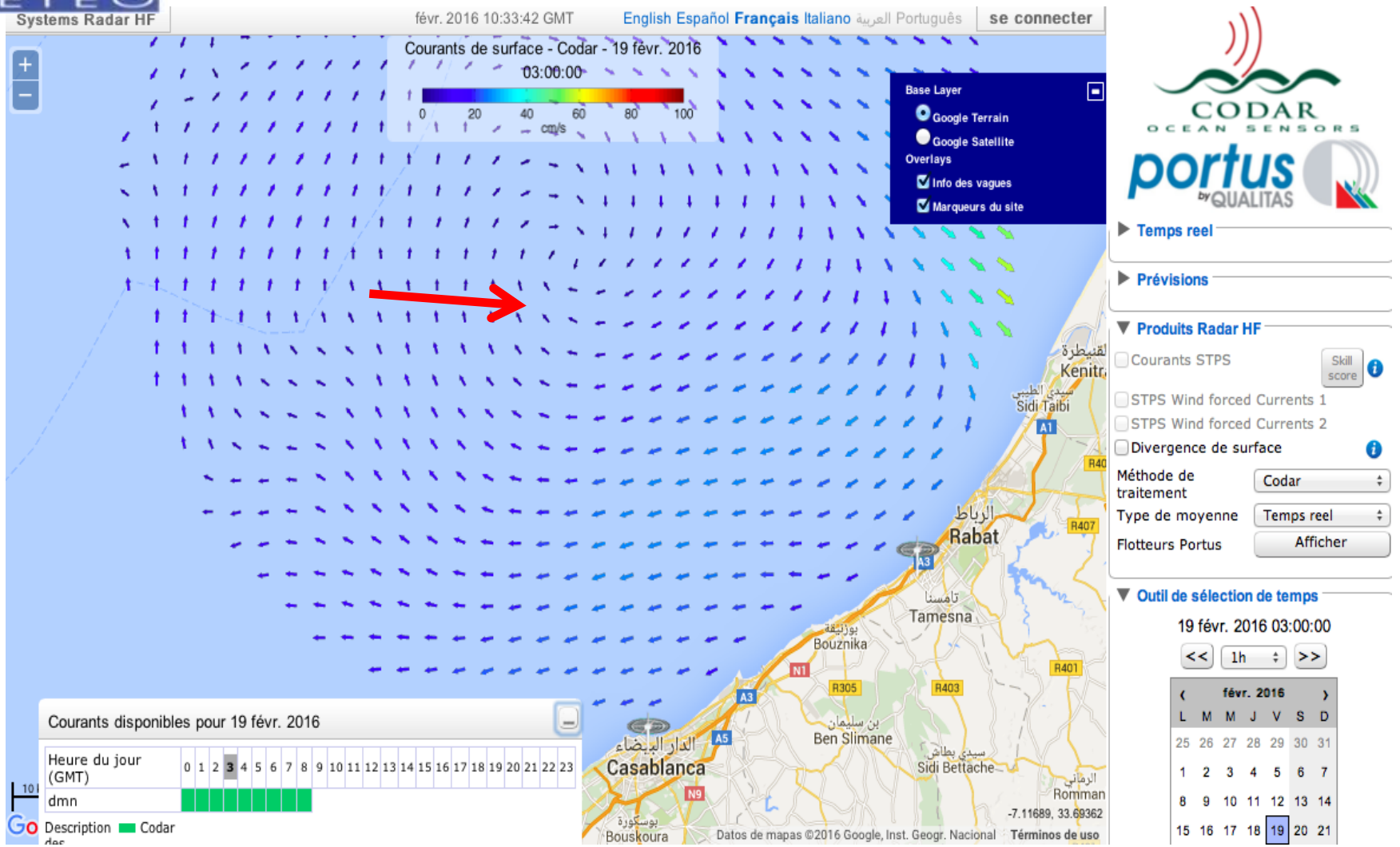


The first 2 HF RADAR in Morocco in Casablanca and Temara

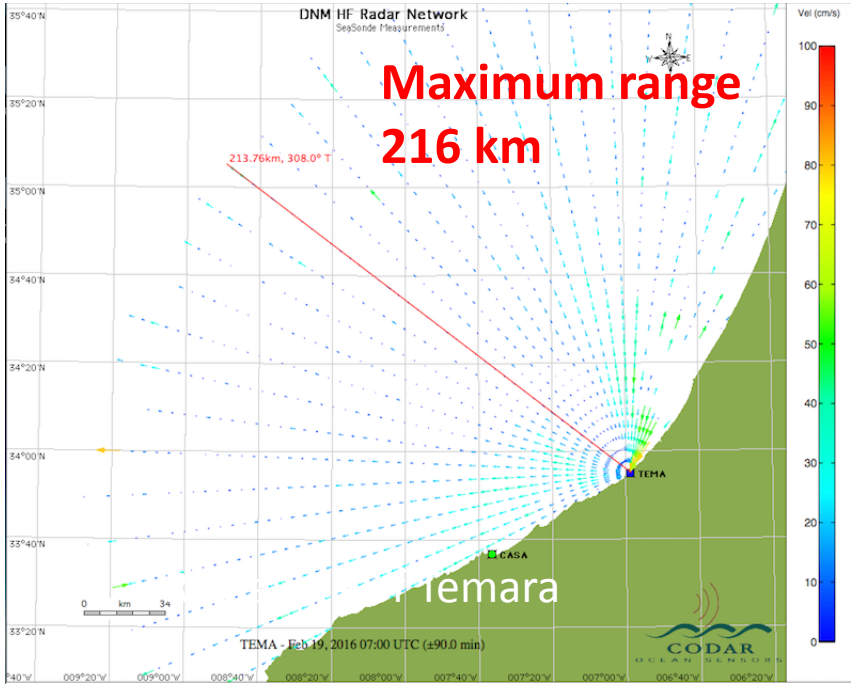


Regional Marine Instrumentation Center (Region IV) Workshop 29 Feb – 2 March 2016

Giant eddy observed in front of Casablanca



The measurement can reach up to 200 km from the coast, providing many thousands of real time data every hour



