



Ośrodek Badawczo-Rozwojowy  
Centrum Techniki Morskiej S.A.



***WE CREATE SAFETY & SECURITY FROM THE SEA***

[www.ctm.gdynia.pl](http://www.ctm.gdynia.pl)

Gdynia, 05th January 2017

## **RESEARCH & DEVELOPMENT MARITIME TECHNOLOGY CENTRE**

**THE RESEARCH AND DEVELOPMENT MARITIME TECHNOLOGY CENTER WAS ESTABLISHED IN 1982.**

**CTM HAVE EXPERTISE ALONG WITH TECHNICAL AND RESEARCH FACILITIES REQUIRED FOR TASKS IN THE FIELD OF CIVILIAN AND MILITARY TECHNOLOGY IN FULL PRODUCTION CYCLE (RESEARCH, DEVELOPMENT, IMPLEMENTATION AND SHORT-RUN PRODUCTION) .**

**THE CENTRE IS SINCE 2014 PART OF THE POLISH ARMAMENTS GROUP (PGZ).**

**CURRENTLY: 290+ EMPLOYEES, 70% WITH MASTER DEGREE, 10% WITH PHD, 1/3 AGED BELOW 35 YEARS**



## MAIN RESEARCH AND DEVELOPMENT ACTIVITY AREAS

- ✓ **COMMAND & CONTROL SYSTEMS**
- ✓ **UNDERWATER WEAPON SYSTEMS**
- ✓ **MARITIME INFRASTRUCTURE PROTECTION SYSTEMS**
- ✓ **RADIO COMMUNICATION AND DATA EXCHANGE SYSTEMS**
- ✓ **PRODUCT TESTING & CERTIFICATION**



## COMMAND & CONTROL SYSTEMS

### COMMAND SUPPORT SYSTEM FOR THE NAVAL FORCES

- The system is designed to support data collection process of the naval situation in the area of responsibility, development and distribution of unified maritime situation picture and command reports;
- The system consists of installations (objects) indicated for stationary and mobile coastal units, surface units (vessels) and air units (aircrafts and helicopters).

### SHIP'S COMBAT MANAGEMENT SYSTEM SCOT

- It integrates the following systems: countering air, surface and underwater targets, combating asymmetric threats, technical observation, radars, communication and services provided by the integrated navigation system regarding ensuring the safety of navigation, monitoring the current geographical position and ship motion parameters.

### CONSOLES OF THE COMMAND & CONTROL SYSTEMS

- The consoles allow to embed any software on it, enabling the support of the command process, as well as the use of weapons and equipment of the ship (vessel).



## UNDERWATER WEAPON SYSTEMS - SHIP'S PASSIVE DEFENCE SYSTEM

### PHYSICAL FIELDS MONITORING SYSTEM

- The Physical Fields Monitoring System increases the safety of the ship in waters, where underwater weapon systems with non-contact incendiary devices were placed and also increases the level of passive defense against the attack of missiles with noses homing infrared sources.

### SHIP'S DEGAUSSING SYSTEM

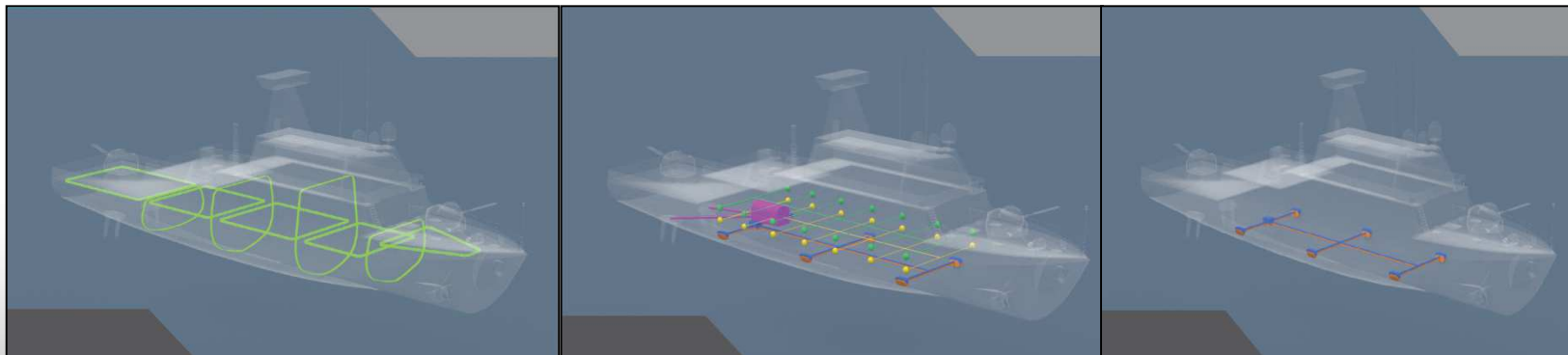
- The system allows to form (in the water area) resolution of the spatial-time and amplitude-frequency spectrum of magnetic field parameters for effective mine warfare.

