

GRAAtech

Robotics, from idea to the sea.

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Creating innovative robotic systems meeting the customer needs is the mission of Graal Tech since its foundation, in 1998. All the Company products are the result of a significant effort for making them highly reconfigurable, in order to be easily customized according to the different technical and operational demands.

The presence of a highly specialized staff with a wide portfolio of technical and scientific skills allows to approach every new challenge coming from the reference markets with a multi-disciplinary approach, which is certainly a key factor to success. It also permits to perform in house all the main activities behind the realization of a new underwater robot, from the conception of the initial idea, till the final validation tests at sea of the developed systems.

The continuous focus on innovation led Graal Tech, in the over 20 years of its history, to participate to a long list of research projects, on behalf of private Industries or with grants coming from public bodies. Thanks to its pluriannual experience, today Graal Tech is considered a valuable partner for R&D activities by a wide range of organizations, including Multinational Corporations, Governmental Institutions, international Research Centers and Academies, working in the fields of **Oil and Gas, Defence, Space, Security, Oceanography and Environmental Monitoring.**

Graal Tech management

Chief Executive Officer

Andrea Caffaz



Head of Mechatronic Division

Andrea Pellegrini



Embedded Systems & Software Engineering

Enrico Clerici



Control Systems & Software Development Manager

Tommaso Bozzo



Director - Business Development

Alessio Turetta



Our numbers

+20

YEARS OF EXPERIENCE

More than 20 years of experience in the underwater mechatronic field.

+20

PROJECTS

R&D Projects we worked on.

+250

AUTONOMOUS UNDERWATER VEHICLES

Underwater vehicles we produced and sold.

+20

PROFESSIONALS

More than 20 experts in our staff.

10.000

HOURS AT SEA

Number of hours spent at sea with robots.

3

SPOKEN LANGUAGES

3 spoken languages.

700

AMOUNT OF SQM

The size of our headquarter, including offices and laboratories.

150

CUBIC METRES

The volume of water of our pool, daily used for tests and experiments.

History

1998

Foundation

The company was established in 1998, by a team of Ph.D. students and researchers from the University of Genoa with the intent of transferring competences and know-how from academy to industry.

2003

Our ancestors

The first autonomous underwater vehicle realized by Graal Tech was launched in 2003 and can be considered a kind of ancestor of the current X-300.

2006

The first EWM

The first underwater manipulation system totally designed and realized by Graal Tech was EWM (Eurobot Wet Model) and it was finalized in 2006.

2020

New agreements, new horizons

Graal Tech signs an industrial agreement with Seabed Geosolutions, a company leader in the O&G market. Seabed joins with the 24% of shares.

2002

The first European Project

Our first European project dates back to 2002 in the Fifth Framework Programme when MEPEMS was launched.

2005

The Research and development service

While maintaining strong relationships with research centers, over the years, the Company enlarged its offer of R&D services to industries, and signed its first R&D contract in 2005 with Thales Alenia Space

2013

A strong relationship

The existing strong commercial relationship between Graal Tech and CGG was consolidated in 2013, when Graal Tech shares were acquired by the Geophysical Corporation .

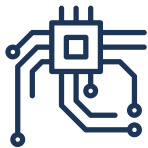
Facilities



Our team is constantly growing. It is made of more than 20 Permanent people with **multidisciplinary skills** and some external collaborator.



Our headquarters are in a modern building, hosting the administrative offices, and the three departments of **design, production and software**.



Electronic laboratories
They are daily used for assembling and testing custom boards and for the wiring of the developed robots.



Mechanical workshop
It is equipped with all the machine tools required for realizing prototypes and test mock-ups.



150 cubic metres pool
It is used for validating robots before going at sea, and for carrying out dedicated experiments on sensors and acoustic tools within a controlled environment.



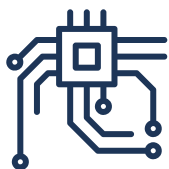
Pressure chamber
To test the water tightness and the pressure tolerance of realized systems up to 50 bars.

Skills



MECHANICAL DESIGN

Our mechanical designers are highly experienced in designing innovative underwater and maritime mechatronic systems.



