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## **Situation Analysis Report**

Deliverable 2.1

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## Terms and Definitions

### Assessment

The method of determining if a training need exists and, if it does, what training is required to fill the gap.

### Competency

An observable behaviour supported by specific knowledge, skills, and attitudes. Each competency has a specific result or output.

### Content Analysis

A procedure for organizing narrative and qualitative data into emerging themes and concepts. Usually associated with a quantitative form of analysis in which the themes are counted or measured.

### Gap Analysis

Also called performance analysis; identifies the difference between current performance and the desired performance.

### Job Analysis

The process of identifying all the parts of a specific job; conducted before a task analysis.

### Learning Objectives

Describes a specific behaviour, conditions, level of achievement and is written from the learner's point of view.

### Needs Assessment

Gathering of information about a specific work need that can be resolved by training. The types of needs assessment include performance analysis, target population analysis, sorting training needs and wants, job analysis, and task analysis.



### **Needs Analysis**

Discovers training needs that are related to the organization's work. Training is linked to the final outcome and providing appropriate training will benefit the individual as well as the organization.

### **Organization**

Person or group of people that has its own functions with responsibilities, authorities and relationships to achieve its objectives.

### **Paradigm**

Example or pattern; an outstandingly clear or typical example or archetype.

### **Paradigm shifters**

Elements of fundamental changes in the basic concepts and experimental practices of a scientific discipline.

### **Pilot Experiences**

Planned actions to test the addressing of Skills and Competence gaps.

### **Performance Analysis**

Also known as gap analysis. Performance analysis looks at an official's current performance and identifies whether the official is performing as desired

### **Performance Deficiency**

A difference with a negative connotation, implying that the official is not meeting a known standard for performance.

### **Requirement**

Need or expectation that is stated, generally implied or obligatory.

### **Simulator**

a device that enables the operator to reproduce or represent under test conditions phenomena likely to occur in actual performance

**Skill**

The ability to do an activity or job well, especially because you have done it many times

**Skills shortage**

Refers to a useful understanding of what skills are in demand or may be in demand in the future for a particular job.

**Target Population**

The individual or group involved in a need assessment or training program.

**Task Analysis**

Finds the best method and sequence of steps to complete a specific task.

**Trainer**

A term used in a corporate setting for a teacher. Also, instructor.

**Training Needs Analysis**

The process of identifying the gap between present training and needs of training. Training needs analysis is the first stage in the training process and involves a series of steps that reveal whether training will help to solve problem which has been identified.

**Validation**

The act or process of making something officially or legally acceptable or approved.



## Acronyms and Abbreviations

<b>EC</b>	European Commission
<b>EU</b>	European Union
<b>CSP</b>	Clean Sea Plan
<b>DGMA</b>	Directorate-General of the Maritime Authority
<b>DCSP</b>	Directorate for Combating Sea Pollution
<b>MAS</b>	Maritime Authority School
<b>MPCS</b>	Marine Pollution Control Simulator
<b>NMA</b>	National Maritime Authority
<b>PFTN</b>	Pollution Fighting Training Nucleus
<b>POLREP</b>	Pollution Reporting System
<b>RICPS</b>	Rapid Intervention to Combat Pollution at Sea
<b>WP</b>	Work package



## History of Changes

*Table 1: History of changes*

Version	Publication date	Changes
1.0	14.06.2022	First version





## Contractual aspects

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## Legal Disclaimer

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## 1 Introduction

In accordance with the Conditions for Application of the Single Country Grants for Disaster risk Management (“Track 1”), the general objectives of the Marine Pollution Control Simulator (MPCS) project are:

“To support Member States’ efforts in enhancing their institutional, technical and financial capacity for preparing, implementing and monitoring disaster prevention and preparedness activities including in relation to the Covid-19 crisis;”

“To support and complement prevention activity in order to achieve a high level of protection against disasters by preventing or reducing their potential effects, by fostering a culture of prevention and by improving cooperation between the civil protection and other relevant services;”

“To improve the knowledge base on disaster risks and facilitate the sharing of good practices in prevention and preparedness planning;”

The MPCS project aims at developing a cloud-based tool easily reachable through different platforms (mobile, tablet, or laptop), that allows the providing of training, exercising, assessment, and performance evaluation of the marine pollution control, at different levels, namely:

- Collective and Individual competence;
- Regional, National, and Supranational levels;
- Small and large-scale scenarios.

