



## **Deep Sea Crawlers for scientific Applications – an Overview about the State-of-the-Art**

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Crawlers are specialised vehicles that allow for underwater intervention by staying in direct contact with the seafloor. These are completely different operating conditions as compared to free flying underwater vehicles. In particular one can expect from this vehicle concept that it offers a very stable platform for conducting delicate measurements at the interface of seafloor and the water column. Additionally, crawlers lend themselves to long term observations with passive phases where the system can go into sleep mode. In space sciences crawlers are already well established platforms and have proven their capabilities in several MARS missions successfully. For ocean sciences there are still a number of technical problems that have to be solved before a widespread use of these types of platforms can be expected.

The attractive properties of crawler systems led to several attempts in the development of wheeled or tracked vehicles. It is still an open discussion which type is better suited for underwater application. Also, due to the lack of experience with these types of platforms in the ocean, potential areas of application have not been investigated systematically. The current motivation is mainly science driven but one can also foresee applications in offshore industry like pipeline inspection.

The focus of the paper lies in the evaluation of propulsion concepts and their possible realisation. As the soil properties in most parts of the world oceans are unknown a concept has to be developed how to predict the performance of crawler systems under different conditions. A wheel performance model has been developed at DLR in the context of MARS rovers which can be used to optimise the propulsion system of underwater crawlers. Investigations of different soil material will be conducted and

used as an input to the DLR model. These investigations will give a guide for further development steps in establishing crawlers as a tool that can play a role similar to that in space sciences.