

## PROTECTING THE NATIONAL AND EUROPEAN CRITICAL UNDERWATER INFRASTRUCTURES WITH THE HELP OF DIVERS

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**Abstract:** *The contemporary security environment is characterized by a high degree of instability and unpredictability, in which the current trend is to transform the great wars in terrorist fights and attack. Directive 2008/114 of the European Council proposes the identification and designation of national and European Critical Infrastructures (ECI), and also the evaluation of the need to improve their protection. In this regard, the paper presents the activity of a special category of workers, i.e. divers. Their work contributes to ensuring peace and security all along the Romanian Black Sea coast, which is a European and national border. The divers, through their activity, manage to eliminate the obstacles that jeopardize the immersed critical infrastructure, and the underwater environment in general, thus, ensuring prosperity, stability and security in the region.*

**Keywords:** contemporary security, critical infrastructure, instability, unpredictability

### 1. Introduction

On the whole, the paper wants to highlight how the activities which were originally meant for the specific requirements of defense, can, also, meet the needs of the civilian life.

The issues concerning protection of environment, of economic objectives, of critical infrastructure and, not in the least, of man are decisive factors in all armies of the world.

Terrorist acts are the evil product of sick minds that use technology, weapons, improvised devices, etc., against noncombatant population (most often innocent civilians become the main target of terrorists), against strategic objectives and infrastructure, or ecosystems. Each time they attack terrorists seek to end in disaster, so as to leave innocent people in threat and terror (they are doing this especially through the audio and video media).

The attacks are mainly aimed to destabilize

economic and social life, thus, affecting the economic processes, the morale of the population, and the environment. The threat is general; attacks can be aimed at anyone regardless of race, gender, religion, occupation or nationality.

In December 2008 the European Council adopted Directive 114 on the identification and designation of European Critical Infrastructures (ECI), and the evaluation of the need to improve their protection. According to the aforementioned directive, the primary responsibility, that of managing the measures for critical infrastructure (CI) protection, within national borders, falls on the member states, and owners / operators of these infrastructures, respectively.

Over 70% of the Earth's surface is covered by water, 90% of the world trade is waterborne (rivers, seas and oceans of the world), while 80% of the world population is clustered in cities, usually situated by the bank of a river.

Today we can say that sea safety is poor and the competent authorities shall endeavor to develop intervention strategies to improve protection of Critical Infrastructures (CI).

Currently, the security of the environment is characterized by a high degree of instability and unpredictability, as we have already mentioned. Romania's geographical position, on the Eastern border of the European Union, attracted, primarily, the development and operationalization of the military divers, as special intervention forces (GNFOS, EOD, and river, deep, board divers, etc.).

Therefore, this paper aims to present, in its first part, the identification and designation of national and European Critical Infrastructure which are included in the area of responsibility of the Romanian state, and of the Naval Forces, respectively.

Also, our study evaluates the need to

improve the protection of all the above mentioned objectives, so as to be able to find concrete ways of intervention for the Romanian divers, who are operationalized NATO forces.

Military divers are well – trained. They are engaged in real, or simulated counterterrorist and anti-terrorist operations, together with other partner structures, specialized forces, at the national and international level.

It is worth pointing out that specially trained divers of the Diving Centre, carry out actions of prevention, protection, surveillance and combat of terrorism, in cooperation and under the leadership of national and international structures, specialized in these types of interventions.

Some specialized institutions, which are our partners, are mentioned in table 1.

*Table 1*

<i>The institution</i>	<i>IPF</i>	<i>ISU</i>	<i>BAT</i>	<i>PP</i>
Hight Forum	MAI	MAI	SRI	City Council

Terrorism, i.e. modern warfare, is the use of force outside the military and moral norms, in order to threaten a given population, which, most often is not the target of the terrorist action. It has a global character; it focuses on political and religious extremism, on the effects of uprooting, on the lack of perspective for the future, and on people in despair. This phenomenon is specific to our times, and it deeply affects the contemporary world. The causes of war today are very different and complex. Most of the times, terrorism emerges from economic, cultural, social crises, or from the virulent reactions against the influence of the Western civilization over those societies which are still tributary to prejudices, etc. The extremist acts are accomplished by fanatical people, in order to force the acceptance of the claims imposed by the perpetrators.