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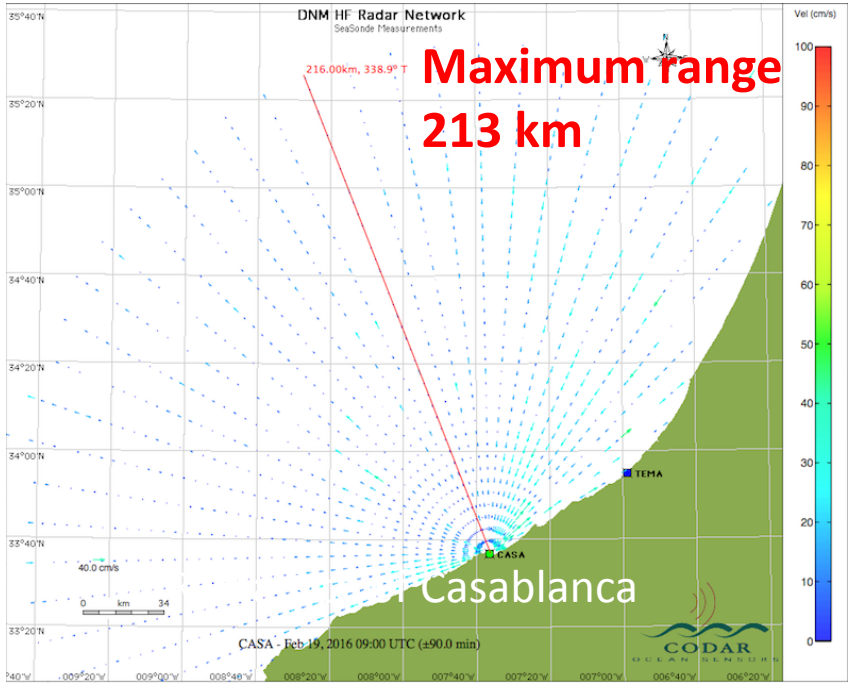
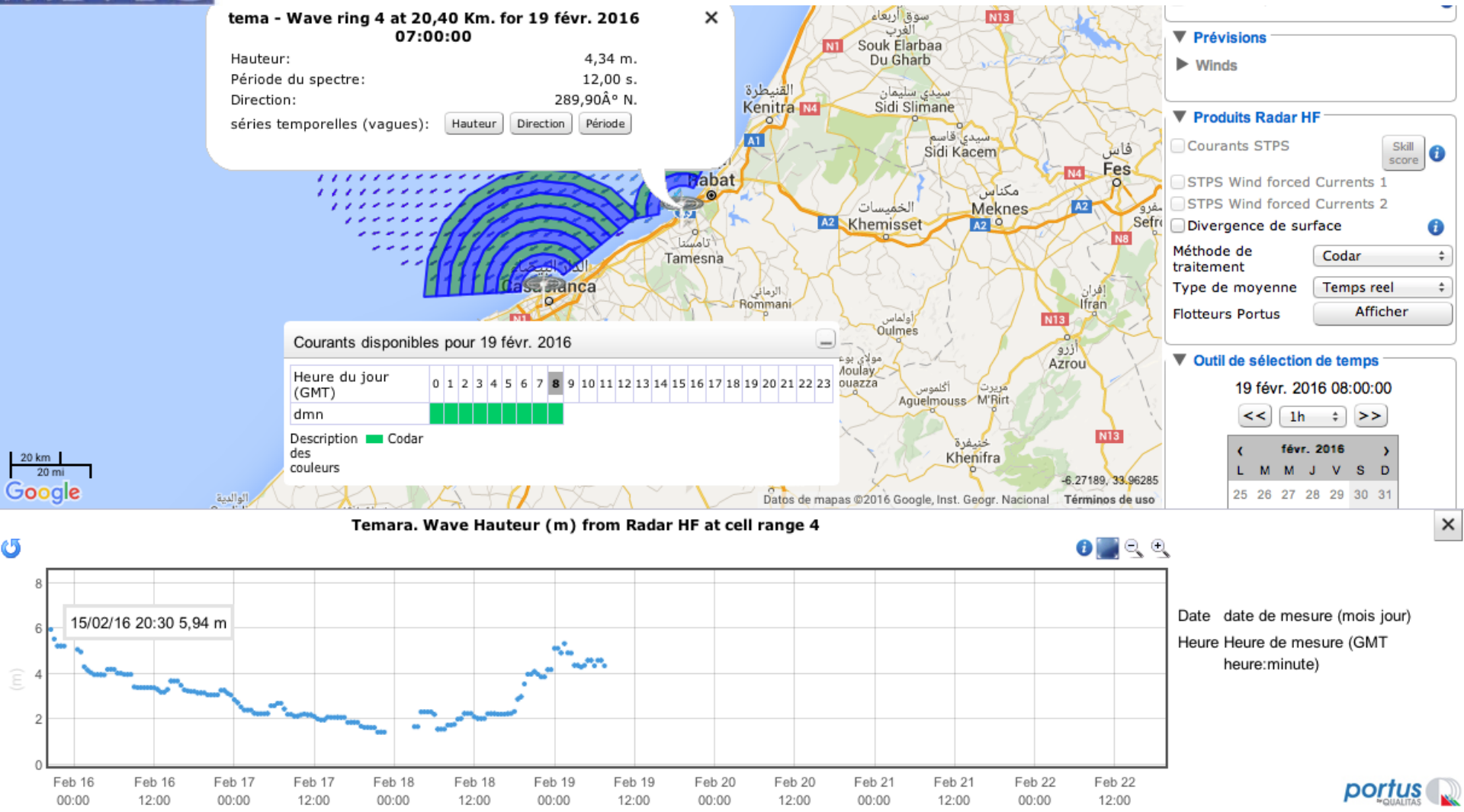


