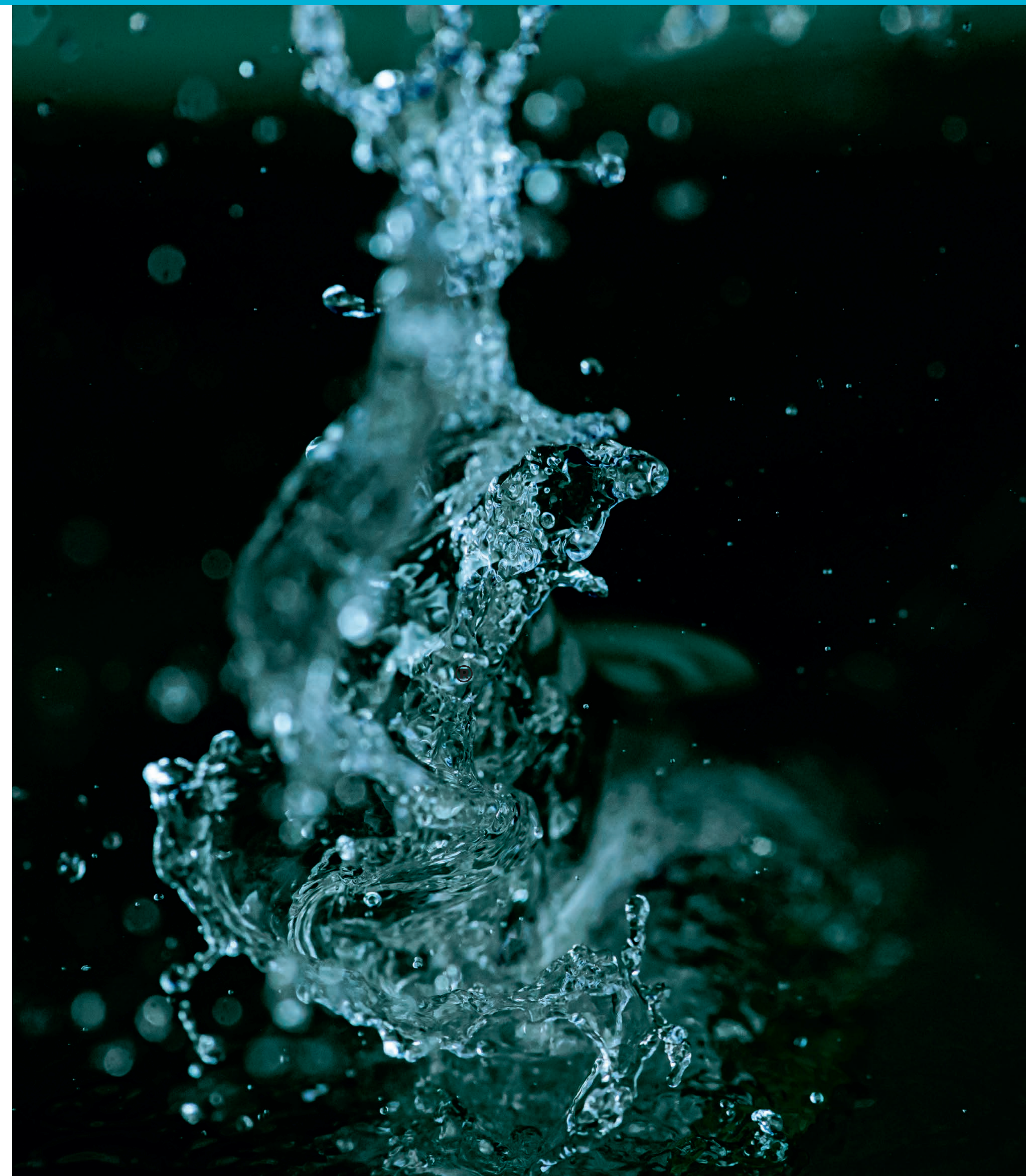


FROM CONCEPT TO IMPLEMENTATION

NAECO ®

SHOWCASE OF SOLUTIONS

- Shipborne environmental systems
- Modular platform for distributed on intime big data-driven integrated aquatic environment monitoring system development



