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TRIPLE-IceCraft - A retrievable melting probe for transporting scientific payloads

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Within TRIPLE, initiated by the DLR Space Administration, Technologies for Rapid Ice Penetration and subglacial Lake Exploration are being researched. The TRIPLE scenario is divided into three components and aims to explore the subglacial ocean of the Jovian moon Europa. The first component is a melting probe which penetrates the icy shield and navigates to the ocean below. It anchors itself at the ice water boundary and releases the second component into the water: The nanoAUV, a small autonomous submarine, will explore the ocean, identify points of interests and take samples. The samples will be transported back to the melting probe and then processed and analysed by the AstroBioLab, the third component.

We present the concept of the TRIPLE-IceCraft, a melting probe which is currently in development. It will be a modular bus system for transporting standardized payloads through ice. The current design will be suitable for the transport of a scientific payload through several hundred meters of ice penetrating into an ocean or subglacial lake and later return to the surface. For the demonstration the TRIPLE-IceCraft aims for an analog scenario at the Ekström Ice Shelf in Antarctica in 2022.

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