

# HAZRUNOFF

PROJECT

## **Training course**

### **MARINER PROJECT**

Enhancing HNS preparedness  
through training and exercising

[ CETMAR on behalf of MARINER partners]



Funded by  
European Union  
Civil Protection  
and Humanitarian Aid

# MARINER: Enhancing HNS preparedness through MARINER training and exercising



## Objective:

Improve regional cooperation in preparedness and response to HNS spills by:

- Compiling HNS R&D outcomes and key resources and making them accessible to planners and responders
- Upgrading and/or improving tools to support decision making and response;
- Improving training and exercise capabilities;
- Increasing awareness and encouraging information exchange.



**Co-financing Programme:** Call 2015 for prevention and preparedness projects in the field of civil protection and marine pollution. DG-ECHO.

**Policy area of activity:** Preparedness.



**Start date:** 1<sup>st</sup> January 2016

**End date:** 31<sup>st</sup> January 2018



**European Commission contribution:** 748.910 EUR (75 %)

**Total budget:** 998.547 EUR



<http://mariner-project.eu/>



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## Partners & Advisory Board



1. Centro Tecnológico del Mar – Fundación CETMAR [Link](#) *Coordinator*
2. INTECMAR - Instituto Tecnológico para o Control do Medio Mariño de Galicia [Link](#)
3. Universidade de Vigo [Link](#)
  - ❖ Salvamento Marítimo – SASEMAR
  - ❖ Ministry of Agriculture and Fisheries, Food and Environment
  - ❖ Galician Coastguards



4. Action Modulers [Link](#) (Currently Bentley [Link](#))
5. CIIMAR: Interdisciplinary Centre of Marine and Environmental Research [Link](#)
  - ❖ Maritime Authority Directorate General. Marine Pollution Response Directorate



6. Public Health England [Link](#)
  - ❖ Maritime & Coastguard Agency

**7 partners from 4 countries  
advised by key governmental agencies**



7. Cedre - Centre of Documentation, Research and Experimentation on Accidental Water Pollution [Link](#)
  - ❖ Ministry of the Ecological and Inclusive Transition



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# Working streams & outcomes



Website Results: <http://mariner-project.eu/results/category/>



INTRANET

Home | About | Results | Knowledge tool | Events | Contact

Knowledge compilation  
and facilitation



Modelling and  
environmental impact



Response protocols



**MARINER** main outcomes are summarized in the project website:  
<http://mariner-project.eu/assets/pdf/results.pdf>

Training



Dissemination



MARINER Results  
overview



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# Working streams & outcomes



## Enhancing HNS preparedness through training and exercising



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MARINER was a DG-ECHO funded project that aimed to improve regional cooperation in planning, preparedness and response to HNS spills by improving training and exercise, increasing awareness and information exchange, and by capitalization and translation of HNS relevant R & D projects' outcomes into operational products.

MARINER run from January 2016 to January 2018. Here you can find a list of the project publicly available outputs. To learn more about the project please visit [www.mariner-project.eu](http://www.mariner-project.eu)

Click on the image to visualise the MARINER Mindmap with an overview of project working streams and results



## KNOWLEDGE COMPILATION AND FACILITATION



**MARINER Knowledge Tool:** Database accessible through a user-friendly online browser that allows carrying out advanced and basic searches on resources relevant for different areas of HNS preparedness and response.

e-Booklets Compiling key resources from the knowledge tool, under specific knowledge areas.



Contingency plans & response

Risk Analysis

Training and exercising

Environmental impact

HNS characterisation

Modelling tools

## MODELLING AND ENVIRONMENTAL IMPACT

### MARINER modelling Platform



Software (3D HNS spill model) and interface (Common Operating Picture - COP) for predicting the fate, behaviour and environmental / public health risks from a chemical spill in the Atlantic area.

### OGC GML schema for HNS Spills



To assure the interoperability among different agencies when they share information about HNS spill events, a Geography Markup Language GML schema was proposed.

### Standard symbols and styles for mapping



This report presents the state-of-the art in the use of different symbols for hazard and warning situations.

### Modelling of HNS hazards to the environment



Toxicological parameters selected



Modelling HNS hazards for predicting effects on the marine amphipods population

### Guidelines and protocols for environmental impact assessment



Compilation of chemical, biological and ecological information to produce guidelines for HNS environmental impact assessment.

### Comparing MARINER system with other systems



Analysis of the performance of the 3D-HNS MOHID model with other models currently in use.

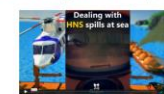
## RESPONSE PROTOCOLS

### Protocols for responding to HNS spills at sea



This guide for responders includes adapted protocols to deal with HNS spills in the marine environment: pre-planning considerations, communication and operational procedures, and technical considerations.