CREATED IN RUSSIA

www.ndeco.ru

N A E C O  ®

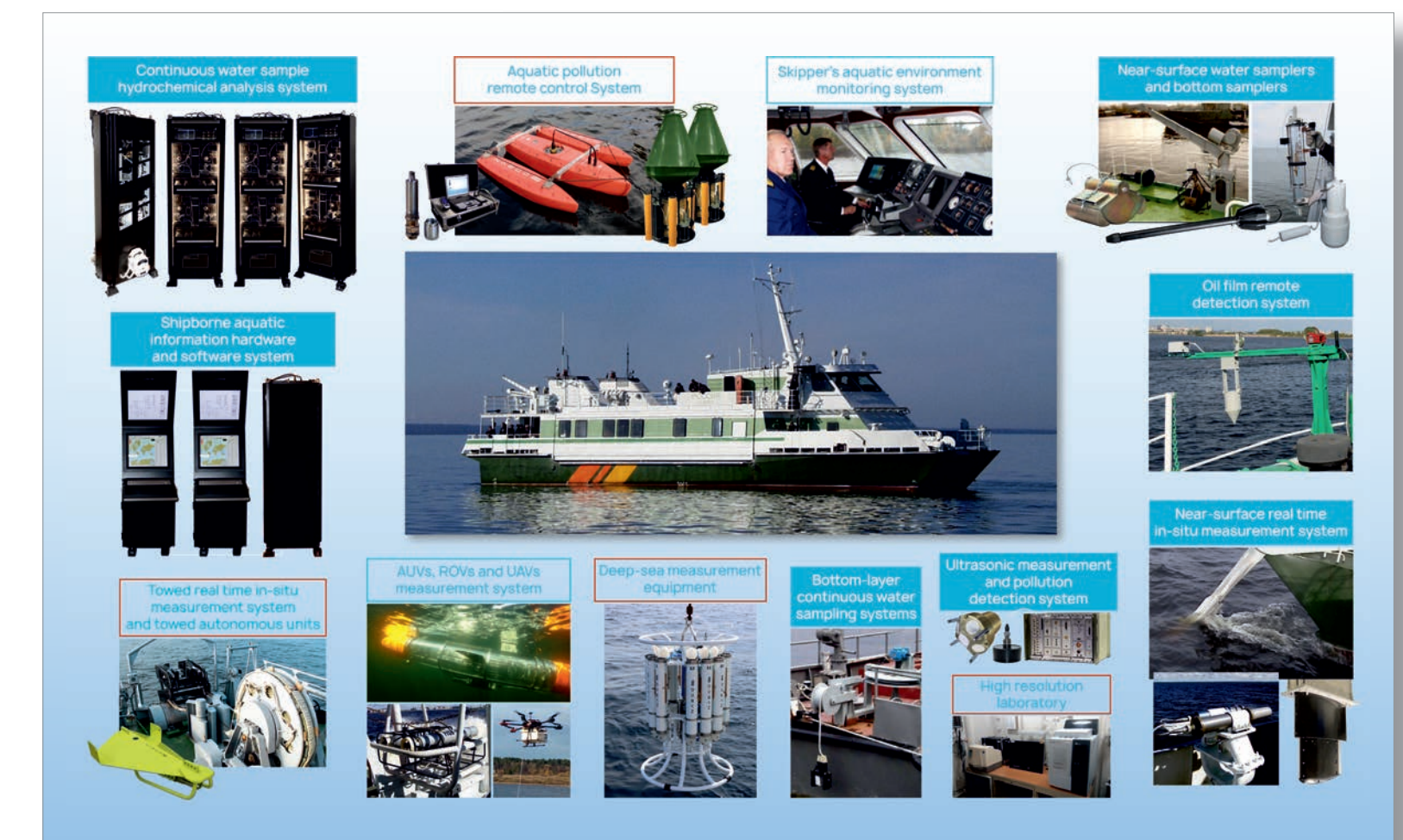
Configuration: Intro



Configuration: Base



Configuration: Advanced



Shipborne environmental system is a multi-channel multi-depth integrated information and measurement system for operational support of decision-making management. System provide continuous automatic measurement of hydrochemical, hydrochemicophysical, hydrooptical and other parameters of the aquatic environment, forming a real-time array of big-data for operational assessment of the ecological state of water areas. The system allows to identify the facts and determine the extent of pollution, as well as identify pollutants and identify sources of pollution.

- ✓ Aquatic environment parameters measurement in real time along the trajectory of the vessel with several depth
- ✓ High performance and spatial resolution. Continuous insitu analysis and complete analysis of continuously sampled samples for 50+ parameters of the aquatic environment simultaneously over several depth
- ✓ Long range due to the AUVs and two types of ship-based UAVs for aerial reconnaissance of work areas and sampling in hard-to-reach areas of the aquatic area, also control of adjacent land areas

Shipborne environmental system. Configuration: Intro

Continuous water sample hydrochemical analysis system



Near-surface water samplers and bottom samplers



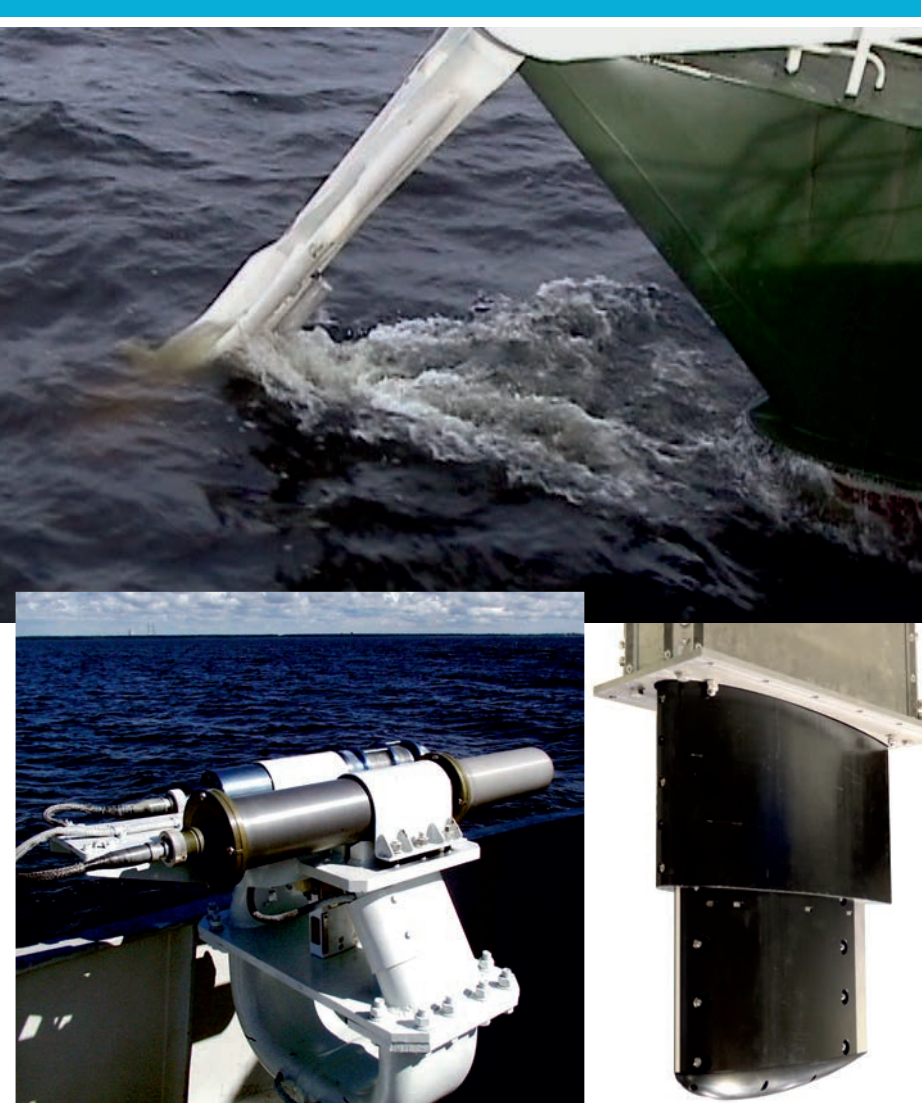
Oil film remote detection system



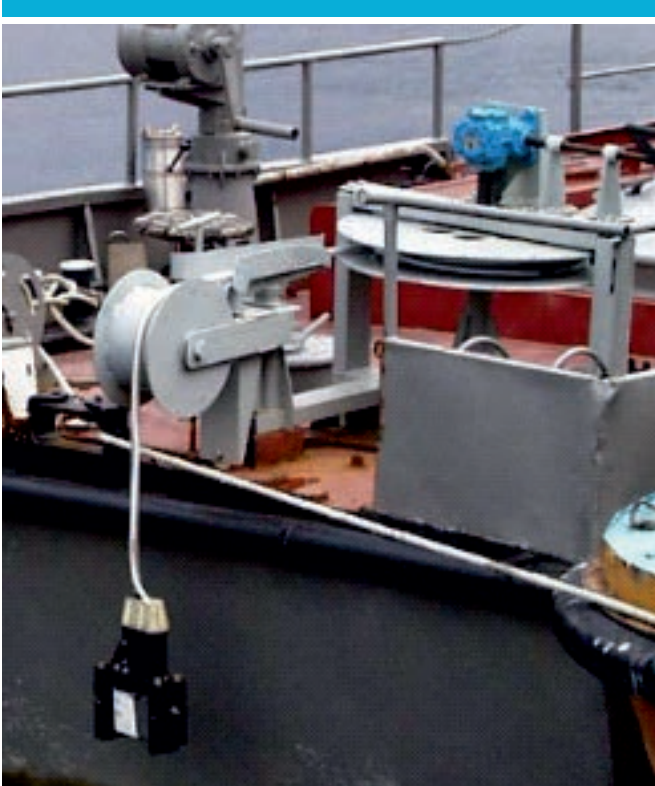
Shipborne aquatic information hardware and software system