### THE ELECTRIC FIELD MONITORING AND MINIMIZATION SYSTEM

- It is designated to protect the hulls of vessels and propulsion units against electrochemical corrosion in the sea water and for monitoring and minimization of the electric field.

### THE CATHODIC PROTECTION SYSTEM (SOK)

- The Cathodic Protection System (SOK) is designated to protect the hulls of vessels and power units against electrochemical corrosion in the sea waters. The basic tenet of the cathodic protection is to reduce the polarization of the metal surface adjoined with electrolyte to the value, which allows to stop the corrosion processes.



## UNDERWATER WEAPON SYSTEMS - MINESWEEPS

### **THE MODULAR LIGHTWEIGHT MINESWEEP (MLM)**

- *The sweep is designed to counter sea mines with influence fuses, whose operation is dependent on the identification of a specific type of vessel, basing on the characteristic signature of physical fields of this vessel.*

### **INFLUENCE MAGNETO-ACOUSTIC SWEEP (PROMIENICA)**

- *The sweep is designed to sweep for bottom mines, equipped with noncontact magneto-acoustic fuses.*

### **LOW-MAGNETIC NAVAL SWEEP WITH MECHANICAL CUTTERS (MMTK-1M)**

- *The sweep with two branches, adapted to be towed by a single minesweeper, is designed for cutting the anchor cables of sea mines by the use of mechanical cutters.*



## UNDERWATER WEAPON SYSTEMS – MINES, CHARGES, INCENDIARY DEVICES

### **NON-CONTACT DEVICE FOR SEA MINES ZKB-760**

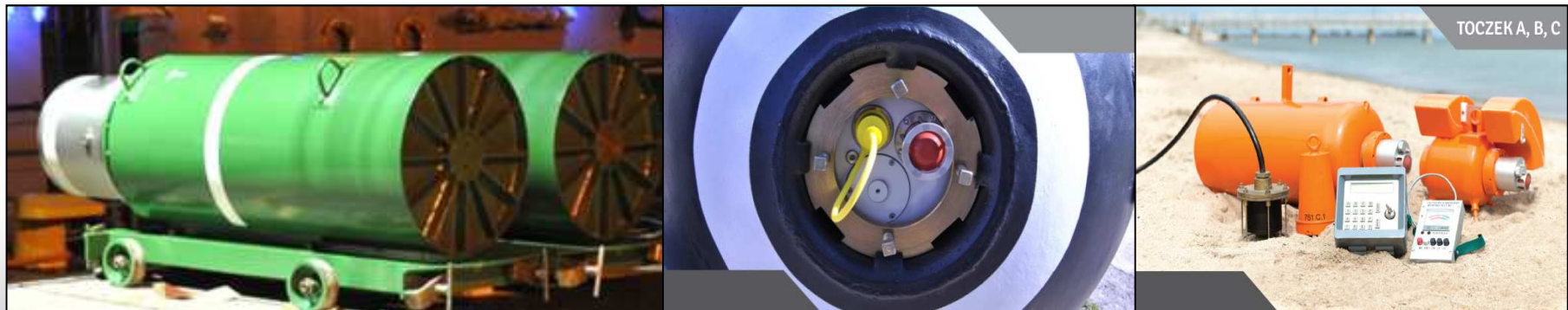
- The non-contact incendiary device for sea mines responds to physical fields generated by surface and underwater vessels. It is equipped with independently programmed channels: hydroacoustic (support channel), hydrodynamic (combat channel), water depth channel.

### **MMD-2 SEA BOTTOM MINE**

- The MMD-2 is a non-contact mine reacting on electric fields generated by vessels. MMD-2 is equipped with a fuse with the following channels: hydroacoustic (duty channel), hydrodynamic and magnetic (combat channels).

