

TRIPLE AND THE RETRIEVABLE MELTING PROBE TRIPLE-ICECRAFT

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Prime targets in the search for extraterrestrial life are the subsurface oceans of icy moons in the outer Solar System (Klenner 2024), particularly Jupiter's moon Europa and Saturn's Enceladus. Future space missions to explore these ocean worlds are of great interest, and a proposed mission scenario includes landing on the surface, penetrating through the massive ice shell with a melting probe, and diving into the ocean with a miniaturized autonomous underwater vehicle that collects samples to identify potential habitats. To facilitate such missions, key technologies are developed within the TRIPLE project (Technologies for Rapid Ice Penetration and subglacial Lake Exploration), initiated by the German Space Agency at DLR. The project focuses on developing technologies capable of exploring Europa's subglacial ocean, beginning with technology demonstrations in Antarctica. The authors central effort is the development of the TRIPLE-IceCraft melting probe (Heinen 2021), a modular payload carrier system designed to traverse several hundred meters of ice to access subglacial water reservoirs and return to the surface. The TRIPLE-IceCraft has undergone testing in an analogue environment on the Ekström Ice Shelf in Antarctica during 2023 and 2024. This talk will provide an overview of the TRIPLE project and present the design of the melting probe TRIPLE-IceCraft.

References

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