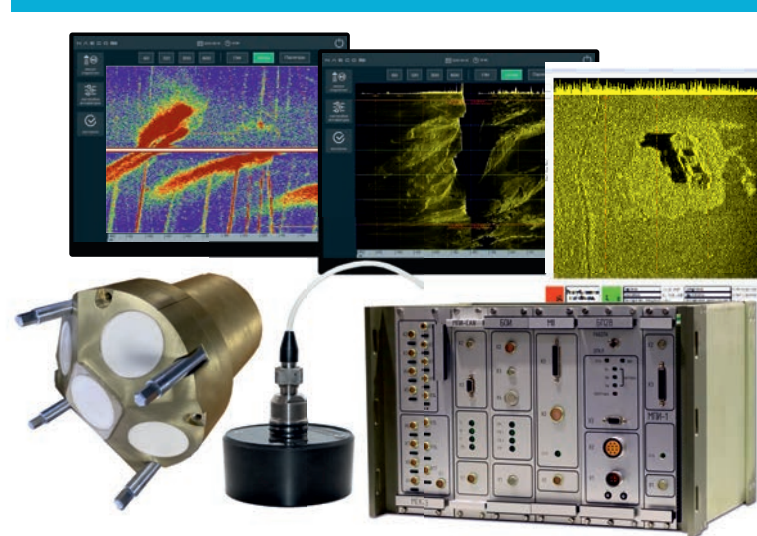
Near-surface real time in-situ measurement system



Bottom-layer continuous water sampling systems



Ultrasonic measurement and pollution detection system



- Notes:
- ✓ Aquatic environment parameters measurement in real time along the trajectory of the vessel with several depth
 - ✓ High performance and spatial resolution. Continuous insitu analysis and complete analysis of continuously sampled samples for 50+ parameters of the aquatic environment simultaneously over several depth (hundreds of measurements of 50+ parameters per minute)
 - ✓ Long range due to the AUVs and two types of ship-based UAVs for aerial reconnaissance of work areas and sampling in hard-to-reach areas of the aquatic area, also control of adjacent land areas.

Shipborne environmental system. Configuration: Base

Continuous water sample hydrochemical analysis system



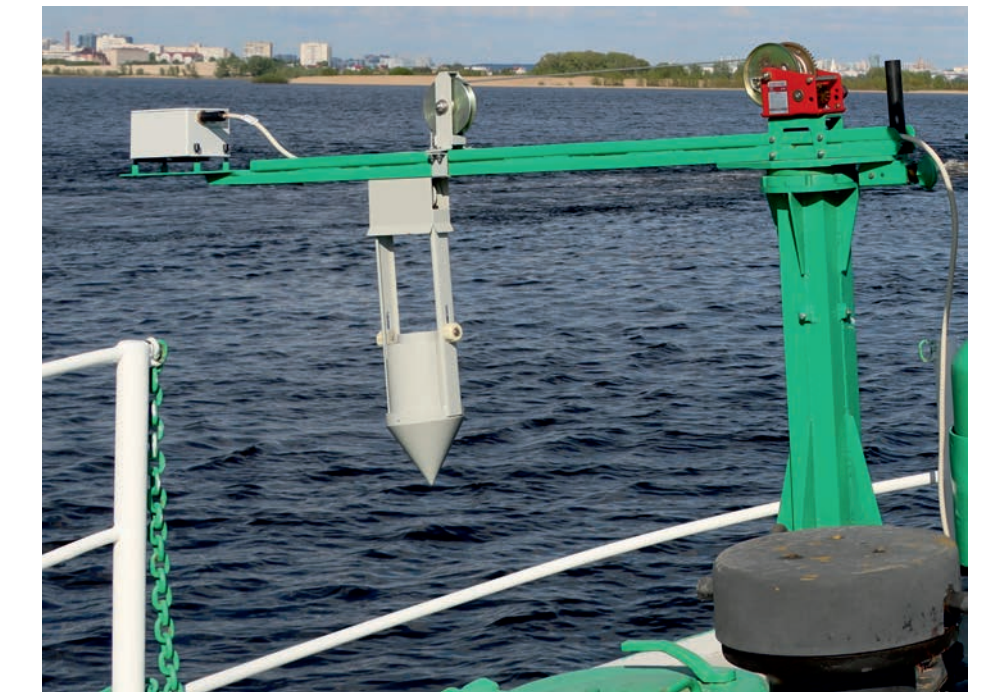
Skipper's aquatic environment monitoring system



