

## Historical Torpedo Proving Ground on the Puck Bay and Polish Navy Control and Measurement Unit

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*This article briefly presents a description of the historic use of the Puck Bay area to test military equipment, and the history of the Polish Navy Control and Measurement Unit, main tasks and facility. The aim of this presentation is to bring together participants in the symposium of the general background of activities in the area of hydroacoustics many times presented previously. In addition, the present symposium is devoted to the memory of Capt. Ignacy Gloza, who has served here for many years. Finally, the traditional annual tour organized during the symposium this year took place in the waters of the Puck Bay, and one of the aims of this presentation is to bring the participants closer to what they see.*

**Keywords:** history of Puck Bay, ships signatures history, signature ranges

### 1. Introduction

Two Hitlerian torpedo research facilities operated in the area of occupied Poland. Both of them were located in Gdynia. The first, Torpedoffenplatz Hexengrund in Babie Doły was a research center of the Luftwaffe. The second, Torpedo Versuchsanstalt Oxhöft in Oksywie, was a research center of the Kriegsmarine. Both were connected by a narrow gauge railway, running along the beach from the port of Oksywie to the research center in Babie Doły. The Torpedowaffenplatz worked mainly on aerial torpedoes and Torpedo Versuchsanstalt worked mainly on acoustic torpedoes.

Both research facilities are identical in design. The one at Oksywie was put to use in early 1940. During the same year, it was decided to build a second twin building for the Luftwaffe, which was ready to serve in 1942.

The building had an assembly plant and a technical-engineering room. It also had an observation tower which allowed monitoring of the track of the fired torpedo. At the bottom of the bay was a hollow corridor in which the torpedo was moving. Launched test torpedoes were fished up by the Warships, and in the next step were analyzed in the research facilities. Torpedo Warehouse in Babie Doły was connected with the mainland by a long pier which was used to transport torpedoes.

In 1945, German troops were evacuated from both research facilities to Hel. After the war, the building of the torpedo warehouse in Oksywie was used for military purposes. The other object - belonging to the Luftwaffe - changed into ruin. The building was never reconstructed in any way or secured, so it got damaged, mainly as a result of storms. Over time, the front wall of the building slumped into the sea. Remains of the wooden landing stage were blown up by the Polish Navy in the mid-1990s. The building is not accessible for the public, however it is sometimes used as a background object in films.



Fig. 1. Former Luftwaffe torpedo warehouse current state. Photo by K. Kaminska.

## **2. The history of establishing Measurement and Control Range of The Polish Navy**

The torpedo training ground was the embryo of the present unit and was formed in 1960. On the basis of the order from 1964 of the Chief of General Staff, The Commander of the Polish Navy issued an order to create the Torpedo Range of Polish Navy, in the already existing Torpedo Range place. The unit received an exact number and became a separate military unit.

On the basis of the order from 1972 of the Chief of General Staff, The Commander of the Polish Navy issued an order to create the Measurement and Control Range of The Polish Navy in the existing Torpedo Range of the Polish Navy place, Coastal Magnetic Range and Magnetic Field Measurement Range.

The commander of the newly formed unit was designated Lt Cdr Jan HANYŻ. In the same year, in the structure of the training ground, was created Hydroacoustic Field Measurement and Control Range and Pressure Measurement and Control Range.

The passing years brought further development. Next measurement and control range were created. Their aim was to give the possibility to measure electric field, heat field, radar cross section and diagnostic range.

A number of researchers working on hydroacoustics have served in this unit. Among them are Prof. Eugeniusz Kozaczka, MSc Leszek Milanowski, MSc Stefan Malinowski, Capt. Ignacy Gloza and Dr. Karol Listewnik [1, 2, 3, 4].



Fig. 2. Former Coastal Station of the Demagnetization of Ships. Second from left Lieutenant Ignacy Gloza, 1990. Photo by K. Listewnik.

In July 2006, the military unit was transferred to a new building where the Coastal Magnetic Range and Diagnostic Range is currently located (Fig. 4.).

On July 1, 2007, the commanding officer of the Measurement and Control Range was appointed Lt Cdr Jerzy SPATUŚKO.

### 3. The main task and basic equipment of the Polish Navy Control and Measurement Unit

The Measurement and Control Range of the Polish Navy is a combat support unit designed for the planning and implementation of measures related to the measurement and minimization of physical fields and the degaussing of Warships.

The Tasks of The Measurement and Control Range:

- Collaboration between The Measurement and Control Range and Warships
- The Measurements of Warship's signatures
- The Optimalization of parameters of Warship's physical fields
- The Analysing of Warship's physical fields
- Improving of passive defense

There are many types of physical fields, but in the Polish Navy we only take care of those: magnetic, electric, infrared, hydrodynamic, hydroacoustic and radar cross section.

The main sources of the physical fields of the warship are presented on Fig. 3.

