

Customized solutions and new aspects in environmental monitoring from a single source

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Marine technologies -portfolio-

- -4H- FerryBoxes (different types, individually customized)
- Environmental monitoring containers
- Time-series station
- Mesocosm installation and control
- Seawater distribution system for labs on research vessel
- Freshwater monitoring systems
- Environmental buoy systems
- Underwater nodes
- Passive sampler and litter sampler (e.g. micro plastics)



Multiple and versatile solutions from a single source

-4H- FerryBox



Without anti-fouling for 4 weeks
Reliable anti-fouling
due to no tap water and acid
system for months

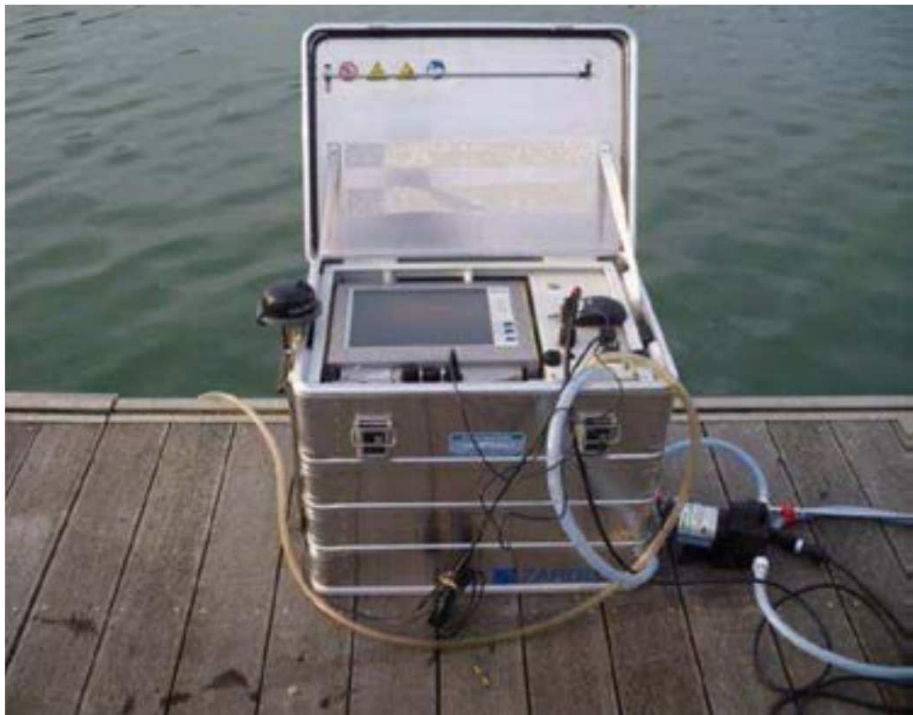
-4H- FerryBox



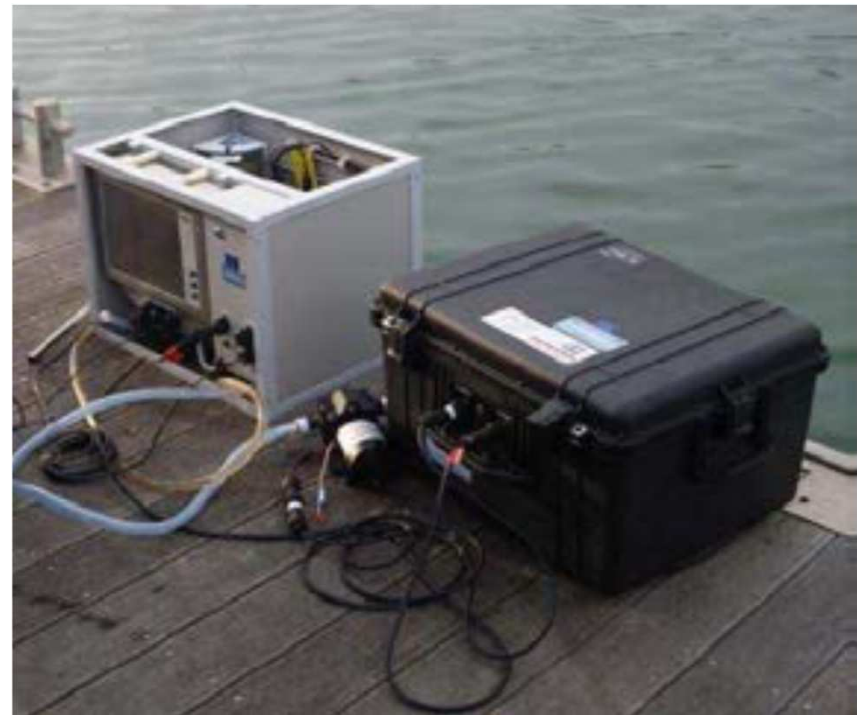
@ Coast guard ship „Zirfaea“, Rijkswaterstaat, NL

-4H- PocketFerryBox

The mobile solution



...flexible and usable „everywhere“...