Near-surface water samplers and bottom samplers



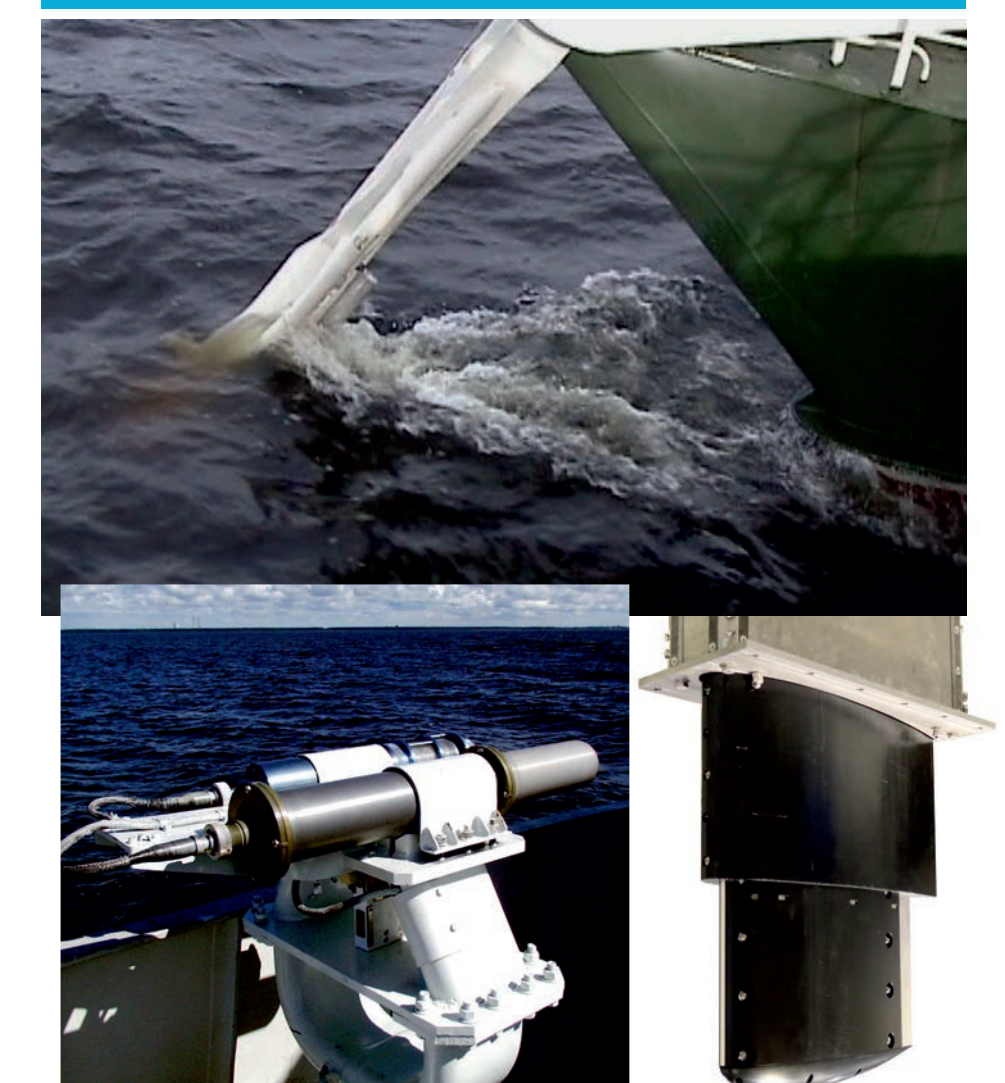
Oil film remote detection system



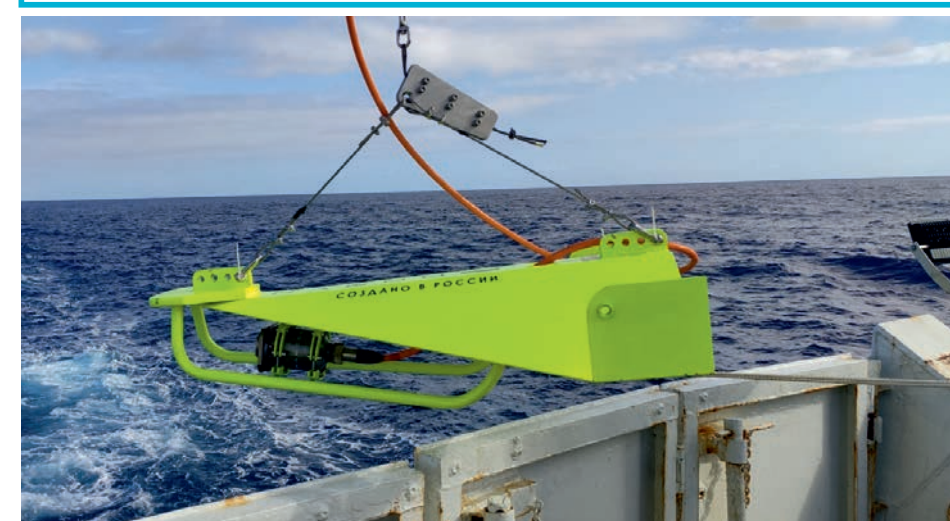
Shipborne aquatic information hardware and software system



Near-surface real time in-situ measurement system



Towed real time in-situ measurement system and towed autonomous units



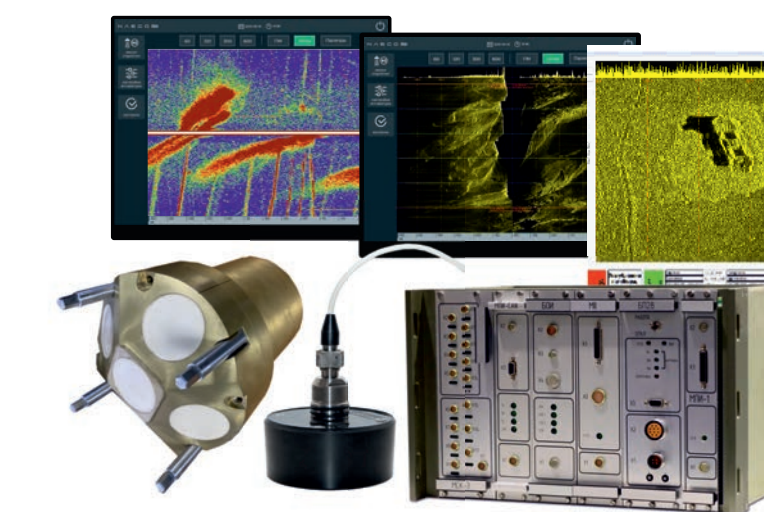
AUVs, ROVs and UAVs measurement system



Bottom-layer continuous water sampling systems



Ultrasonic measurement and pollution detection system



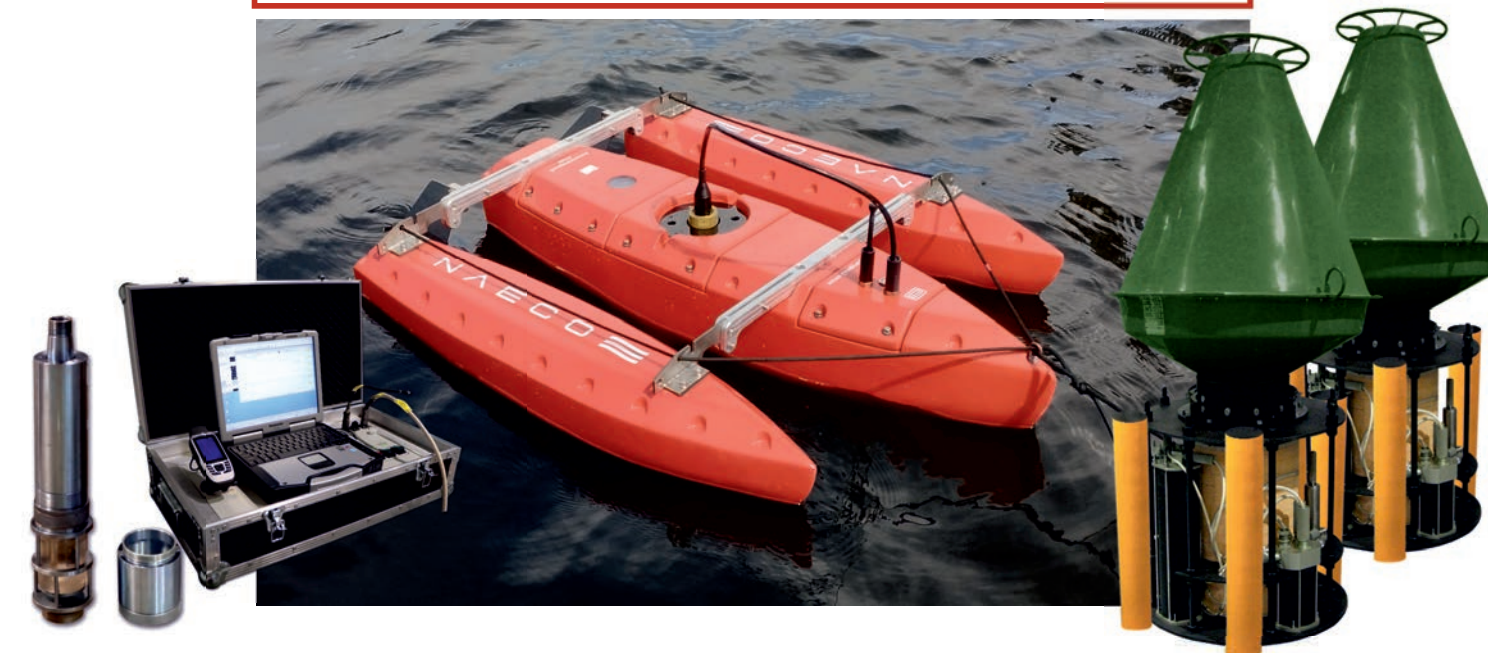
- Notes:
- ✓ Aquatic environment parameters measurement in real time along the trajectory of the vessel with several depth
 - ✓ High performance and spatial resolution. Continuous insitu analysis and complete analysis of continuously sampled samples for 50+ parameters of the aquatic environment simultaneously over several depth (hundreds of measurements of 50+ parameters per minute)
 - ✓ Long range due to the AUVs and two types of ship-based UAVs for aerial reconnaissance of work areas and sampling in hard-to-reach areas of the aquatic area, also control of adjacent land areas.

