

# Marine Observing Systems

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## Precision Salinometer

The OPS is a new salinometer that brings laboratory salinity reference measurements to modern standards, including a full documentation of the evaluation process.



It also improves the achievable accuracy enormously. This allows researchers to investigate reliably numerous issues that were difficult to access up to date, like the consistency of different Standard Seawater (SSW) batches, the consistency of SSW within one batch and the potential stratification in a sample bottle or a Niskin bottle used to extract water from the deep oceans.

## SpillWatch

The *SpillWatch* sensor is installed downward looking several meters above measurement level. The sensor technology is based on fluorescence excitation and detection. Its innovative optical set-up and all-solid-state opto-electronic components guarantee high sensitivity and allow maintenance free operation for a period of two years.

The system automatically filters out ambient conditions (e.g. sunlight), providing highly reliable detection of Oil spills under all light, weather and water surface conditions.



## PopUp

Recovery of oceanographic data from moored sensors normally requires operation of large vessels.

*PopUp* buoys serve as data capsules; they can receive and store data from moored sensors via wireless IrDA data transfer.

After a given time or a specific command, the *PopUps* are individually released from the sensor-PopUp or datalogger-PopUp array to ascend to the sea surface from where data are transferred via Iridium communication to a receiving station.



## Telemetry buoys for various Applications



Telemetry buoys or tracking buoys can be used to acquire and transmit data from different scientific instruments or just for tracking the instruments position or any other target like an iceberg.

The Data and the GPS-Position is transmitted via IRIDIUM to a Land-Base.

Several customized buoys with various sensors have been built during the past years, especially for harsh conditions in polar regions.

## NEMO

For the worldwide ARGO program OPTIMARE produces the *NEMO*-Float.

Once launched it ascends from a depth of up to 2,000 meters to the surface in regular intervals and transmits the collected data via the ARGOS or IRIDIUM satellite system.



The *NEMO*-Float is based on the SOLO design and has been further improved to allow also the deployment under ice, the positioning through GPS and RAFOS as well as the integration of new sensors.

Depending on the sensors installed the *NEMO* platform has been used so far for the measurement of salinity, temperature, depth, oxygen, underwater radiance and irradiance fields (AOPs), fluorescence and attenuation of in-water optical properties (IOPs), and RAFOS sound signals in the ocean.

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The **OPTIMARE Marine Observing Systems** started in 2001 as a division of the **OPTIMARE** with the main focus on the acquisition and preliminary processing of physical and bio-geochemical data of the ocean. Paired with service activities on research vessels **OPTIMARE** began shortly after with the development of customized instruments and platforms for special tasks. Meanwhile the business unit produces state-of-the art competitive instruments and systems for coastal and marine monitoring and data acquisition, as well as for reference measurements in the lab.

Beside their own activities **OPTIMARE** was able to take advantage from the close cooperation with major research institutes in Germany and their expertise.

By this **OPTIMARE** could realize some excellent ideas and concepts during the past years:

- **NEMO** – an autonomous operating ARGO float
- **Precision Salinometer** – a modern instrument for highest precision salinity measurements
- **Spillwatch** – a robust and reliable oil spill detection sensor
- **PopUp** – self buoyant data capsules to transfer data from moored sensors to the surface and then via a satellite link to a Land-Base
- **PACT** – a Bottom Pressure Recorder with acoustic link to a surface buoy for TSUNAMI detection
- **MEDUSA-SHIP** – a data acquisition and distribution system for research vessels
- **SUMO** – a Submersible Underwater Motion Observer for the on-line observation of the motion from CTD-Rosette water samplers

And several other customized instruments, systems or telemetry units.

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