Scientific Cooperation:

4H FerryBox

Automatic and remote-controlled measurements for ships and harbour monitoring

Stephan Orlamünder
-4H- JENA engineering GmbH

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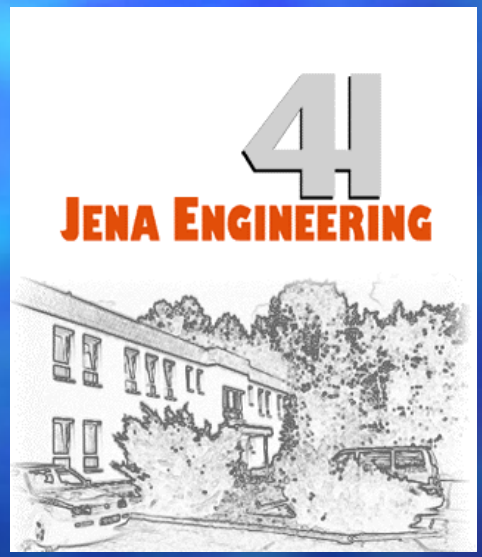
Contents

- Company profile
  - Marine measuring techniques
- 4H-FerryBox
  - Concept
  - New data system
  - Interfaces
  - FerryBox “family”
    - Applications
- Summary

Company profile

Windtunnel techniques

Optical inspection techniques



Optical devices

Marine measuring techniques

Marine measuring techniques

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4H-FerryBox

- flow through measuring systems
- long-term in situ monitoring of rivers, estuaries, coastal zones and open sea

4H-FerryBox I
Galathea expedition

4H-FerryBox II
Ferry Funny Girl

Concept of the 4H FerryBox

- Antifouling concept
- Modular and expandable
- Process controlled water system
- Data
  - Visualization
  - Transmission
  - Quality

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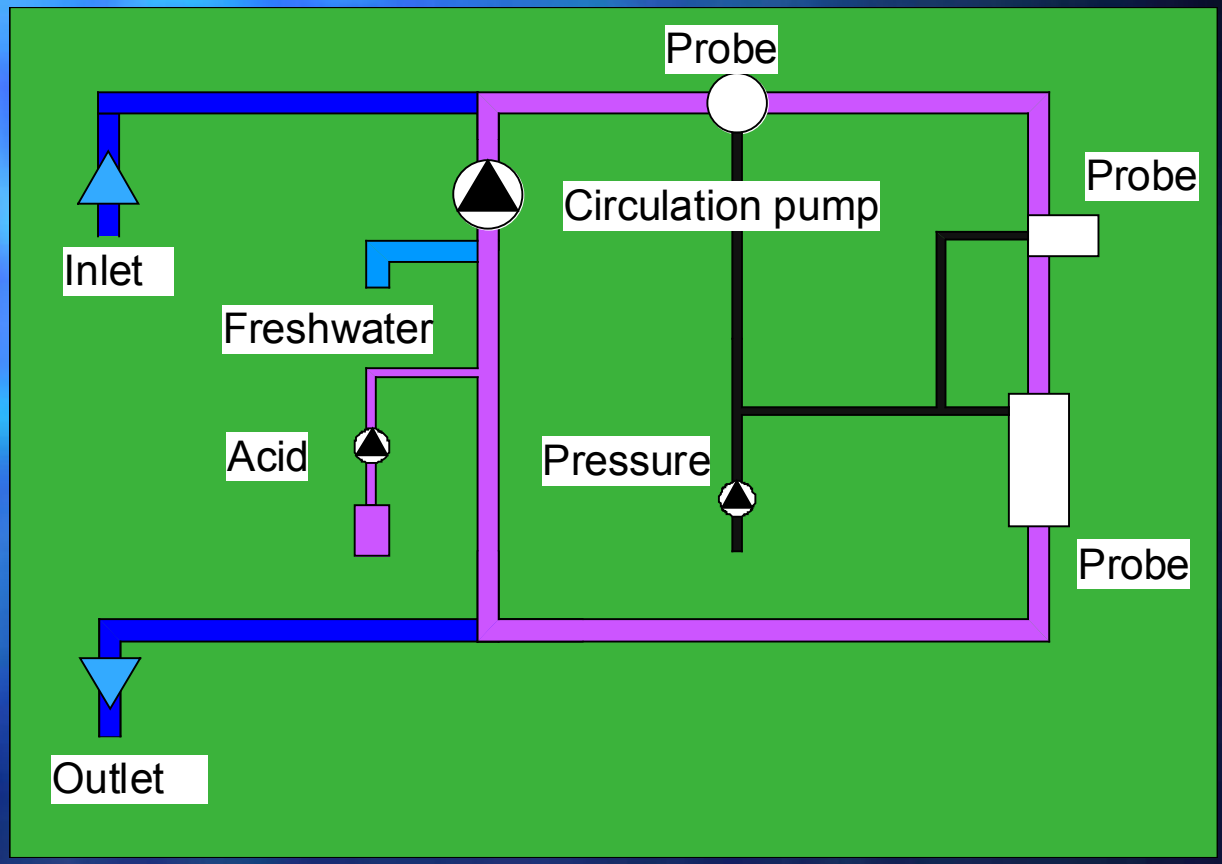
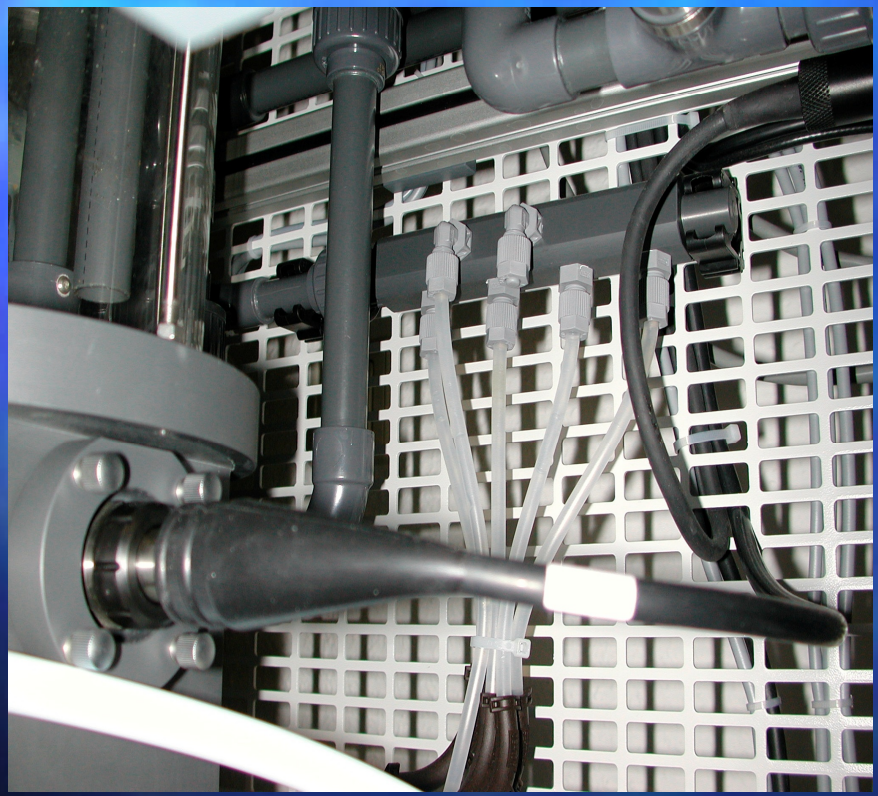
Antifouling concept