This report aims to characterize the actual situation in comparison with the Call requirements and the end user’s needs to identify the end-state (desired) solutions and, subsequently, the existing gaps between both (actual vs desired situation). The end-state (desired) solutions will trigger the subsequent simulator design, development and validation.

Next, in chapter 2, we describe the actions we’ve done to prepare this report. In chapter 3 we present the actual situation in pollution control education and training in Portugal. In chapter 4, we synthesize the educational and training needs of the End users. Finally, in chapter 5, we propose an identified solution that can reduce the gap between actual and desired situation.



## 2 Actions taken in the preparation of this report

On February 7 and 8, Rui Sampaio, from Qualiseg, attended to a course of Pollution Control at the facilities of the Directorate for Combating Sea Pollution (DCSP). At this course we had the opportunity to have a close look to the actual procedures and equipment used in pollution control at an estuary and at a beach.

On April 13, a meeting took place at Coimbra University with the presence of Rui Sampaio and Miguel Moreira, from Qualiseg, and Licínio Roque, Fernando Ramos, Luís Pereira, João Barata, Pedro Martins and Jorge Cardoso from Coimbra University Informatics Faculty. The objective of the meeting was the presentation by the Technical Coordinator, Rui Sampaio, of the main ideas about simulator functional requirements to assess their viability from the responsible for simulator development. The problems addressed were mainly the simulator objectives, the representation of the real world, the interactions between users and between users and equipment on their job of pollution control (coordination, communication and procedures of logistic, technical and administrative nature) in a virtual world and the simulation of the oil spill drift and its interaction with the booms, skimmers and coast.

On May 5, Rui Sampaio went to Viana do Castelo to assist to the Atlantic Poxex 2022, a pollution control exercise that Portugal organizes every year, to acquire some insight about the coordination, communications and procedures that are usual in this type of situations.

On May 11, Rui Sampaio had a meeting at the headquarters of the DCSP with Joana Gerónimo and José Santos, both Navy Officers. The objective of the meeting was to reflect about what we saw at Viana do Castelo exercise, understand what they believe that are the weaknesses of the pollution control in Portugal and acquire further knowledge about coordination in pollution control.

On May 13, there was a remote meeting with the presence of Rui Sampaio, Miguel Moreira, Manuel Carrasqueira and José Daniel, from Qualiseg and Lauren Vandermeer and Yolanda Fernandez from EVM. The purpose of the meeting was to define the 3 types of e-learning modules to be developed within the scope of this project, that is, modules for training in pollution control, one module for simulator administration and other for simulator operation. Some ideas of themes for e-learning modules were presented and it was agreed that by the end of May EVM would send a proposal of a framework for e-learning modules development for further discussion.



On June 1, José Daniel and Rui Sampaio participated at a meeting held at EMSA. The objective of the meeting was the presentation of the project, exchange ideas about the weaknesses of the pollution control of the member states and ask for access to some databases managed by EMSA. The MPCS project was presented and after there was a fruitful discussion about some specific aspects of the project. The access to a database with the Portuguese means to pollution control is underway and it was spoken that future contacts are of mutual interest.



## 3 Preparedness for Marine Pollution Control in Portugal

### 3.1 Legal requirements, Standards and Best Practices

In 1993 (Resolução do Conselho de Ministros n.º 25/93) Portugal approved the actual legislation concerning the marine pollution control, the “Plano de Emergência para o Combate à Poluição das Águas Marinhas, Portos, Estuários e Trechos Navegáveis dos Rios, por Hidrocarbonetos e Outras Substâncias Perigosas” or “Emergency Plan to Combat Pollution of Marine Waters, Ports, Estuaries and Navigable Sections of Rivers, by Hydrocarbons and Other Dangerous Substances”, shortly “Plano Mar Limpo” or Clean Sea Plan (CSP).