Shipborne environmental system. Configuration: Advanced

Continuous water sample hydrochemical analysis system



Aquatic pollution remote control System



Skipper's aquatic environment monitoring system



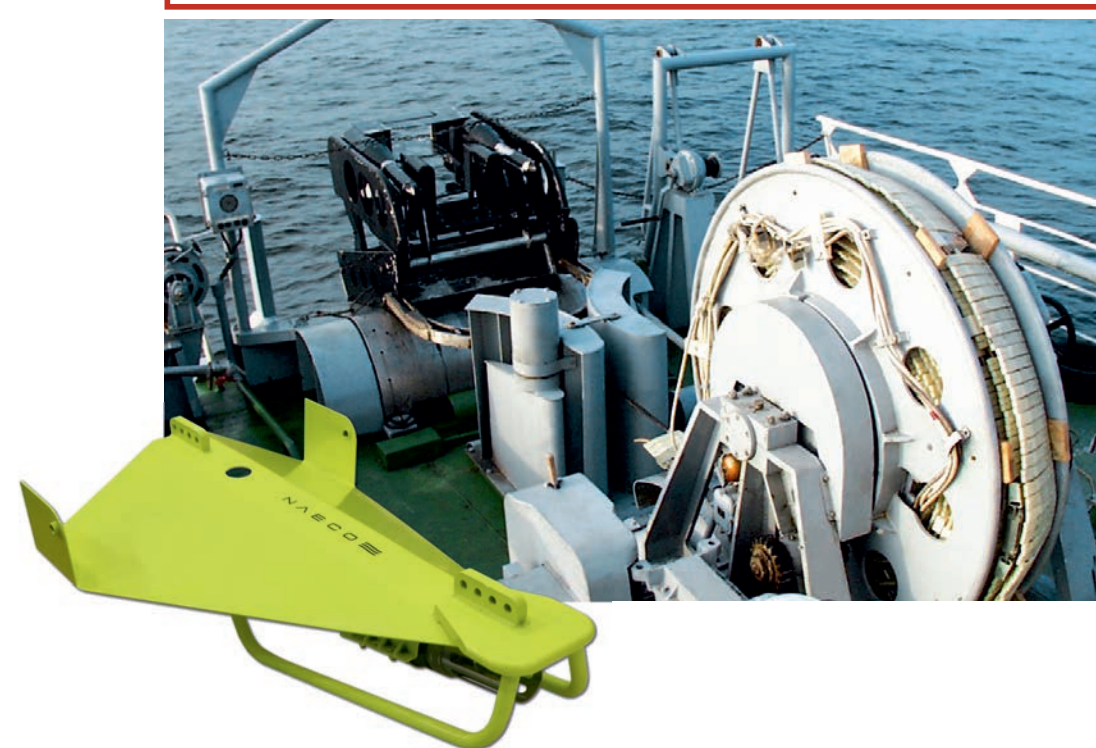
Near-surface water samplers and bottom samplers



Shipborne aquatic information hardware and software system



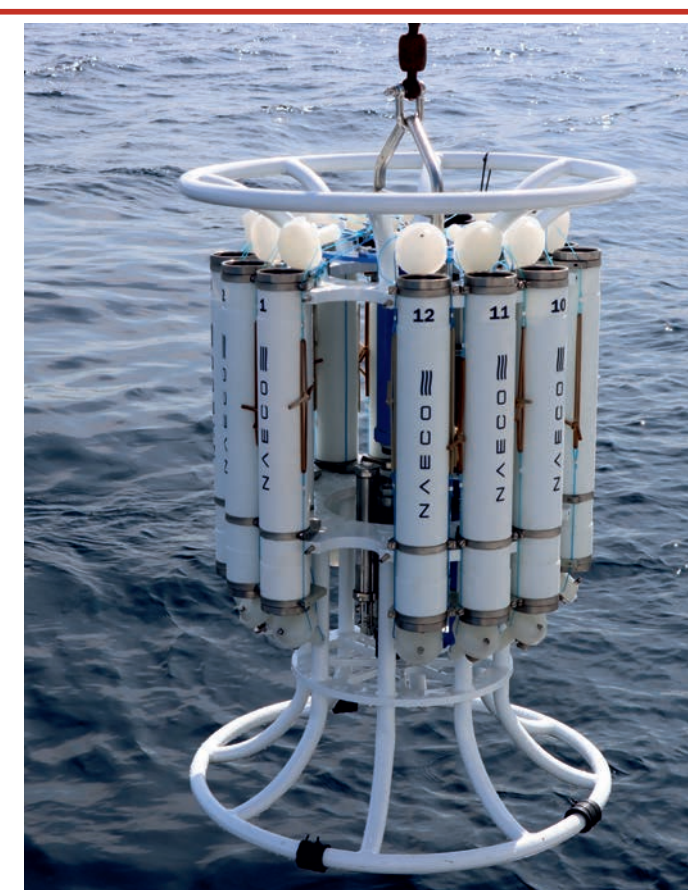
Towed real time in-situ measurement system and towed autonomous units



