28.08.2025

The MMinE-SwEEPER project, "Marine Munitions in Europe: Solutions with Economic and Ecological Profits for Efficient Remediation,"

Program: Horizon Europe (Cluster 3: Civil Security for Society)

Implementation period: 2024–2028 (42 months).

Total budget: €5.9 million

Project website: https://mminesweeper-munition.eu/.

Project Objectives:

The MMinE-SwEEPER project addresses one of the biggest environmental and security challenges in Europe: the presence of conventional and chemical munitions that were sunk in the seas after World Wars I and II. These unexploded ordnances (UXOs) endanger shipping safety, public health, and marine ecosystems.

The project focuses on developing modern technologies for detecting, classifying, and neutralizing naval munitions. It also aims to create a secure data exchange platform and build a European network of knowledge and expertise in this area.

Project Consortium:

Twenty-one partners from seven EU countries and two associated countries are implementing the project. These partners represent the scientific community, the military, border services, industry, and international organizations.

Main partners:

- Fraunhofer Gesellschaft zur Förderung der Angewandten Forschung e.V. (GEOMAR) – Germany
- Aarhus University – Denmark
- Institute of Oceanology, Polish Academy of Sciences (IOPAN) – Poland

- Vlaams Instituut voor de Zee (VLIZ) – Belgium
- Universitetet i Tromsø – Norges Arktiske Universitet (UiT) – Norway
- Service Hydrographique et Océanographique de la Marine (SHOM) – France
- Consiglio Nazionale delle Ricerche (CNR) – Italy
- Seaterra GmbH – Germany
- north.io GmbH – Germany
- IQUA Robotics Sociedad Limitada – Spain
- Forsvarets forskningsinstitutt (FFI) – Norway
- École Royale Militaire – Koninklijke Militaire School – Belgium
- Landeskriminalamt Schleswig-Holstein – Germany
- Bundespolizei – Germany
- Wyższa Szkoła Straży Granicznej (WSSG) – Poland
- The Baltic Marine Environment Protection Commission (HELCOM) – Finland
- Joint Programming Initiative on Healthy and Productive Seas and Oceans (JPI Oceans) – Belgium

Supporting partners:

- Wehrtechnische Dienststelle für Schiffe und Marinewaffen (WTD 71) – Germany
- Cranfield University – United Kingdom
- Forsvarsdepartementet – Norway

Scope of Research: Work Packages (WPs)

The project consists of 12 thematic work packages and two horizontal ones: coordination and ethics.

WP 1: Stakeholder Dialogue and Co-Design (HELCOM)- engages stakeholders from various management levels — administration, NGOs, the public sector, and industry — to identify their specific needs. WP1 collaborates with all the other work packages to ensure that the research and technological activities align with the actual expectations and requirements.

WP 2: Responsibility, Risk Assessment, and Decision-Making (Aarhus University)- describes the roles and responsibilities of entities involved in marine munitions management in the EU and associated countries. The workgroup considers legal and practical aspects and analyzes approaches to risk assessment.

WP 3: Detection and Identification of Munitions on the Seabed (FFI) - develops methods and best practices for using MBES, SSS, and SAS sonars on ships and AUVs. The workgroup develops technologies for classifying objects from images, including 3D reconstructions and advanced processing of hydroacoustic and optical data.

WP 4: Detection and Classification of Munitions buried under the Seabed (RMA) investigates the feasibility of detecting buried munitions in marine sediments. The project covers magnetic, LF-SAS, sub-bottom profiling (3D-SBP), and electromagnetic methods. The goal is to develop effective techniques for detecting and classifying buried objects.

WP5: AI and Secure data management (North.io) - focuses on two areas:

1. Developing artificial intelligence algorithms that support the detection, classification, and identification of ammunition based on sonar and image data.

2. Creating a secure data exchange infrastructure based on the TrueOcean platform that enables the analysis, collaboration, and storage of sensitive information in the cloud.

WP6: Autonomy of AUV/USV vehicles (UiT) - aims to develop real autonomy for underwater (AUV) and surface (USV) vehicles, enabling them to perform cooperative, adaptive, and safe missions.

WP 7: Removal of Ammunition Using a Grab Method (SeaTerra) - will develop technologies and specialized tools, including grapples, for the faster and safer lifting and transport of munitions from the seabed.

WP 8: Environmental monitoring of chemical contaminants (GEOMAR) - collects and expands data on levels of chemical compounds from munitions in EU coastal waters. The work package develops in situ platforms and technologies for detecting explosives and warfare agents.

WP 9: Evaluation of UXO remediation methods (FHG-ICT) - investigates and compiles methods for neutralizing individual objects and entire ammunition fields, as well as strategies for monitoring chemical contamination during cleanup operations.

WP10: Testing and Demonstrations (GEOMAR) - evaluates the technologies developed in WPs 3–8 during field campaigns in known and new areas. Testing includes experimental research and cleanup operations conducted by project partners.

WP 11: Integration of Best Practices and Educational Materials (IOPAN) - compiles knowledge and results from previous work packages (WPs) to develop training materials,

datasets, and historical analyses. The goal is to develop expertise and prepare tools for future use in Europe.

WP 12: Communication, Knowledge Transfer, and Competence Building (JPI Oceans) - promotes the topic of naval munitions at the national and international levels. It is responsible for information activities, knowledge transfer to key stakeholders, and developing the Munitions Portal as a European knowledge center.

WP 13: Coordination and Management (GEOMAR)- is responsible for effectively implementing the project, providing organizational oversight, and ensuring ethical compliance.

Munitions Portal: European Knowledge Base

This project involves developing the Munitions Portal, which is set to become the primary source of information on naval munitions in Europe. Created as part of the JPI Oceans initiative, the portal was launched during European Maritime Day 2024.

The portal's mission is to collect data, best practices, and educational materials, and to promote international cooperation by establishing a Knowledge Hub of experts.

Portal: www.munitionsinthesea.eu