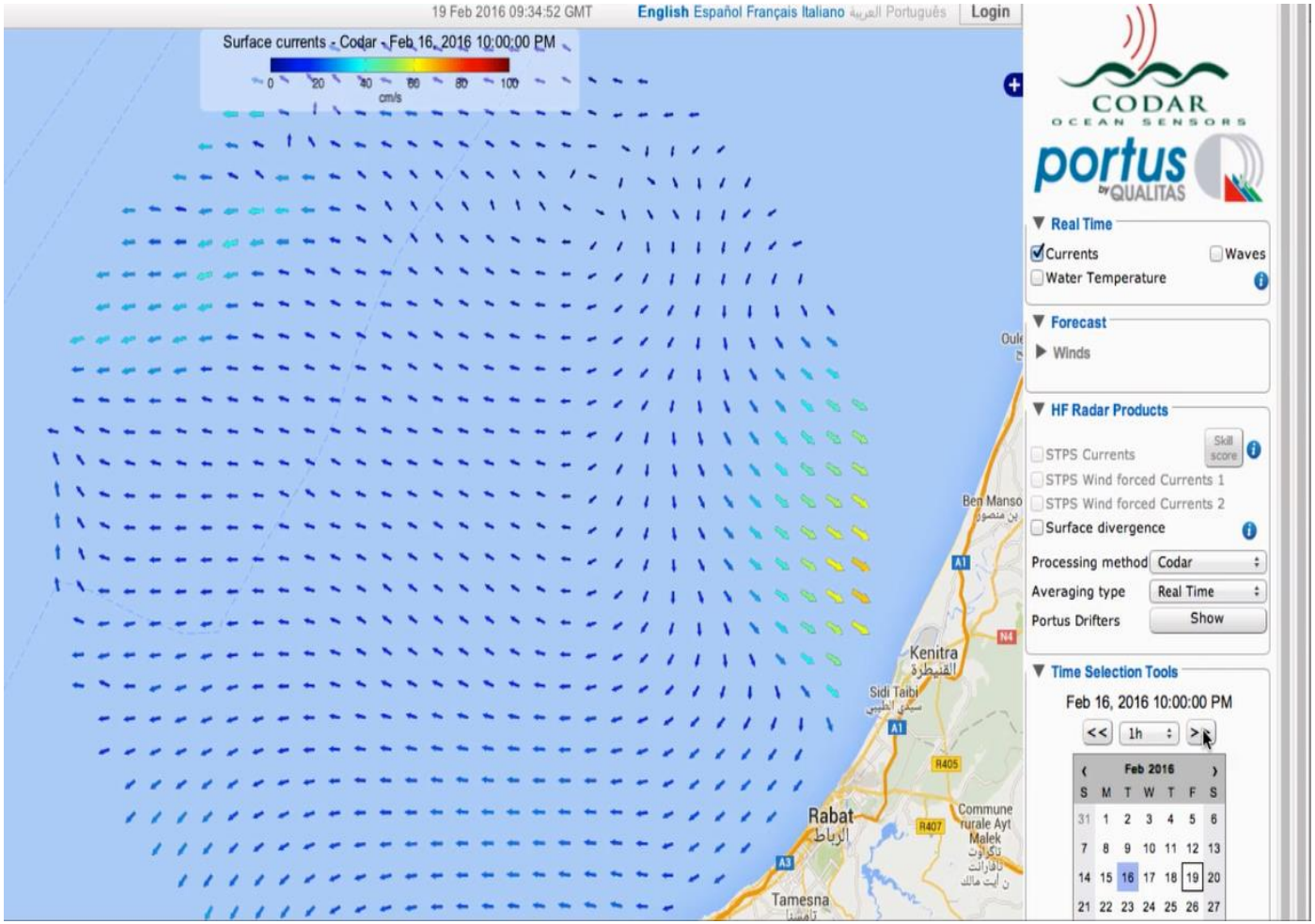
Tiemara

Casablanca

Half hourly significant wave height time series in each radar station

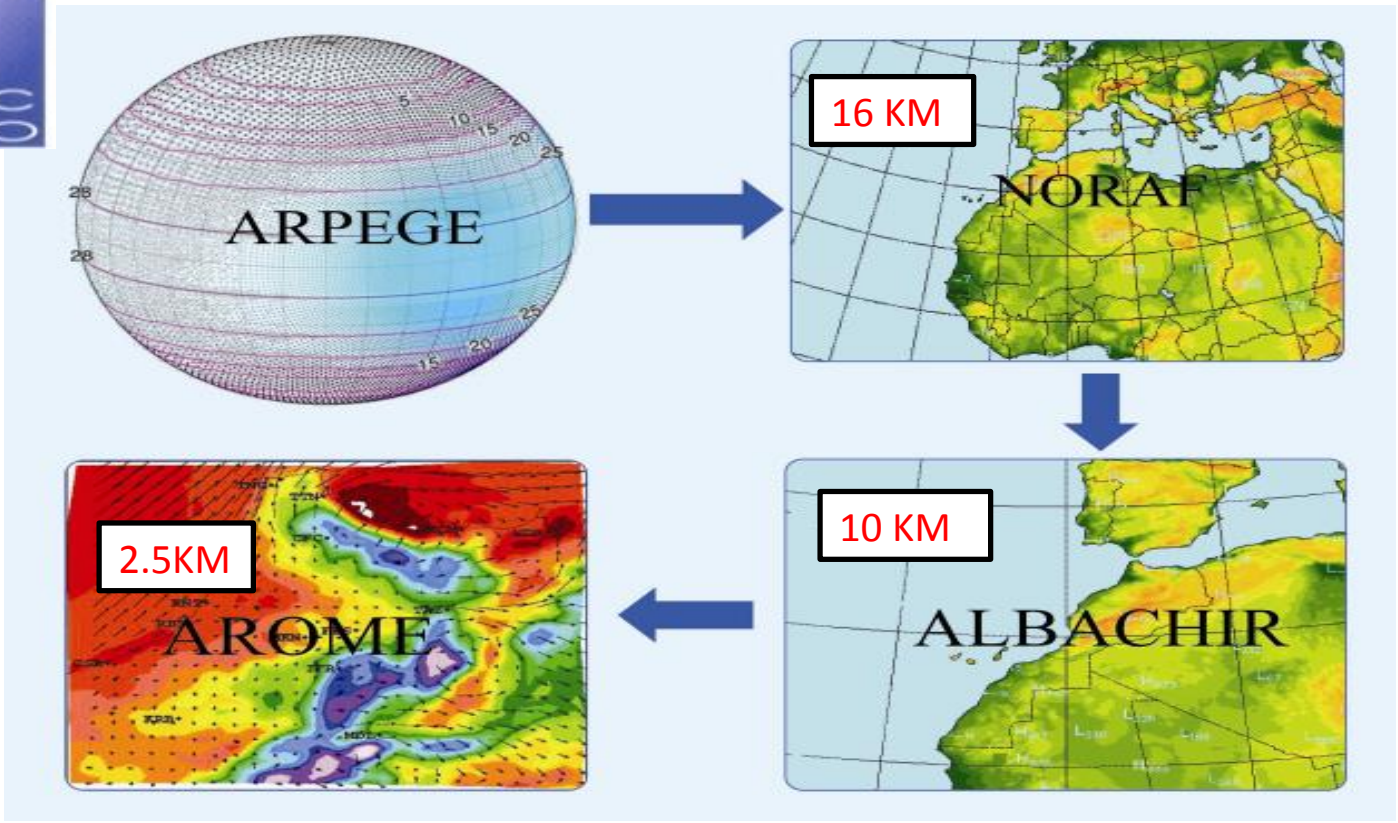


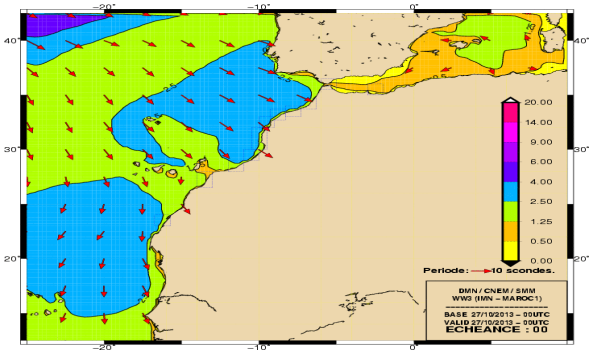
Atlantic current observed in front of Casablanca and Temara