As a consequence of the approval of the CSP, in 1996 (Despacho Conjunto 16 august 1996) the 5 Regional Intervention Plans and the 28 Local Intervention Plans were approved.

In 2020 (Circular 168/2020), considering the need to establish changes to the response to incidents in the 2nd and 3rd degree of the CSP, a new structure and organization was created by the National Maritime Authority (NMA) based on the following principles:

- a Reinforcement of human resources, technical capacity and means of the entity that is responsible for the response;
- b Standardization of the number of elements and functions of the Brigade for the Rapid Intervention to Combat Pollution at Sea (RICPS) of the Maritime Departments;
- c Compliance with a RICPS employment protocol in the event of a pollution incident, the size and complexity of which requires the activation of the 3rd degree of the CSP or the passage to the 2nd degree

In 2014 (Despacho 4567/2014) was approved the list of dispersant products that can be used in the combat to pollution at sea.

### 3.2 Plano Mar Limpo / Clean Sea Plan (CSP)

#### 3.2.1 Purpose

The CSP has the general objectives of establishing a response to situations of oil spills and other hazardous substances, or situations of imminent threat of these same spills, defining the responsibilities of the entities stakeholders and establishing the powers of the authorities in charge of implementing the tasks that answer entails.



Achieving this objective requires:

- a The establishment of measures on a national scale to respond to the occurrence of that results or may result in pollution, by hydrocarbons and other substances in hazardous areas, marine waters, ports, estuaries and navigable stretches of rivers;
- b The definition of the responsibilities of national entities and bodies involved in the preparation, support and continuation of actions to combat pollution, namely departments of the Government of the Republic and the Autonomous Regions, local authorities, port authorities, handling hydrocarbons and other hazardous substances, public and private companies, associations and other entities;
- c Establishment of the powers of the entities in charge of coordination and carrying out activities relating to the preparation and continuation of pollution control operations.

### 3.2.2 General instructions

Combating marine pollution encompasses the stages of preparation and intervention:

- 1 The preparation aims to provide the responsible entities with the necessary means and appropriate techniques;
- 2 The intervention aims to combat the spillage already mentioned, eliminating or limiting the negative impact on the marine environment.

The preparation phase includes, among others, the following measures:

- a The establishment of adequate and up-to-date intervention plans at the level of each of the authorities responsible for carrying out actions to combat pollution;
- b The timely implementation of measures of a logistical nature (e.g., acquisition, conservation and maintenance of materials and equipment, prior preparation of facilities and infrastructures) and organizational (e.g. establishment of communications plans, preparation of actions, studies to anticipate situations of pollution and projection of combat results, obtaining information) inherent to intervention plans;
- c Adequate technical training for those responsible for combating pollution, as well as intervention personnel;
- d Carrying out periodic exercises activating the mechanisms and means foreseen in the intervention plans, with the aim of training the personnel involved in the tasks incumbent upon it, within the framework of collective action, as well as to carry out the evaluation of intervention plans and the effectiveness of the means.



The intervention phase encompasses all operations or actions to be carried out according to the applicable intervention plan, from the moment of detection of the occurrence of pollution to the disposal of waste from the collected products. Due to its nature, extent and cost, this set of measures must be conducted by a single responsible authority, which coordinates the action of all public or private entities participating in the intervention plans and those that may eventually be called upon to intervene.

### 3.2.3 Principles and procedures

The entities and structures called upon to participate in the CSP should guide their intervention according to the following principles:

- 1 Eliminate or limit the risk of pollution;
- 2 Reduce the consequences of the spill in terms, in particular, of impact environmental;
- 3 Reduce to the minimum possible the number of hydrocarbons and other hazardous substances to be incorporated into marine waters, ports, estuaries and navigable rivers.

The elimination or limitation of the risk of pollution must be achieved through suitable techniques for installations and equipment at risk of generating pollution, to restore its safety and functional stability, namely, the transfer of products for safer installations, the timely repair of equipment and the reinforcement of structures.