ELECTRONIC DESIGN

We design customized electronic boards for the control system of our robots.



SOFTWARE DESIGN AND DEVELOPMENT

We produce real-time software and embedded systems for controlling the robots, as well as multi-platform graphical user interfaces for interacting with the robots and for mission planning and monitoring.



SYSTEMS INTEGRATION

we do in-house integration of systems by performing assembly and wiring activities and by carefully planning and executing intense validation tests in lab and in our pool, before the final campaigns at sea.



Our products

All the available products can be delivered in their standard configuration or can be tailored to the specific needs of the customer, thanks to the modularity of the mechatronic designs and to the flexibility of the control software on board.

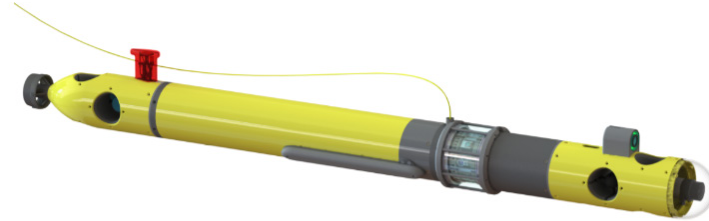
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1 X-300 – AUV

2 MGB-300 – USV

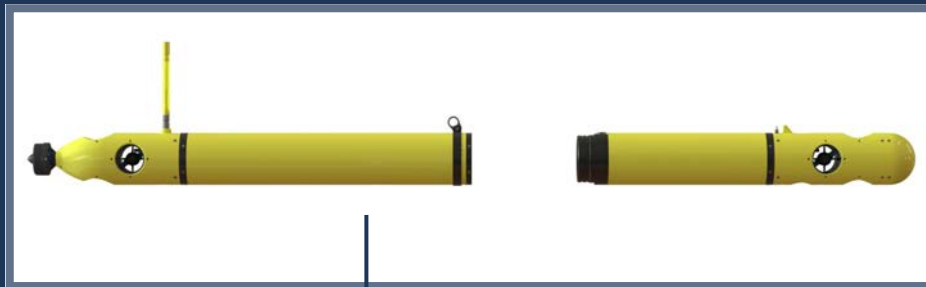
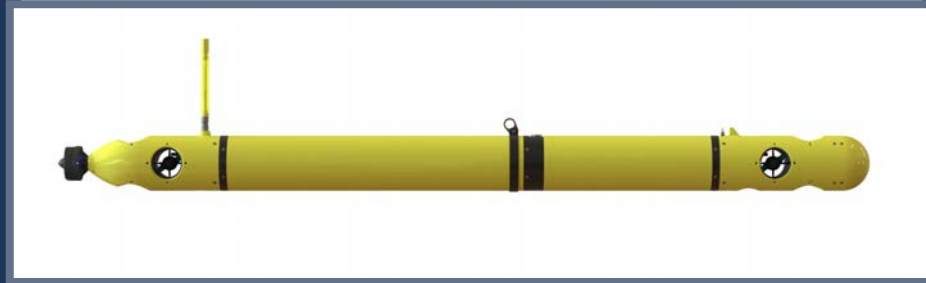
3 X-300 Simulator