Over the last 20 ÷ 30 years the global

society has constantly faced the terrorist phenomenon both nationally and internationally, where both the forms and methods of action are different. The great variety of attacks carried out by terrorists, worldwide, stand as a proof of this phenomenon.

## **2. Identification of zonal risks**

Identification of threats and vulnerabilities of critical infrastructure in the specific responsibility sectors of the Naval Forces Directive 114 / EC of 8.12.2008 was also taken into consideration.

Under this Directive, the following criteria are formulated with reference to the critical infrastructure protection:

- a) the criterion related to victims (evaluated in terms of the potential number of deaths or injuries);
- b) the criterion related to the economic effects (evaluated in terms of the importance of economic loss and / or

degradation of products or services, including potential environmental effects);  
c) the criterion related to the effect on the human factor (evaluated in terms of the impact on confidence, physical / psychological suffering, or disruption of daily life, including the loss of essential

services).

In accordance with Directive 114 [4] the sectors chosen for the implementation of this Directive are the energy sector and the transport sector with the following subsectors: (see table 2).

Table 2 [4]

Sector	Subsector	
I. Energy	1. Electrical energy	Infrastructures and installations for the production and transport of electrical energy, in terms of its supply
	2. Petroleum	Oil production, refining, treatment, storage and pipeline distribution
	3. Gases	Gas production, refining, treatment, storage and pipeline distribution (LPG Terminals)
II. Transport	4. Road transport 5. Railway transport 6. Air transport 7. Inland waterway transport 8. Short sea shipping and ports	

This paper has considered the following sectors:

- the energy sector (hydro electric power plant, CNE (nuclear power plant), exploitation of the continental shelf of the Black Sea)
- the transport sector (river and sea, road and rail - through underwater inspections to bridge legs, considered mandatory strategic points for crossing and for mounting underwater protection part)
- the information and communication technology sector ("ICT") – through a system of underwater cables, and the related infrastructure: port areas, fairways, berths, lighthouses, waterways, the Danube (as a European transport route, which facilitates contact with cargo or cruise ships crossing Hungary, Austria, Germany), bridge legs (as road and rail mandatory points of passage), locks, gates, offshore drilling and production rigs, oil and gas transport pipelines, coastal zone (where annually drifting mines are signaled), The Danube Delta and the Danube marshes, dams on the inland rivers in Romania, and the hydroelectric power plant "Portile de Fier"

(HPP) (located at the border between Romania and Serbia). Any threat of their infrastructure may affect both the country and the Eastern part of the European Union. These are the sectors where the divers of our unit were asked to intervene, in the long run of time.

The risks can be ranked according to the non-military and military factors as follows:

- economic risks (shipping, petrochemical industry, power generating sector – especially "Cernavodă" Nuclear Plant, the ICT sector etc.);
- risks related to the security of the environment, and of the underwater ecosystems, respectively;
- risks to civilians (innocent victims), to population's health, nutrition and education (IT terrorism);
- national and international political risks (imposed by the geo -strategy of the area);
- risks arising from increased activity of the paramilitary and national extremist organizations, against the changes in the geo - strategy of the area, and the emergence of new regional actors etc.

The improvement of the IC protection,

administered by the Romanian people is a priority of our country. Meeting the requirements of the European Council Directives is closely monitored.

### 3. National and European Critical Underwater Infrastructures

The national and European critical underwater infrastructures are controlled by the Romanian Naval Forces, by maritime and river port administrations, by the oil companies involved in exploration and offshore works, etc. These infrastructures are permanently under threat, and the implications of terrorist attacks can have a major impact on them. They are possible

points where divers or other special groups of various forces, involved in such interventions are trained, and where they can be called upon to intervene, if necessary.

Table 3 lists a few of the Romanian institutions on which the impact of a terrorist attack could have serious consequences, both on the population, and on the environment, belonging to the South-Eastern Europe and beyond it, i.e. the ministries of civil institutions. Vulnerable points and objectives that require divers' interventions are permanently under control.