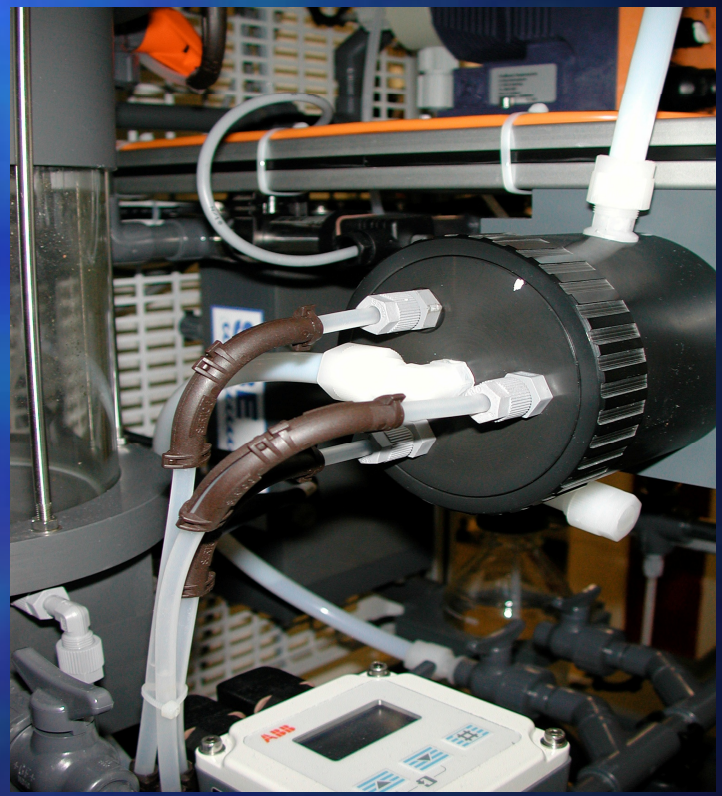
Principle of the water system
Antifouling:

1. Freshwater
2. Acid
3. High pressure
4. Back flush



Pressure cleaning





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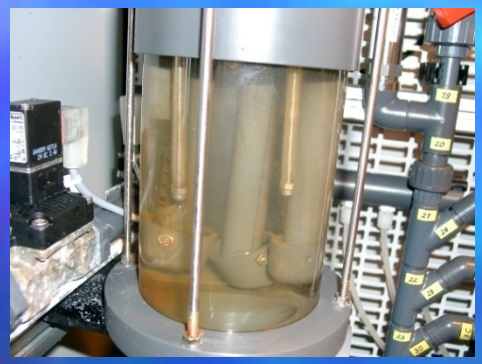
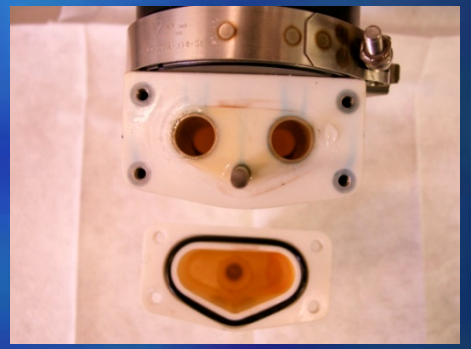
Cleaning results

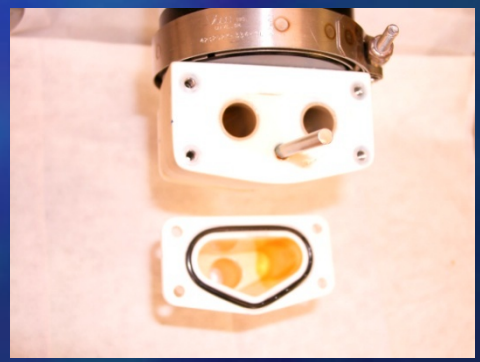
Debubbler after 2 years
without manual cleaning



© BAH/AWI

Iron impurities
Cleaning with oxalic acid





© Rijkswaterstaat

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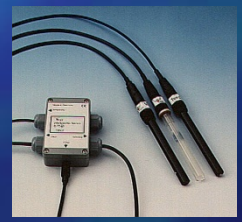
Modular and Expandable

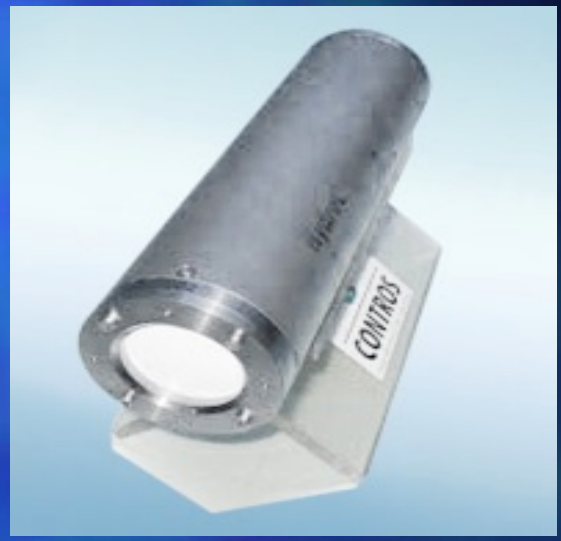
Parameters:

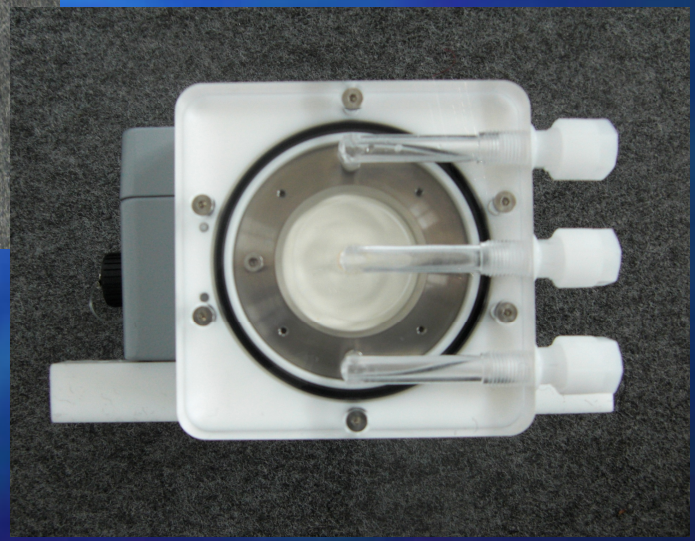
- Temperature
- Salinity
- DO
- pH
- Algae classes
- Chlorophyll-a fluorescence
- Turbidity
- Nutriens
- pCO2, …