AUVs, ROVs and UAVs measurement system



Deep-sea measurement equipment



Bottom-layer continuous water sampling systems



Ultrasonic measurement and pollution detection system



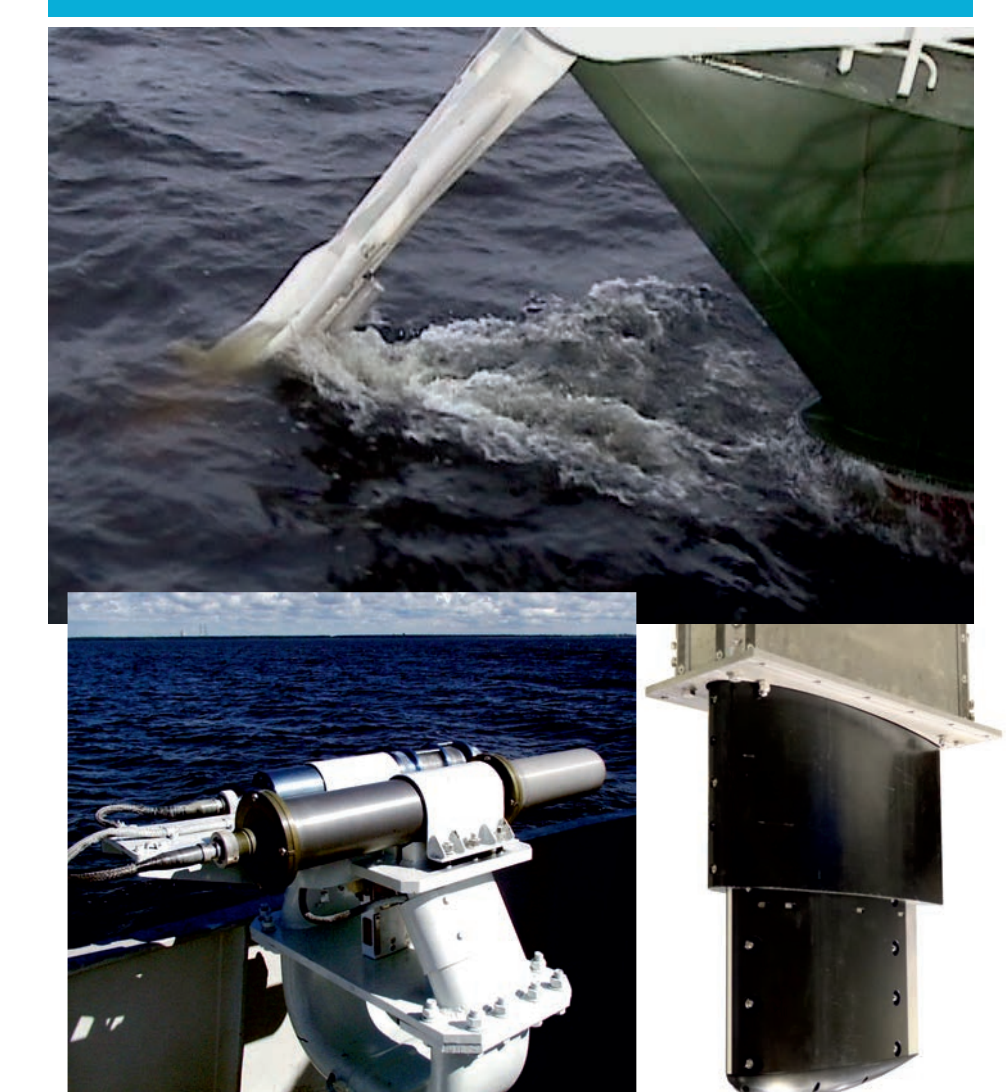
High resolution laboratory



Oil film remote detection system



Near-surface real time in-situ measurement system



- Notes:
- ✓ Aquatic environment parameters measurement in real time along the trajectory of the vessel with several depth
 - ✓ High performance and spatial resolution. Continuous insitu analysis and complete analysis of continuously sampled samples for 50+ parameters of the aquatic environment simultaneously over several depth (hundreds of measurements of 50+ parameters per minute)
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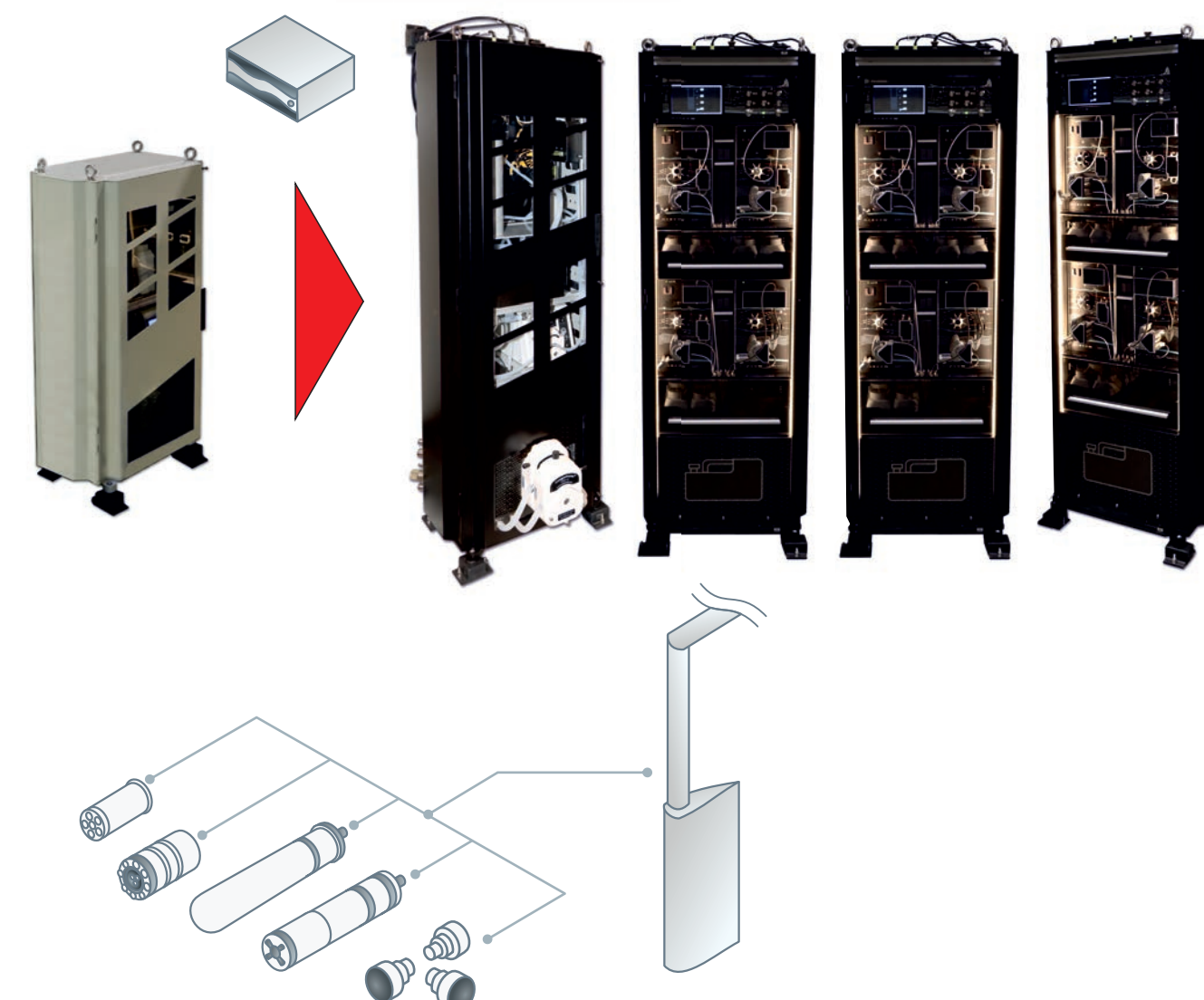
NAECO® AQUATORIUM® modular hardware and software systems designed for integration on various platforms

CWSS-GHPP point



Buoys based software and hardware system

CWSS-GHPP multi channel system



Stationary hardware and software system (mobile laboratory)

CWSS-GHPP gate

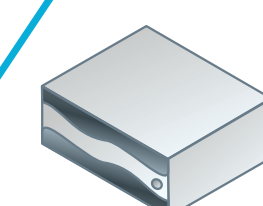


An autonomous software and hardware system based on a mobile platform, with the data transmission via integrated communication module

CWSS-GHPP trajectory



Mobile hardware and software complex based on RIB type boats with the data transmission via integrated communication module.



Communication module:

The software and hardware systems are designed for the placement of the communication module of developers distributed integrated systems
Possible channels: GSM/ Satellite / Cable / radio channel. A GSM channel is provided in the basic version.

Appointment:

Automatic operational environmental control at the stationary area point with the data transmission via integrated communication module.

Installation base:

Various types of buoys.

* It can be placed on the customers buoys.