### Video: dealing with HNS spills at sea



EXTENDED

## TRAINING

### Training package on HNS spill management



### Exercise Web Tool for bespoke desk-top maritime HNS exercises



### Training package on HNS modelling and environmental impact



### E-learning: International Health Regulations and HNS maritime incidents



## DISSEMINATION

### MARINER Layman's report



### 1st MARINER Project Workshop



### 2nd MARINER Project Workshop



### Final Project Conference



### MARINER Introductory video



### Awareness raising video



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# Working streams & Outcomes



## • HNS knowledge compilation & facilitation



Enhancing HNS preparedness through training and exercising




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This report presents the state-of-the-art in the use of different symbols for hazard and warning situations.

*"Identification and compilation of existing HNS preparedness and response knowledge generated"*

## The MARINER Knowledge Tool.

Online repository on marine research and technical resources focused on the preparedness and response to HNS (Hazardous and Noxious Substances) spills.

Resources extracted from :

-EU and national research and cooperation projects addressing maritime pollution and chemical spills.

-Key organizations on the fields of maritime pollution and health and environmental protection.



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# Working streams & Outcomes

- HNS knowledge compilation & facilitation

[www.mariner-project.eu](http://www.mariner-project.eu)



Home About Results **Knowledge tool** Events Contact



INTRANET

<http://knowledgetool.mariner-project.eu/>

## MARINER KNOWLEDGE TOOL

Welcome to MARINER Knowledge Tool

User-friendly access to an inventory of HNS preparedness and response resources generated in the frame of research projects (i.e. Knowledge Outputs) or by specialised organisations. [Read more...](#)



**Projects**

Inventory of relevant research and cooperation projects on HNS and their Knowledge Outputs



**Organisations**

Inventory of key organisations working on maritime pollution and their main Resources



**Resources**

Inventory of all the Knowledge Outputs -compiled from projects- and the Resources -from organisations- dealing with HNS

## Electronic booklets clustering relevant resources from the tool by areas of knowledge



Contingency  
plans & response



Risk  
Analysis



Training and  
exercising



Environmental  
impact



HNS  
characterisation



Modelling  
tools



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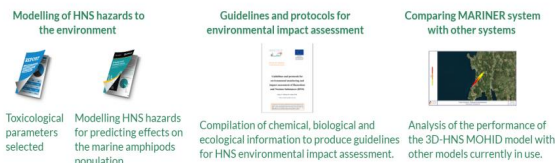
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# Working streams & Outcomes

## • RESPONSE PROTOCOL

*"Identification of expertise from chemical industry, civil protection and fire's crews and their response protocols and equipment to be adapted for marine events".*



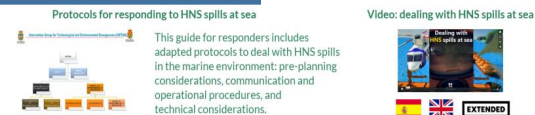
## -Guide for Responders.

### -Protocols to deal with HNS spills in the marine environment.

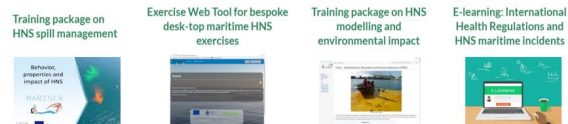
**-Analyses land services operations and protocols for pre-planning considerations, communication and operational procedures and technical considerations.**

**-Evaluates protocols covering different behaviours of HNS (evaporators, floaters, sinkers, and dissolvers) and recommendations to deal with HNS spills at sea.**

### RESPONSE PROTOCOLS



### TRAINING



### DISSEMINATION



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# Working streams & Outcomes



## • RESPONSE PROTOCOL

Modelling of HNS hazards to the environment



Toxicological parameters selected

Modelling HNS hazards for predicting effects on the marine amphipods population

Guidelines and protocols for environmental impact assessment



Compilation of chemical, biological and ecological information to produce guidelines for HNS environmental impact assessment.

Comparing MARINER system with other systems



Analysis of the performance of the 3D-HNS MOHID model with other models currently in use.