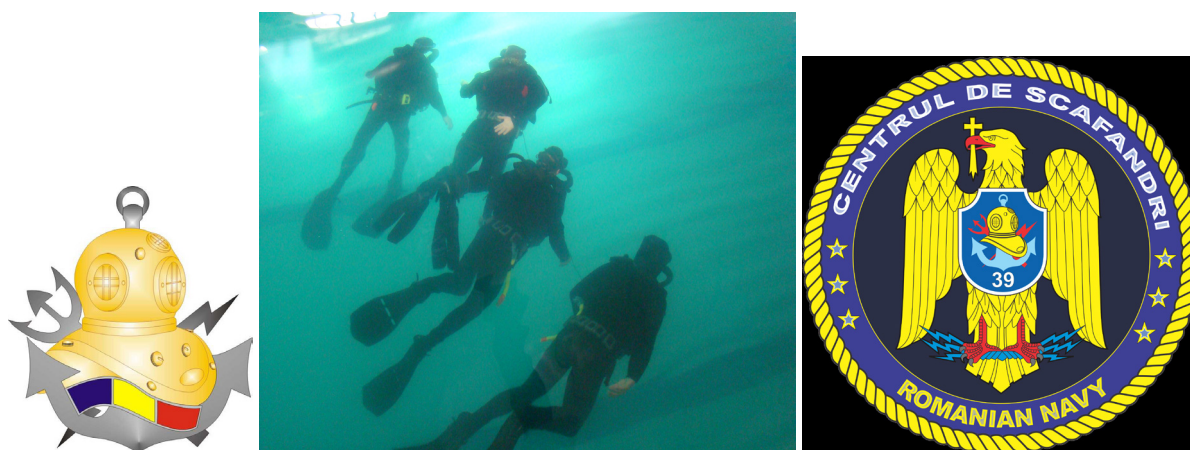


Figure 1: The Diving Center prepared for specific interventions

Table 3

<i>Institution</i>	<i>Apa Nova</i>	<i>Petromar</i>	<i>APC, APDM, APDF</i>	<i>CAN and Transcanal</i>	<i>CNE PROD Cernavodă</i>	<i>Porțile de Fier Hydroelectric power plant</i>
<i>The ministry it belongs to</i>	Ministry of Waters and Environmental Protection	Ministry of economy	Ministry of transport and infrastructure		Ministry of energy	
<i>Vulnerable points</i>	Basins for the distribution of fresh water	Drilling and extraction rigs, submerged pipes for oil and gas transport, underwater buffer reservoirs, ships for transport	People and freight transport, fairways, buoys, berths, bridges, harbour, specific logistics, etc.	Navigable waterways/canals, locks and their gates, underwater pipes, data/energy –transmitting cables	Periodic checks on the tightness and pressure of no 1 and no 2 reactors, in order to evaluate the loss ratio, etc.	The underwater infrastructure of the dam (bulkheads, gates, etc.)

The fact that various civil sectors have experience, expertise and specific requirements for the protection of their CI

should be taken into account, too. The need to develop and implement a unified concept in this field require that the Diving Centre

correlate their own modalities of intervention with divers, and other national specialized security forces.

Through its specific compartments the diving center analyzes the possibilities of coordinating and completing the EU directives, in full compliance with the NATO norms, in order to find the best methods to intervene when and where it is necessary.

#### **4. Divers activities carried out for protection of national ICS**

##### **4.1. Analysis of the correspondence between 114 / EC / Directive and the divers' activity**

Directive 2008/114/CE proposes the identification of national and European critical infrastructures (CI), and takes into consideration the need to improve their protection.