The reduction in the environmental impact of the consequences of the spill must consider:

- 1 The protection of human health;
- 2 The preservation of living resources;
- 3 The maintenance of economic activities (fisheries, aquaculture, industry and transport);
- 4 Protection of areas used for recreational or bathing activities.

Limiting the amount of hydrocarbons and other hazardous substances introduced in the marine environment determines, in any occurrence of pollution, the priority level that is given to combat strategy and technique that leads to the quickest possible collection of the spilled product and its transfer for proper treatment and disposal; inside of this principle, and whenever there are no important reasons of an operational or economic nature that impose it, the use of dispersing products or the abandonment of the polluting area to the action of natural elements.

Taking into account the principles referred to in the previous number, the measures of intervention shall successively adopt the following procedures:





- 1 Containment and collection at the polluting source;
- 2 Containment and collection at sea;
- 3 Physical protection of sensitive areas;
- 4 Collection and cleaning of affected coasts and banks;
- 5 Careful application of approved and authorized dispersants in accordance with the current legislation;
- 6 Transport of collected products for appropriate treatment and disposal.

### 3.3 Organization

The DCSP is the body of the Directorate-General of the Maritime Authority (DGMA) responsible, in the areas under the jurisdiction of the NMA, for the National technical guidelines in terms of combating sea pollution, being responsible for this, namely, to maintain a close functional cooperation with the local bodies of the DGMA.

The DCSP's mission is to establish, at a national level, procedures of a technical nature relating to surveillance and combating sea pollution, as well as coordinating and directing operations to combat sea pollution.

The DCSP is responsible for:

- a Execute, in the first line, operations to combat sea pollution in the 1st degree of readiness of the CSP;
- b Propose, when necessary, the activation of the National Center for Operational Coordination within the scope of the CSP and direct the actions of the Intervention Team's, when they are constituted;
- c In accordance with the instructions of the Director-General of the NMA, support the other bodies and services of the DGMA, namely in operations to combat sea pollution in the 2nd and 3rd degrees of readiness of the CSP, and, under the terms to be defined on a case-by-case basis, other State or external authorities, in operations to combat sea pollution outside the maritime spaces under the jurisdiction of the NMA;
- d Represent the DGMA in international meetings and forums in the context of combating sea pollution.

The adequacy of the means involved, according to the seriousness of the situation, is done by degrees of readiness, to each of which corresponds a coordinating entity, without prejudice to the fact that, when the circumstances justify it, it can be invoked by the higher hierarchical level. The establishment of the levels of readiness by the maritime authority at the appropriate level binds all those involved in the intervention plans within the framework of the CSP. The degrees of readiness referred to, are, in increasing order of severity, as follows:



- a The 4th degree of readiness corresponds to the normal situation of no occurrence of pollution - with the different entities having to carry out the measures relating to preparation phase - or the occurrence of small spills of very localized, low-impact and capable of being tackled by the means local (from the maritime, port authority or local operators);
- b The 3rd degree of readiness is to be established by the local maritime authority (captain of the port). In port areas it will be established by the port authority, giving immediate notice to the master of the port, as defined in the respective intervention plan, according to the availability of means to this area, which must be delimited in the plan. This grade is to be established in case of the occurrence of pollution of greater magnitude or complexity than the referred in 4th degree - but still of local scope and impacts -, requiring the intervention of the means of local combat, according to the intervention plan in a single operational system, under the direction and coordination of the maritime or port authority, taking into account the available resources and the affected area;
- c The 2nd degree of readiness is to be established by the regional maritime authority (head of the Maritime Department) in whose area there is a pollution occurrence which - due to its dimensions, complexity, impact or resources necessary for its combat - go beyond the scope of local action, assuming regional characteristics and dimensions, forcing the integration of regional means of combat, according to the intervention plan, in a single operational system, under the direction and coordination of that authority;
- d The 1st degree of readiness is to be established by the Director-General of the Navy, when the occurrence of pollution situation which - due to its dimensions, complexity, impact or resources necessary to combat it - go beyond the regional scope, assuming national characteristics and dimensions, forcing the use of national or international means, under the direction and coordination of that authority.

