DBCP Capacity Building Workshop on Ocean Observations for Operational Services in the Indian Ocean Region

Mauritius

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Prime Minister's Office
Republic of Mauritius

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Existing Capacities/Activities for Observation /Forecasting

Governance & Marine Spatial Planning

- **Management of Maritime Zones and Ocean Space** is overseen through national legal frameworks and regional cooperation.
- To support **Marine Spatial Planning** Initiative - collect, store, organize and provide access

Forecasting & Meteorological Services

The **Mauritius Meteorological Services (MMS)** provides:

- Short- to medium-range marine weather forecasts
- Tropical cyclone forecasts, including track, intensity, and associated ocean impacts
- Integration of satellite data and support from regional meteorological centers (e.g., Meteo France)

Observation Infrastructure

- **Mauritius Ocean Observatory E-Platform** acts as a centralized portal for data sharing and access to marine environmental information.
- **Tide gauges and wave rider buoys** are operational to monitor sea level changes and wave conditions, especially around the main islands.
- Drifting buoy deployments (eg ARGO programmes)

Hazard Monitoring & Early Warning

Early warning systems are under development and refinement for **Heavy Swells, storm surges**

Regional & International Collaboration

Participation in **capacity building and technical workshops** through WMO, DBCP, and Indian Ocean regional initiatives.

Active contribution to **IOC-UNESCO regional forecasting systems** (e.g GOOS, IOGOOS)

Gaps and Needs for Observation /Forecasting

Geographical & Strategic Context

Mauritius has a vast Exclusive Economic Zone (EEZ) of approximately **2.2 million km²**, yet most of this marine area remains largely unmonitored.

Observational Gaps

Sparse in-situ ocean observations in and around Mauritius and across the wider Southwest Indian Ocean.

Limited availability of moored/data buoys for real-time measurement of critical ocean parameters

Lack of observational networks, (tide gauges, buoys, ARGO, etc.).

Satellite Data Challenges

Limited access to **high-resolution satellite datasets** specific to the Mauritius region.

Underutilization of available satellite data due to constraints in data processing capacity, software, and trained personnel.

Institutional & Technical Barriers

Financial and resource limitations restrict the deployment and maintenance of ocean observing systems.

Need for sustained capacity building in:

- Oceanographic instrumentation and data management
- Forecasting and modeling tools
- Satellite data interpretation and application

