



Eni emergency preparedness and response in the Mediterranean Sea

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Outline

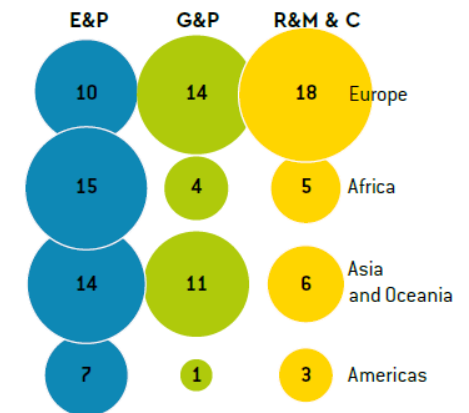
- Eni and HSEQ department – major emergencies unit
- **Preparedness:** procedures & tools at central level
 - ✓ Common Operating Picture: web-GIS Eni **3Ter Advanced**
 - ✓ Tsunami Risk Management, the Italy case
 - ✓ Exercises
- **Response**
 - ✓ Oil Spill Response for offshore facilities in Italy

Mission

We are an **energy company**.

We are working to build a future where everyone can access energy resources efficiently and sustainably. Our work is based on passion and innovation, on our unique strengths and skills, on the quality of our people and in recognising that diversity across all aspects of our operations and organisation is something to be cherished. We believe in the value of long term partnerships with the countries and communities where we operate.

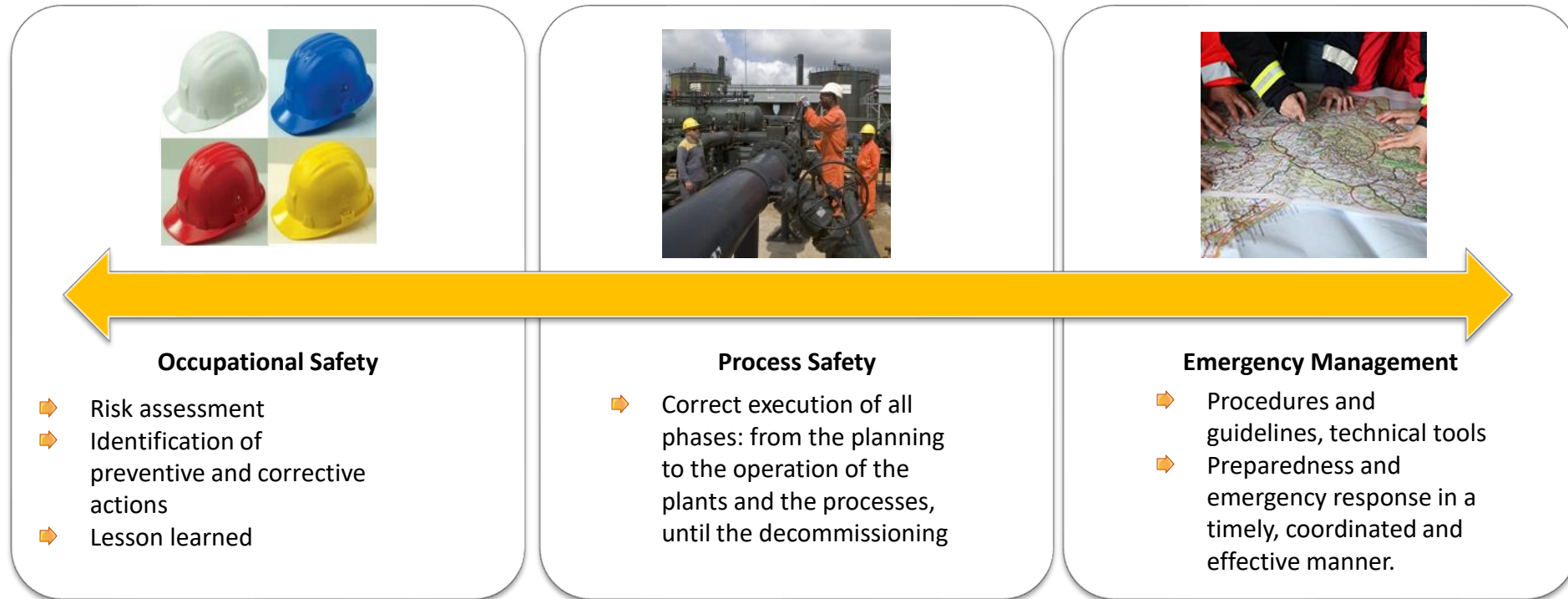
Eni is an integrated energy company of 32'000 people in 71 countries.



Eni activities:
Exploration & Production (E&P),
Gas & Power (G&P), Refining & Marketing
and Chemicals (R&M & C).



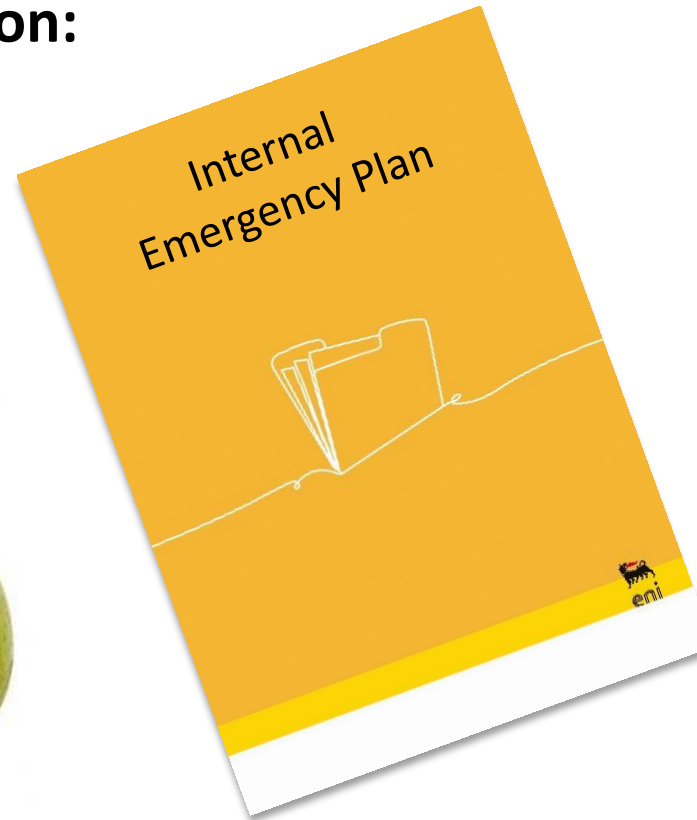
Safety & emergency management at HSEQ central department



