

-4H-FerryBox

Past, present, and future

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Genoa Aquarium
Italy

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4 JENA
ENGINEERING

Since 2001, -4H-JENA engineering produced more than 70 FerryBoxes and PocketFerryBoxes.

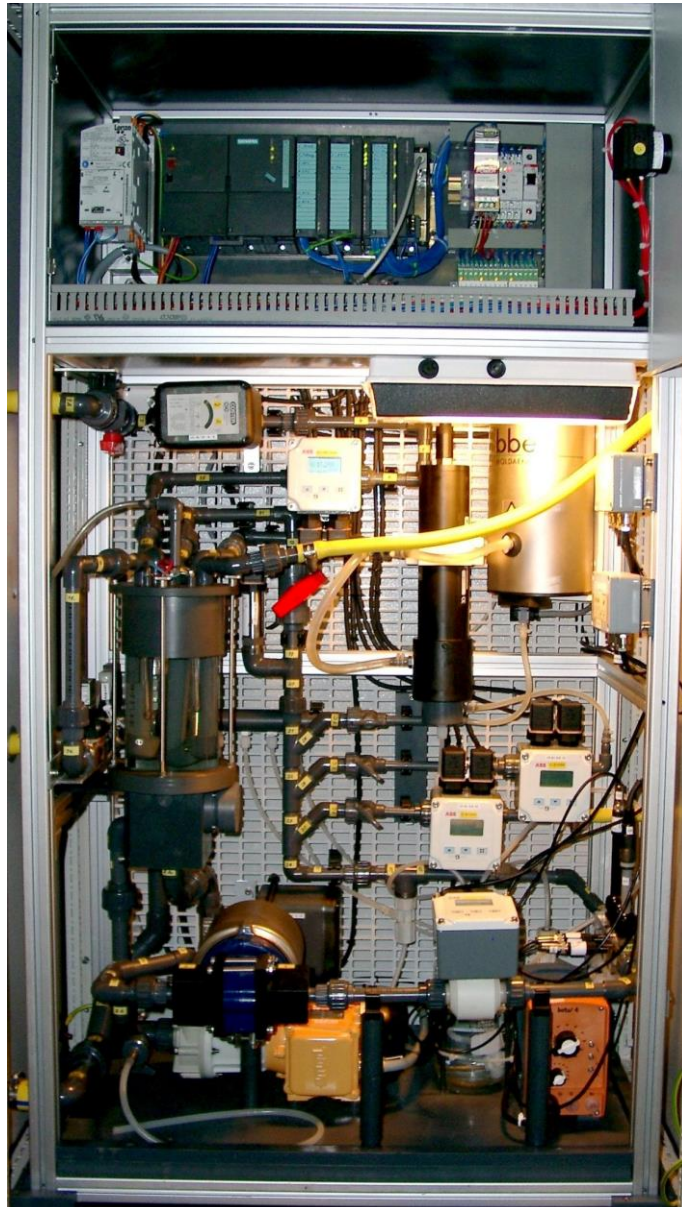
These years of experience and our technical know-how makes us the market leader for FerryBox systems.

Selected examples, the temporal development, and future perspectives are shown here.

2003

AWI Helgoland, Germany





MS-DOS based software, programmed in TurboPascal.