The areas of responsibility of the CSP are:

- a The area of responsibility of the Director-General of the Navy, with regard to the execution of the CSP, covers the entire area of national maritime jurisdiction;
- b The responsibility of the head of the Maritime Department, in the execution of the CSP, covers the area of maritime jurisdiction situated within the limits of the respective Department;
- c The area of responsibility of the captain of the port, in the execution of the CSP, covers the area of maritime jurisdiction within the limits of the



respective captaincy without prejudice the responsibility of the harbour master, under the terms of this resolution.

The operational structures to activate when necessary and in accordance with the intervention plan are Operation Centres, Logistics Bases and Intervention Teams.

The location and dimension of the Operation Centres depends on the readiness level and so, could be national (in Lisbon and permanent), regional (in the Maritime Department, permanent or mobile), local (in the port authority, permanent or mobile) and local (in the harbour area).

At least, in each Maritime Department (North, Center, South, Azores and Madeira) there is a logistic base with personnel and material

The intervention team's constitution and dimension depend on the readiness level and so, could be national, or national with international support, regional in accordance with the regional intervention plan or local in accordance with the local intervention plan

The Regional and Local Intervention Plans are a very important instrument for the success of the pollution control. They define:

- 1 The Organization
  - 1.a The responsibility area
  - 1.b The conditions to establish the adequate readiness level
  - 1.c Identification of the risk areas and probability of oil spill
  - 1.d Sensitive areas
  - 1.e Operational organization
    - e.i Management and coordination of the pollution combat operations
    - e.ii Entities intervening in the operations and form of intervention
    - e.iii Organization and mobilization of personnel involved
    - e.iv Responsibilities and functions of the personnel involved
    - e.v Material mobilization
    - e.vi Support of other entities
    - e.vii Operation Center
    - e.viii Intervention Teams
    - e.ix Communications plan
- 2 Operational procedures
  - 2.a Incidents typification
  - 2.b Scenarios classification
  - 2.c Oil spill and volumes lost at sea behaviour and evolution
  - 2.d Combat strategies



- 2.e Combat techniques
- 2.f Cleaning operations at the coast
- 2.g Means of transport, storage, treatment and disposal of debris
- 3 Operational Plan
  - 3.a Alert
  - 3.b Activation of the readiness level
  - 3.c Deactivation

### 3.4 Education and training

In Portugal the training in combating pollution at sea is a responsibility of the NMA, despite that there are several initiatives of the private scope.

The Maritime Authority School (MAS) is a training establishment under the NMA and its main mission is to guarantee and promote the technical-professional training of staff assigned to the bodies and services of the NMA structure.

The Pollution Fighting Training Nucleus (PFTN) is responsible for carrying out training actions within the scope of Prevention and Action in Cases of Pollution in the Maritime Environment. The training provided are the following short duration courses:

- 1 Oil Spill Sample Collection Course;
- 2 Pollution Combat Operator Course; 3 days, target: personnel of port authorities, of harbour administrations, of maritime departments and several other public and private harbour and maritime operators;
- 3 Course ADN05 which includes a 5-day pollution module, target: port captains and deputies,
- 4 Course IDD04 which includes a 5-day pollution module; target: the future experts from maritime departments (engineers and engine sergeants).

The Oil Spill Sample Collection Course aims teach the administrative offence proceedings for illicit marine pollution to maritime police officers in office, linked to the Maritime Departments and Port Authorities.

The course is taught in collaboration between the Hydrographic Institute (Division of Marine Chemistry and Pollution) and the DCSP.

The themes are addressed in a theoretical and practical way, focusing on the documentation in use in the area, on the sampling techniques and material to be used in the collection of samples at the scene of the incident and in the suspicious sources and in the respective chemical analyses carried out on them.