In compliance with this EU Directive the Diving Center offers the following lines of research and development:

- identification of national and ECI in the area of responsibility of the Romanian state;
- conducting studies for localization, classification, grouping of the identified CI based on the experience accumulated by the Diving Center;
- research and analysis of contemporary terrorism and its motivations;
- modeling the movement of specialized EOD diver groups (according to NATO procedures) for the execution of demining missions, so as to determine the optimal time to intervene, and the optimum speed of reaching the work site, and also, the necessary logistics;
- modeling the movement of underwater vehicles (mini- submarines, autonomous robots, remote controlled vehicles, etc.), resulting in complex programs to simulate interventions in areas difficult to reach;
- studies of solutions and implementation of procedures for action against improvised explosive devices (IED);
- designing and building devices to neutralize IED;

- elaboration of normative protection measures and antiterrorist intervention procedures for the underwater CI;
  - research and expertise in working with machinery and equipment for underwater activities;
  - testing equipment in wet or dry hyperbaric and / or marine environment;
  - simulations and studies in the Diving Center Hyperbaric Laboratory, in dry and wet conditions;
  - identification and treatment of possible diving accidents based on the experience of the specialized personnel of the HL;
  - development of warning systems in good time, in terms of the threats to the immersed objectives and CI identified;
  - development of NDT (non-destructive technologies) for underwater structures;
  - technical studies to provide solutions for communication and cooperation in crisis situations between the forces and structures, at all levels (national, regional, community or international);
  - harmonization of prevention and defense concepts of NATO - EU with the needs identified under Directive 114 / EC;
  - acquisition of safe, reliable, portable, special equipment for divers interventions;
  - modernization of techno / logistic support for the treatment of diving accidents (Hyperbaric Laboratory pressure chambers) and providing a computer system and office equipment.
- Effective identification of risks, threats and vulnerabilities in specific sectors of responsibility constitute an operative priority of the Diving Center's specialists. Maintaining a safe atmosphere of the Romanian Black Sea Coast, and of the Danube, which is the link with central EU, means continuous training of the military divers and of the civilian personnel, in order to ensure peace and security in the areas mentioned above. Through their effective work, their skill, discipline, discretion and professionalism the Romanian seaside (EU border), and not only, will develop safely.