4 R-300 – AUV/ROV

5 X-300 Explorer – AUV

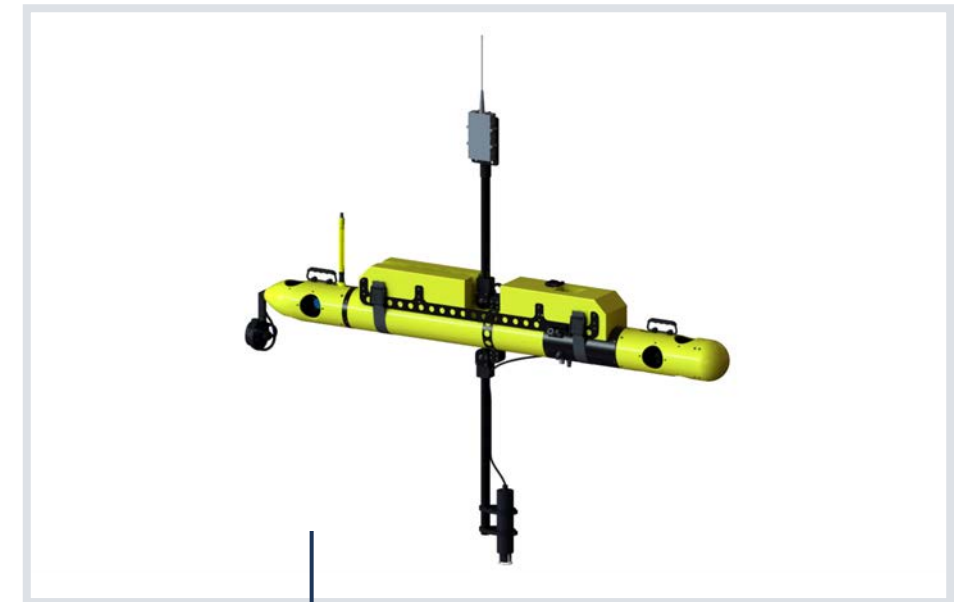
6 UMA-1500 – Manipulator

X-300 – AUV



Lenght	2222 mm
Diameter	155 mm
Weight in air	29 kg (68 lb)
Weight in water	Variable -0.35/+0.35 kg (-0.77/+0.77 lb)
Max depth	300 msw (in AUV mode) ; 150 msw (in glider mode)
Max speed	5 knots
Min speed	0 knots
Endurance	14 hours at max speed in AUV mode, days in glider mode
Batteries	Li-Ion — 14,4V — 1200 Wh
Navigation sensors	GPS, depth-meter, 3D inclinometer
Aditonal sensors	Humidity, temperature, battery level
Mission sensors	User selectable (payload modularity)
Communication	Radio link, Acoustic link (optional)

MGB-300 – USV



Lenght	2044 mm
Height	2017 mm
Weight in air	28 kg
Weight in water	Positive range from 2 to 4 [Kg]
Speed	2 knots (up to 4 knots if required)
Energy storage	Li-Ion batteries 14,4 Volt — 1200 Wh
Endurance	12 hours at max speed
Navigation sensors	GPS, depth-meter, 3D inclinometer
Software	Windows GUI
Communication	WiFi radio Link (short range 1km) UHF radio modem (long range 10Km)

X-300 Simulator

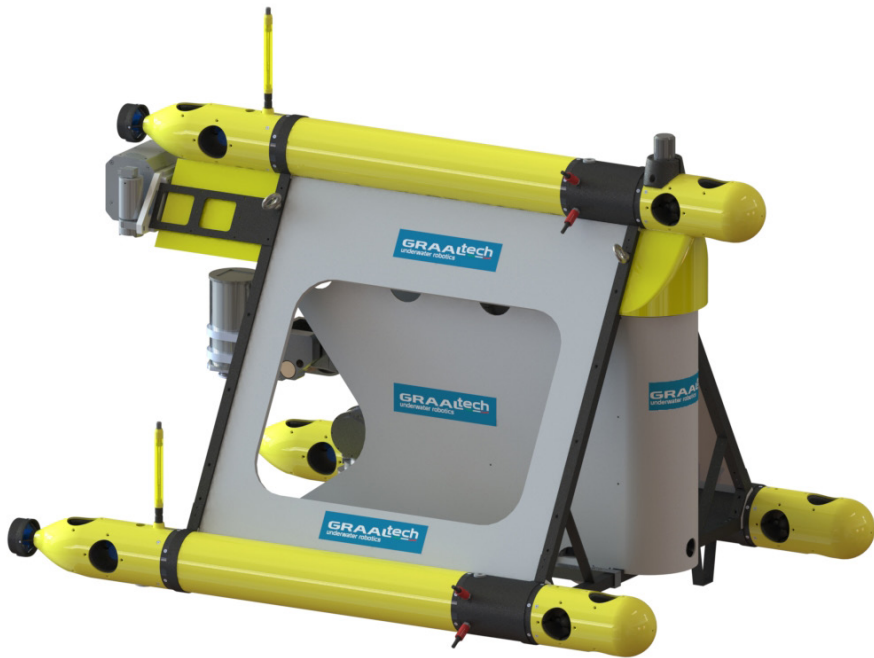
X-300 Simulator is the latest product developed by Graal Tech, aimed at customers that want to experience the use of X-300 AUV without going at sea.