Adapted sensors

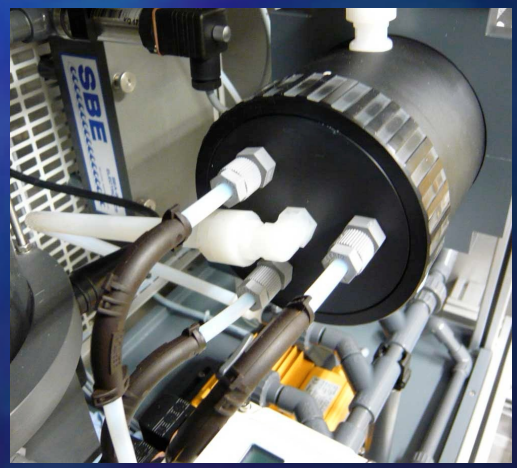
e.g. pCO2





Sensor integration

e.g. Turner Designs C3



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New Interfaces of devices

- RS232
- RS484
- Analoge (V, 4-20mA)
- IEEE
- Paralell Bus
- CAN, Profibus, ..
- USB (2, 3, ..)
- LAN (1000, 10000)
- WLAN
- ??

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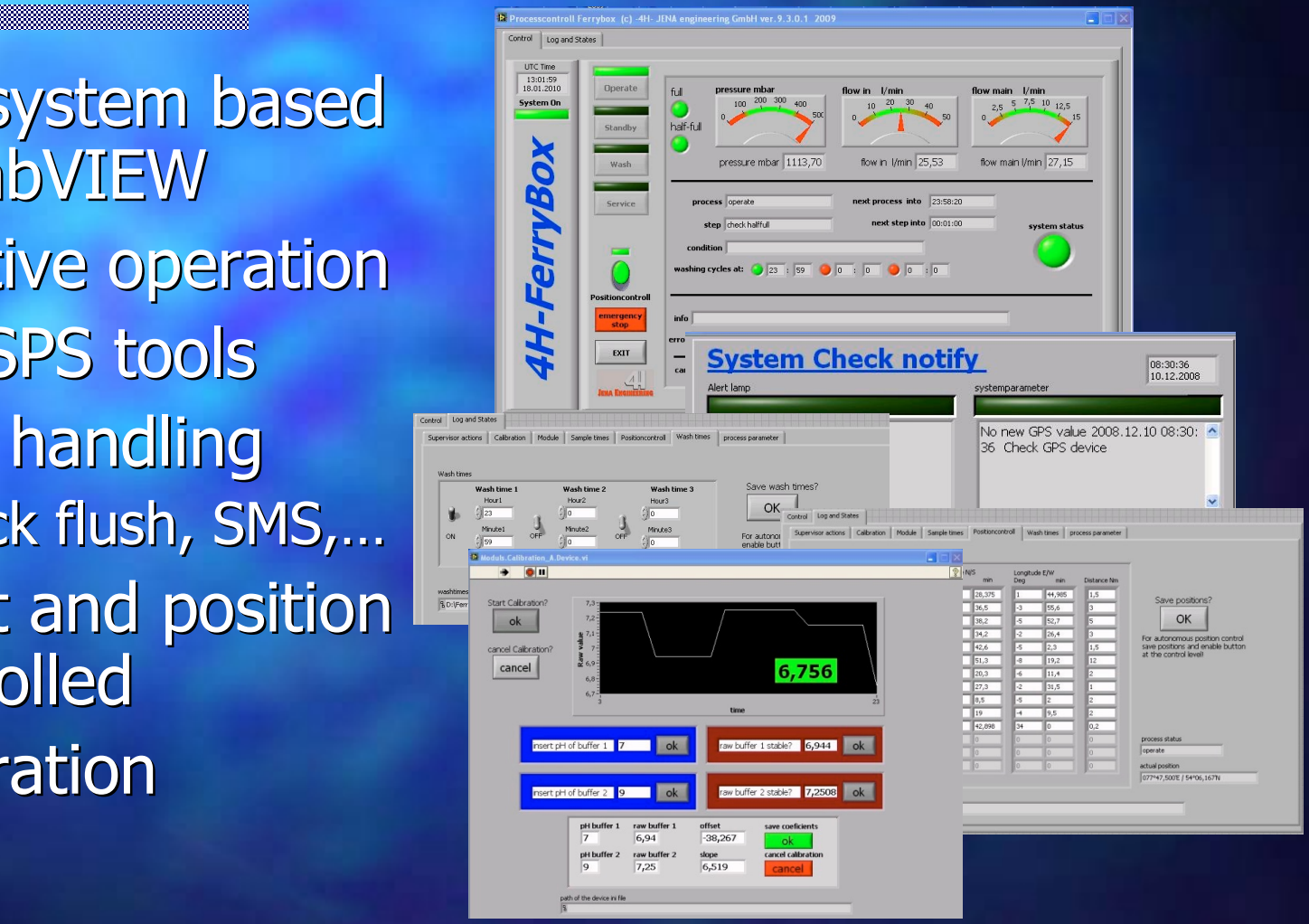
Process controlled water system

- Datasystem based on LabVIEW
- Intuitive operation
- Soft SPS tools
- Error handling
  - Back flush, SMS,...
- Event and position controlled
- Calibration