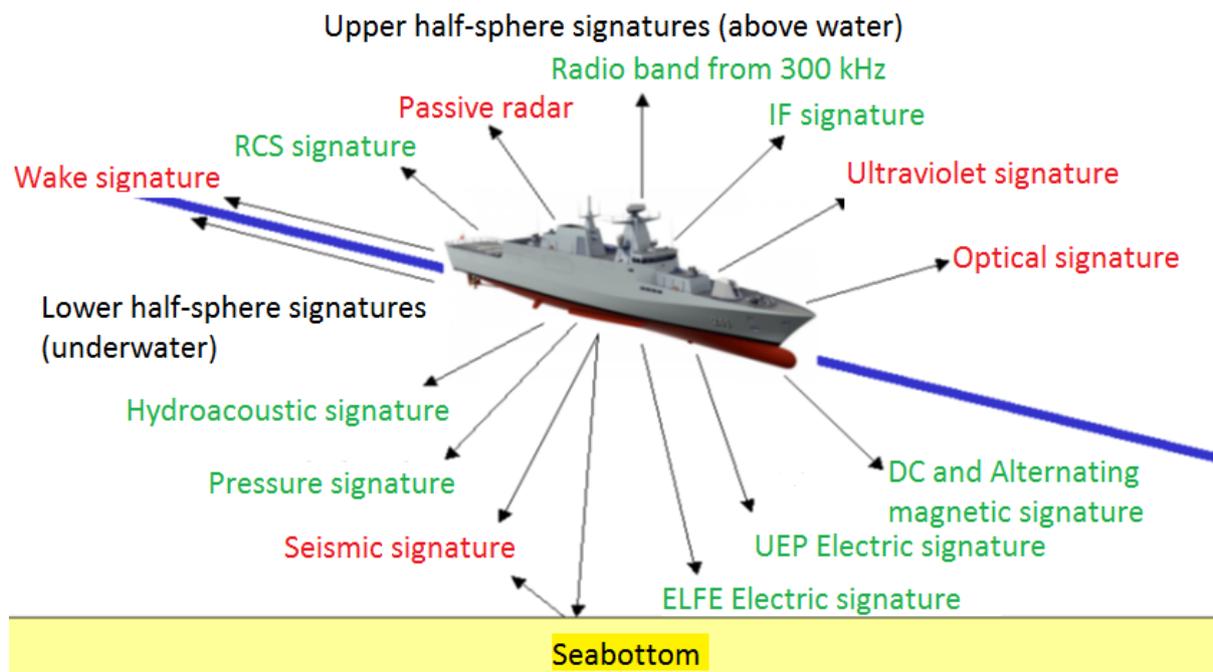


Fig. 3. The main sources of the ships' signatures.



Fig. 4. View of the operator console at the new Coastal Station of Demagnetization of Ships, 2017.  
Photo by K. Kaminska.

The Coastal Magnetic Range is designed for degaussing of Warships, and for measuring parameters of warships magnetic field by using mobile magnetometers and multi-sensor magnetometers. The Coastal Magnetic Range is used for analyzing and archiving the parameters of the physical fields of Polish Navy Warships, and the marine environment.

The Diagnostic Range enables the making of control measurement of the magnetic sensors and probes, in order to compare their parameters with the pattern. The Diagnostic Range is supposed to make for the user a way to identify failed probes or sensors on the basis of the generated diagnostic report.

The necessary infrastructure to perform degaussing process is: two generating sets each for 560 kW, one generating set for 250 kW, capacitor's batteries, mobile magnetometer and degaussing operation control room.

The unit content of 3 measurement ranges such as : shallow water range, medium depth water range and deep water range. The ranges are placed about 200m, 600m and 1800m from the torpedo range building. Shallow water range and medium depth range are connected with each other with the building of torpedo range. The third range is not connected with the other, two but directly to the building of the torpedo range by an optical fiber. The reference probe switch is necessary to perform measures located behind the control range.

The picture presents the underwater multisensors construction just before sinking next to the measurement and control range building.

And the next picture presents the construction diagrams with hydrodynamic and hydroacoustic sensor's location and the electric probe.

Hydroacoustic Field Measurement and Control Range is designed for dynamic measurement of the hydro-acoustic field of the Warships. It can be done stationary in the area of the Torpedo warehouse where the training ground depth is of 6m and 10m. In the case of using a mobile range, the measurement is possible in the whole Baltic Sea area.

Hydroacoustic Field Measurement and Control Range makes control and comprehensive measurements. Each newly built Warship or Warship after shipyard repairs passes comprehensive measurements during which the parameters of the engine in each operating condition are checked. Each engine is checked separately and then both engines at once. In this way you receive certain characteristics which allows one to assume when the warship is the most silent. The Characteristics of control measurements are compared with the characteristics which were taken during comprehensive measurements. The next step is checking the offset of the two characteristics.

During control measurements, the Warships pass through the training ground at least two times at a 180° and 0° course with the parameters of the operating propulsion system determined by the Measurement and Control Range crew. Warships reach specific parameters minimum 300 meters before the training ground, and don't change until the warship passes 600 meters. Mostly, the data collected include the measurements of underwater acoustic disturbances produced by a moving ship. The data collected is recorded by hydrophones located one meter above the bottom. Continuous recording of sound pressure is made at a certain distance in front of the Warship's bow and behind the stern. The information obtained in this way makes it possible to characterize the underwater disturbance of the Warship.

In addition, this information makes it possible to check if the warship can conduct military tasks, according to NATO standards. In addition, the range is used to collect data about background noise, and conduct research and development projects and silent procedures.

The main sources of ship's hydroacoustic disturbances are the propellers, the propulsion system and the hull.

The Pressure Measurement and Control Range is designed for dynamic measurements of the hydrodynamic field of Warships. It can be done stationary in the area of the Torpedo warehouse where the training ground depth is of 6 m, 10 m and 20 m. In the case of using a mobile range the measurement is possible in the whole Baltic Sea area.

The Electrical Field Measurement and Control Range enables effective measurement of the Warship's electric field in the presence of the interferences and the monitoring of corrosion peril of the Warships.

#### **4. The summary**

Finally I would like to present the applying of the measurement results:

- The Analyzing of the warship's physical fields
- Describing the parameters of the warship's passive defence
- Creating of data base with parameters of warship's physical fields
- Projection and construction of hull and warship's systems
- Projection and construction of mine-sweepers, mine-hunter and non-contact detonators

- Projection of measurement station
- Elaboration of defence standard

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