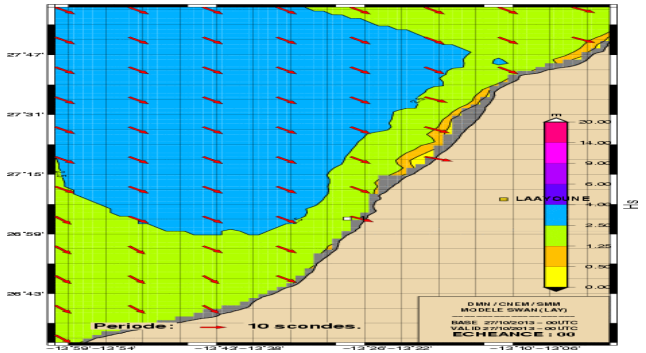
Data Processing

Moroccan weather air limited numerical model





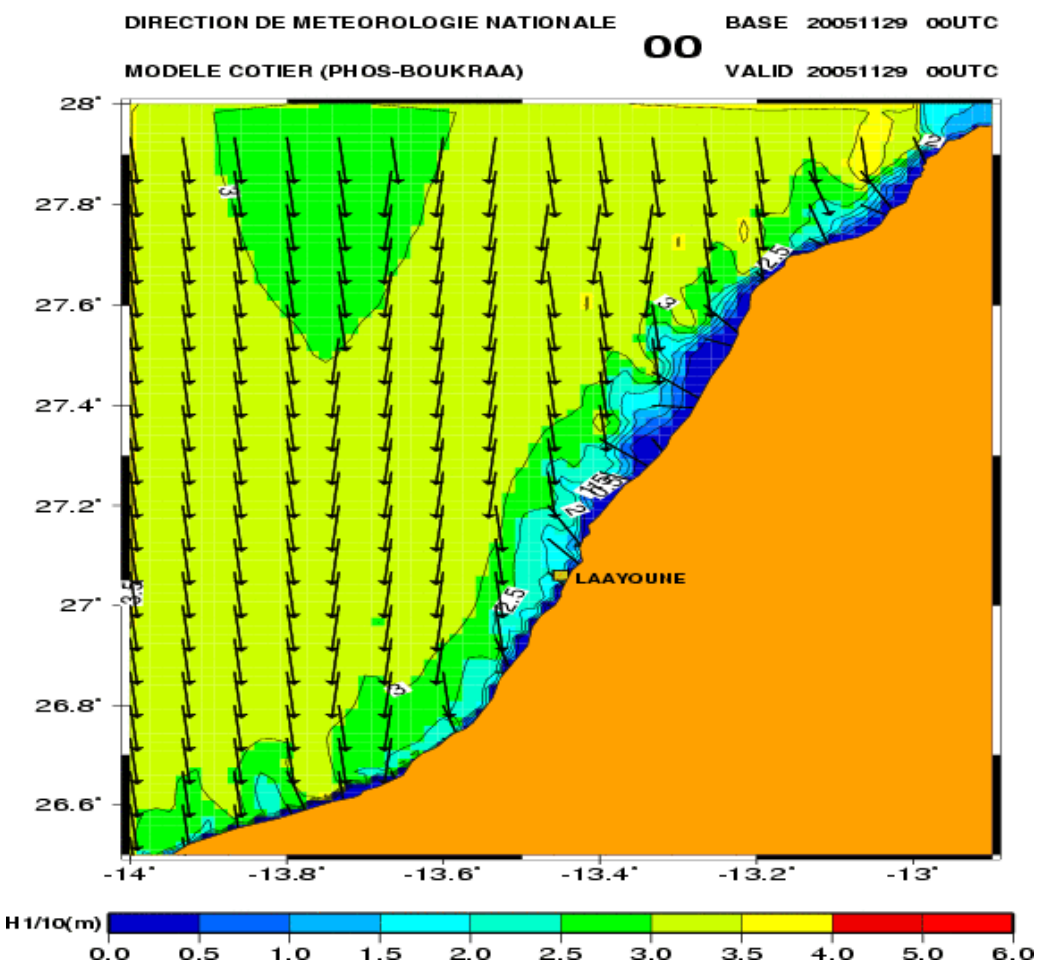
Marine



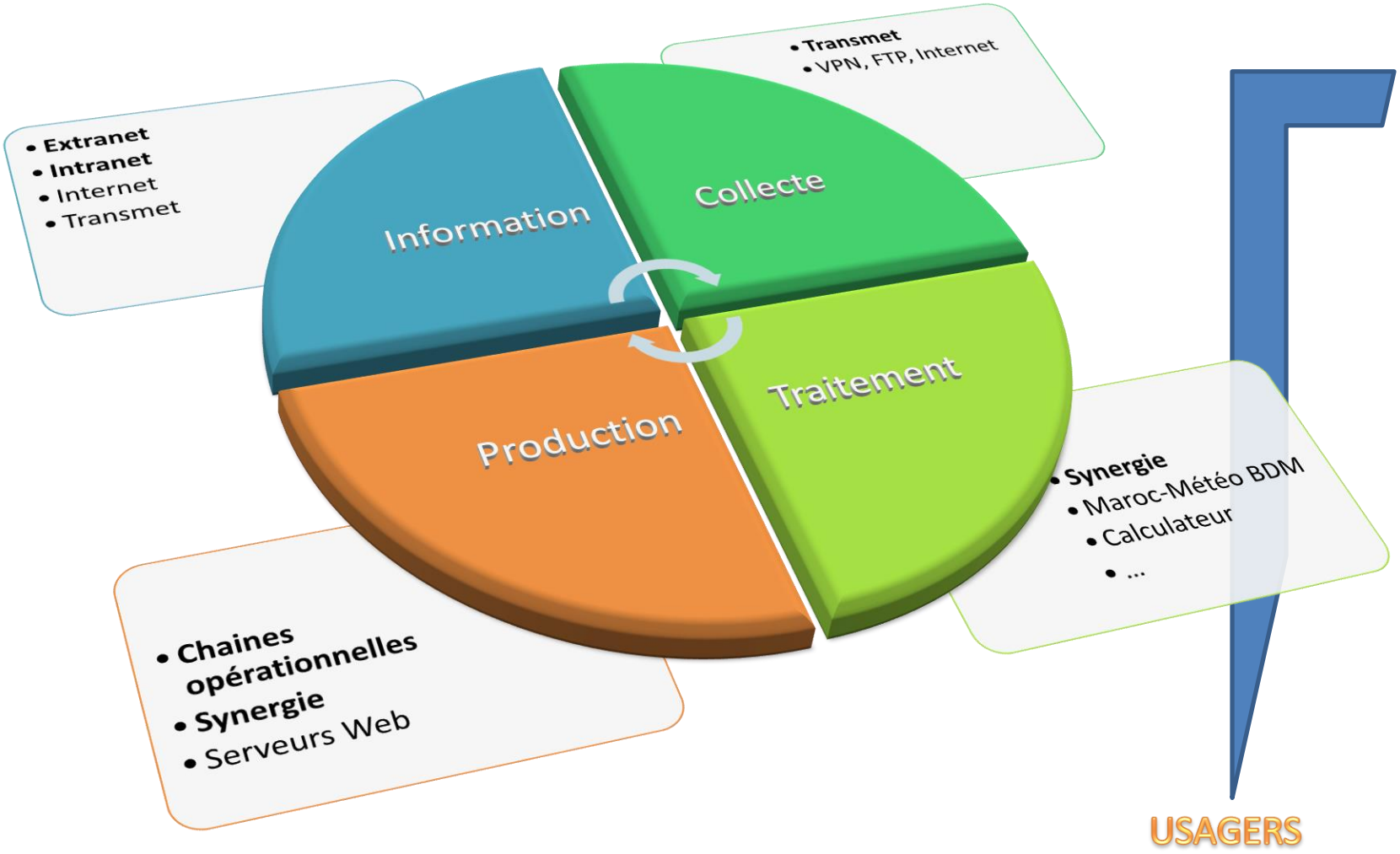
Coastal model
For Marine Forecasts

Animated graphics outputs of the coastal model at LAAYOUNE

72 Hours forecast for Wind and the Swell.

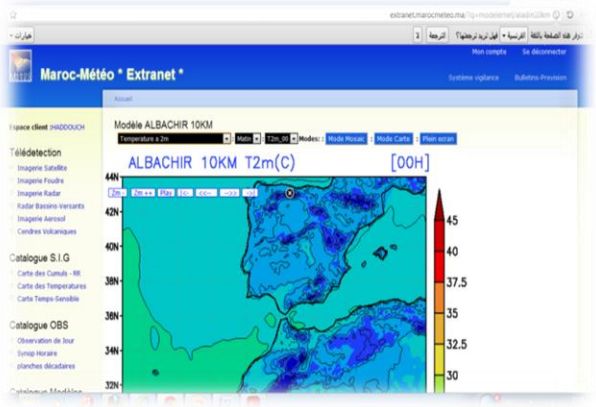


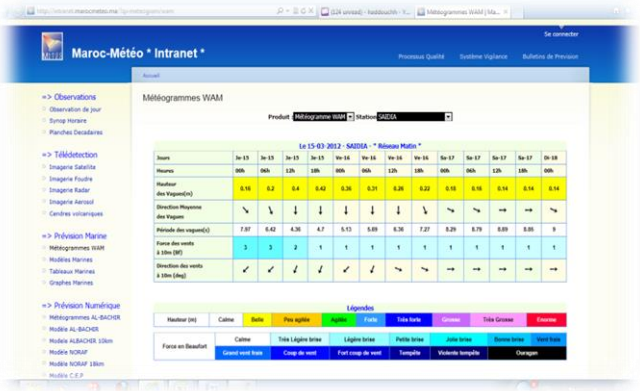
Information System : An integrated approach to serve users and management

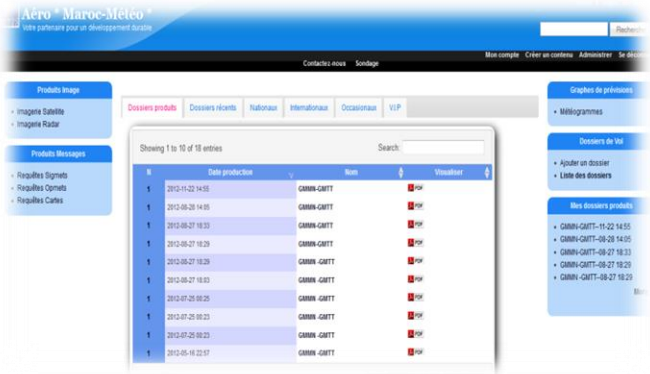


Web-Based systems

- ✓Internet
- ✓Intranet
- ✓Extranet
- ✓Prodmet
- ✓Aero-Met
- ✓…





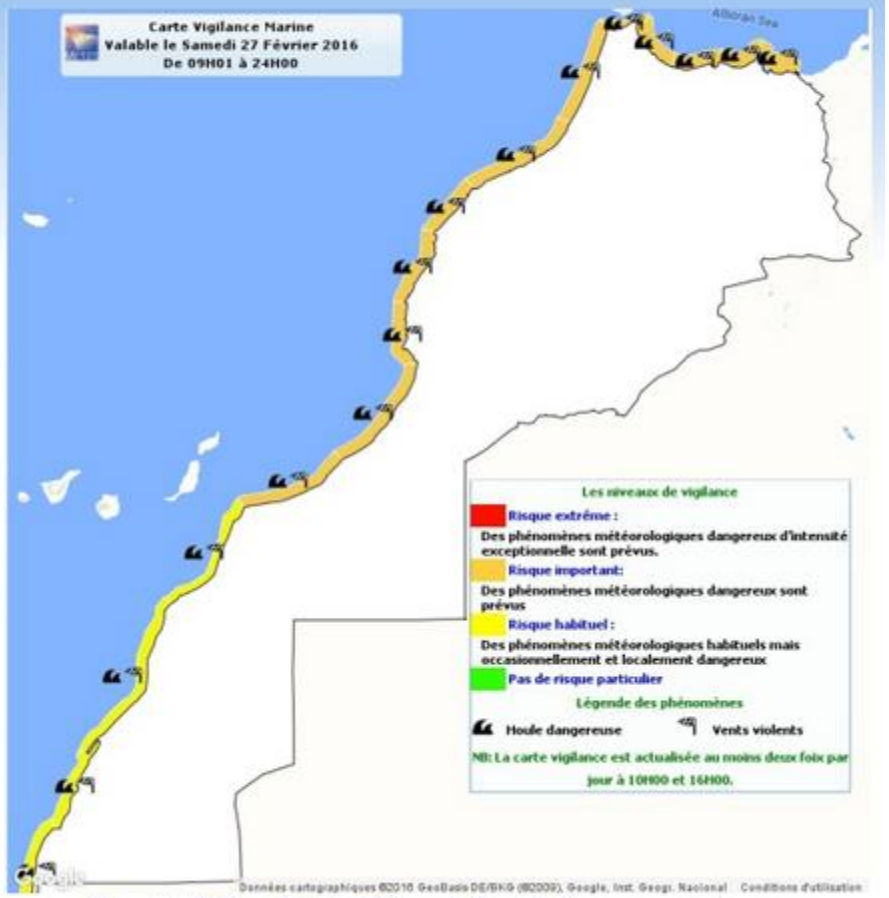


Marine vigilance

ROYAUME DU MAROC
Direction de la Météorologie Nationale
Centre National d'Exploitation Météorologique