...with external battery pack (car batteries)

-4H- PocketFerryBox



ComBox with

GPS, Modem, Router for
PocketFerryBox connection
plus Laptop uplink



-4H- PocketFerryBox



PowerBox with all
cabling, power
supplies and flow
meter

Individual boxes



- Control and data storage of a multi-parameter probe
- Triggered by flow-control
- Tailored design for Damen Ship Yard, NL

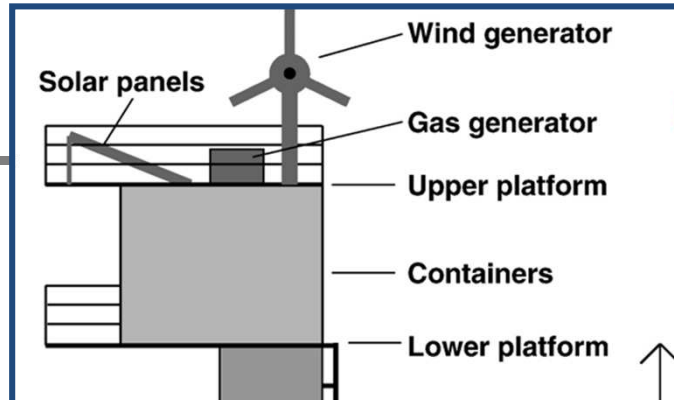
-4H-Environmental Observing Container

- Hosts a -4H-FerryBox and additional systems (sampler, sediment trap, nutrient analyzers, fridge...)
- Meteorological parameters from the roof
- Designed for autonomous environmental monitoring on ships, rivers, estuaries, coastlines, harbors and lakes
- Telemetry, remote control, data transmission
- Ready to operate - plug and play with external water and power connection