Case Study: Mauritius Ocean Observatory E-platform

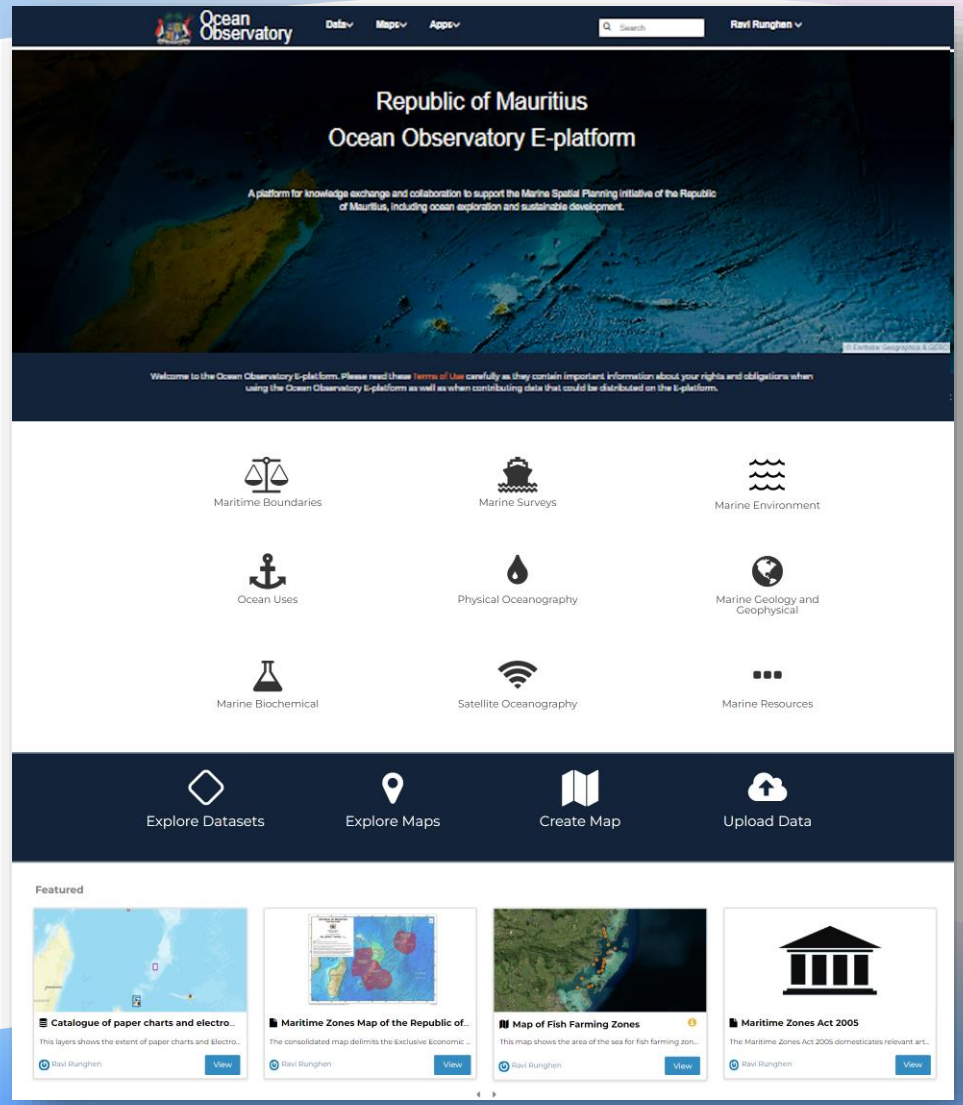
Aim

Centralize geospatial data for the maritime zones of the Republic of Mauritius

GeoNode

Marine Spatial Data Infrastructure (MSDI)

- Browse and search for geospatial data and web services
- Upload, manage, and share geospatial data and metadata
- Create and share interactive maps
- Collaborate and interact with other users



Mauritius Ocean Observatory E-platform

Upgrades – Maintenance

2018 - GeoNode ver 2.8

2022 - GeoNode ver 3.0

2024 - GeoNode ver 4.3

Access

https://oceanobservatory.govmu.org/

Maritime Boundaries

Marine Surveys

Marine Environment

Ocean Uses

Physical Oceanography

Marine Geology and Geophysical

Marine Biochemical

Satellite Oceanography

Marine Resources

Objectives

- To support **Marine Spatial Planning Initiative** - collect, store, organize and provide access
- To host the **National Oceanographic Data Centre (NODC)** of the Republic of Mauritius under IOC-UNESCO
- To provide access to cruise reports and data collected during the conduct of **Marine Scientific Research**
- To serve as the central repository for all bathymetric data and channel all request related to bathymetric information
- To host shipwreck data - **Mauritius Underwater Cultural Heritage project**

MoU between CSMZAE and INCOIS

MoU signed between Indian National Centre for Ocean Information Services (INCOIS) and the Department for Continental Shelf, Maritime Zones Administration & Exploration (CSMZAE) in March 2025 to create a framework for cooperating in maritime zone management and ocean observation and research.

As part of MoU, INCOIS donated the Department a Directional Wave Rider Buoy

ESSO- Indian National Centre for Ocean Information Services

Arrival and Handing over of the WAMAN Wave Rider Buoy

The Wave Rider Buoy arrived in Mauritius on 08 May 2025.

A **symbolic Handing Over Ceremony** was held the same day between the **High Commission of India, INCOIS** and the **Mauritian authorities**.

A Symbol of Regional Cooperation

The deployment of the WAMAN Wave Rider Buoy in Port Louis Harbour stands as a floating symbol of the enduring partnership between India and Mauritius, reflecting their shared commitment to fostering a more informed, secure, and resilient ocean region.