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Video: dealing with HNS spills at sea



## -Video on training

### Video: dealing with HNS spills at sea



### TRAINING

Training package on HNS spill management



Exercise Web Tool for bespoke desk-top maritime HNS exercises



Training package on HNS modelling and environmental impact



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Universidade de Vigo



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The MARINER project made a great effort to implement sea response protocols for HNS spills as is shown in this video:

<https://vimeo.com/257102781>

# Working streams & Outcomes



## • TRAINING

Modelling of HNS hazards to the environment



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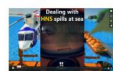
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EXTENDED

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### Training package on HNS spill management



### Exercise Web Tool for bespoke desk-top maritime HNS exercises



### Training package on HNS modelling and environmental impact



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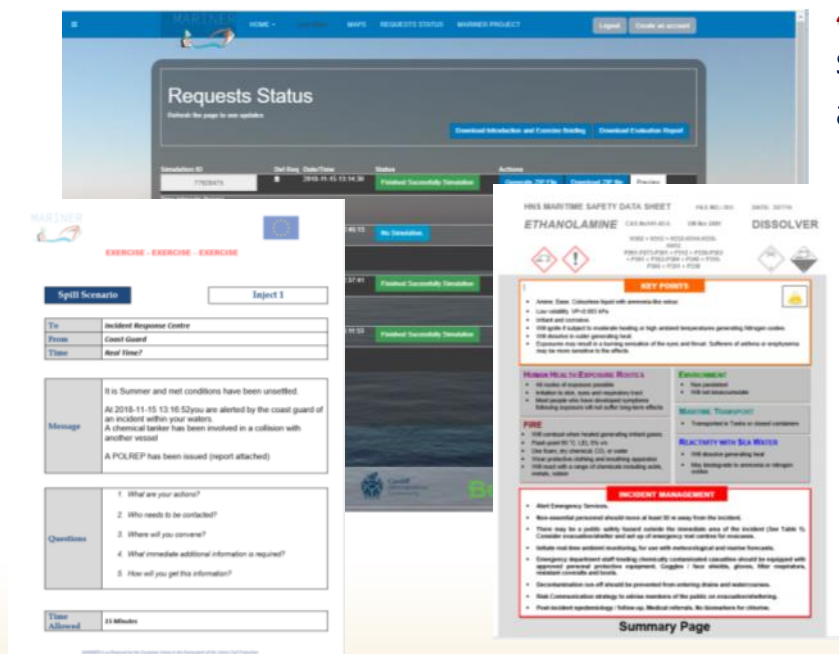
# Working streams & Outcomes

## • TRAINING

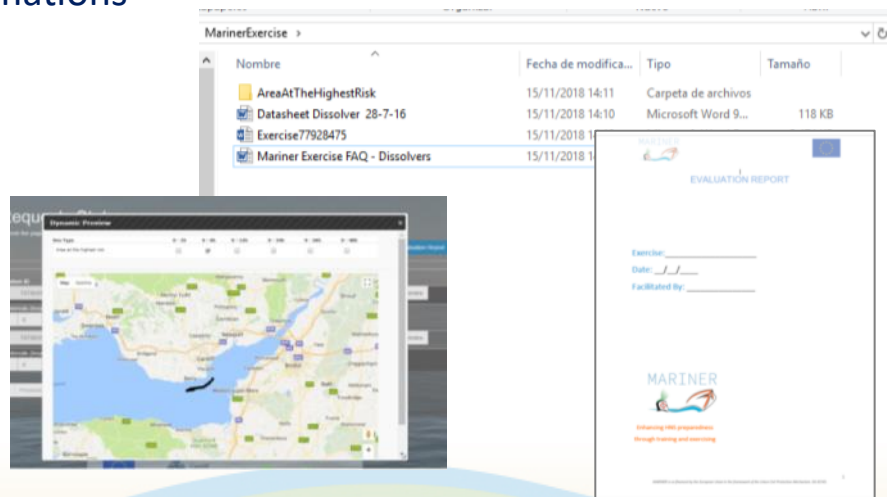
### MARINER Exercise Tool on HNS incidents

- The tool combines: HNS information, modelling interface and a library of exercise materials providing scenarios
- Users can select HNS type, scale, location and conditions and populate the database with regional data
- It generates desktop exercises simulating maritime HNS incidents adapted to local conditions

**ZIP File:** word documents for the exercise including scenario setting, injects and supporting materials, and modelling animations



The screenshot displays the MARINER Exercise Tool interface. The top section shows the 'Requests Status' page with a table of requests. Below this, there's a 'Split Scenario' section with a 'Inject 1' button. The main content area shows a detailed HNS Maritime Safety Data Sheet for 'ETHANOLAMINE DISSOLVER'. This sheet includes sections for 'Hazardous Properties', 'Physical Properties', 'Environmental', 'Marine Toxicity', 'Fire', 'Reactivity with Sea Water', and 'Incident Management'. The 'Incident Management' section is highlighted with a red border. The bottom of the sheet shows a 'Summary Page'.



The screenshot shows a file explorer window. The main pane displays a list of files and folders, including 'AreaAtTheHighestRisk', 'Datasheet Dissolver 28-7-16', 'Exercise77928475', and 'Mariner Exercise FAQ - Dissolvers'. The right pane shows a preview of an 'EVALUATION REPORT' document, which includes fields for 'Exercise', 'Date', and 'Facilitated By'.