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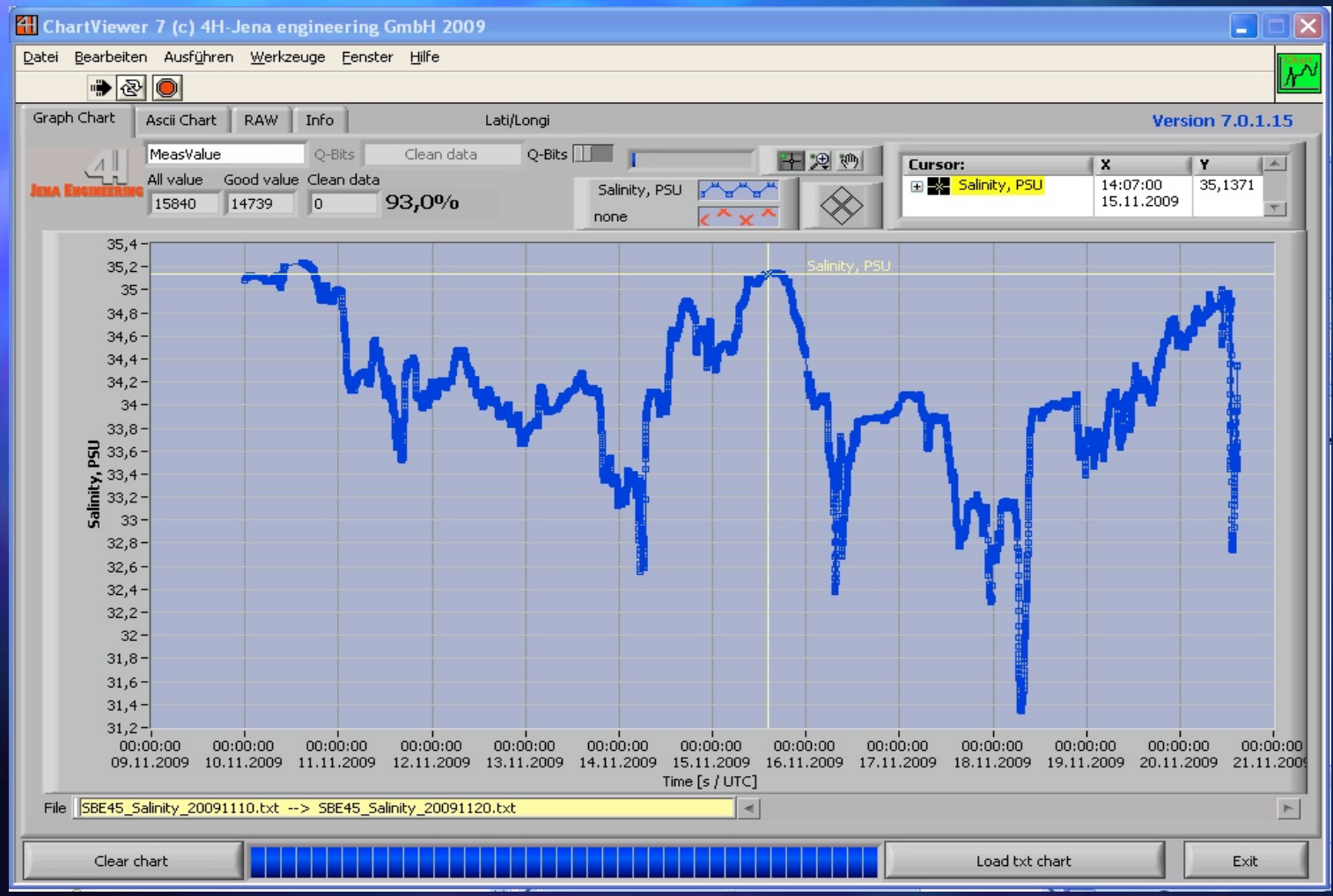
Data Visualization