It is a standalone desktop simulation tool, equipped with the same software and the same processing units as the actual X-300 AUV, to accurately replicate the vehicle's behaviour within a digital environment.

An embedded PC hosts the simulative engine, running the dynamic model of the AUV, receiving stimuli from the virtual environment, while the graphic libraries for 3D rendering enable the customer to gain a thorough understanding of what is going on underwater.

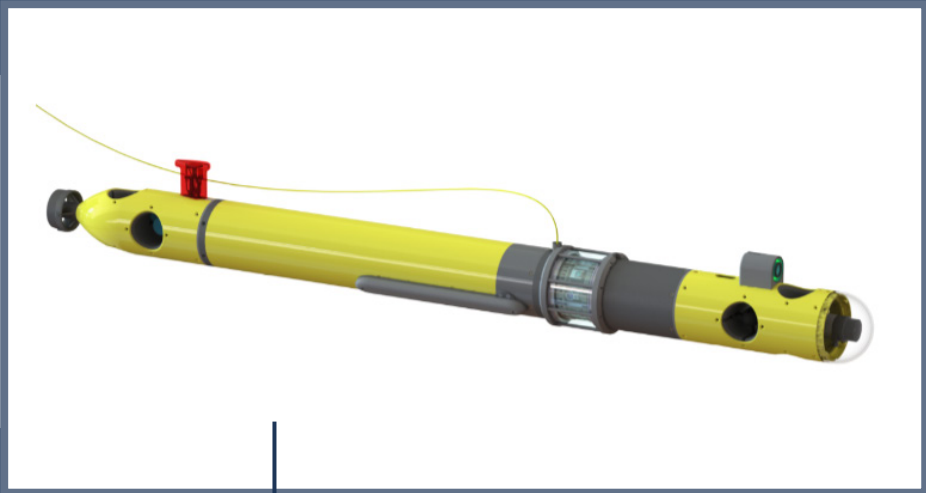


R-300 – AUV/ROV



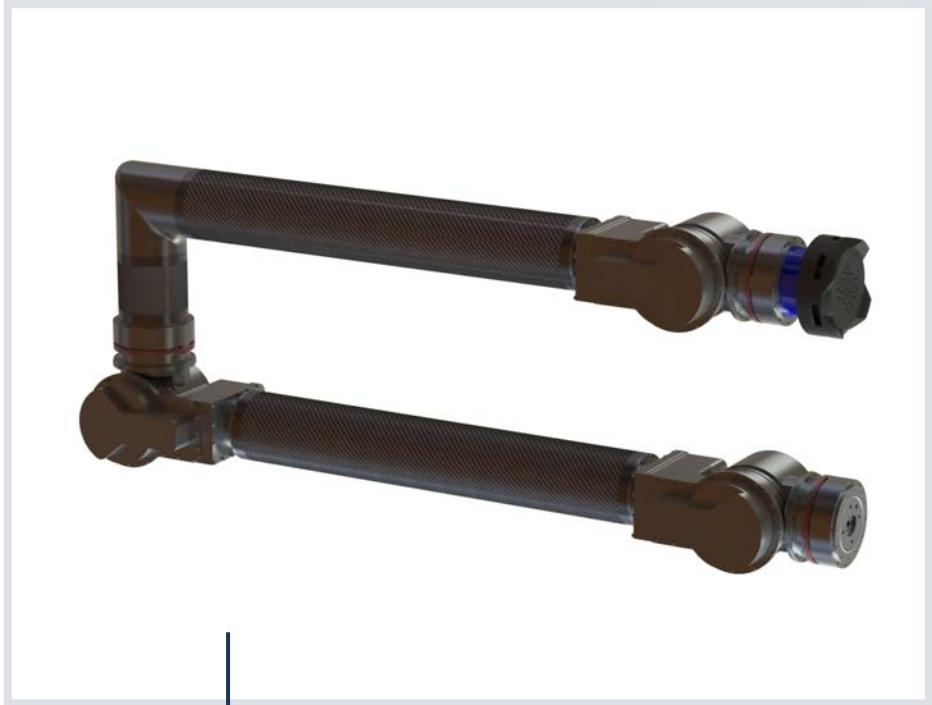
Lenght	2044 mm
Weight in air	180 Kg
Payload capability	60 Kg
Speed	4 knots
Energy storage	Li-Ion batteries 14,4 Volt – 3200 Wh (espandibile)
Endurance	12 hours at max speed
Navigation sensors	GPS, depth-meter, 3D inclinometer, INS
Software	Windows GUI
Comunicazione	WiFi radio Link (Short range 1km), Optical fiber (if requested)