Directional Waverider (DWR4)

Enhancing Maritime Safety and Coastal Monitoring in Mauritius

In a collaborative effort to improve maritime safety and manage marine resources in Mauritius, the Prime Minister's Office through the CSMZAE partnered with the High Commission of India and the Indian National Centre for Ocean Information Services (INCOIS) for the deployment of the WAMAN (WAve Monitoring Along Near-shore) Directional Wave Rider (DWR4) Buoy.

Objectives of the DWR4 Deployment

The DWR4 provides real-time oceanographic data to:

- Improve the safety and operational efficiency of vessel traffic in and around the Port area.
- Support coastal monitoring, hazard forecasting, and long-term coastal zone management initiatives.

Key Measurement Capabilities of DWR4

The buoy is equipped to measure:

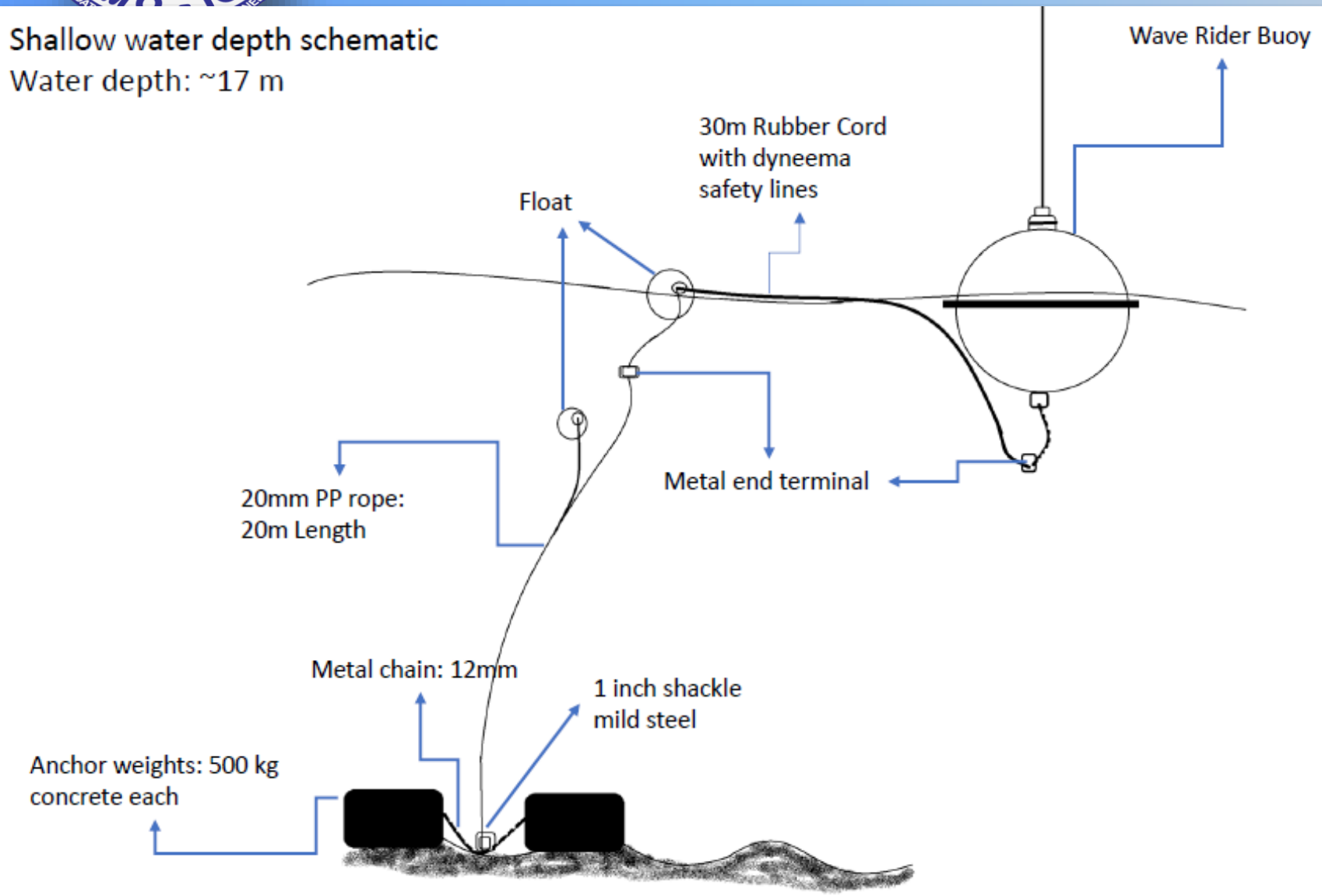
- **Wave Height:** For periods ranging from 1 to 30 seconds, with 0.5% accuracy.
- **Wave Direction**: Providing directional wave spectra for improved ocean condition forecasting.
- **Surface Currents:** Supporting navigation and marine drift modeling.
- **Sea Surface Temperature (SST):** A critical parameter for climate and weather forecasting.