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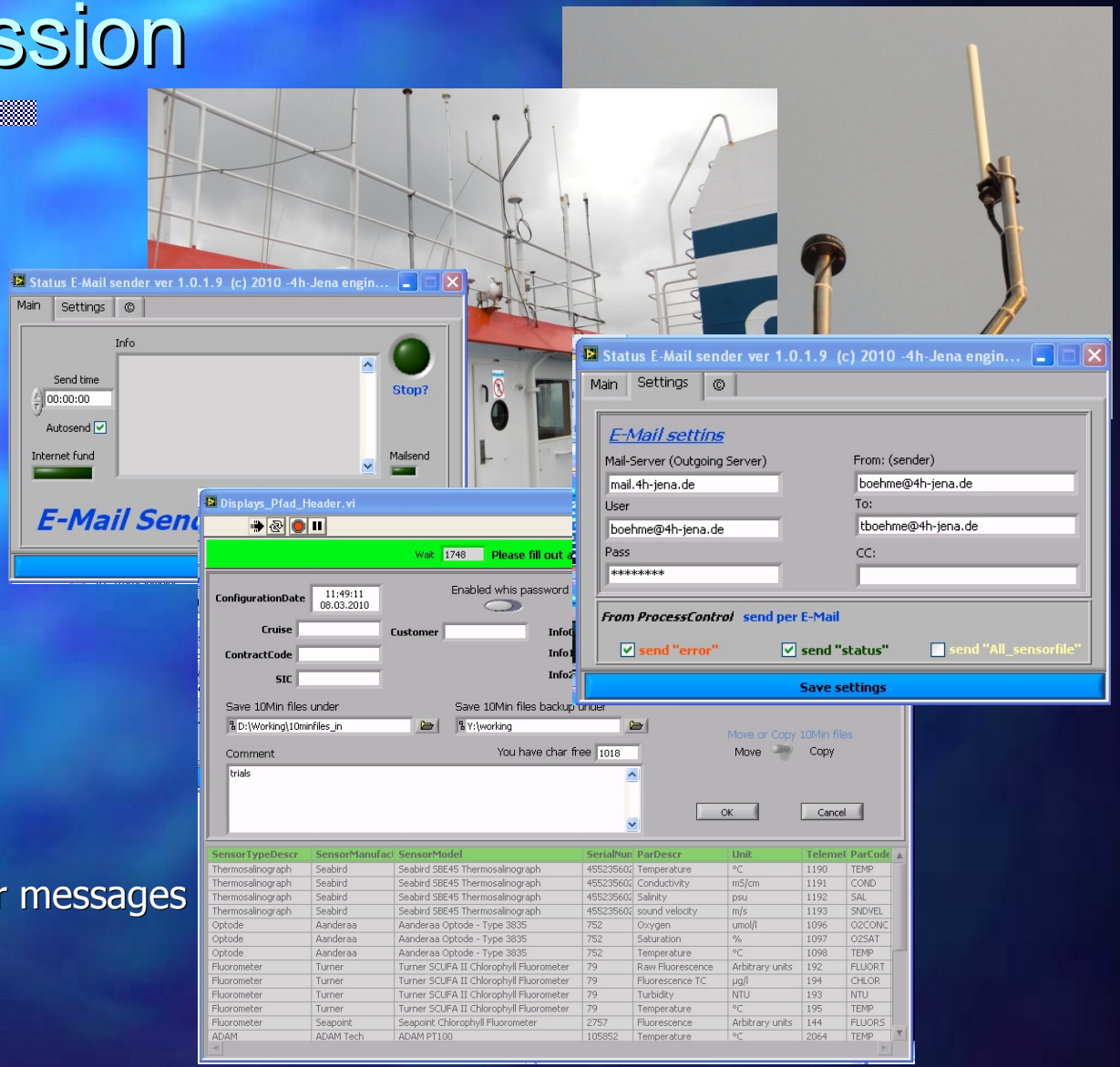
Data Transmission

- Telemetry
  - UMTS/G3
  - Iridium
  - WLAN
- Email
- FTP



- Transmission: data & errror messages
- Remote control

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Data quality and Database exchange

$Filename; CDT90_1_Temperatur_20080605.txt										
$FORMATS										
$1; Timestamp, Date Time; YYYY.MM.DD hh:mm:ss										
$2; Temperatur, □C; Float										
$3; Quality, Flags; Int										
$4; MeasCount, Cnt; Int										
$5; MeanTime, Sec; Int										
$6; Range, MR; Int										
$7; Minimum, □C; Float										
$8; Maximum; □C; Float										
$9; Variance, Units; Float										
$10; Longitude, Deg: Float										
$11; Latitude, Deg; Float										
$DATASETS										
$Timestamp	Temperatu	Quality	MeasCour	MeanTim	Range	Minimum	Maximum	Variance	Longitude	Latitude
$Date Time	□C	Flags	Cnt	Sec	MR	□C	□C	Units	Deg	Deg
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05.06.2008 18:33	22,80	16	515	61	0	22,78	22,82	0,00018	10,18	54,33
05.06.2008 18:34	22,82	16	516	61	0	22,81	22,84	0,00012	10,18	54,33
05.06.2008 18:35	22,83	16	517	61	0	22,82	22,84	0,00003	10,18	54,33
05.06.2008 18:36	22,84	16	515	61	0	22,82	22,86	0,00024	10,18	54,33
05.06.2008 18:37	22,88	16	515	61	0	22,86	22,89	0,00008	10,18	54,33
05.06.2008 18:38	22,91	0	515	61	0	22,89	22,92	0,00014	10,18	54,33
05.06.2008 18:39	22,93	0	514	61	0	22,92	22,93	0,00002	10,18	54,33
05.06.2008 18:40	22,94	0	516	61	0	22,93	22,96	0,00005	10,18	54,33
05.06.2008 18:41	22,97	0	515	61	0	22,96	22,99	0,00007	10,18	54,33
05.06.2008 18:42	22,98	0	514	61	0	22,97	22,99	0,00003	10,18	54,33
05.06.2008 18:43	23,00	0	516	61	0	22,99	23,00	0,00003	10,18	54,33
05.06.2008 18:44	22,98	0	515	61	0	22,98	23,00	0,00002	10,18	54,33
05.06.2008 18:45	23,01	0	517	61	0	23,00	23,02	0,00006	10,18	54,33
05.06.2008 18:46	23,02	0	516	61	0	23,02	23,03	0,00002	10,18	54,33
05.06.2008 18:47	23,01	0	516	61	0	22,99	23,03	0,00009	10,18	54,33
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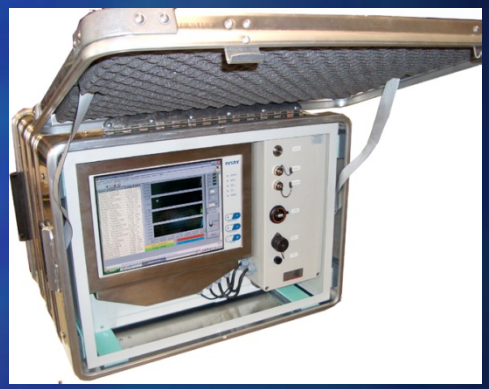
05.06.2008 18:50	22,91	0	516	61	0	22,89	22,93	0,00020	10,18	54,33