### **REMOTELY FIRED CHARGES FOR SEA MINE COUNTERMEASURE (TOCZEK)**

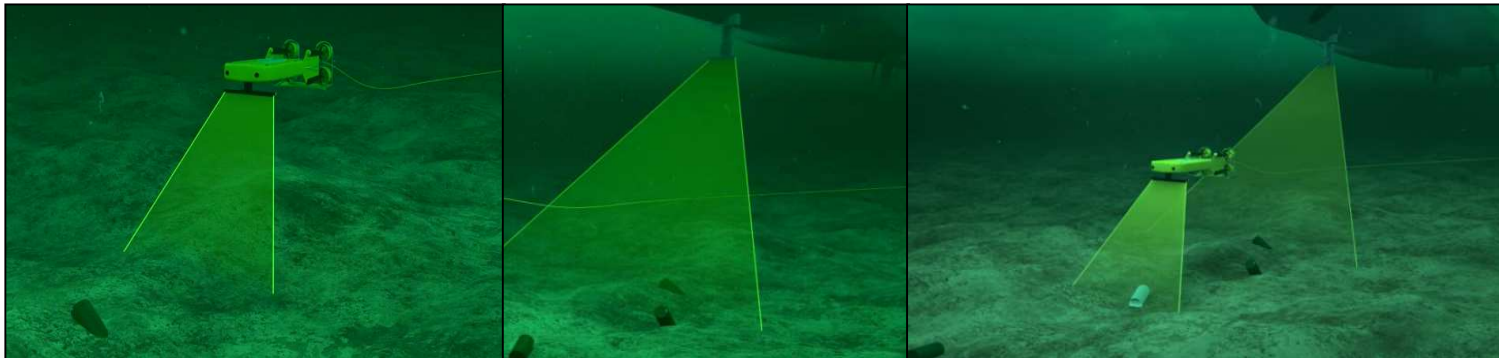
- The system of remotely and wireless fired charges (TOCZEK) was developed to counter sea mines. Charges type A and B are transported and positioned by remotely operated vehicles ASW or AUV. Charge type C is transported and located by a diver.



## UNDERWATER WEAPON SYSTEMS – MCM SONAR SHL-101/TM

### TRIPLE FREQUENCY WIDEBAND, HIGH RESOLUTION HULL MOUNTED MCM SONAR (SHL-101/TM)

- *It is designed for detection and classification of bottom and anchor mines, including those difficult to detect. It can operate in shallow waters in conditions of strong stratification of depths and in the presence of interferences. The SHL-101/TM MCM sonar is distinguished by excellent performance as a result of advanced technology of hardware and software use.*





## CRITICAL MARITIME INFRASTRUCTURE PROTECTION SYSTEM

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- *The integrated multi-sensor, detection system consists of acoustic (active) and magnetic (passive) barriers complemented by sensors, such as: cameras, infrared cameras, radars, passive acoustic antennas, sonars and others. The detection system is integrated with a system to countermeasure underwater threats, which is based on the pyrotechnic effectors.*

### PORTABLE MAGNETIC BARRIER

- *The Portable Magnetic Barrier (PMB) is dedicated for continuous, automatic monitoring of the underwater situation in naval bases, harbours and anchorage areas in terms of protection against terrorism threats, such as: divers, small underwater vehicles etc. The subsystem is equipped with a system of highly sensitive magnetic transducers installed on the sea bottom, which detects sea anomalies caused by aforementioned objects.*

### PYROTECHNIC EFFECTOR

- *The pyrotechnic effector is intended for countering terrorist threats in harbour approaches, water areas and vessel anchorages. To counteract underwater terrorist threats an impact water wave is generated.*



## RADIO COMMUNICATION AND DATA EXCHANGE SYSTEMS

### CTM RADIOS FAMILY:

#### **RKS-8000 HF TRANSCEIVER**

- The RKS-8000 HF transceiver is a modern radio compliant with STANAG 4203. The multipurpose RKS-8000 transceiver is the basic element of stationary and mobile (mounted on board of vehicles and caterpillar vehicles) radio communication systems.

#### **RKP-8100 MANPACK TRANSCEIVER HF/VHF/UHF, MOBILE ADAPTER RKP-8100AM-B**

- The RKP-8100 radio is a modern manpack transceiver that provides reliable tactical communication. It offers solutions to all kinds of tactical communication, as well as uniformed and reduced logistics services. To extend the possibilities of the RKP-8100 manpack transceiver of transportation usage the mobile adapter type RKP-8100AM-B was designed. The whole transceiver system was integrated in one device and the maximal power was increased up to 150W in HF connection range and 50W in UHF connection range.

#### **RKL-8200 RADIO TRANSMISSION MODULE**

- The RKL-8200 was designed and constructed to meet the needs for radio data transmission for training aircrafts type ORLIK for a 30÷88MHz frequency band. Its functionality was adapted to customer's requirements. The RKL-8200 transmission module ensures reliable communication at a tactical level (digital data transmission).