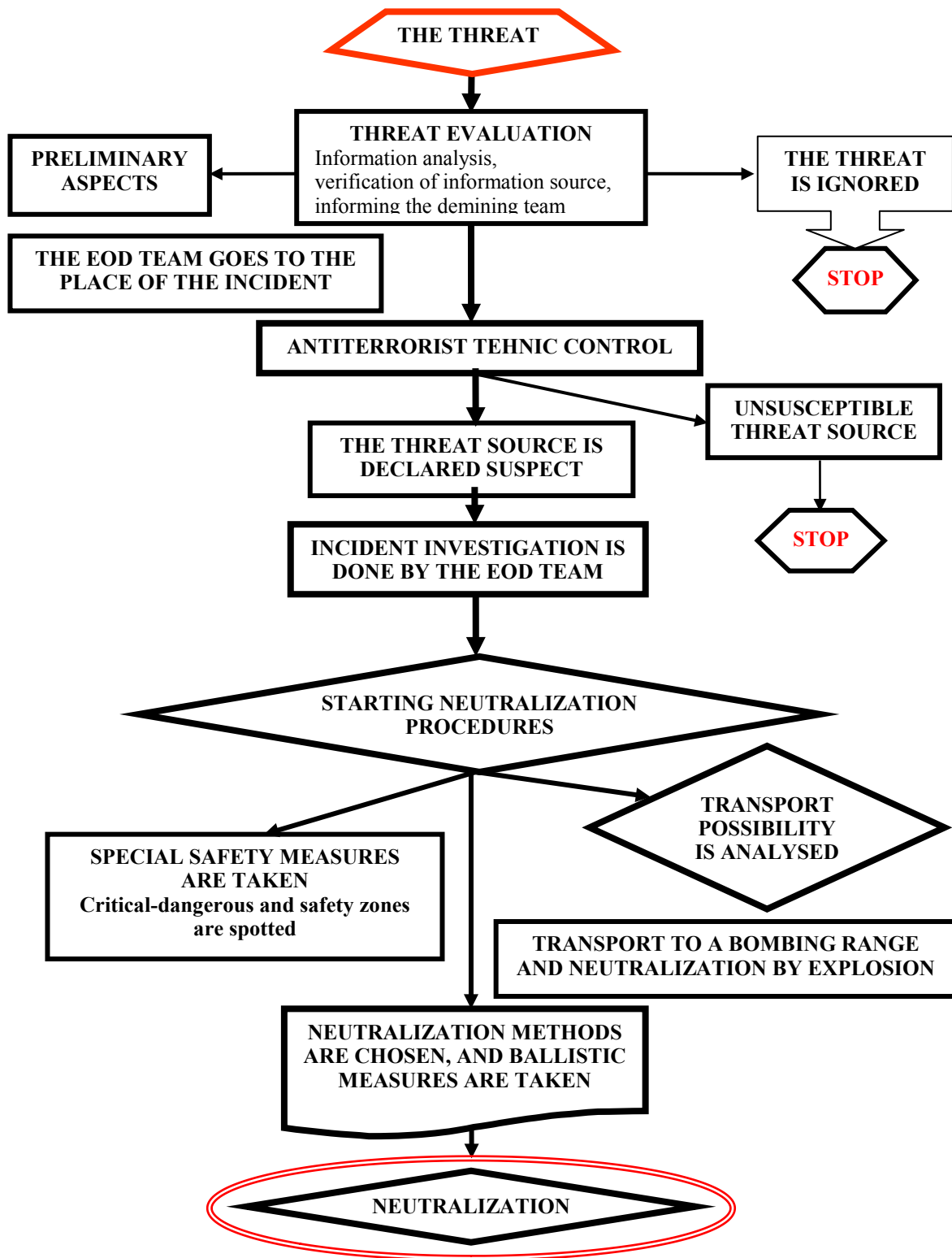


Figure 2: The design of the intervention activities to neutralize an explosive device. Such missions are of highest risk, which may be the first and last mistake