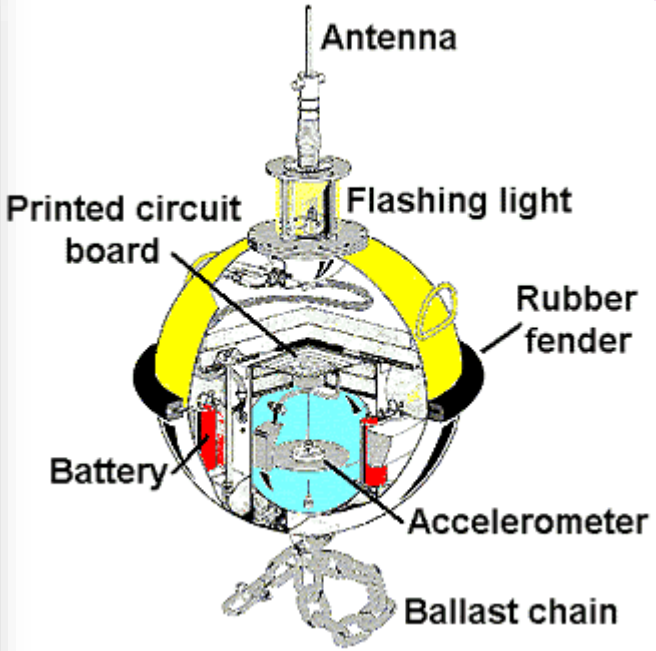
Data Transmission

All data is transmitted via HF telemetry to the CSMZAE receiving station. (Line-of-Sight; Antenna installed on top of CSMZAE building)

