

Robotic Underwater Salvage and Disposal Process with the Technology to Remove Explosive Ordnance in the Sea, in Particular in Coastal and Shallow Waters

The goal of this collaborative project is to develop an economically viable process and corresponding equipment, ideally suited for use in coastal and shallow waters, that will be able to uncover and identify detected objects as well as dispose of explosive ordnance under water, fully automatically and without detonation. For this purpose, a supply platform with a low-cost WROV and processing unit will be developed and deployed.

This project is realized by automatic Klein GmbH, the Fraunhofer Institute for Chemical Technology, Heinrich Hirdes EOD Services GmbH (Coordinator) and the Institute for Infrastructure and Resources Management of Leipzig University.

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Photo by Randy Kühn/Universität Leipzig

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Photo by Heinrich Hirdes EOD Services GmbH

Research Project OffVali

Conception and Development of an Offshore-Validation Procedure and a Commercial Testing Ground

A sub-project of
RoBEMM



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OffVali

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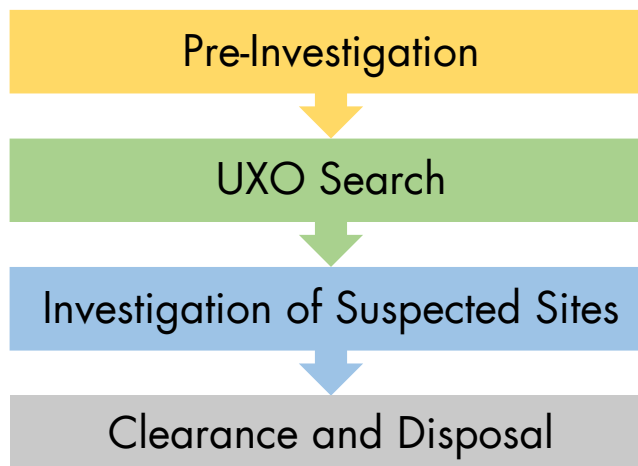
The purpose of OffVali is to develop a quality guideline for the detection, clearance and disposal of offshore unexploded ordnance (UXO).

A holistic quality guideline is key for the establishment of a standard for the procedure of handling offshore UXO in Germany. The 4-Phase-Model breaks down the process of handling offshore UXO into its distinct phases and serves as a basis for:

- The identification of the involved stakeholders and the documentation of their requirements and obligations.
- The elaboration of the detailed process steps taking place during each of the phases.
- The determination of requirements for preparation, documentation, communication and execution for individual processes.
- The establishment of a register, containing technical quality indicators and threshold values that are relevant for offshore UXO projects.

Concurrently, a commercial testing ground is conceptualized. This testing ground will serve to evaluate, validate and certify existing as well as new technologies and procedures with the help of investigation parameters.

4-Phase-Model



Pre-Investigation

- Reconstruction of historic events
- Environmental conditions
- Risk assessment

UXO Search

- Selection of survey technology
- Execution of technical survey
- Data evaluation and interpretation

Investigation of Suspected Sites

- Retrieval of suspected site
- Inspection and identification of suspected objects

Clearance and Disposal

- Evaluation of handling and transport safety
- Detonation, delaboration or disarming
- Salvaging and disposal

The Challenge

Unexploded ordnance (UXO) in German territorial waters and the German exclusive economic zone is mainly a legacy of the two World Wars. The industrialization of war made the mass production of high explosives possible and the technological developments of the time lead to an intensification of both naval and aerial combat. In addition, a great amount of unutilized ammunition was dumped into the sea in the aftermath of the Second World War, as an easy and economic way to disarm Germany.

This UXO constitutes a challenge during the construction of infrastructure in the North and Baltic Seas, including drilling rigs, pipelines, wind parks and cables that connect not only the infrastructure to the land, but also the abutters to each other. At times, UXO is accidentally recovered by fishing vessels, thereby causing a hazard to the fishermen working aboard. Furthermore, washed up UXO or parts thereof could lead to catastrophic accidents harming coast dwellers or tourists.

The liability of submerged UXO has therefore been identified to be a source of impairment for sustainable development in the North and Baltic Seas.