### 3.5 Training and Exercising

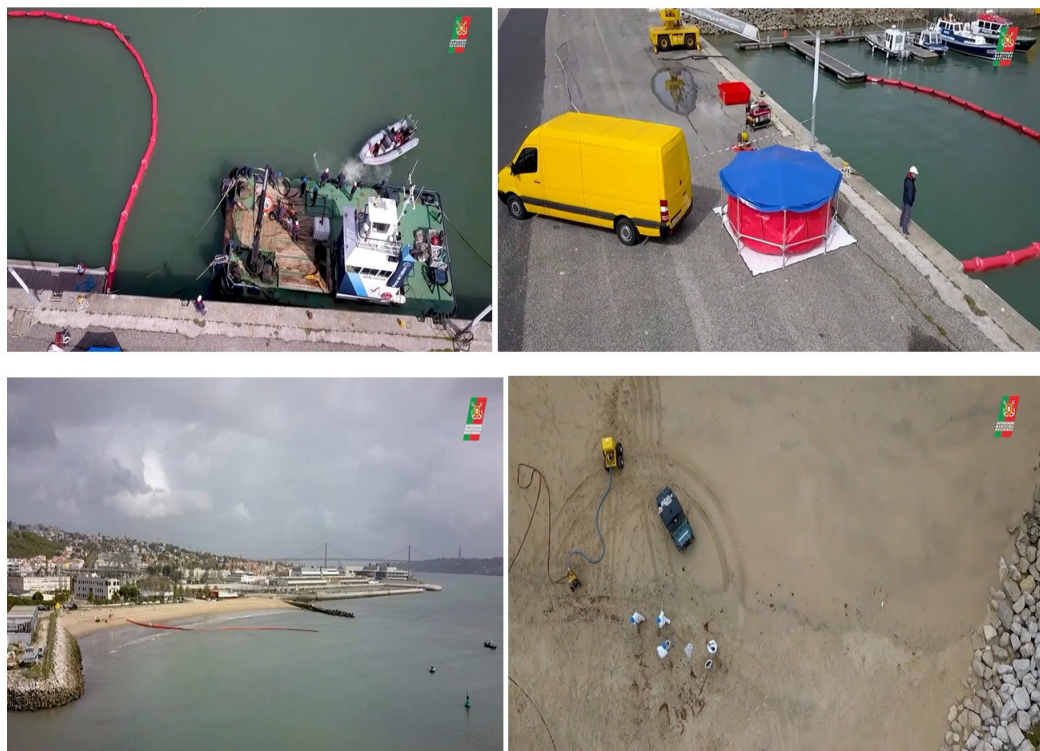
Every year the DCSP organize several exercises to train the entities responsible for pollution combat at sea, ports and rivers and to test all the involved material.

To illustrate the scope of the exercises we reproduce here some official news of these exercises:

a Algés March 2022

“National Maritime Authority carries out an exercise to combat pollution in Algés.

The National Maritime Authority, in conjunction with the Administration of the Port of Lisbon, carried out on Tuesday, March 8, 2022, an exercise to combat pollution in the marine environment with the aim of training response procedures in the event of an outbreak of pollution at a local level, in Algés.



The exercise, which aimed to test the procedures of various entities as provided for in the Clean Sea Plan, consisted of simulating an accident between two vessels in the area of the Maritime Traffic Control Tower of Algés, which resulted in a pollution scenario in the marine environment



with the spillage of fuel and oil that affected a port area and a beach area.

A total of 36 elements from the Maritime Department of the Centre, the Captaincy of the Port of Lisbon, the Directorate for Combating Sea Pollution and the Administration of the Port of Lisbon were committed to combating the focus of pollution. contained the polluting material using various means of combating pollution, such as containment barriers, sea pollution recovery systems, light beach cleaning equipment or portable pollutant storage tanks.

This exercise allowed and contributed to ensuring the readiness of the local device of the National Maritime Authority and the Port Authority with regard to combating pollution of the marine environment, with the carrying out of various actions of containment, collection and cleaning of polluting material in different scenarios, in collaboration with other entities that make up the Clean Sea Plan. It is worth noting the excellent collaboration between entities that allowed them to enhance their capabilities, ensuring a more efficient and effective fight against pollution at sea.”

b Faro, April 2022

“The elements of the Port Captaincies and Local Commands of the Maritime Police of Faro and Olhão and of the Maritime Department of the South carried out today, in collaboration with Faro Airport and the National Authority for Emergency and Civil Protection, a training action to the placement of platforms and engagement of vessels in the rescue of victims, in Ria Formosa, next to Faro Airport.