# Working streams & Outcomes

## • TRAINING

### Training Package on HNS spill management

14 presentations + 4 infographs

#### Modules

- 1 - General aspects on HNS
- 2 - Prevention & preparedness
- 3 - Response
- 4 - Post-crisis actions





# Working streams & Outcomes

## • TRAINING

### Training package on HNS modelling and impact assessment

Main page Discussion

#### Main Page

Welcome to the "Training Package on HNS Modelling and Environmental Impact" from MARINER project.

The material was organized by CIIMAR (Helena Oliveira, Joana Soares, Miguel Santos) and Bentley Systems.

The material is separated in the following sections:

**Unit 1 - Introduction to Hazardous and Noxious Substances (HNS)**

**Unit 2 - Environmental Impacts**

**Unit 3 - Environmental Monitoring**

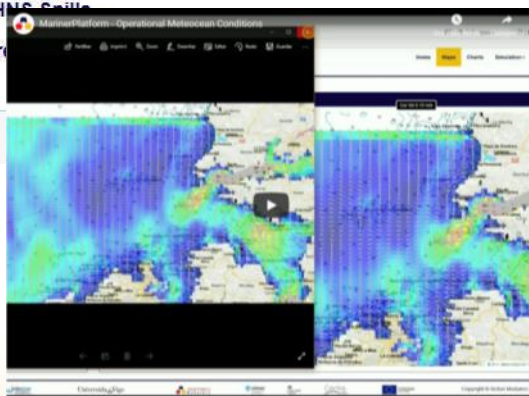
**Unit 4 - Advanced Tools for Preparedness & Response:**

**Unit 4.1 - Situational Awareness & Common Operating Picture**

**Unit 4.2 - Integration of online databases in preparedness & response**

**Unit 4.3 - Modelling Fate & Behaviour of HNS Spills**

**Unit 4.4 - Coastal Vulnerability Mapping: r**



Hazardous and Noxious Substances Spill Incidents

climar

Advanced Search


Ship name:   
IMO:   
Year:   
Incident location:

On this database it is collected information on the fate and behaviour of hazardous and noxious substances (HNS) accidentally spilled at sea around the world. It gathers and summarizes existing information to assist stakeholders involved in spill preparedness and response, and builds robust information databases for the chemicals involved. It will facilitate the incorporation of lessons from past incidents on the decision process to improve preparedness.

Spill Incidents

Ship name	Incident date	Incident location
Anglo Maritime	1984	Crete
Our	1987	Italy
Val Rosandra	1988	Italy
Ami	1988	The Netherlands
Pallenger	1979	USA
Porter-Park	1988	USA
Infelix	1985	Caracas
Patella	1989	The Channel
Bahamas	1988	Brust
Anna Bona	1988	The Netherlands
Puerto Rican	1984	USA
Kubark	1984	Korea
Belo	2001	Spain
Jose Maria (Current name: Marinka Kalmayev)	1988	Spain
Star Prince	2008	USA

Modelling tools for chemical spills at sea



Rodrigo Fernandes  
(Bentley Systems)

Bentley ciimar

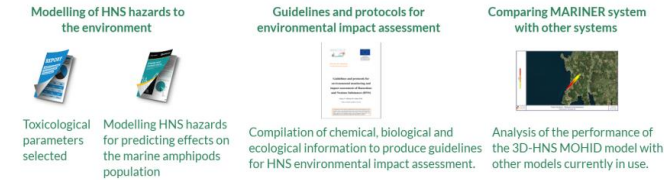
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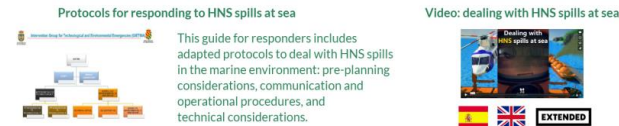
# Working streams & Outcomes

## • DISSEMINATION

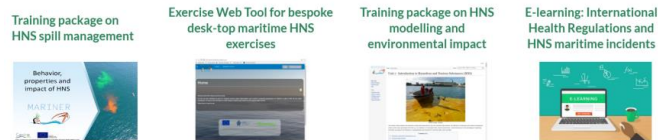
### Training package on HNS modelling and impact assessment



#### RESPONSE PROTOCOLS



#### TRAINING



#### DISSEMINATION



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### LAYMAN report



### MARINER events



### MARINER Videos



### Awareness Raising

<https://vimeo.com/224075676>



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# MARINER



Universidade de Vigo



Protecting and improving  
the nation's health



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