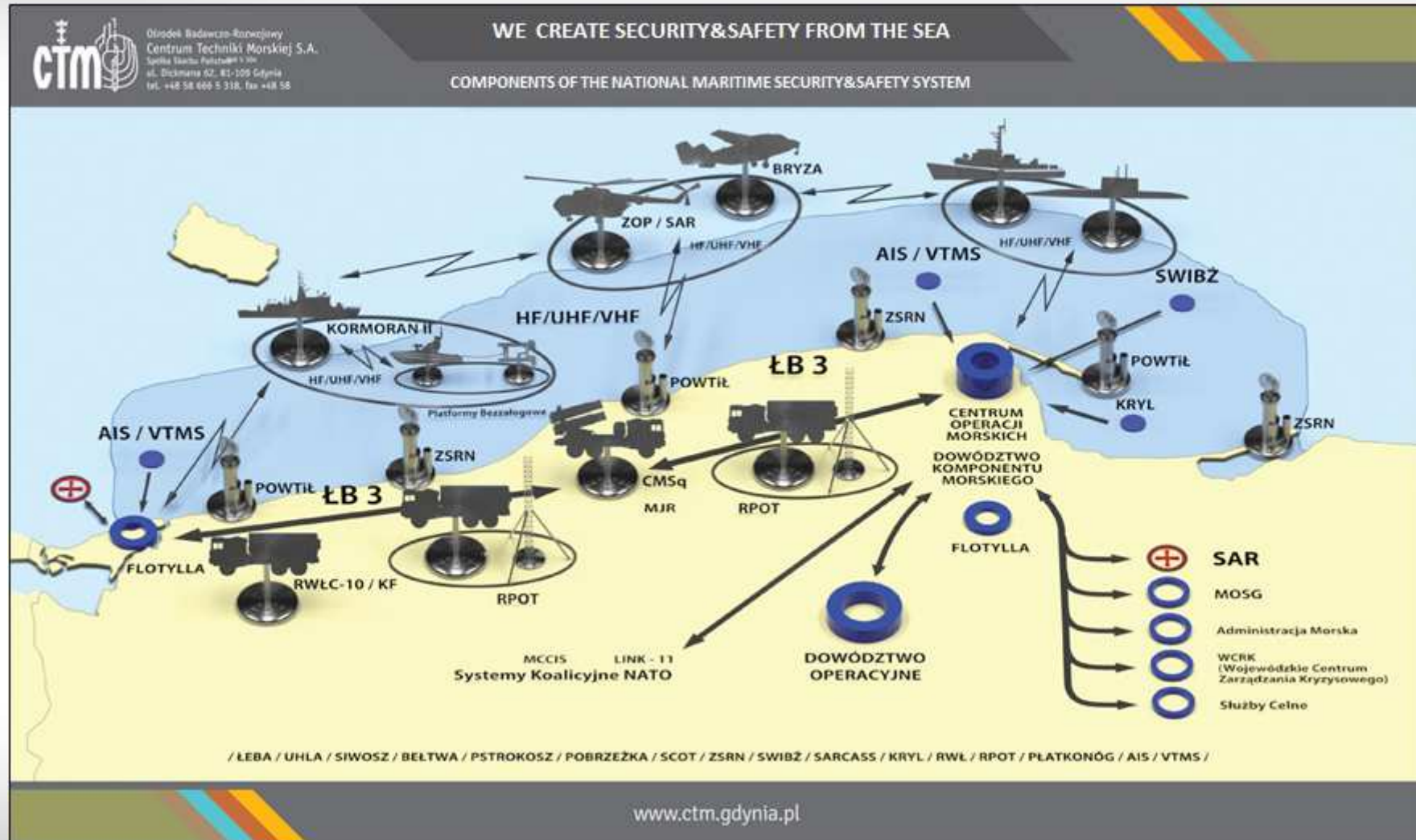
## TESTING AND PRODUCT CERTIFICATION

### **OBR CTM RESEARCH LABORATORIES:**

- ✓ **ELECTROMAGNETIC COMPATIBILITY LABORATORY**
- ✓ **VIBROACOUSTIC, SHOCK RESISTANCE AND MAGNETIC FIELD LABORATORY**



## COMPONENTS OF THE NATIONAL MARITIME SAFETY & SECURITY SYSTEM

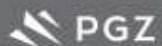


## **„MODERN MINEHUNTER-KORMORAN II” PROGRAM**

**ON THE 23rd OF SEPTEMBER 2013 AN AGREEMENT FOR THE IMPLEMENTATION OF THE DEVELOPMENT WORK „MODERN MINEHUNTER-KORMORAN II” WAS SIGNED. ON BEHALF OF THE CONSORTIUM, THE AGREEMENT WAS SIGNED BY THE CONSORTIUM LEADER-REMONTOWA SHIPBUILDING SA IN GDAŃSK, WHICH, TOGETHER WITH THE NAVAL SHIPYARD SA IS RESPONSIBLE FOR THE PLATFORM DELIVERY.**

**CTM ACTS WITHIN THE CONSORTIUM AS AN INTEGRATOR AND SUPPLIER OF THE INTEGRATED MISSION SYSTEM. THE CENTRE IS ALSO THE SUPPLIER OF THE PASSIVE DEFENCE SYSTEM AND HIGH CLASS SELECTED SENSORS AND EFFECTORS (TRIPLE FREQUENCY SHL-101/TM MCM SONAR, MCM SHL-300 SONAR, REMOTELY WIRELESS FIRED CHARGES „TOCZEK”).**





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