2009, HZG, Germany
Ferryboat „Funny Girl“





Very compact design
Windows based LabView software

2012
HCMR, Crete, Greece
Ferry „Festos Palace“





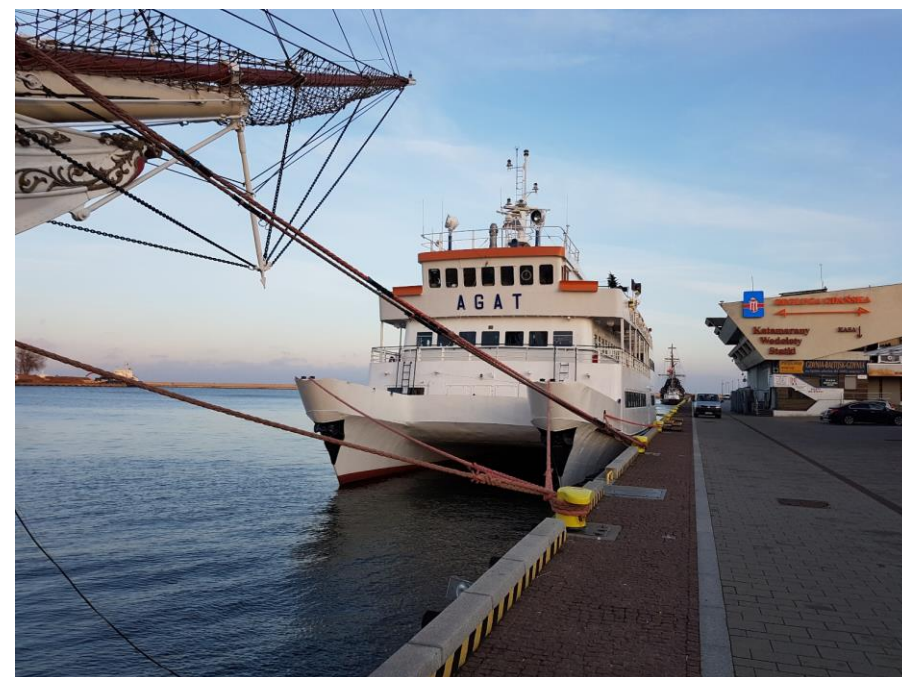
2015
Qinghuangdao
Environmental
Monitoring Centre, China

R/V „China Environmental
Monitoring 001“



2017, Institute of Oceanology Polish
Academy of Science (IOPAS/IOPAN),
Poland

Ferryboat MS „AGAT“





2018

National Antarctic Scientific Center, Ukraine
Fishing/research vessel „MORE
SODRUZHESTVA“, sailing in Antarctica

Up to now the southernmost FerryBox



2019

Swedish University of Agricultural Sciences (SLU)
and Swedish Meteorological and Hydrological
Institute (SMHI)

New research vessel „SVEA“



Integration of big devices like:

Seabird „EcoFLU“

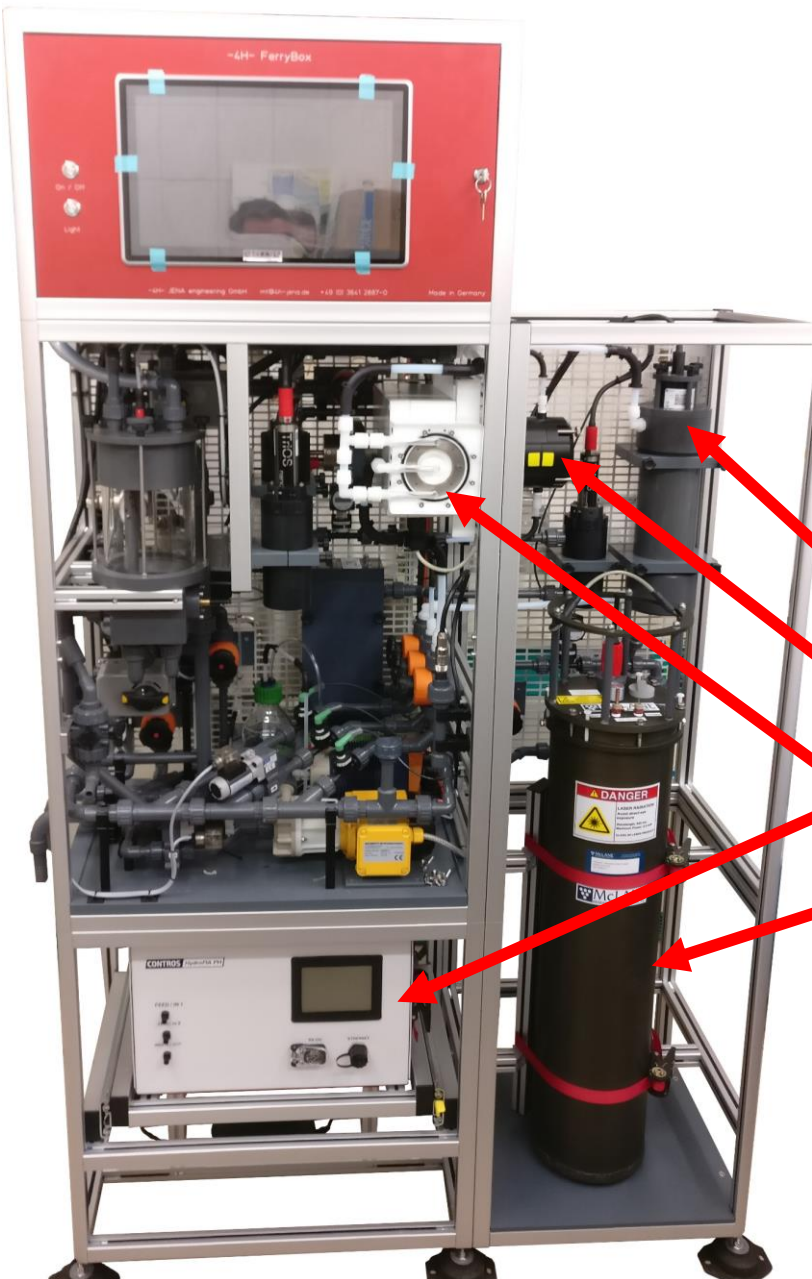
TriOs „OSCAR“

KM Contros pCO₂ and HydroFIA pH

McLane „Imaging FlowCytobot (IFCB)“

...

To be installed in May 2019



Additional systems



2010



2016

-4H-PocketFerryBox



2019



-4H-Sampler

- Modular design: 2x3 tubes
- Stand-alone version
- For sampling plankton and/or marine litter



Cascaded sieves

or



Plankton nets

Future demands

Sensor identification extension

To store information of remote sensors which they do not provide by themselves, like:

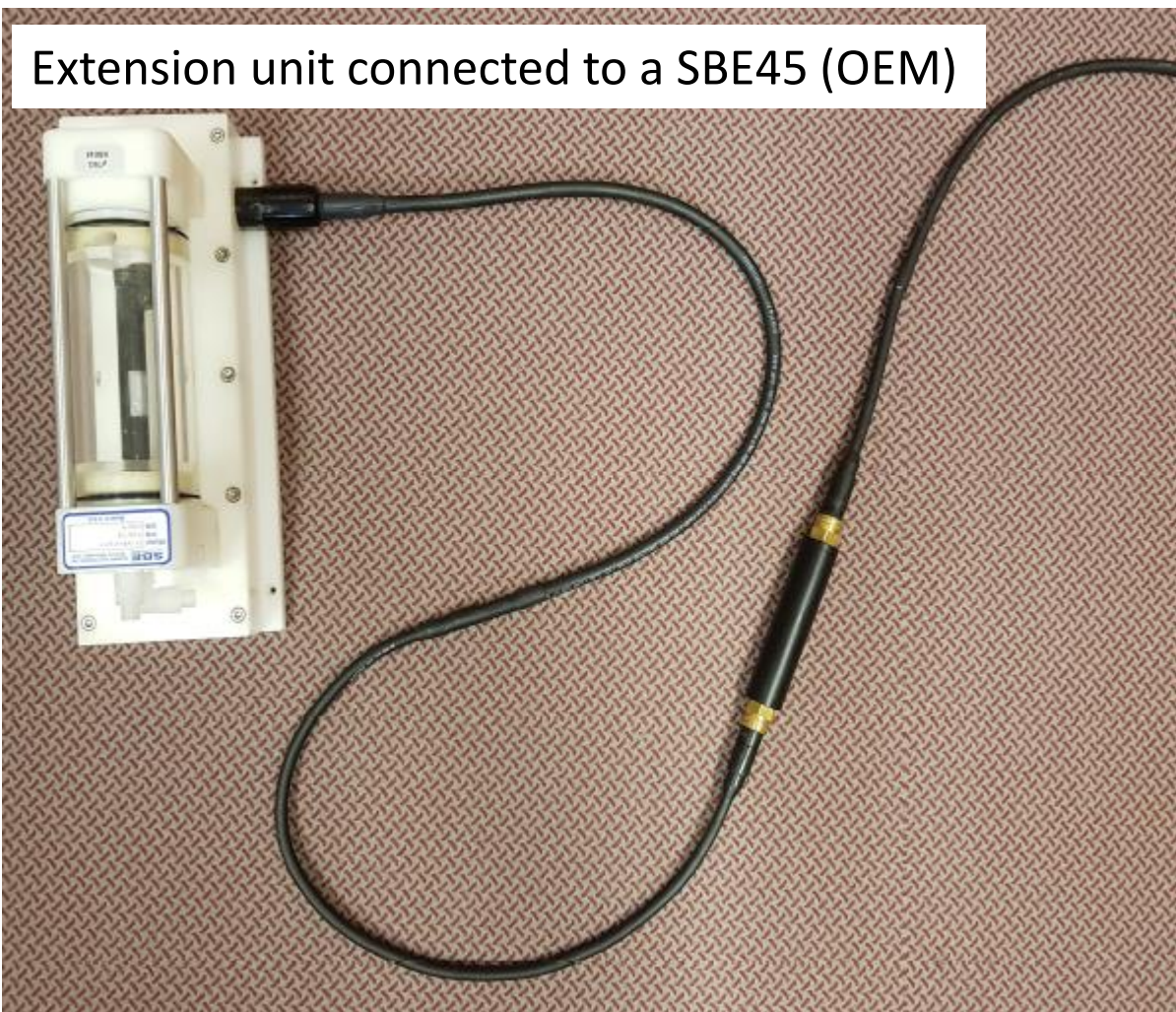
- Serial number
- Date of installation
- Calibration coefficients
- Date of last calibration
- ...