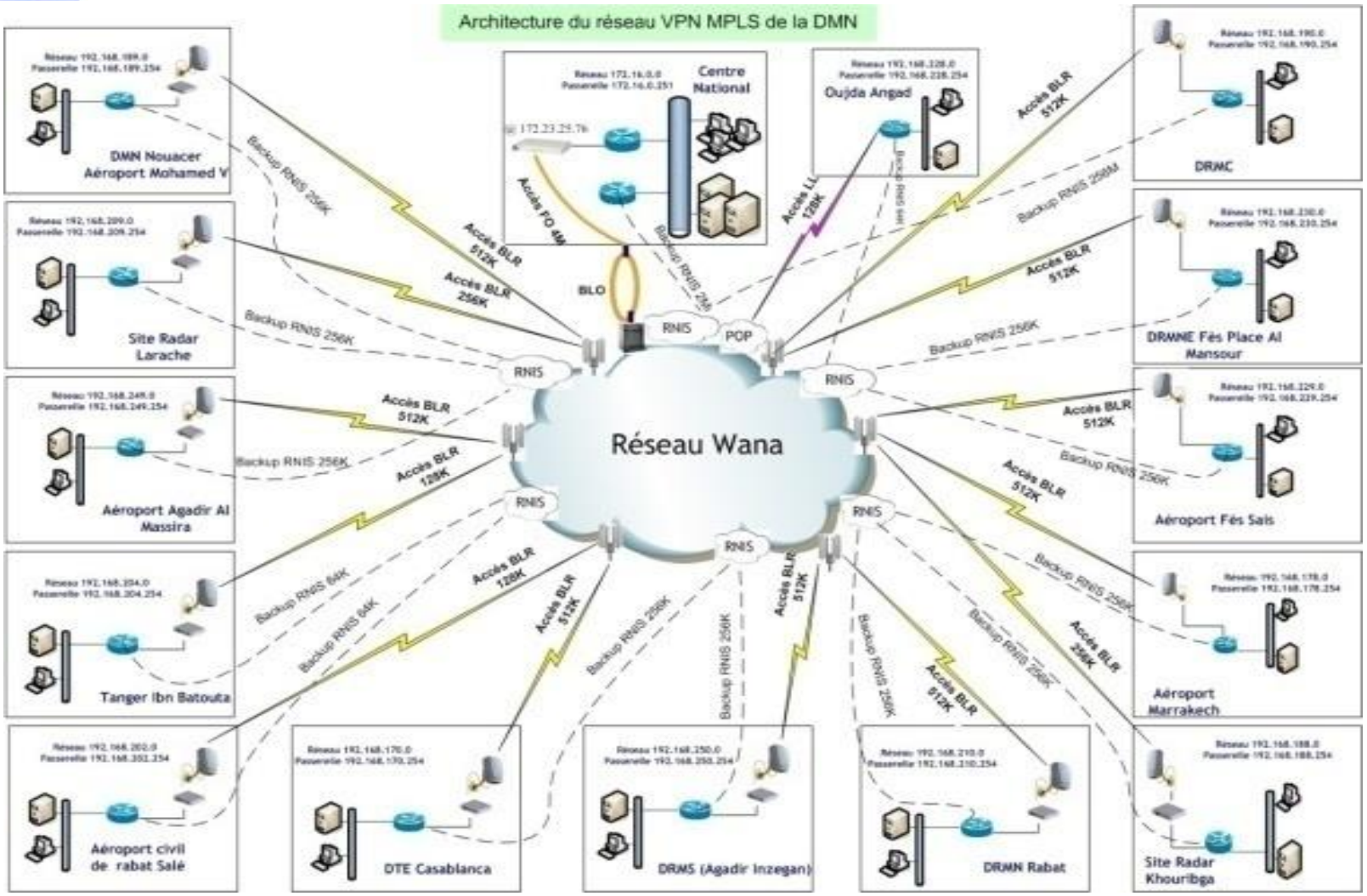
CARTE VIGILANCE MARINE
Actualisée le Samedi 27 Février 2016 à 09H01 (GMT)

Vigilance valable le Samedi 27 Février 2016		
VAGUES FORTES *(m)*	00H00 A 24H00	
saidia / Cap des Trois Fourches (Nador) *([3, 5[)*, cap des trois fourches / cap Quitales *([3, 5[)*, cap Quitales (Al Hoceima) / JABHA *([3, 5[)*, ALJABHA / Pointe Alimana (sebta) *([3, 5[)*, Pointe Alimana (sebta) / cap Spartel *([3, 5[)*, Cap Spartel / Mehdia *([4, 6[)*, Mehdia / El Jadida *([4, 6[)*, El Jadida / Cap Beddouza *([4, 6[)*, Cap Beddouza / cap Sin *([4, 6[)*, Cap Sin / cap ghir *([4, 6[)*, cap ghir / cap draa *([4, 6[)*, cap draa / cap juby *([4, 6[)*		
Cap juby / cap bojador *([2.5, 4[)*, cap bojador / pointe durnford *([2.5, 4[)*, point dunford / cap barbaras *([2.5, 4[)*, cap barbaras / lagouira *([2.5, 4[)*		
VENTS FORTS *(beaufort)*	00H00 A 24H00	
saidia / Cap des Trois Fourches (Nador) *([8, 10[)*, cap des trois fourches / cap Quitales *([8, 10[)*, cap Quitales (Al Hoceima) / JABHA *([8, 10[)*		
ALJABHA / Pointe Alimana (sebta) *([6, 8[)*, Pointe Alimana (sebta) / cap Spartel *([6, 8[)*, Cap Spartel / Mehdia *([6, 8[)*, Mehdia / El Jadida *([6, 8[)*, El Jadida / Cap Beddouza *([6, 8[)*, Cap Beddouza / cap Sin *([6, 8[)*, Cap Sin / cap ghir *([6, 8[)*, cap ghir / cap draa *([6, 8[)*, cap draa / cap juby *([6, 8[)*, Cap juby / cap bojador *([6, 8[)*, cap bojador / pointe durnford *([6, 8[)*, point dunford / cap barbaras *([6, 8[)*, cap barbaras / lagouira *([6, 8[)*		