X-300 Explorer – AUV



Lenght	2100 mm
Weight in air	25 Kg
Weight in water	Neutral
Speed	4 knots
Energy storage	Li-Ion batteries 14,4 Volt – 1200 Wh
Endurance	12 hours at max speed
Navigation sensors	GPS, depth-meter, 3D inclinometer, INS
Software	Windows GUI
Communication	Optical fiber
Sensors	Frontal camera, Up / down / left / right camera, Frontal sonar, Side Scan Sonar, acoustic localization (on demand)

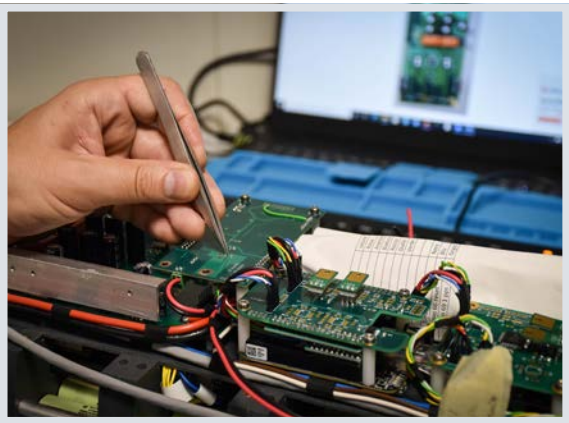
UMA-1500 – Manipulator



Number of axes*	6 (customizzabile)
Lenght*	2 m (customizzabile)
Weight in air*	28 kg (61.8 lbs)
Weight in water*	14 kg (30.9 lbs)
Max depth*	1000 msw
Lifting capabilities*	10 kg (22 lbs) in air
Control system	Embedded servo-boards with joint-level control at 200 Hz
Sensori	Joint position with high resolution, 6-axis force / torque on the wrist (optional), camera on the wrist (optional)
Power	24 Volt, 200-500 Watt (depending on number of active motors)

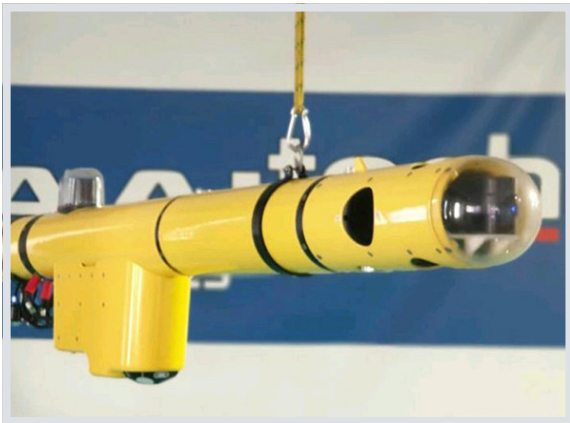
* User selectable. The data is located at the system in the figure.

Our services



RESEARCH AND DEVELOPMENT

Acting as a single R&D performer, or working in multi-partner consortia we are used to participate to challenging research projects on behalf of third parties. Nowadays the company can support its clients to create new mechatronic solutions by handling technical risks and reducing timing and costs. Turning a simple idea into a business opportunity is a complicated process that is carried out through an intense planning, implementing and testing process. Our staff has the necessary competences to support its clients in each stage of the development of the mechatronic solution until its validation at sea.