The 4H-Ferrybox family

Standard FerryBox I

FerryBox II

Pocket FerryBox



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Stationary ocean-monitoring

Continues measurements
of metrological, oceanographic
and biological parameters
in of the Bay of Paranaguá

Parameter:
T, S, DO, pH, Chl-a,Turbidity,
Inlet Temperature, Pressure, Global Radiation

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Stationary ocean-monitoring

Continuous measurements
of chemical, oceanographic
and biological parameters
in the German Bight.
(Biological Institute Helgoland,
BAH/AWI, Germany)

Parameter:
T, S, DO, pH, Chl-a, Algae classes,
Turbidity, Nutriens (NH_4^+, P, NO_3^-/NO_2^- , Si_xO_y)

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Mobile ocean-monitoring

FerryBox as standard monitoring equipment on the Cost guard research vessels RF Zirfaea (Photo.: Rijkswaterstaat, Netherlands)

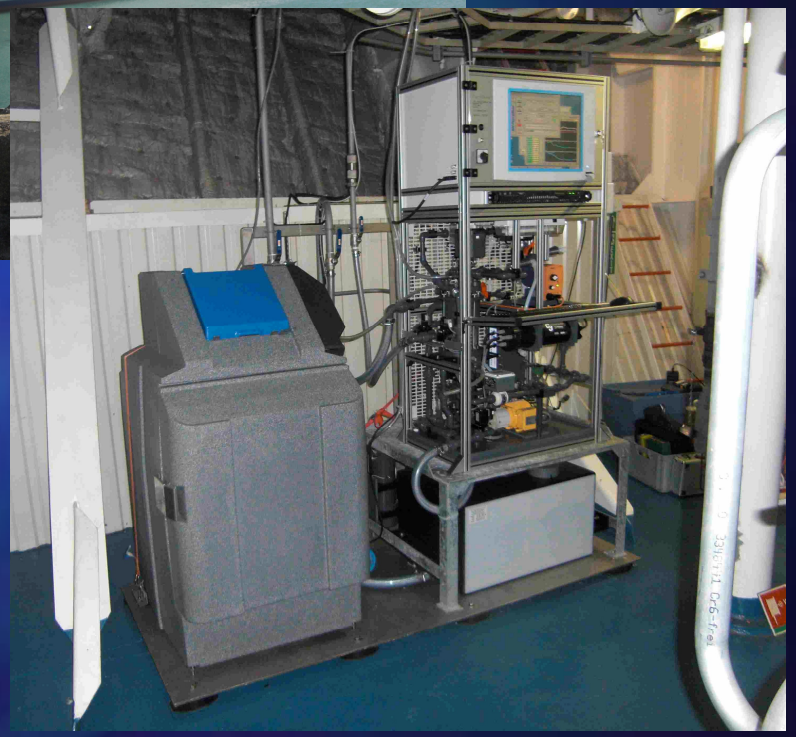
Parameter:
T, S, DO, pH, Chl-a,Turbidity, inlet temperature, watersampler

Applications

Mobile ocean-monitoring

FerryBox as monitoring equipment on the Ferry Armorique

(CNRS station biolog. Roscoff)



Parameter:
T, S, DO, pH, Chl-a,Turbidity, CDOM,
Inlet temperature, watersampler

Applications

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Mobile ocean-monitoring

FerryBox as monitoring equipment on the Container Vessel Trans Carrier

(Rijkswaterstaat)