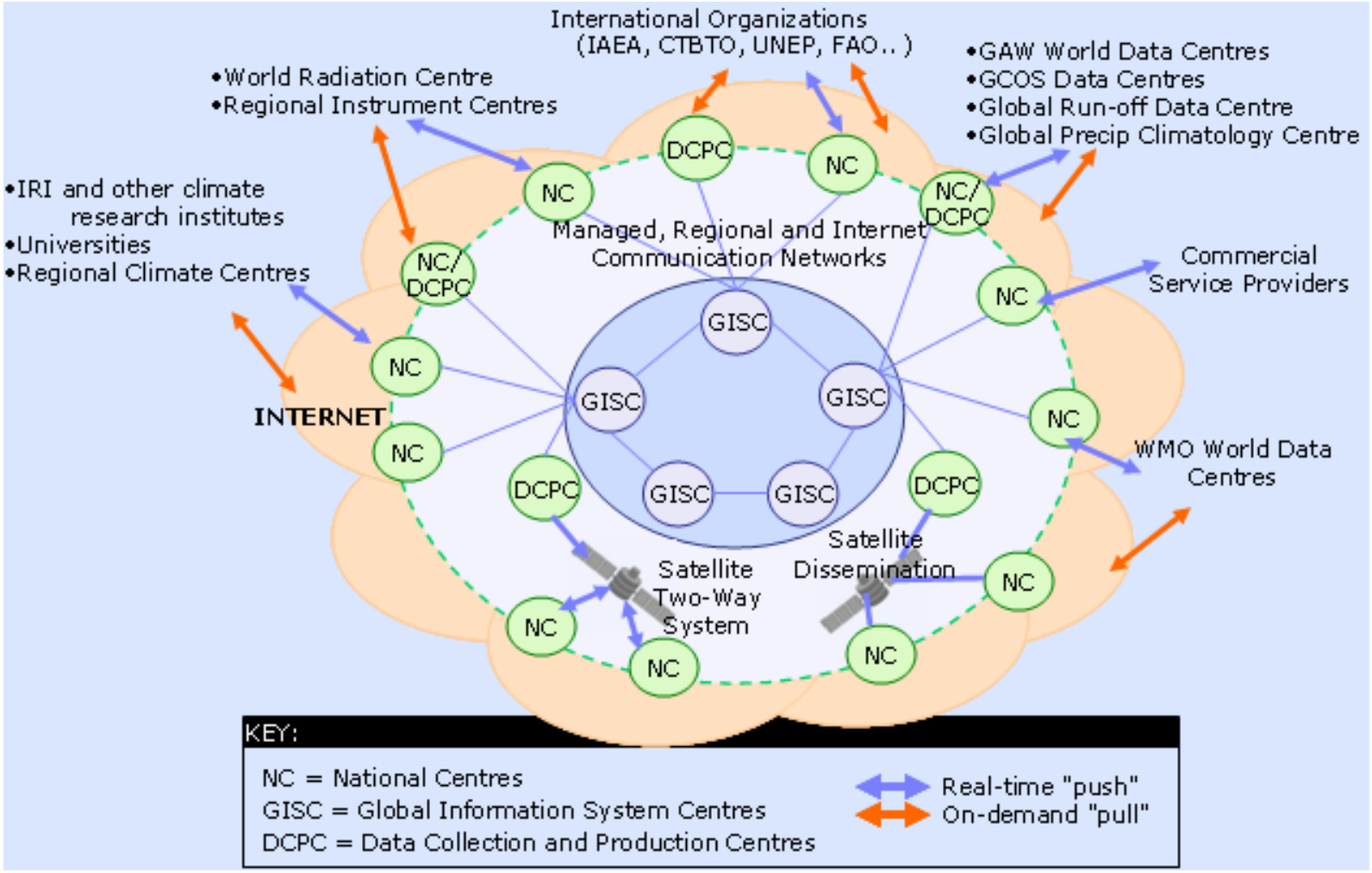


Telecom infrastructure

V .P. Network



WMO INFORMATION SYSTEM
Global Information Sysytem Center- CASABLANCA



Quality Management

BUREAU VERITAS
Certification

Direction de la Météorologie Nationale (Maroc Météo)

Boulevard du Complexe Administratif, Hay Hassani. BP 8106 Casa Oasis.

Casablanca, Maroc.

Bureau Veritas Certification Certifie que le système de management de l'organisme susmentionné a été audité et jugé conforme aux exigences de la norme :

Standard

ISO 9001 : 2008

Domaine d'activité

- Contribuer à la sécurité des personnes et des biens par la mesure, l'observation, la prévision et la veille météorologique, climatologique et environnementale ;
- Assurer l'assistance météorologique à la navigation aérienne et maritime ;
- Concevoir et développer les produits en relation avec les domaines de la météorologie, de la climatologie des changements climatiques et de l'environnement pour les besoins des secteurs socio-économiques.

- المساهمة في حماية الأشخاص والممتلكات عن طريق توفير خدمات القياس ، الملاحظة ، التوقعات الجوية والسهر الرصدي والمناخي و البيني ،
- ضمان المواكبة والدعم الرصدي لمجالي الملاحة الجوية والبحرية،
- تصميم و تطوير جميع المنتوجات المرتبطة بميادين الأرصاد الجوية : الرصد الجوي ، المناخ ، التغيرات المناخية و البيئة، لتلبية مختلف حاجيات القطاعات الاقتصادية والاجتماعية

- Contribute to the safety of persons and property by measuring, observing, weather forecasting and climate monitoring;
- Ensure meteorological services to aviation and marine activities ;
- Design and develop the products in relation to the fields of meteorology, climatology, climate change and the environment to the needs of socio-economic sectors.

Date de début du cycle de certification: **03 Septembre 2014**

Sous réserve du fonctionnement continu et satisfaisant du système de management de l'organisme, ce certificat est valable jusqu'au: **02 Septembre 2017**

Date originale de certification : **03 Septembre 2014**

Affaire n° : 8362044 **Date : 10 Septembre 2014**

Omar BENAICHA
Directeur Général

Patrick LIBIHOUL
Vice-Président Nord-Ouest
Région Centrale

cofrac
CERTIFICATION D'ENTREPRISES & DE PERSONNELS
ACCREDITATION N°4-0535 PORTEE DISPONIBLE SUR WWW.COFRAC.FR

Adresse de l'organisme certificateur : Bureau Veritas Maroc – 7, boulevard de la résistance, 20.310 Casablanca - Maroc

Des informations supplémentaires concernant le périmètre de ce certificat ainsi que l'applicabilité des exigences du système de management peuvent être obtenues en consultant l'organisme. Pour vérifier la validité de ce certificat, vous pouvez téléphoner au : 00 212 522 543 540.

Certification
ISO 9001
V2008

ISO 9001 V2008 certification

- Official recognition for the quality and performance of services and benefits available to its partners and users.
-Strengthen the position of the DMN internationally.
-a recognition operation of the DMN in compliance with international standards and practices

Calibration facilities

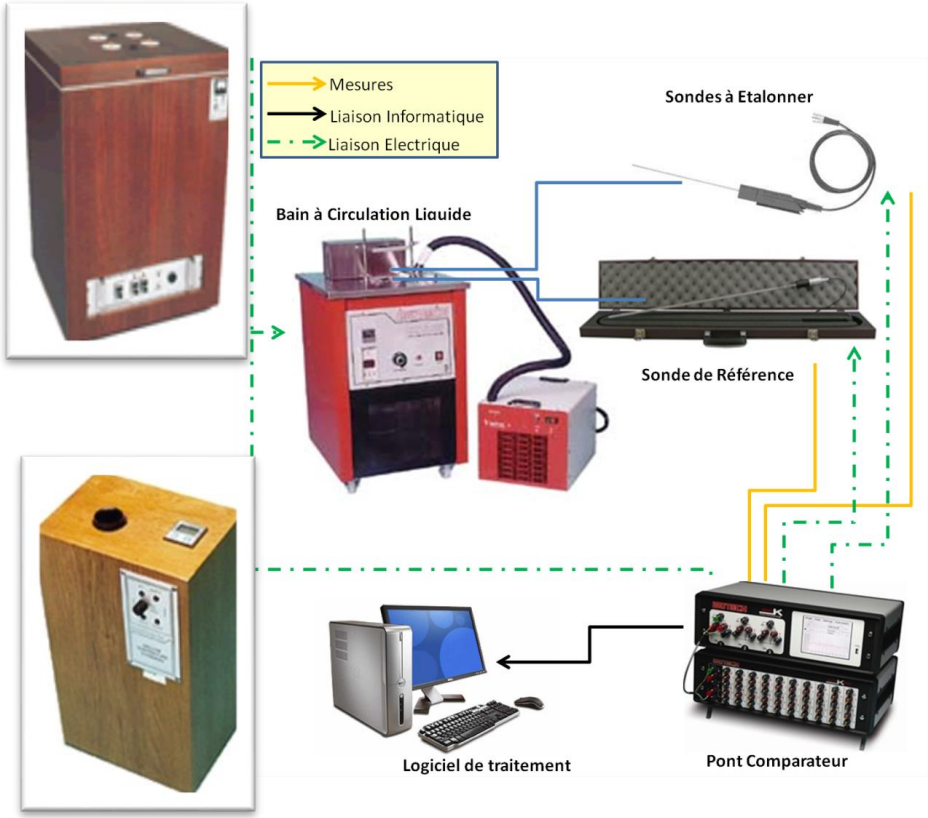
- The calibrating laboratory of Morocco became a WMO Regional Instrument Center for the RA I

- The NMS launched the WIGOS demonstration project consisting on strengthening the material and human resources capabilities of the Calibrating laboratory to allow it to accomplish it’s mission and functions

Calibration facilities

Temperature

- Calibration of temperature probes for **ambient temperature** and **Sea Surface Temperature.**
- A new and completely automatic solution for calibrating temperature probes:
- Two SPRTs as working standards
- Two fixed points cells (gallium and triple point of water)



