NATO SPS PROJECT MODUM

Towards Monitoring Dumped Munition Threats



MODUM project is financed by the NATO Science for Peace and Security programme. It unites 8 Institutions from Poland, Russia, Canada, Germany, Lithuania, Estonia, Sweden, Denmark and Finland. The goal of the project is the development of cost-effective and accurate methods for surveying, identifying and onboard analysis of dumped chemical munitions.

Dumped Chemical Weapons pose an actual environmental and security hazard in the Baltic Sea Region. Their actual positions are unknown, and pollution originating from corroded munitions can only be roughly estimated. Nowadays, with more and more Industrial Activities being performed in the Baltic Sea Area, the threat level is rising. The dumping operations occurred shortly after World War II and included captured German

munitions. Operations with munitions from the Soviet occupation zone were performed by the Soviet Navy, operations with munitions from British and American occupation zones were performed in areas outside of the Baltic Sea (Skagerrak Strait); the fate of munitions from the French occupation zone was never reported. Due to difficult legal status of these munitions, and high costs of remediation and retrieval, removal of these weapons from the bottom of the Baltic Sea seems unlikely in the foreseeable future. Location of munition dumpsites is shown on Figure 1. Nevertheless, environmental and security challenges created by dumping operations need to be addressed by Baltic Sea countries. A possible low-cost solution is the creation of a monitoring network, providing information about exact locations and the environmental threat posed by sea dumped chemical weapons (CW).

The project is directed jointly by Dr. Jacek Bełdowski from the Institute of Oceanology, Polish Academy of Sciences, and Professor Vadim Paka from the Shirshov Institute of Oceanology, Atlantic Branch, Russian Academy of Sciences. The other institutions involved include:

- 1. Aarhus University, Denmark
- 2. Thünen Institute of Fisheries Ecology, Germany
- 3. VERIFIN, Finland

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- 4. International Dialogue on Underwater Munitions, Canada
- 5. Swedish Defence Research Agency, Sweden
- 6. Lithuanian Environmental Protection Agency, Lithuania
- 7. Tallin University of Technology, Estonia

Project end-users include the environmental protection agencies of Poland and Russia, and the maritime administration of Poland, namely:

- 1. Maritime office Gdynia, Poland
- 2. Chief Inspectorate for Environment Protection, Poland
- 3. Ministry of Natural Resources and Environment of the Russian Federation, Russia
- 4. Ministry of Emergency Situation of the Russian Federation, Russia

The project aims to establish a monitoring network to observe Chemical Weapons dumpsites in the Baltic Sea, using Autonomous Underwater Vehicles (AUVs) and Remotely Operated Underwater Vehicles (ROVs), and utilising the existing research vessels of partner institutions as launching platforms. The AUV survey is based on the IVER2 platform by OceanServer, equipped with Klein 3500 side-scan sonar. The identification phase utilises several ROVs, equipped with targeting sonars, acoustic cameras capable of penetrating turbid bottom waters up to 20m, and visual HD cameras. A novel sediment sampling system, based on a camera and sonar equipped cassette sampler, has been developed to obtain surface sediments. The project consists of a test phase, which will involve choosing the best available solutions for the difficult Baltic Sea environment, a survey phase, which will locate the actual objects concerned, and a monitoring phase, which will concentrate on the collection of environmental data close to the objects concerned.

Three areas of concern were selected as study sites, differing in types of ammunition dumped and environmental settings. They are located in Gotland Deep, Bornholm Deep and Flensburg Fjord. The first two sites are deeper, ranging from 80 to 120m, while Flensburg Fiord is shallower, ranging from 12 to 40m. Deep sites are located offshore, which requires rugged survey and sampling equipment, while Flensburg Fiord is characterised by high velocity currents (up to 3 kn). Such variability requires careful selection of tools and ships, to be able to properly address all the challenges encountered.

The project will provide a solution for expanding such a network to all areas of concern in the Baltic Sea area, and other seas of concern. Monitoring activities performed will include habitat status evaluation, fish health studies and modelling of possible threats to adjacent areas. So far, a detailed survey of Gotland Deep site has been performed, revealing the existence of several bomb-like targets in an area where previous projects detected only a single bomb and traces of degraded warfare agents in sediments. This means that observed sediment pollution may originate from several diffuse sources rather than from a single source. This knowledge may be critical for future monitoring of this area.

Biological surveys include cod health studies, as these provide a direct link between pollution and commercial fish stocks. To that end, a special scientific fishing vessel was used –Walther Herwig III, owned by Johan Wolfgang von Thünen Institute. Preliminary results point to some adverse effects on fish health in the Bronholm Area, but it is too early to definitely ascribe these effects to pollution originating from dumped munitions.

Because of very high costs of underwater research, core activities performed within the project will provide only limited information, but of a quality that will provide stakeholders with the ability to make well-founded decisions in addressing the security threat. At the same time, the project co-directors will seek national and international funds to further expand the level of detail of the performed investigations. Implementation of the project – meaning the creation of a long-term monitoring network covering all Baltic CW dumpsites - will be dealt with after successful project execution. As the costs of this solution exceed the funds available in the SPS Programme, other agencies (such as UNEP and EU) will be approached for the funding of this stage.

Data obtained during the project will be stored at IOPAS, a datacentre constructed especially to provide fast access to large sonar files, and will be available to stakeholders from the Baltic Sea area and NATO. This will help relevant stakeholders to design a monitoring network to cover all the Baltic dumpsites, and may also be used as an aid to decision making with regard to selective remediation strategies in areas where the existence of munitions creates adverse effects for the ecosystem or conflicts with the maritime economy.

https://www.hydro-international.com/content/article/towards-monitoring-dumped-munition-threats