During this action, several floating platforms were placed in the water, with the aim of providing access for emergency means to marshy areas and difficult access to vessels, to assist and rescue victims of air accidents that may occur in the Ria Formosa area.

The elements of the Port Captaincies and Local Commands of the Maritime Police of Faro and Olhão, supported by two vessels, participated in this exercise with a view to providing maritime and land support to the elements of the National Emergency and Civil Protection Authority and Faro Airport, testing the evacuation of victims either using floating platforms or using nautical means, thus ensuring their safety.”

c Viana do Castelo, May 2022

“Between yesterday and today, another edition of the exercise to combat pollution in the marine environment “ATLANTIC POLEX.PT 2022” is taking place in Viana do Castelo, organized by the Directorate for Combating Sea Pollution of the National Maritime Authority.

This exercise is based on the simulation of an explosion on board a container ship about 20 nautical miles (approximately 37 kilometres) south-west of Viana do Castelo, resulting in a large hole in the hull of the ship, causing a spill of large quantities of oil and the fall of several containers overboard. This patch of pollution will affect an area on the



high seas, as well as in the coastal area of Viana do Castelo, namely in the estuary of the river Lima, in the port, in the urban ecological park, in areas of nurseries and in beach areas.



Various means are involved in this exercise, in different scenarios, on land and at sea.

"ATLANTIC POLEX.PT" is an annual exercise in response to marine pollution incidents, which aims to test the national contingency plan against pollution incidents in different types of scenarios where an incident can occur: at sea (offshore), in the harbour, in marinas and on the beach."





## 4 Educational and Training needs of the End user's

Analysing the legal requirements for preparedness in pollution control defined in the CSP and the real situation concerning organization, education and training, that we observed, read and learned, we can conclude and synthesize:

- 1 The purpose of the Maritime Pollution Control is to provide a quick and effective response to the threat, or occurrence, of an oil spill, or other dangerous substances at sea, in order to minimize damage to the environment as well as the impact on the economic and social goods of the populations located in its proximity.
- 2 The response can be structured in two phases, immediate actions and operations to pollution control.
  - 2.a Immediate actions are:
    - a.i Confirmation
    - a.ii Definition of the entity responsible for the direction and coordination of the fight against pollution
    - a.iii Establishment of the Degree of Readiness
    - a.iv Information to Responsible Entities
    - a.v Activation of the Operations Center
    - a.vi Activation of the Intervention Team
    - a.vii Initiation of facts and actions recording
    - a.viii Collecting samples
    - a.ix Execute POLREP (international report)
    - a.x Appointment of Liaison Officer
  - 2.b Operations to pollution control are:
    - b.i Situation assessment
    - b.ii Civilian safety
      - ii.1 Civilian rescue
      - ii.2 Isolation of contaminated areas
    - b.iii Team safety
      - iii.1 Adequate equipment operation
      - iii.2 Access lanes to coast/beach
      - iii.3 Food, rest and medical support
    - b.iv Equipment safety
      - iv.1 Adequate maintenance
      - iv.2 Adequate operation
    - b.v Spill isolation
    - b.vi Containment/Spill guidance/Protection of sensitive areas (harbour entrances, water intakes, aquaculture, nature reserve)



- b.vii Collection, Cleaning and/or Dispersion
  - b.viii Temporary storage
  - b.ix Final destination
  - 3 The usual training objectives are the improvement of:
    - 3.a Coordination (what to execute, who, when and how)
    - 3.b Communication
    - 3.c Procedures (Individual and Team):
      - c.i logistic
      - c.ii technical
      - c.iii legal, national and international administrative
- and the test of the equipment and material

and we can outline some issues:

- 1 The current exercises are planned. A real situation isn't.
- 2 The current exercises are adjusted to the means, personnel and material, available. A real situation isn't.
- 3 The current exercises planned guarantee the safety of the personnel. A real situation doesn't.
- 4 The Regional and Local Intervention Plans are outdated.
- 5 The coordinators of the pollution combat (ports captains and heads of maritime departments) change frequently. It is very difficult to guarantee adequate training: leadership in pollution control, adequate techniques, information databases access, terrain knowledge, harbour and coast economics, etc...