Calibration facilities

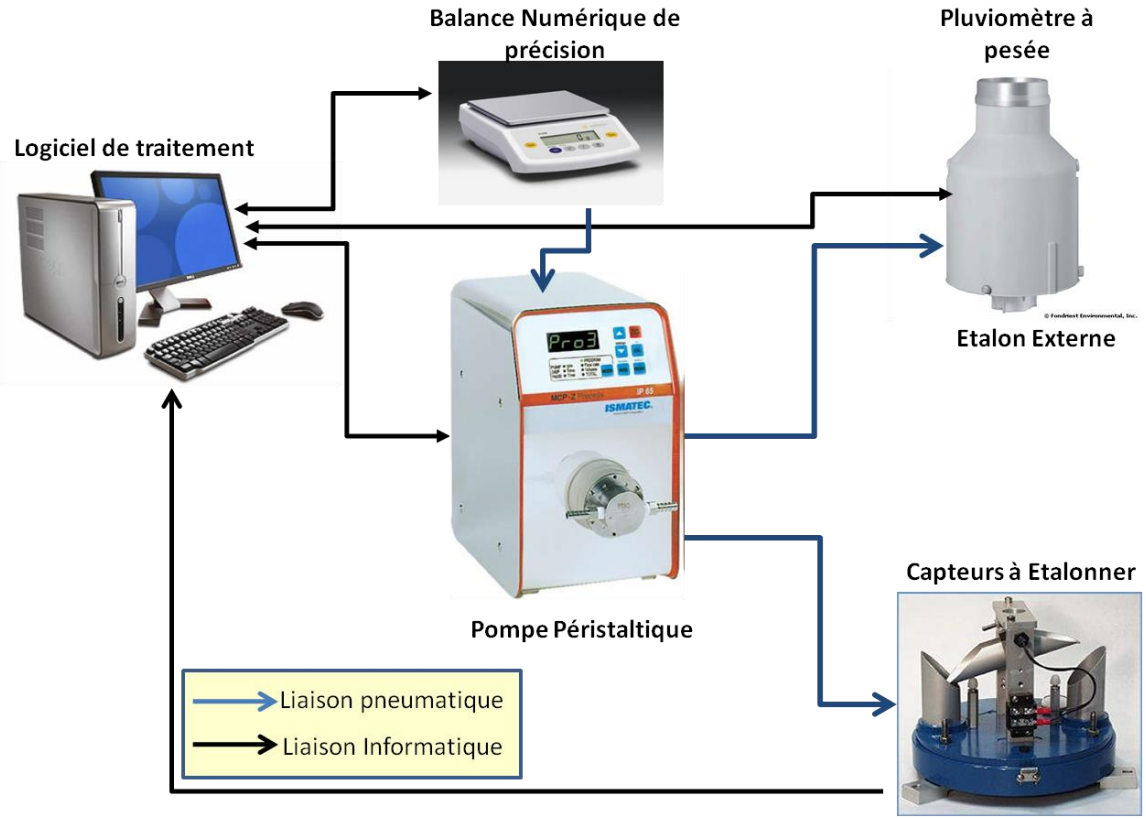
HUMIDITY

- A new climatic chamber
- A chilled mirror hygrometer as a humidity standard
- Saline solutions
- Two Portable Humidity generators

Calibration facilities

Precipitation

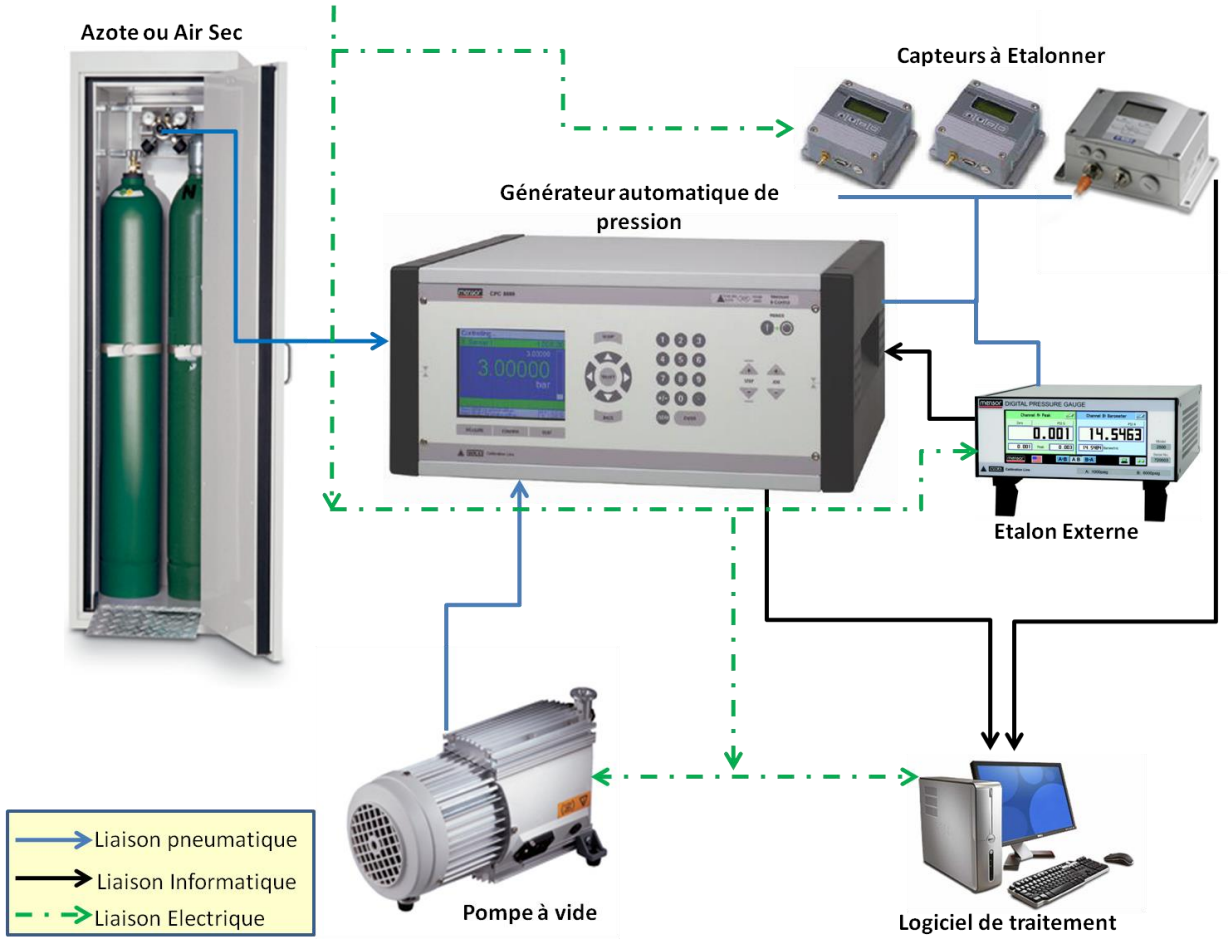
- A solution to calibrate tipping bucket rain gages



Calibration facilities

Pressure

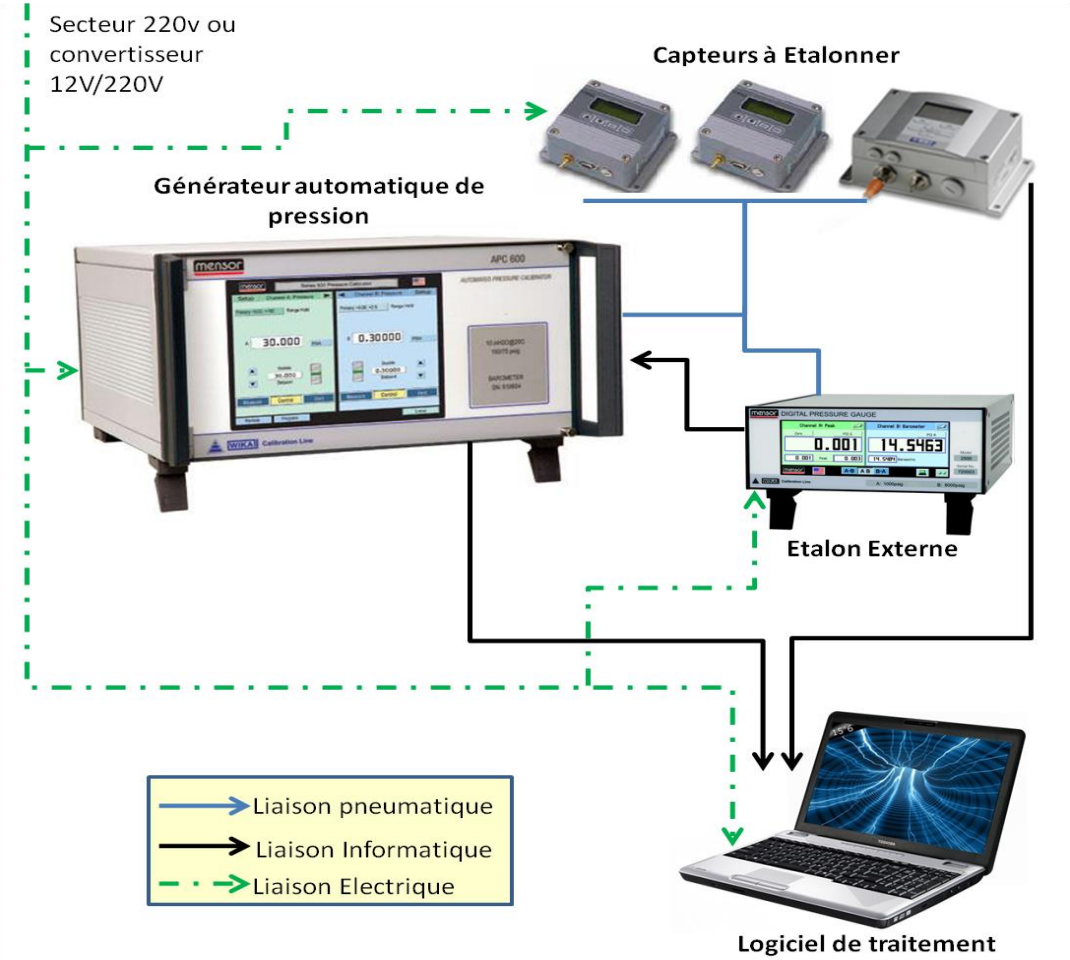
- An automatic solution for calibrating digital barometers **on laboratory**