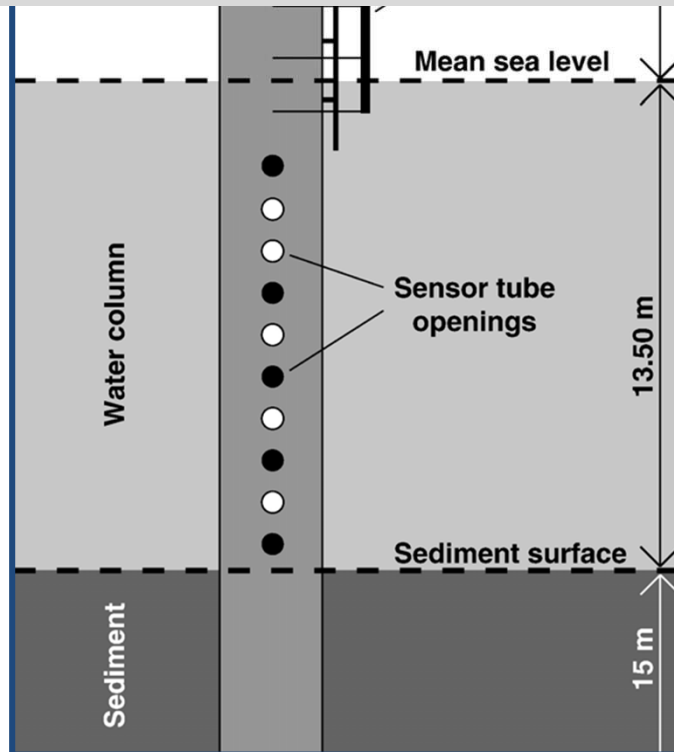
Time-series station



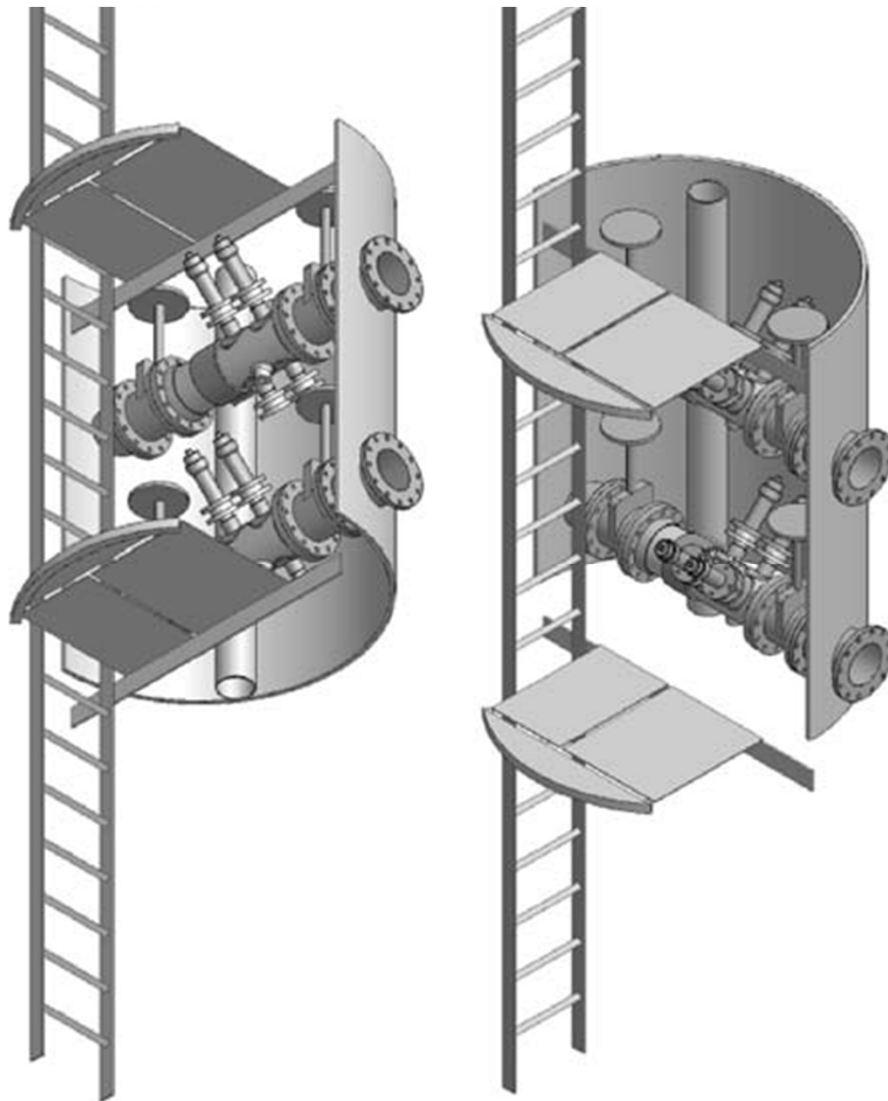
Grunwald et al. (2007), Marine Chemistry
Reuter et al. (2009), Ocean Dynamics



In operation since autumn 2002.
Sensors renewed in 2013.



Time-series station



- Flow tubes for sensor installation
- Direction of the tubes according to flow direction of the tides
- Tubes are accessible and lockable from inside the pole

- 12 basins (1600 L each)
- **Control of:**
 - Tides
 - Currents (bi-directional)
 - Temperature (daily and annual cycle simulation)
 - pH by changing CO₂ conc.
- **Sensors for:**
 - Temperature
 - Salinity
 - pCO₂
 - pH
 - Diss. oxygen
 - Turbidity
 - Chlorophyll-a



Seawater distribution for labs on research vessel R/V Sonne



- Different suction positions at the ship's hull
- Supply of pure seawater to different labs onboard
- Pressure and flow control
- Special debubbling system
- Online measurements: intake temperature, salinity (conduct.), chl-a, algae groups, and yellow substances

Seawater distribution for labs on research vessel R/V Sonne



Freshwater quality monitoring panel



- Sensors for:
 - pH
 - Temperature
 - Chlorine
 - Turbidity
 - Flow(additional on request, up to 16)
- Integrated data logging

