

Teredo IceShuttle

Through-Ice-Cap Transfer-Vehicle & Base Station

System Description

The *Teredo IceShuttle* is a robotic probe which is capable to transport a payload through an ice-shield towards an environment located beneath the ice. The System is developed in context of the project *Europa-Explorer*. Here a set of robots are developed to model the exploration of the hypothesized ocean on Jupiters icy moon Europa by an analog mission on earth. Within the scenario the *IceShuttle* transports an autonomous underwater vehicle (AUV) as its payload. The propulsion through the ice is generated by a thermal drill. Besides transportation the *IceShuttle* functions as a stationary base station. It provides a docking interface as well as a set of additional sensors to support the AUV's navigation.

Due to the given requirements and the necessity to carry the AUV within the *IceShuttle* the two systems and their design are highly integrated and adjusted towards each other.

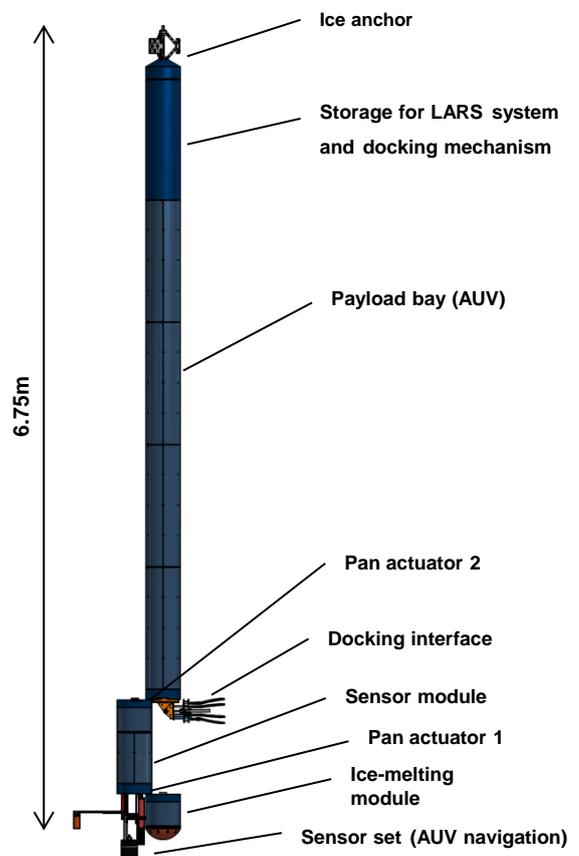


Application: Exploration (Planetary & Antarctic)

Projects: EurEx
Europa-Explorer
(12/2012 - 04/2016)

Technical Details

- **Size:** Ø 0.28 m x ca. 6.75 m (in development)
- **Weight:** ca. 160 kg
- **Propulsion:** thermal drill, thermal power 3.6 kW (ice-melting tip using 6 x 600 W cartridge heaters), drilling rate ca. 0.8 m/h
- **Sensors (AUV navigation):** Evologics S2CR 48/78 USBL, Sea & Sun Marine Tech SV48-6000 (CTD-Sensor), RJE International ULB-350 (acoustic beacon)
- **Two modules rotatable around an excentric axis to enable different functions and states of the vehicle:** propulsion using the thermal drill; deployment, launch and recovery of the AUV; deployment of the sensor set; docking mode
- Linear deployable sensor set (AUV navigation)
- **Docking interface:** data exchange and possibly energy transfer
- **LARS system:** deployment, launch and recovery of the AUV (payload bay to exploration environment)
- Heatable hull, to avoid the system to become icebound (development)
- Ice anchor to enable a final stationary position
- Tripod and winch system on the surface



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