So, we can conclude that:

- 1 A simulator guarantees the safety of the personnel no matter the simulated pollution event, weather and sea condition.
- 2 A simulator can complement what an exercise can give.
- 3 The simulation of unexpected and extreme situations can improve the training.
- 4 The simulator increments the number of training.
- 5 The simulator is an excellent tool to improve the existing courses.
- 6 The simulator functional requirement of access to e-learning modules during the simulation is another tool that improves training.
- 7 The simulator can train sectoral parts of the means used in a situation of pollution which gives flexibility to training.
- 8 The simulator and the e-learning modules favours autonomous study which compensates the deficit in training of the port captains and heads of maritime departments because of their high turnover.



- 9 The simulator can carry out a more efficient and ambitious assessment of available means performance (personnel, equipment and support material);
- 10 A simulator can't test equipment and material.



## 5 End-state solution

The proposed end-state solution will contribute to improving the actual situation, even though it will be not the solution for all marine pollution control events.

This end-state solution is a multilingual computer-based training software based on the Cloud and accessible by different platforms (smartphone, tablet or computer), which allow the virtualization of all the main activities described in Immediate actions and Operations to pollution control that constitute the response to a pollution event.

The users are all the entities of NMA involved in pollution control, public and private schools of pollution control courses and other public and private entities addressed in CSP.

The objective is to increase the preparedness in pollution combat allowing the training of:

- 1 Coordination (what to execute, who, when and how);
- 2 Communication;
- 3 Procedures (Individual and Team):
  - 1.a Logistic;
  - 1.b Technical;
  - 1.c Legal, national and international (administrative);

As well its performance evaluation:

- 1 Recording automatically all the exercise will allow the debriefing and the necessary reflection about the personnel performance;
- 2 The history of similar exercises will allow the necessary comparison and so evaluate the relative performance;
- 3 At least we intend to evaluate exercises performance with time and economics criteria.

The simulator is a simulation of the real world:

- 1 Every available virtual person exists, as well as the institutions, facilities, equipment, support material and elements, except oil spill and drift which is based in an accurate and proved scientific model;
- 2 The simulator aims to provide the same possible actions that exist in the real world between people, between people and equipment, between equipment and support material, between all the entities and the GPS and between oil spill and real elements, real coast, booms and skimmers;



- 3 The available actions must allow the simulation of the necessary and fundamental procedures in the fight against pollution such as the operation of equipment (booms, skimmers, pumps, shovels, hoses, blankets...), the combined operation of equipment (boom and vessel(s)), the autonomous movement, or not, of entities, the replenishment of equipment, etc.

The simulator is like a game that runs on the internet in a multi-user environment:

- 1 Users run the Exercise on their smartphone, tablet or computer;
- 2 Their login determines who they are in the Exercise. When assuming an identity (usually their own), inherit the properties and actions that the database has defined for that identity and that differ from person to person (e.g., skills, roles, weight...);
- 3 Any action between the different virtual entities is determined by their virtual geographic location and by their current properties;
- 4 Virtual entities interact and move in real geography/infrastructures (Google Maps) and meteorology (current or recorded);
- 5 Each Exercise must be prepared (definition of criteria, selection of real and simulated people, creation of the initial scenario, that is, the initial conditions of all the entities, and definition of realism) by the Exercise Manager who will also start it;
- 6 The entire Exercise will be monitored by the Exercise Manager who, in addition to the respective parametrization and start-up, will control it (time compression management), support all users and assist in solving simulator operation problems;
- 7 The Exercise ends by decision of the Manager, for having exceeded the time limit foreseen for the exercise or for having reached the defined objectives.