- Pressure resistant housing
- SubConn connectors
- universal usability for digital sensors (analog usability under development)



Extension unit connected to a SBE45 (OEM)



Data can be received as:

- a) Unchanged data string; to run e.g. manufacturer's software

```
18.1882, 0.8133, 14.4499, 1506.5238
7.6974, 1.1088, 42.1723, 1797.4559
92.4572, 7.4487, 13.6651, 1814.4466
92.4434, 2.2106, 46.0438, 739.5427
32.0701, 1.7424, 28.2753, 1069.3695
```

- b) Unchanged, but with configurable header

```
SN:0815
CF:x=1, y=2, z=3
CD:01.04.2019
LW:15.04.2019
ID:25.04.2019
68.0025, 3.9245, 4.7919, 1135.1634
88.6951, 0.4497, 40.8464, 394.9581
82.5622, 6.0082, 17.1547, 941.3658
6.2796, 5.8246, 17.3865, 225.2058
```

- c) Modified, with prefixed configurable information in each data string line

```
SN:0815;CF:x=1, y=2, z=3;CD:01.04.2019;ID:25.04.2019; 1.9320, 5.8622, 34.7719, 920.1021
SN:0815;CF:x=1, y=2, z=3;CD:01.04.2019;ID:25.04.2019; 7.7482, 3.4593, 26.3581, 1546.6464
SN:0815;CF:x=1, y=2, z=3;CD:01.04.2019;ID:25.04.2019; 39.1972, 8.7666, 41.4711, 374.8173
SN:0815;CF:x=1, y=2, z=3;CD:01.04.2019;ID:25.04.2019; 89.1903, 6.2077, 42.5156, 248.0734
```

A photograph of a damselfish larva, which is a small, translucent fish-like creature with a large, dark eye and a long, thin tail. The larva is shown in profile, facing left. Its body is filled with numerous small, white, spherical particles, which are microplastics. The background is a light, neutral color. The word "Microplastics" is overlaid in large, black, sans-serif font across the center of the image.

Microplastics

A Damselfish larva that has ingested tiny plastic particles.

© Oona Lonnstedt

What are we talking about?

Diameter of plastic marine litter	English term
> 25 mm	macroplastic
5 – 25 mm	mesoplastic
1 – 5 mm	large microplastic particle
< 1mm	small microplastic

Source: Umweltbundesamt, Texte 64/2015

Problems:

- Many different sources and types of MP
- No information about current amount and distribution available
- No option to determine concentrations of MP automatically

Needs:

- Automatic sampling devices for high amounts of water to determine concentrations
- High capacity filtration units for removing MP from water entering the oceans
- Tool for definition of limit values for MP in (fresh)water

Microplastic sampler



Prototype successfully tested at a sewage treatment plant.



- Specials developed pre-filtration unit (by Nägele GmbH)
- Cascaded automatic filtration (by time or volume)



What are your thoughts about
current and future needs in
environmental monitoring?

Thank you for your attention.