Calibration facilities

Pressure

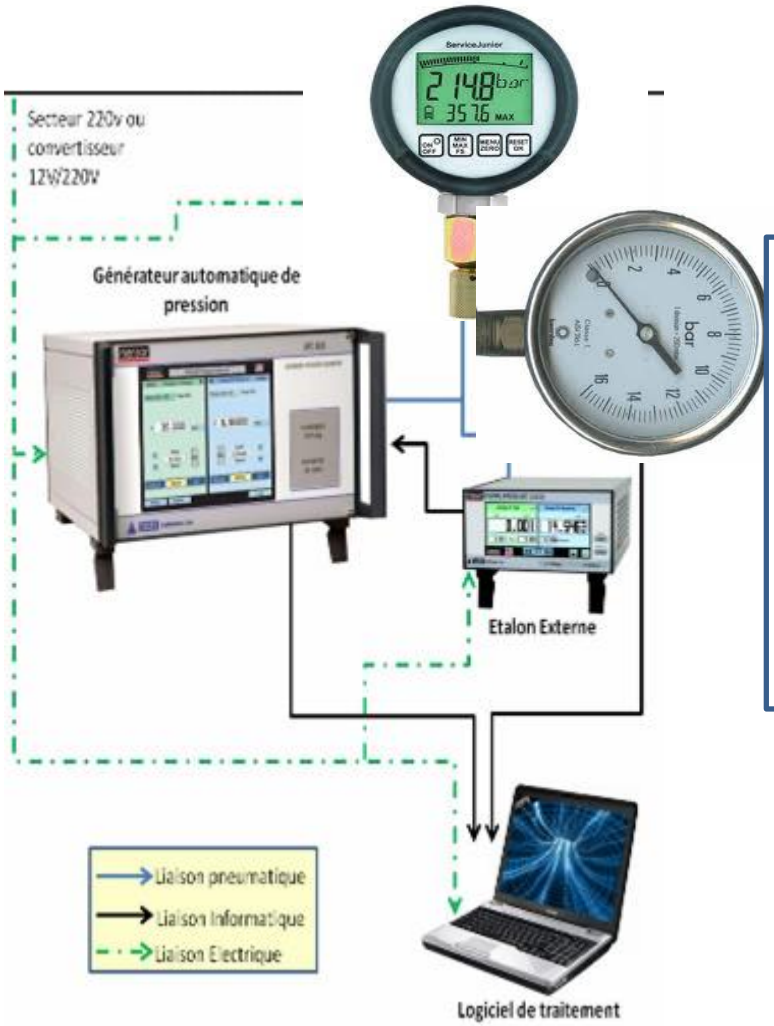
- An automatic solution for calibrating digital barometers **on site**



Calibration facilities

- A solution for calibrating pyranometers.

Calibration facilities



Pressure

Automatic solution for calibration of pressure gauges up to 25 bars,
to calibrate tide gauges bottom pressure

Calibration facilities

A solution for **field comparative calibration** of wind sensors : a **mobile automatic wind station** using high precision calibrated probe

Calibration facilities

measurements of water level and temperature.
The instrument is suitable for the determination of temperature profiles.

On site verification of tide gauges and determination of the temperature profile of the sea.

KLL-T

RIC-Casablanca

- RIC Casablanca plays a very important role in the Region I -Africa:
- Very active in OPAG “operational capabilities and Metrology Development “,
- RIC-Casablanca ensures the exchange and sharing of information and knowledge with all Francophone members of RA 1.

RIC-Casablanca

- WMO and NMS of Morocco have organized two training session in Morocco in calibration and maintenance of meteorological instruments (four weeks each) for operators participants from RA 1.

First training session in Morocco in calibration and maintenance

Regional Marine Instrumentation Center (Region IV) Workshop 29 Feb – 2 March 2016

Second training session in Morocco in calibration and maintenance

Regional Marine Instrumentation Center (Region IV) Workshop 29 Feb – 2 March 2016

RIC-Casablanca

- A training center by **E-LEARNING** will be opened to conduct training session via conference call in real time, for both practical and theory courses.

Future projects
RIC-Casablanca

- The monitoring of Inter-laboratory Comparisons (ILC) at the Region I

- Traveler standards will be acquired by the RIC for rotation at other RICs and accredited laboratories in the region-I to conduct Inter-laboratory comparison operations on pressure, temperature, humidity and rainfall.

Scope of Accreditation ISO 17025

Accreditation ISO 17025 of the RIC-Casablanca is underway since early February 2016 on :

- **Pressure**
- **Temperature**
- **Humidity**

A prior audit was already conducted, to carry out corrective actions, for compliance with all aspects (management and technical perspective) of the ISO17025,

Needs of measurment of salinity and conductivity

- Maritime weather stations are interested in measuring the salinity and conductivity of sea water.

- The measurement of salinity and conductivity in the field of hydraulics is an important activity for determining the quality of surface and underground water.

measurment of salinity and conductivity

Underway acquisition of calibration equipment of conductivity and salinity parameters, as part of the development of the activity of the metrology laboratory of the **National Direction of Meteorology.**

Extension of RCI to a mobile laboratory

Considering the broad scope of the meteorological stations network and the wide coastal perimeter of Morocco, an implementation project of a mobile laboratory is underway for 2017

Action plan for establishment of RMIC-Casablanca

Action item	By whom	Deadline	Status
ISO 9001 certification	DMN & VERITAS	September 2014	Achieved
Surveillance Audit ISO 9001 certification	DMN & VERITAS	October 2015	Achieved
ISO 17025 accreditation	DMN & accreditation committee	May 2016	the audit was already initiated. Progressing with correction of requirements of the pre-audit
The DMN internal agreement on RMIC budget and future commitments	DMN	2016-2017	In progress

Action plan
for establishment of RMIC-Casablanca

Action item	By whom	Deadline	Status
Preparation of Letter	PR Morocco	31/10/2016	Statement of compliance and commitment signed and submitted to the JCOMM Co-Presidents
Preparatory documentation and draft Resolution submitted to WMO and IOC Executive Bodies	Secretariat	2016-2017	Preparatory documentation and draft Resolution submitted to WMO and IOC Executive Bodies

Conclusions & Recommendations
Areas where support is needed

Morocco is actively moving forward with new technologies.

- To investigate new technology as appropriate to improve cost efficiency;
- To continue with the implementation of ISO in relation to the measurements of ocean;
- To participate in team works and expert group in relation to marine meteorology;
- To participate and organize training in the calibration of the marine instruments to assist in capacity building;

Conclusions & Recommendations
Areas where support is needed

- To participate on inter-laboratory comparisons with other RMICs;
- Easy calibration and maintenance of marine instruments;
- Improve the quality control of maritime observation data;
- Establish an information exchange system.

Contact information

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Thank you!