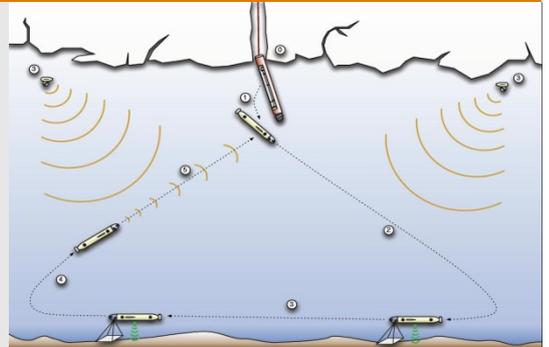


Europa-Explorer

Autonomous exploration of Jupiter's ice moon Europa



The AUV Leng, for the project Europa-Explorer



Schematic overview of a possible mission scenario

An analogous mission as preparation for future explorations of Europa

The project Europa-Explorer is a pilot survey for future missions to Jupiter's moon Europa. It focuses on the aspect of navigation of robotic systems on and especially under Europa's surface. Below Europa's ice shield (thickness between 3 and 15 kilometers) an ocean comprised of liquid water is expected. For the exploration of this ocean a fully-autonomous system is necessary due to the long run-time of communication from earth to Europa (33 to 53 minutes).

The project Europa-Explorer will create a feasibility study for such a mission in a terrestrial scenario. Its main aspects are navigation under ice and integration of a functional complete exploration system out of the necessary components. A potential real mission is to be drafted together with the Max-Planck-Institute for Solar System Research. In a two step process first the expected environmental conditions on Europa will be researched, which are the basis for validation experiments in terrestrial environments. In the second step the realizability of the drafted mission with respect to the usability of the build exploration system will be revised in detail. During the second step a possible concept for a full mission (including transit to Europa and landing) will be sketched.

For the evaluation of the developments of this project an exploration-AUV and an ice-drill including a payload-section will be integrated as experiment platforms. The necessity for development of a new system lies in

the high order of specialization of the two components: autonomous ice-drilling is a new area of research, especially with an integrated system including a payload system which is not available off the shelf. Regarding the AUV the problem is the specific necessity of a vehicle with small diameter (it needs to fit into the payload section of the ice-drill) with highly-specialized sensors for the exploration under ice – which in this combination are not available on the market, since typically under-ice-exploration AUVs are significantly bigger.

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