Mooring Layout of DWR4 deployed in Mauritius

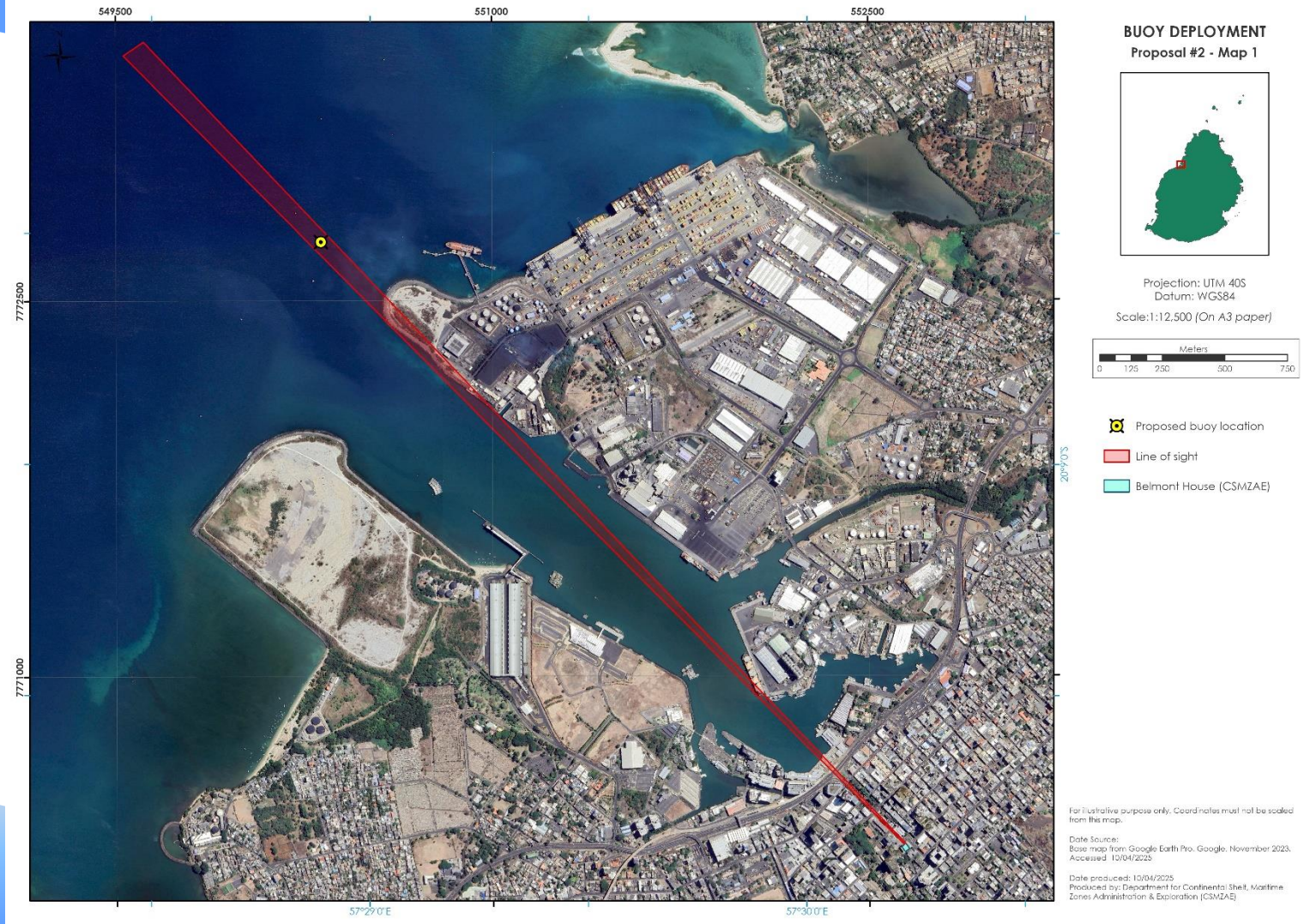
Shallow water depth schematic
Water depth: ~17 m





