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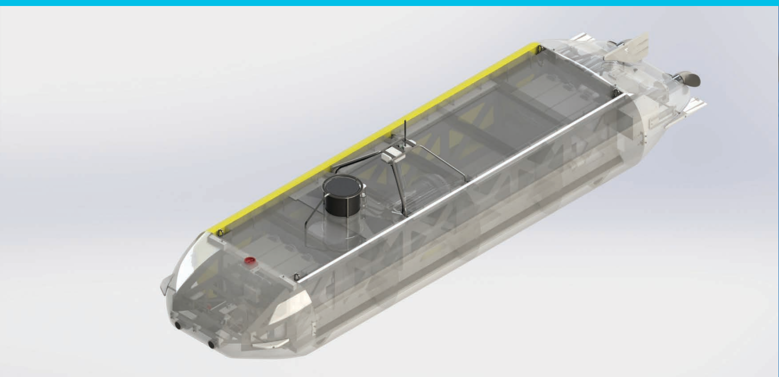

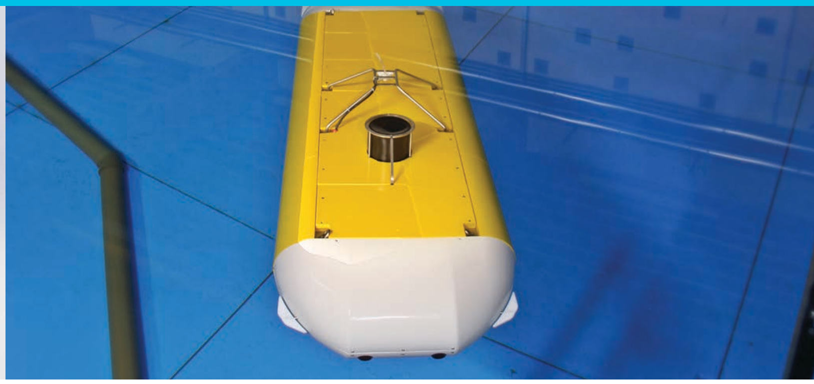

DEEP DIVING AUTONOMOUS UNDERWATER VEHICLE FOR EXPLORATION: “DEDAVE”

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Overview

Exploring the oceans is one of the most challenging tasks today. The scientific community uses autonomous underwater vehicles (AUVs) to understand processes like climate change, to collect water column and ocean floor data and to create bathymetric maps.

AUVs are also attractive to the offshore oil and gas industry to find new resource locations, to survey the sea bottom for pipeline construction operations and to inspect already existing pipelines.

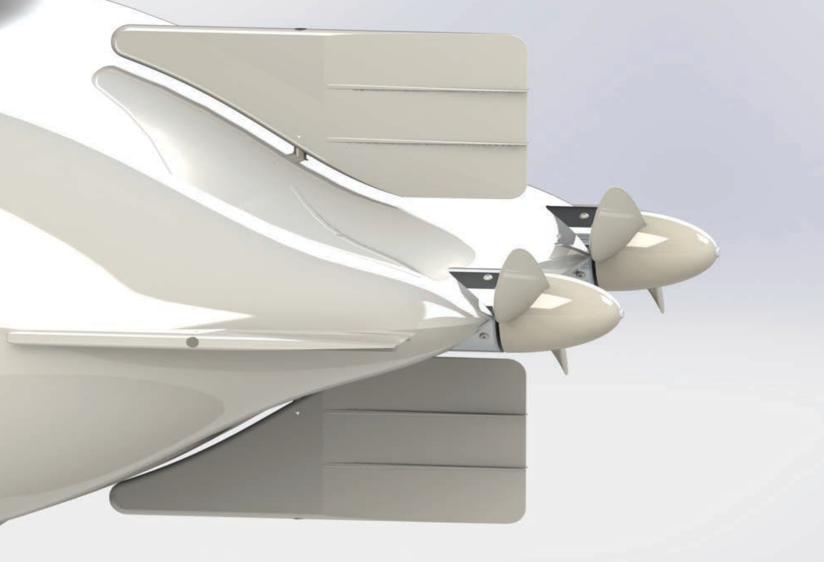
New applications arise from activities like ocean mining and renewable energy generation projects like offshore wind farms. Prospection of potential sites, monitoring of human activities and the inspection of the infrastructure are possible tasks for autonomous vehicles.