Appointment:

Automatic environmental monitoring (up to 50 parameters simultaneously) with the data transmission via integrated communication module.

Installation base:

Coastal accommodation in specialized small-sized uninhabited and habitable modules.

* The module is not included in the package.

** It can be placed in the customers premises.

Appointment:

Automatic operational environmental control of non-navigable aquatic areas at special designated gates.

Installation base:

The system is installing on a mobile platform included in the package.

* The platform can be equipped with various modules.

Appointment:

Mobile environmental monitoring with automatic parameters measurement of the aquatic environment along the trajectory.

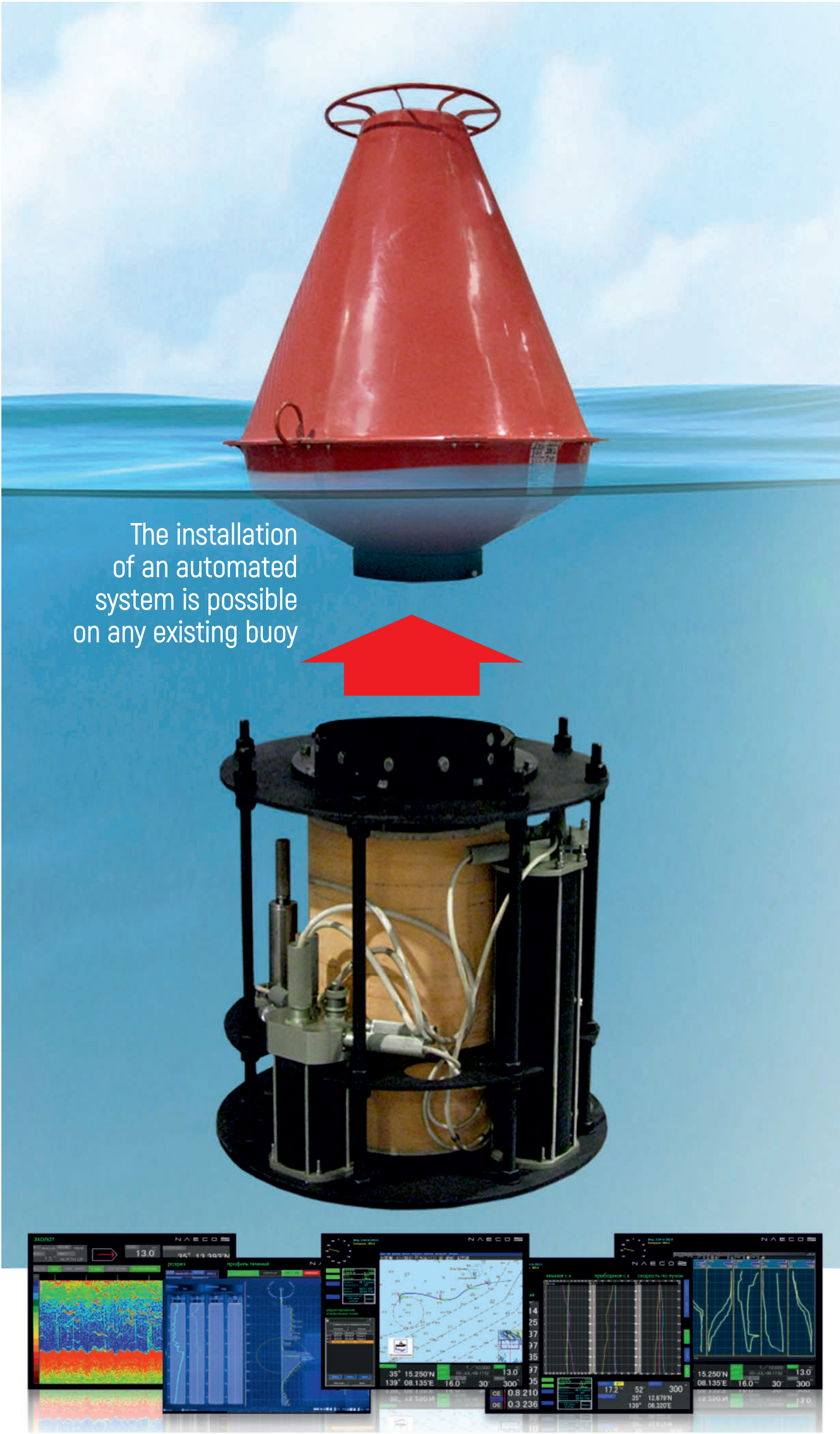
Installation base:

It can be placed on customers boats of RIB-type or other small watercraft.

* The boat is not included.

** The boat can be equipped with various modules

Note - serially manufactured components for developers



A concealed installation autonomous automatic measurement system, mounted on various types of buoys, designed to automatically monitor the parameters of the aquatic environment with the data transmission via integrated communication module.

Measuring parametres:	Equipment				
	1	2	3	4	5
Temperature	+	+	+	+	+
Specific electrical conductivity	+	+	+	+	+
Hydrostatic pressure (disturbance)	+	+	+	+	+
Hydrogen index, pH			+	+	+
Redox potential			+	+	+
Mass concentration of dissolved oxygen			+	+	+
Volumetric activity of gamma-emitting radionuclides of water in the equivalent of Na-24				+	+
Volumetric activity of gamma-emitting radionuclides of water in the equivalent of K-40				+	+
Energy range of the detected gamma radiation				+	+
Mass concentration of uranium				+	+
Mass concentration of rhodamine B				+	+
Perylene mass concentration				+	+
Turbidity				+	+



Frozen-in buoy



Buoy for shallow non-navigable areas

What in the box:

- Beginner

1

Means of registration. The period of autonomy 1 month.
- Base

2

Means of registration. Sampling by signal. Registration of the tide/low tide level. The period of autonomy 1 month.
- Full

3

The measuring instrument. Sampling by signal. Registration of the tide/low tide level. The configuration can be expanded. The period of autonomy 1 month.
- Professional