Weight: approx. 580 kg

Finding Ideal Location of HF Antenna



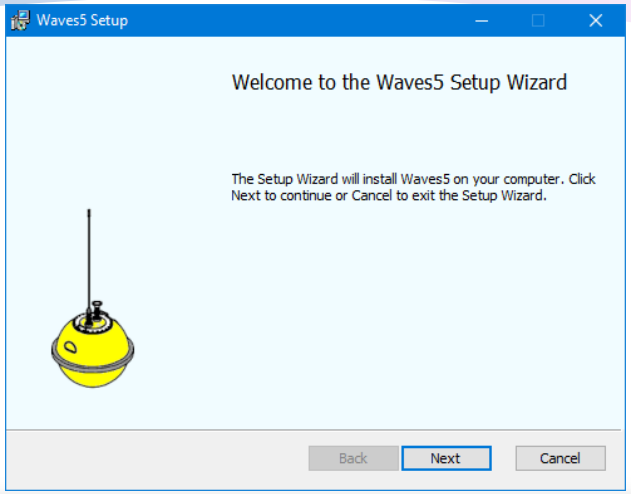
Waves5 Software

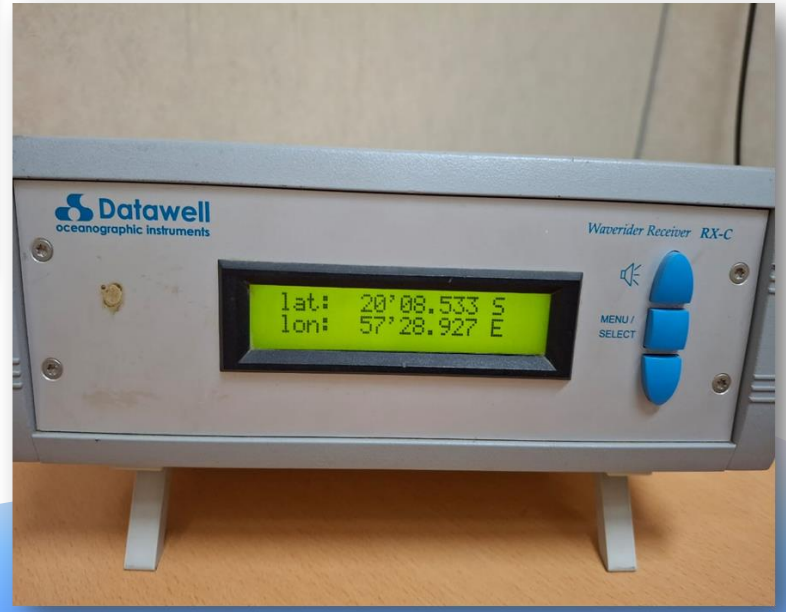
Waves5 is Datawell's newest Microsoft Windows based software package for data acquisition, processing, and display of wave data by Datawell Waveriders – directional and non-directional.

Key Functions:

- **Real-time wave data display (wave height, period, direction)**
- **Spectral plots and time series visualization**
- **Data logging and exporting (CSV, NetCDF formats)**

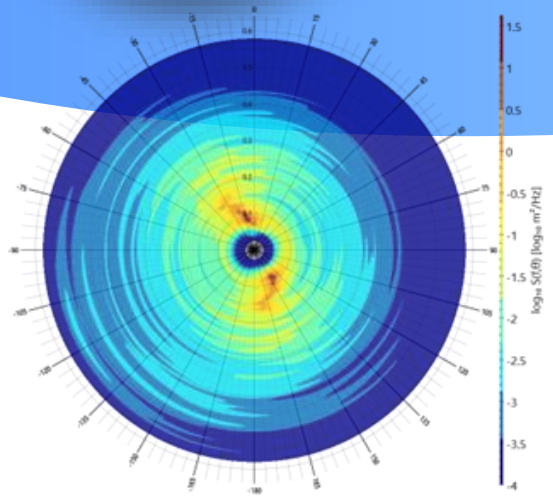
Communication setup: Supports multiple connection types, for Mauritius we using HF modem
User-friendly interface for both operational monitoring and scientific analysis