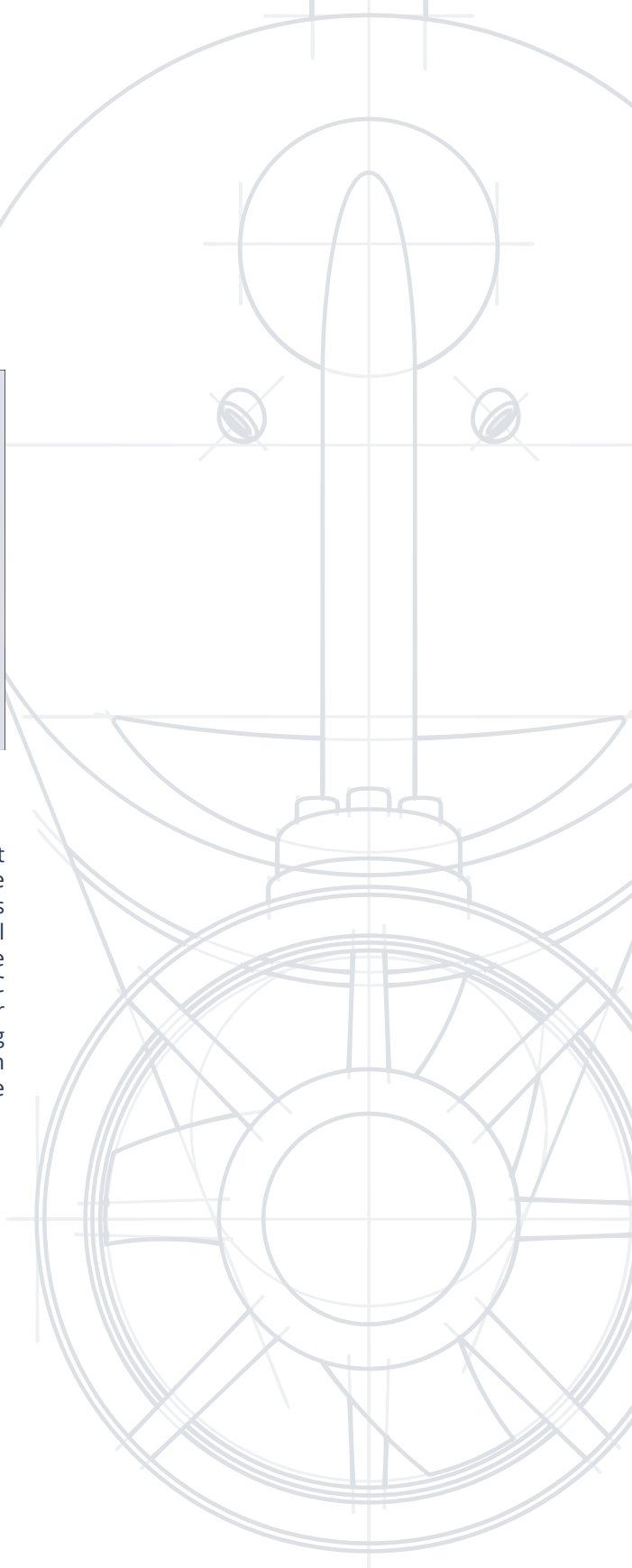
EQUIPMENT RENTAL

Graal Tech provides a rental service of its underwater robotic systems for helping clients in collecting data from the marine environment, performing customized missions at sea, or executing underwater experiments. Customers that instead need to run experiments in a controlled environment can use our 150 cubic meters watertank. Sound generators, hydrophones and recorders are available for acoustic tests. Underwater force and torque sensors can be used for the dynamic characterization of underwater actuators or for hydrodynamic effects on mobile bodies in water.



DYNAMIC MODELLING & SIMULATIONS

Graal Tech can support customers who want to get a mathematical model of an underwater vehicle by setting up and running CFD-based simulations with modern CAD tools. In addition, our virtual software tools allow to test and validate at office complicated missions based on new custom GNC algorithms, or involving multiple vehicles, or requiring sensor-driven behaviours. By identifying and de-bugging major problems at home, an important saving of money is obtained, for the reduced time of means and people at sea.



Business areas

University



Defence



Oil & Gas



Safety



Oceanography



Environmental monitoring



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