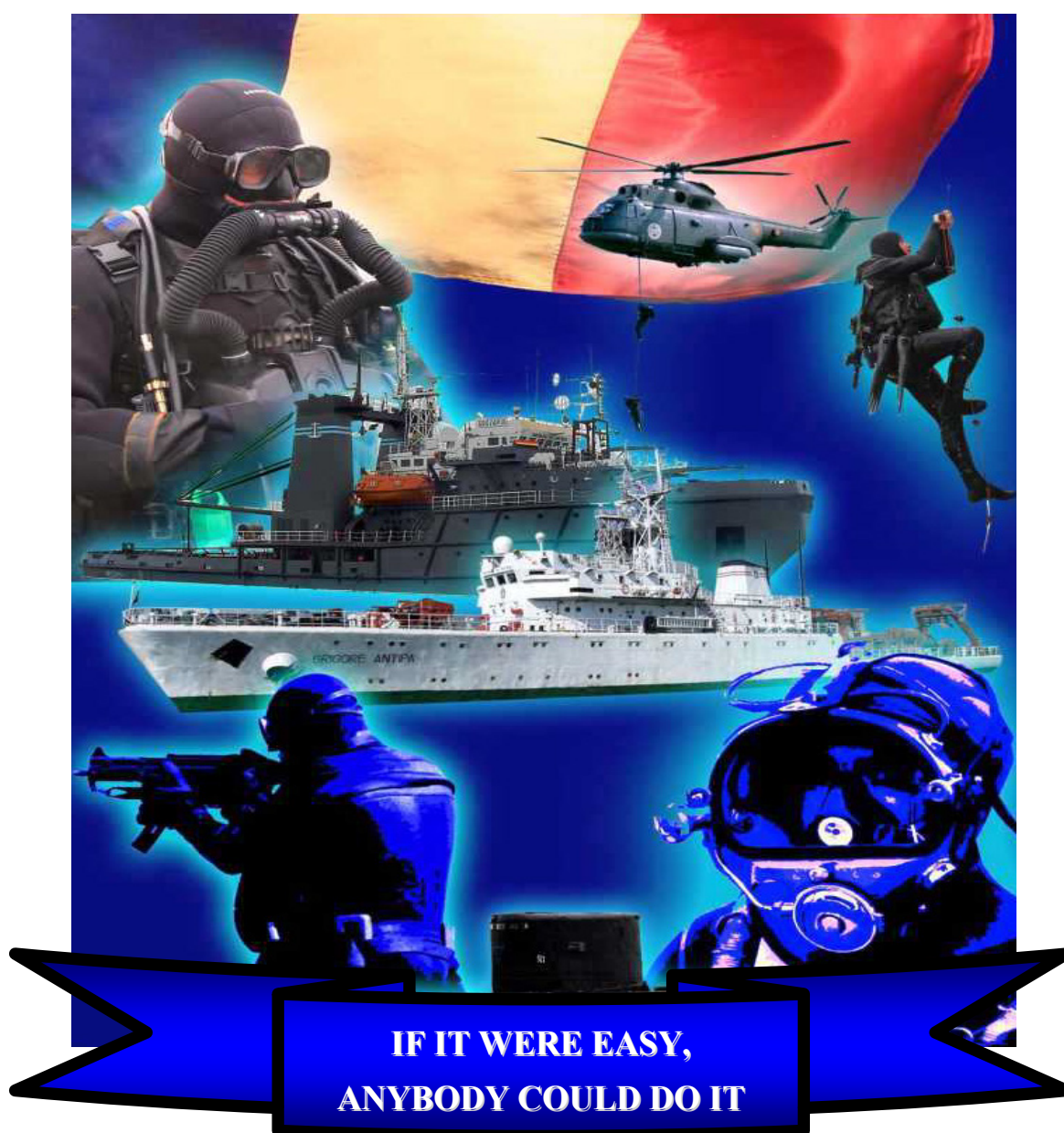


#### **4.2. Influence of the regional security on the actions of the Naval Forces divers, within their responsibility area**

The geographical position of our country, and the evolution of international terrorism, the significant changes in its strategy and goals are a permanent source of risk to the national and European security.

Romania is not currently facing domestic terrorism. Still, the relative stability in the internal operational situation is affected by constant threats of international terrorism which includes Romania in their sphere of

action. As a country strongly and explicitly committed to the fight against terrorism Romania contributes significantly to achieving a well-developed security system, and a solid legal basis which ultimately leads to the building of a prosperous, safe and equitable world.world.dpi, which still allows printing without quality degradation. Higher resolutions enlarge the data without significant better printing quality. Please note that the conference proceedings printout will be realized with greyscale.



*Figure 3: Aspects from the activity of the divers belonging to the Diving Center*

The continuous escalation of non-military threats led to appropriate measures and laws. Romania's national security strategy [3] and the National Strategy for preventing and combating terrorism [1] are the laws governing the protection of AT institutions, of the Romanian citizens, and of the foreigners living in Romania, and implicitly, of the national CI against terrorist attacks, in the context of international efforts (imposed by the tragic events in the world) to strengthen the internal and external security.

## 5. Conclusions

The analysis of the area and threats led to the identification of the following critical infrastructures located in the area of responsibility of our divers:

a) IC located on the Black Sea coast:

- maritime port areas
- fairways
- ore, cargo and passengers berths
- light houses, buoying systems etc.

b) Offshore:

- offshore drilling and extraction rigs
- underwater pipelines for oil / gas transport
- underwater buffer for petroleum or gas products storage

- immersed communication cables
- that part of the ship which is below the waterline of freight / passengers transport,

c) CI located on rivers, natural and artificial lakes or inland rivers:

- river port area (berths for mooring ships and boats),
- navigable waterways, locks, lock gates
- the coastal area, The Danube Delta
- the Danube with its infrastructure (route that connects Hungary, Austria & Germany),
- the submerged part of road and railway bridges, at Danube crossing points, or inland rivers as obligatory points of passage-the Cernavodă Nuclear Electric Power Plant (checks for pressure and tightness levels at reactors 1 and 2, in order to evaluate the loss rates, periodically), the immersed part of CNE, etc.,

- hydroelectric power plants (control to gates mechanisms, and also, on request, verification of the immersed parts etc.)

- "Portile de Fier" HPP (cleaning of bulkheads).

