German Research Center for Artificial Intelligence

AUV DeepLeng

Exploration-AUV for Long-Term Missions

System Description

The autonomous underwater vehicle (AUV) DeepLeng was designed as a long-distance exploration vehicle capable of reaching bathypelagic depths. As the second iteration of the AUV Leng the vehicle's reliability and readiness for undertaking long-term autonomous missions was improved as well as its depth rating, while keeping the overall vehicle design as similar as possible. Its shape was specifically designed to meet the requirements of the Europa-Explorer-scenario: very small diameter (in order to fit into an ice drill) as well as a hydro-dynamically optimized outer hull (in order to reduce energy consumption and enable long-range missions). The vehicle is equipped with a large number of different navigation sensors since localization quality and availability are of key importance. In the Europa-Explorer-scenario the vehicle has to return to its starting position even after having conducted long-distance missions. The vehicle's docking interface allows sub-sea charging of the battery and transfer of mission data. A payload bay allows the AUV to be equipped with mission-specific sensors.

Technical Details

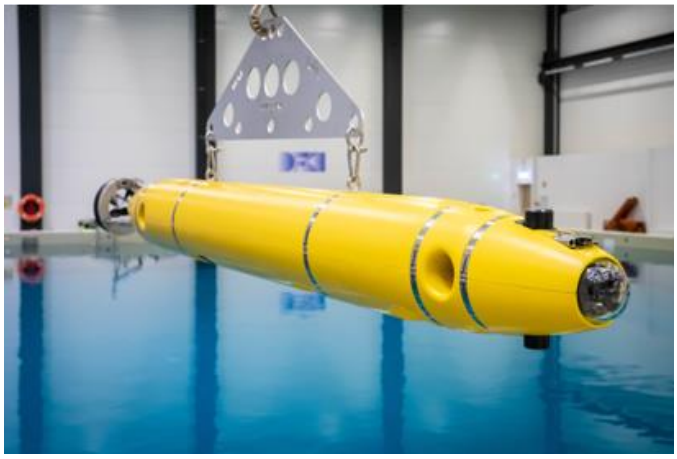
- **Size: Ø 0.28 m x 3.00 m**
- **Weight: 130 kg**
- **Operating depth: 2000 m**
- **Propulsion: Kraken Power hubless main thruster with pan-tilt unit, 2x BlueRobotics thruster for lateral motion**
- **Maximum speed (horizontally): 6 kn**
- **Vertical motion: dive-cell (0.7 l volume)**
- **Battery life: approx. 10 hours**
- **Acoustic Modem: Evologics S2CR 18/34**
- **DVL: Nortek DVL 500kHz**
- **IMU: KVH 1750 3-Axis FOG**
- **Payload: CTD Probe, Multibeam Echosounder**
- **Obstacle-Avoidance: Tritech Micron DST Sonar, Tritech Micron Echosounder**
- **Stereo camera system: 2x Basler acA2440-20gc, 120 mm base-line**
- **Docking camera: 1x Basler acA2040-35gc**
- **Illumination: 4x LED-Flasher, 6800 Lumen**
- **Control: ARM-based system-management-modules, Quad Core Cortex A72 for navigation and Intel i7-PC for image-processing**

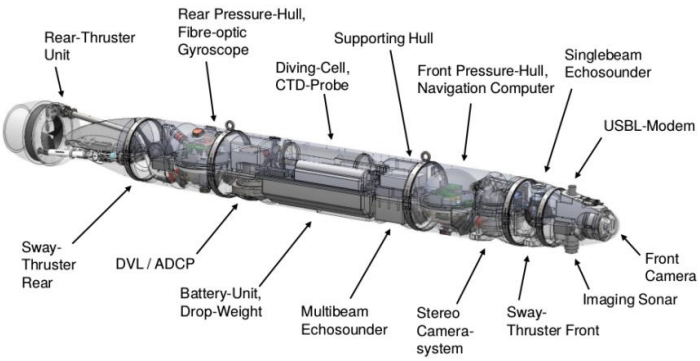
Application Areas: Exploration (Planetary & Arctic)

Projects:

EurEx-SiLaNa
EurEx-Safe Long Term Navigation
(09/2017 - 10/2019)

EurEx-LUNa
EurEx-Persistent under-ice navigation
(03/2020 - 05/2022)





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