Parameter:
T, S, DO, pH, Chl-a,Turbidity,
Inlet temperature, watersampler

Applications

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Mobile ocean-monitoring

FerryBox as
scientific equipment
on the Polarstern

Email as Data export

Parameter:
T, S, DO, DCO2, pH, Chl-a, turbidity,
inlet temperature, watersampler,
nutrients (NH_4^+, P, NO_3^-/NO_2^-, Si_xO_y)

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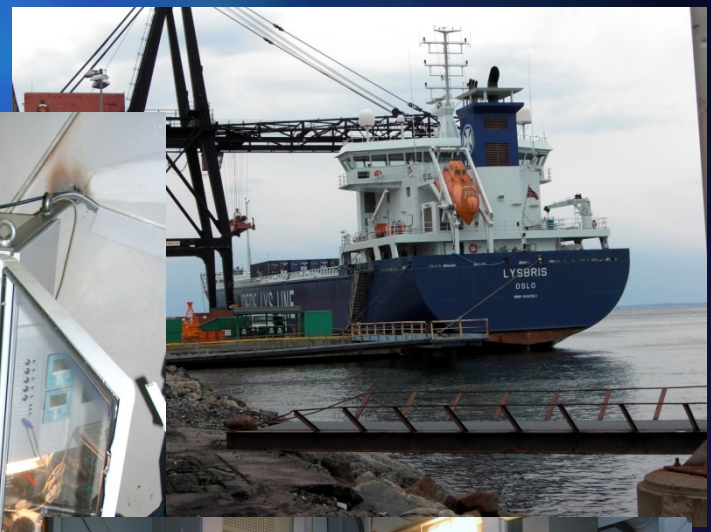
Mobile ocean-monitoring

FerryBox as standard monitoring equipment of the institute for coastal research at the GKSS



Parameter:
T, S, DO, pH, Chl-a, algae classes, turbidity, nutrients (NH_4^+, P, NO_3^-/NO_2^-, Si_xO_y)
water sampler

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Mobile ocean-monitoring

FerryBox as a standard monitoring equipment of the research vessel Endeavour

(marine observation at Cefas)

Parameter:
T, S, DO, Chl-a, algea activity, turbidity, pH, insitu temperature, water sampler, debubbler

Applications

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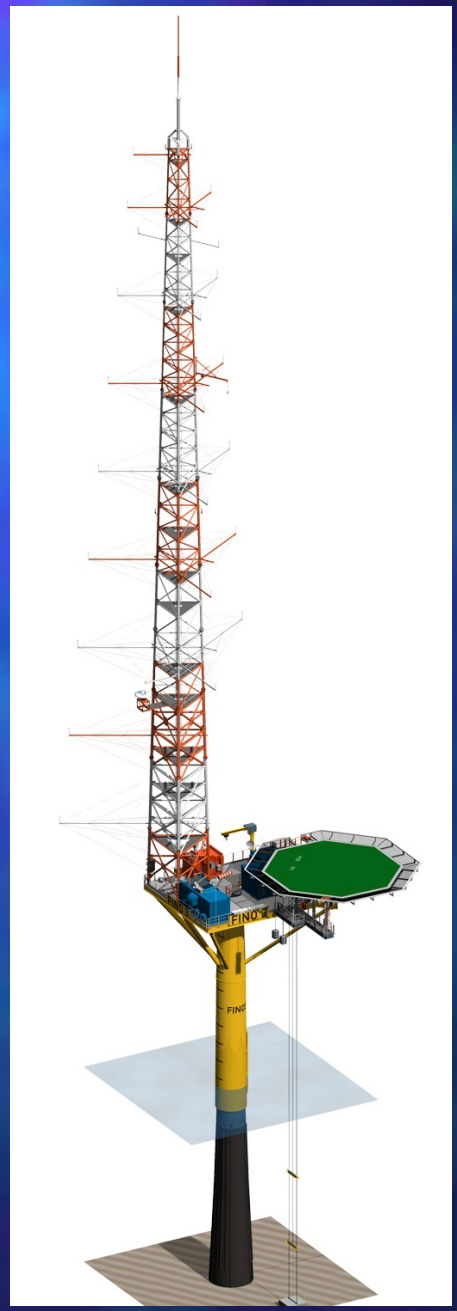
Ongoing projects:

4H-FerryBox for FINO 3



Parameter:
T, S, DO, turbidity, pH,
inlet temperature, water sampler

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Summary

- The 4H-FerryBox provides solutions to most of the problems associated with long-term in-situ monitoring of rivers, estuaries, coastal zones and open sea.
- The modular flow-through system combines high flexibility in the choice of sensor-types and –methods with a fully integrated antifouling concept and the possibility for automatic and remote-controlled operation.

Coming

- New APG – autonomous profilig carrier
- automated airtight watersampling on surface

Thank you very much
for your attention

Detailed scheme