After the analysis of the responsibility area and identification of the critical infrastructure located in the area, the "risk analysis" is taken into consideration, with an impact on: environment, ecosystems, economy, energy sectors, civil society, disruption of communications and security effectively and virtual space, or the strategic critical infrastructure. .

Those persons performing the risk analysis and developing the methodology of AT struggle, or CT intervention, are specially prepared for this; they must come to think like a terrorist.

By saying that we combat terrorist phenomena we do nothing but use general terms, behind which lie a thorough analysis and specialized training, which describe all measures against terrorism, which, in their turn are the starting point of the actions imposed by government, or international organizations, to reduce the likelihood of an attack against a particular objective of strategic importance.

The need to improve the protection of CI is growing. Evaluation of the needs to correlate, at multiple levels, the protection measures is always performed by national and international specialized bodies. These measures and guidelines are reviewed and implemented by all the factors that are related to local, regional, national and international defense.

The Romanian military divers are part of the regional actors who operate under the command of specialized forces, for combating terrorism, for national and European protection of underwater infrastructures, within the Romanian Naval Forces area of responsibility, or military theaters of operation in which Romania's military is requested to intervene.



## **Acknowledgements**

**ACN** = Administration of Navigable Canals and Channels

**APC** = Administration of maritime ports of Constanța;

**APDM** = Administration of the Danube maritime ports, of Galați;

**APDF** = Administration of the Danube ports of Giurgiu;

**AT** = antiterrorist fight – prevention of terrorist acts. Antiterrorism represents the effort of controlling terrorism, and it consists of methods for personal protection, safe actions, in general all measures able to ensure: evaluation of danger, strengthening the objectives, prevention and discouragement of any terror-building practice;

**AUV** = Autonomous Underwater Vehicle;

**BAT** = antiterrorist squad;

**CE** = Council of Europe;

**CI** = Critical Infrastructure;

**CMN** = Navy Healthcare Center;

**CNE** = Nuclear Electric Plant (in Romania: CNE PROD Cernavodă SC Nuclear-Electrica SA);

**CPSA** = Research and Underwater Plunging Laboratory;

**CT** = Combating Terrorism; counterterrorism is the answer to a terrorist action that occurred in the past, or is in progress, and it may consist in offensive actions, such as tactical fight back through emergency actions taken by special operations forces, management of the response to a terrorist action which is in progress (hostage-taking, kidnapping, etc.);

**DNS** = Squadron for divers;

**DNFOS** = Squadron Naval FOS;

**ECI** = European Critical Infrastructure;

**EOD** = Explosive Ordnance Disposal;

**FOS** = Special Operation Forces;

**GNFOS** = Special Operation Forces Naval Group;

**GSLEOD** = EOD Diver Group;

**HPP** = Hydroelectric Power Plant;

**HG** = Governmental Decision;

**HGR** = Romanian Government Decision;

**ICT** = information and communication technology sector;

**IED** = DEI = improvised explosive devices;

**IGPR** = Romanian Police HeadQuarter;

**IPF** = Romanian Coast Guard;

**ISU** = Emergency Situations HeadQuarter;

**IT** = informatics terrorism;

**HL** = Hyperbaric Laboratory;

**MAI** = Ministry of Administration and Interior;

**MApN** = Ministry of Defence;

**MEC** = Ministry of Education, Research and Innovation;

**MO** = Official Gazette;

**NDT** = Non Destructive Testing;

**NATO** = Nord Atlantic Treaty Org.;

**OZU** = Daily Military Journal;

**PAS** = Prepare and Training Divers;

**PfP** = Partnership for Peace;

**PP** = Port Police (Harbour Police);

**SEE** = South-Eastern European States;  
**SCAFS** = research, certificate and formation department for divers;  
**SPP** = Guard and Protection Service;  
**SRI** = Romanian Intelligence Service;  
**SRS** = quick rescue launch;  
**TIC** = Information and Communication technology;  
**UCI** = Underwater Critical Infrastructure;  
**UDWG** = Underwater Diving Working Group;  
**UE** = European Union;  
**UM** = Military Base/Unit.

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