AUV DeDAvE

The AUV DeDAvE was developed from 2013-2014 in order to create a versatile, compact vehicle that is easier to handle than existing systems while providing more space for payloads and fast turn-around times. DeDAvE is able to operate in ocean depths of 6.000 meters.

DeDAvE is equipped with state-of-the-art sensor systems, easily exchangeable battery and data storage modules and a distributed control infrastructure. This allows to adapt the AUV to very different mission tasks, to integrate additional actuators (like bow dive planes or thrusters) and to add more battery capacity (into the payload area).

The modular design of the DeDAvE AUV creates a family of AUVs for different diving depths, mission durations and payload requirements.



System concept

The DeDAvE AUV consists of a number of individual sections that hold the different vehicle components.

The bow section contains the obstacle avoidance sensors, one emergency weight drop system and the (optional) diving plane.

By default two energy sections with eight battery modules are located near bow and stern.

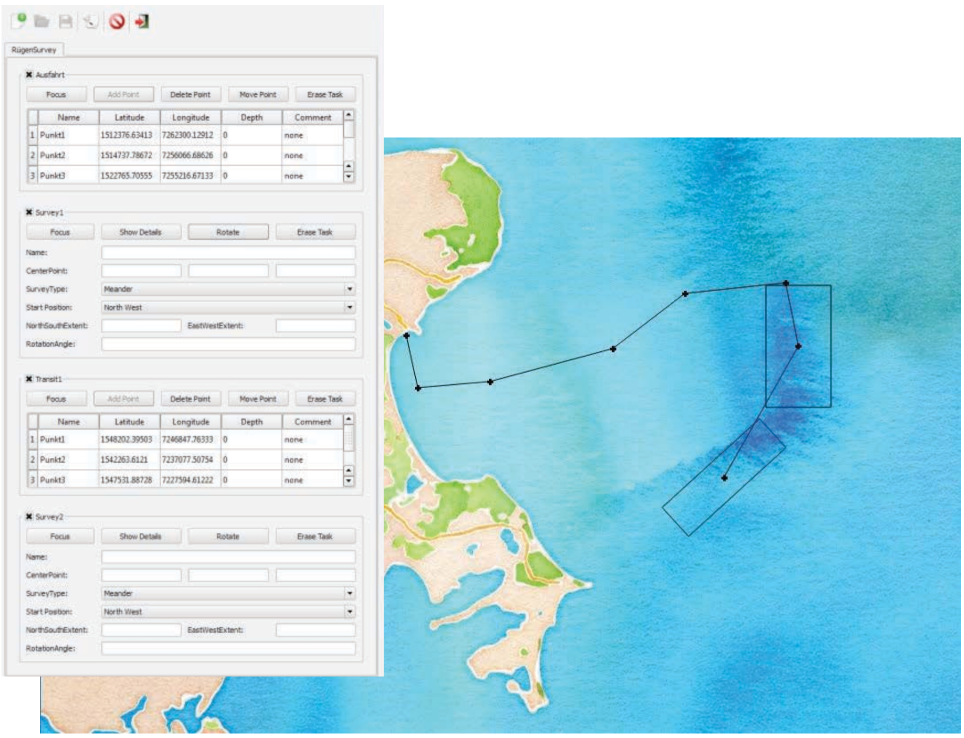
The control and navigation section houses the control computer, the inertial navigation system, an acoustic modem with USBL function, the emergency and communication unit (with backup battery) and a sound velocity sensor.
The AUV prototype carries the following sensors as payloads:

- Multi beam echo sounder (Reson Seabat® T20-S)
- Interferometric synthetic aperture sonar (Kraken AquaPix® MINSAS)

Other payloads can be easily integrated upon request. The AUV can handle Payload interfaces like Ethernet, serial port or CAN bus.

Technical characteristics

- Dimensions: 3.50 x 0.95 x 0.50 m (LxWxH) Weight on air: 675 kg
- Main Battery: ~11 kWh (8 LiPo battery packs)
- Diving depth: 6000 meters
- Deployment time: up to 10 hours
- Acoustic modem range: up to 8000 meters



Mission planning software

The mission planning software is integrated into the Geographical Information System Quantum GIS (Version 2.x) and works as a plugin. Thus, importing many existing map formats (vector and raster data) and planning missions on this material is possible. Using scripts enables the user to add new functionality (like individual maneuvers, tasks, etc.) if necessary.