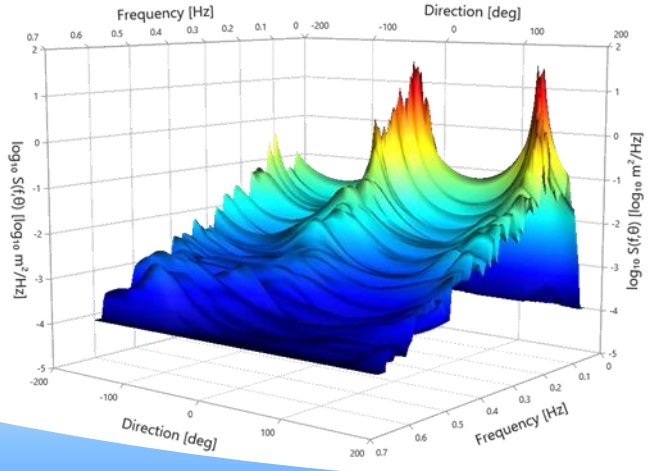


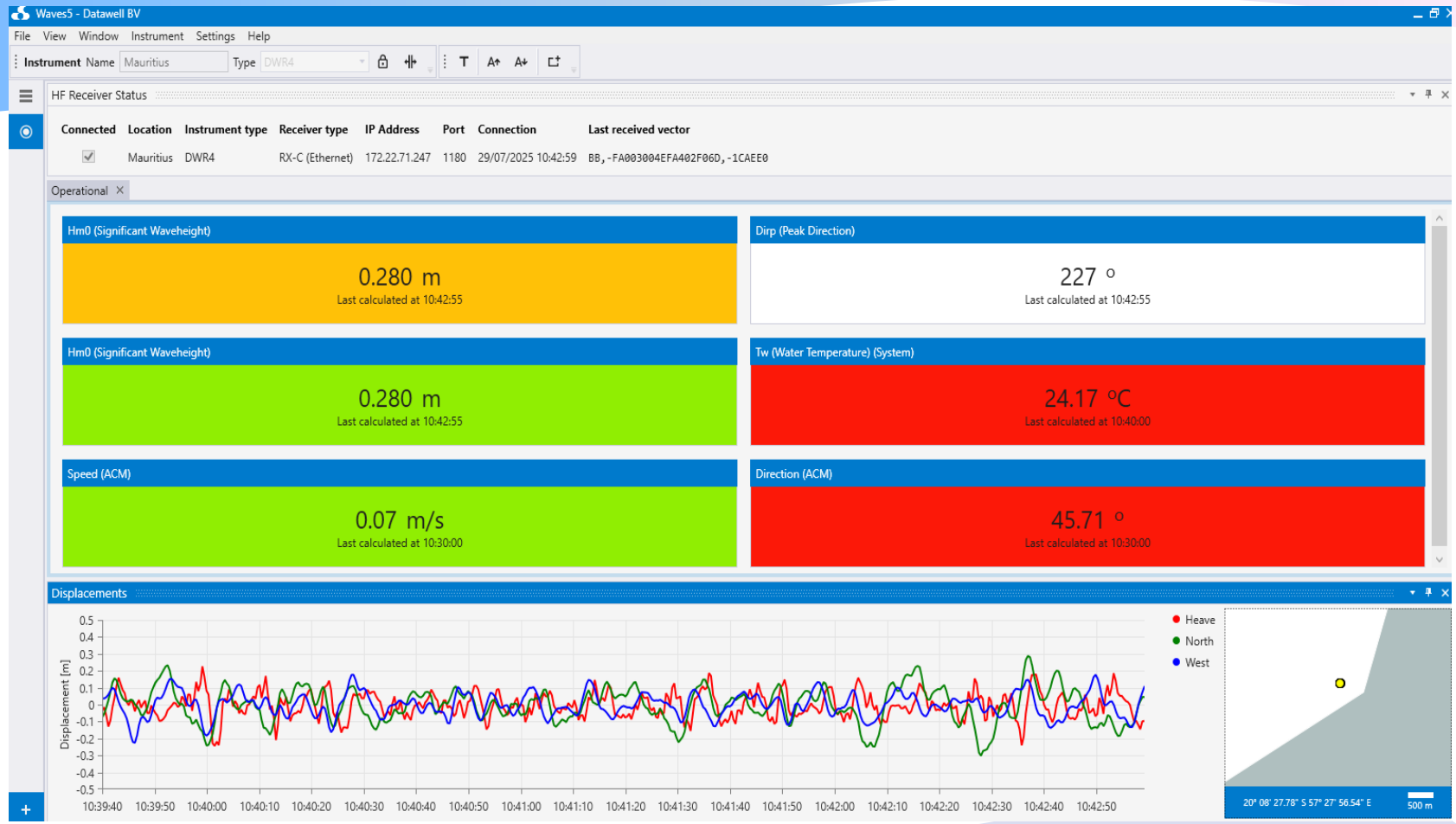


Datawell BV
oceanographic instruments

Waves5 in Action – Mauritius Buoy Deployment







Way Forward: Mauritius Ocean Observatory E- Platform

Deliverables

- **Dashboard for real-time visualization of key parameters** (e.g. time series plots, wave height, SST, directional wave rose diagrams)
- **Script for data parse** and statistical parameter computation
- **Download module** integrated with E-platform UI
- **Dashboard for real-time buoy monitoring-position**, battery, signal quality, sensor health indicators
- Final technical documentation for system architecture, data flow, and dashboard use