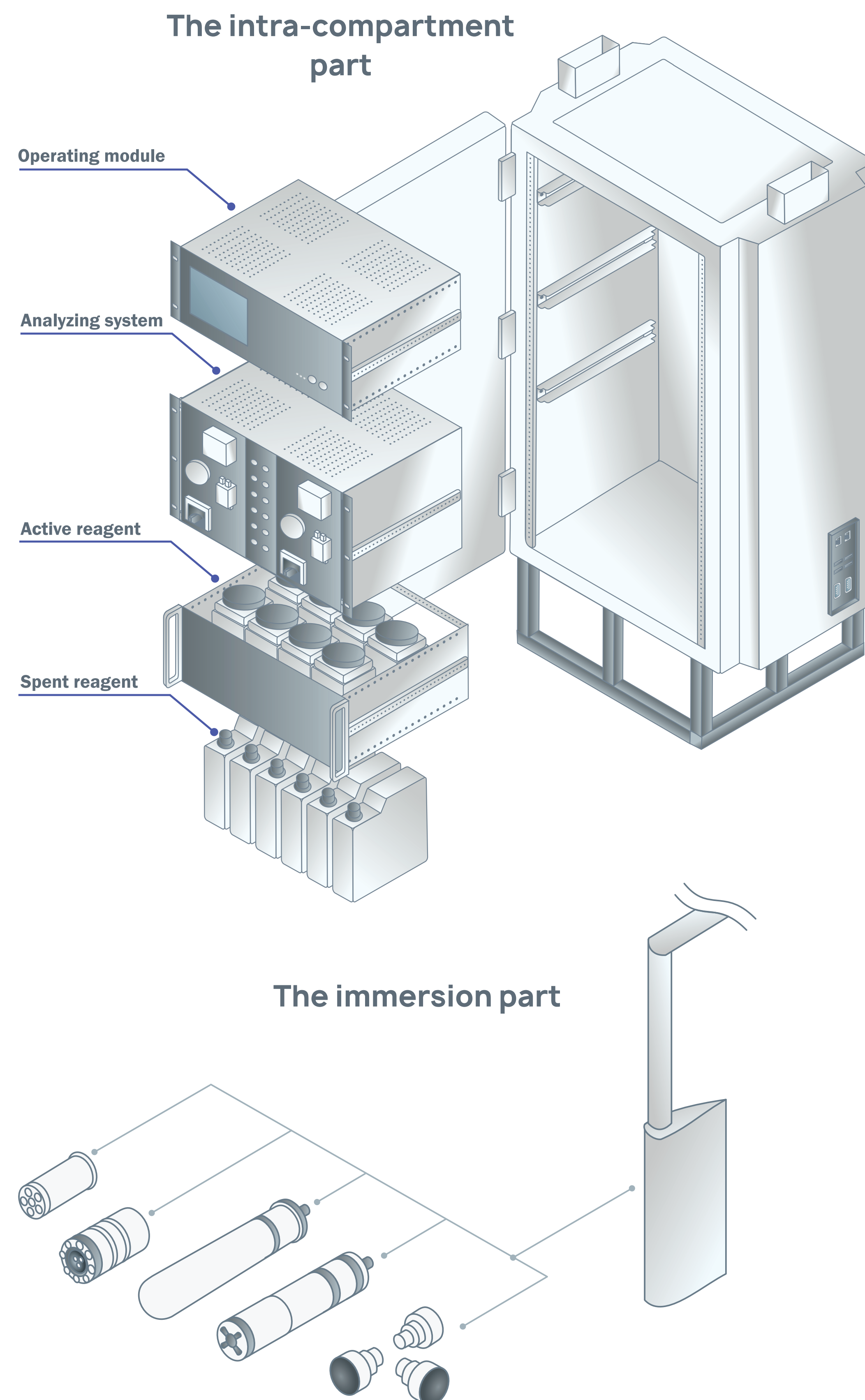
4

The measuring instrument. Sampling by signal. Registration of the tide/low tide level. Investigation of the gamma radiation characteristics in the aquatic environment. Fluorimetry. Measurement of the hydrochemical characteristics of the aquatic environment through a single channel. The period of autonomy 1 month.
- Scientific

5

The measuring instrument. Sampling by signal. Registration of the tide/low tide level. Investigation of the gamma radiation characteristics in the aquatic environment. Fluorimetry. Measurement of the hydrochemical characteristics of the aquatic environment through a five channel. The period of autonomy 5 month.

CWSS-GHPP multi channel system

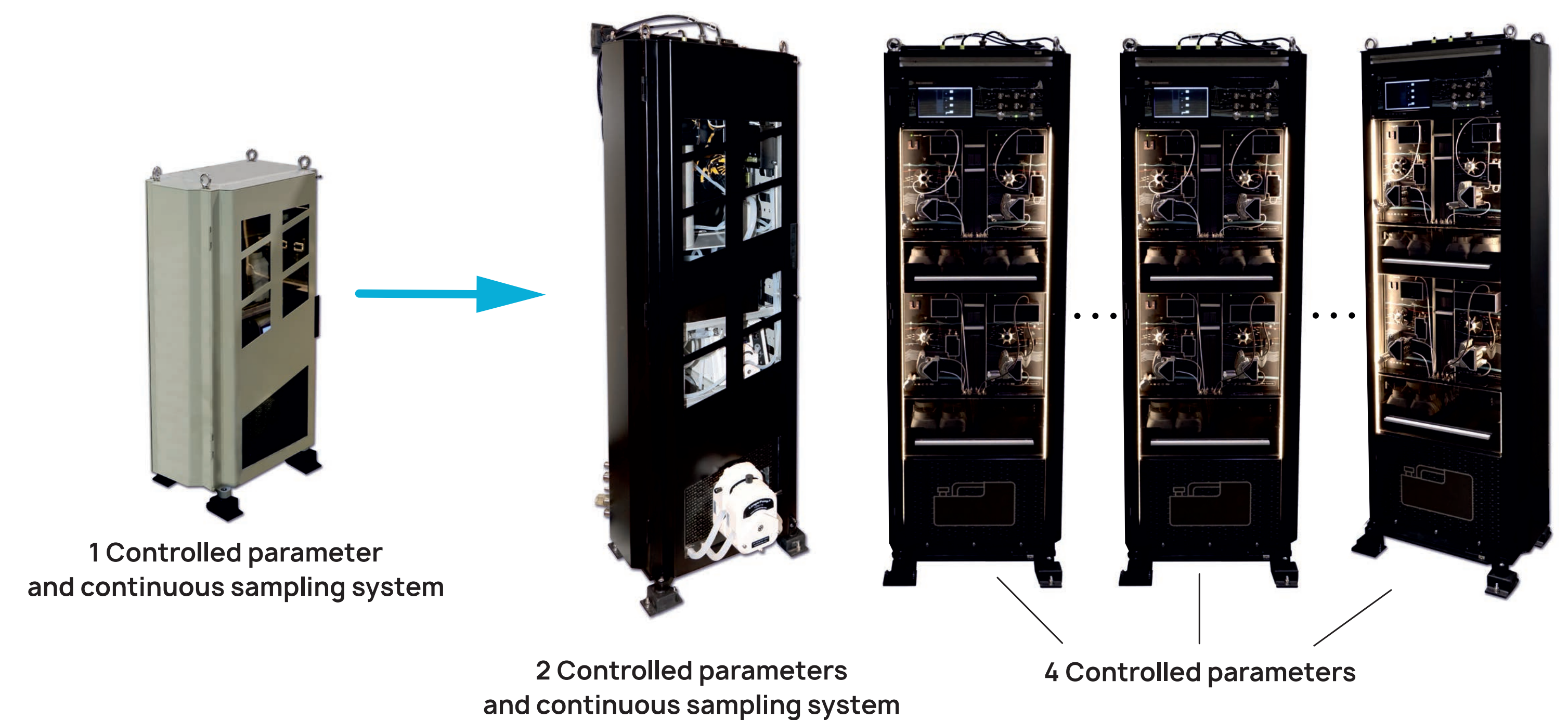


A hardware and software system for the stationary post organization.

Major goal

Operational control of the presence and quantity of pollutants in the aquatic environment.

It is possible to scale the system



Main functions

Automatic measurement of the concentration of pollutants in aquatic area in continuous mode (without operator involvement) at the installation point in the aquatic area (up to 50 parameters simultaneously) with the data transmission via integrated communication module.

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FROM CONCEPT TO IMPLEMENTATION

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