Buoy



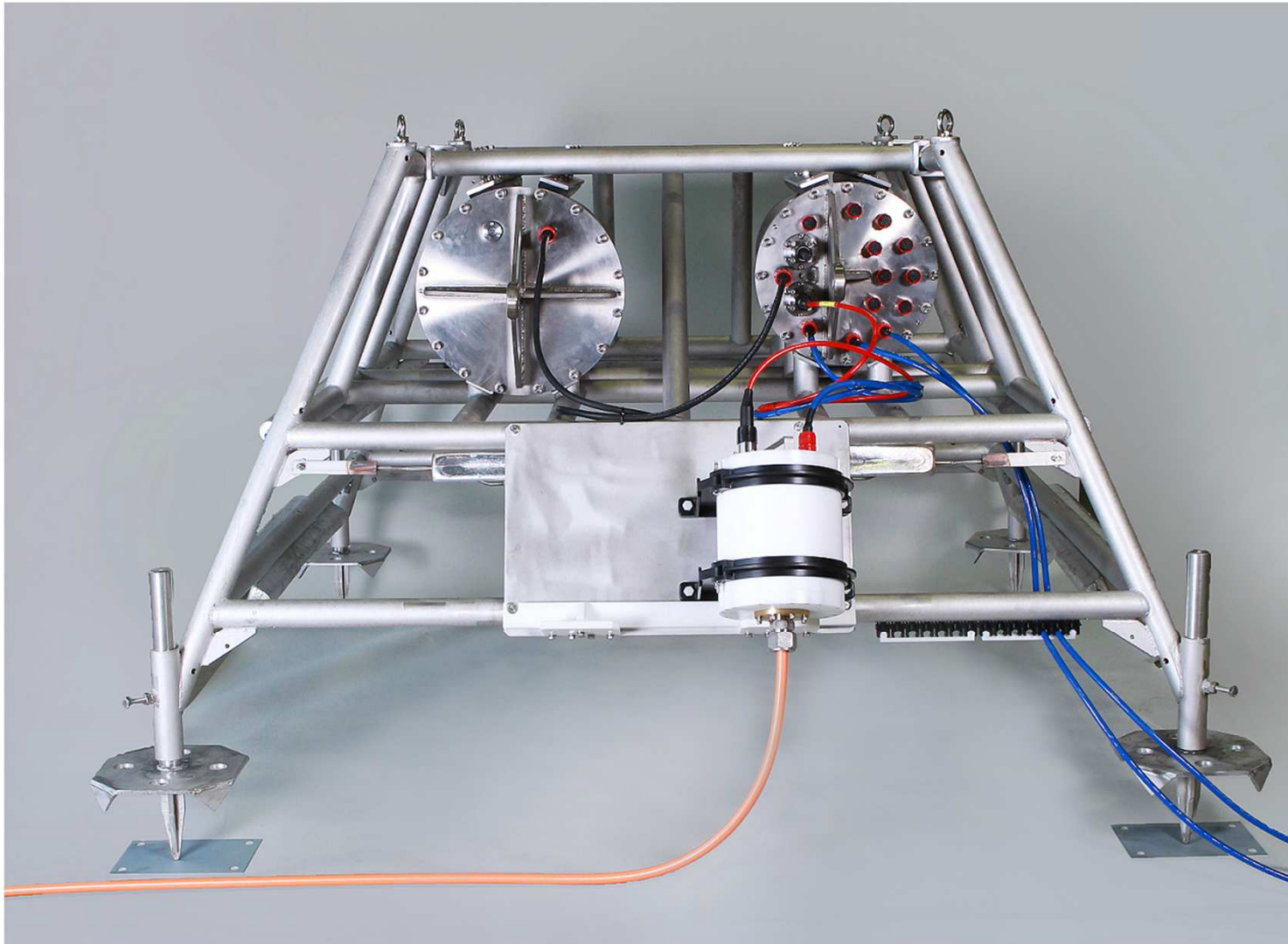
- Power by
- Solar panels
 - Wind generator
 - Fuel cell



Self sustained surface and cable connected seafloor measurements.

End of this year: Connection to an underwater node

Underwater Node



In cooperation with COSYNA, AWI, loth engineering

www.cosyna.de

Underwater Node

- Up to 10 km from shore
 - Up to 1250 W power consumption
 - 10 sensor systems per node
 - Max. 3 nodes connected in series → max. 30 km distance to shore
 - Gbit fibre-optic cable for data transfer
 - Separated virtual networks for each sensor system (can be combined)
 - Users can operate their sensors as they are besides them in the office (Access from anywhere in the world via internet is possible)
 - Each individual sensor can be checked and re-adjusted by remote control from outside (sensor dependent)
 - Data storage and forwarding by land station
- @ MarGate, 800m off Helgoland, 12m water depth

Passive sampler



Plankton and litter sampler

Thank you.