Emergency plans

After hazard identification, consequence analysis and mitigation of impacts on:

- *People*
- *Environment*
- *Asset*
- *Reputation*

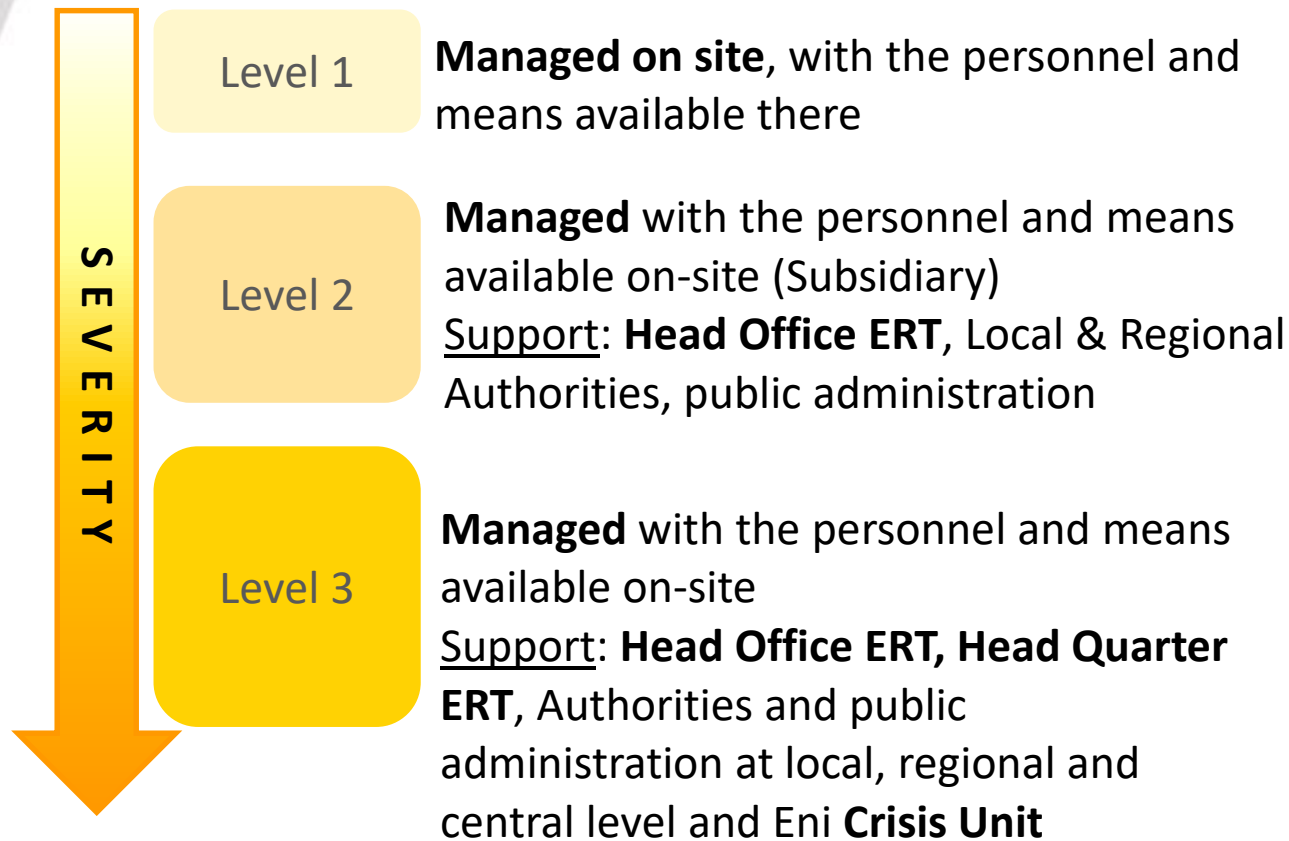


plans define roles and responsibilities.

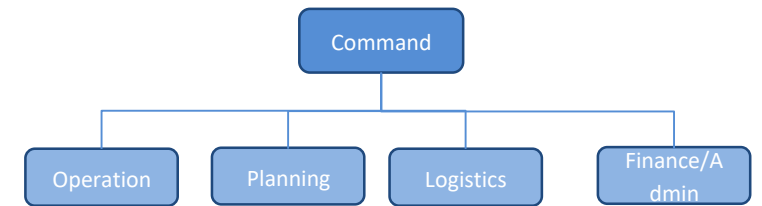
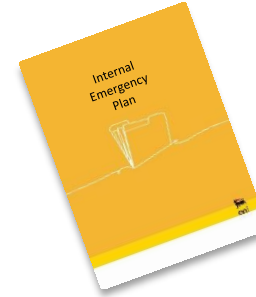
Internal plans support external ones.



Emergency preparedness: tiered approach



Tiered approach and Eni **Crisis Unit** are consistent with Incident Management System (**IMS**).



IMS

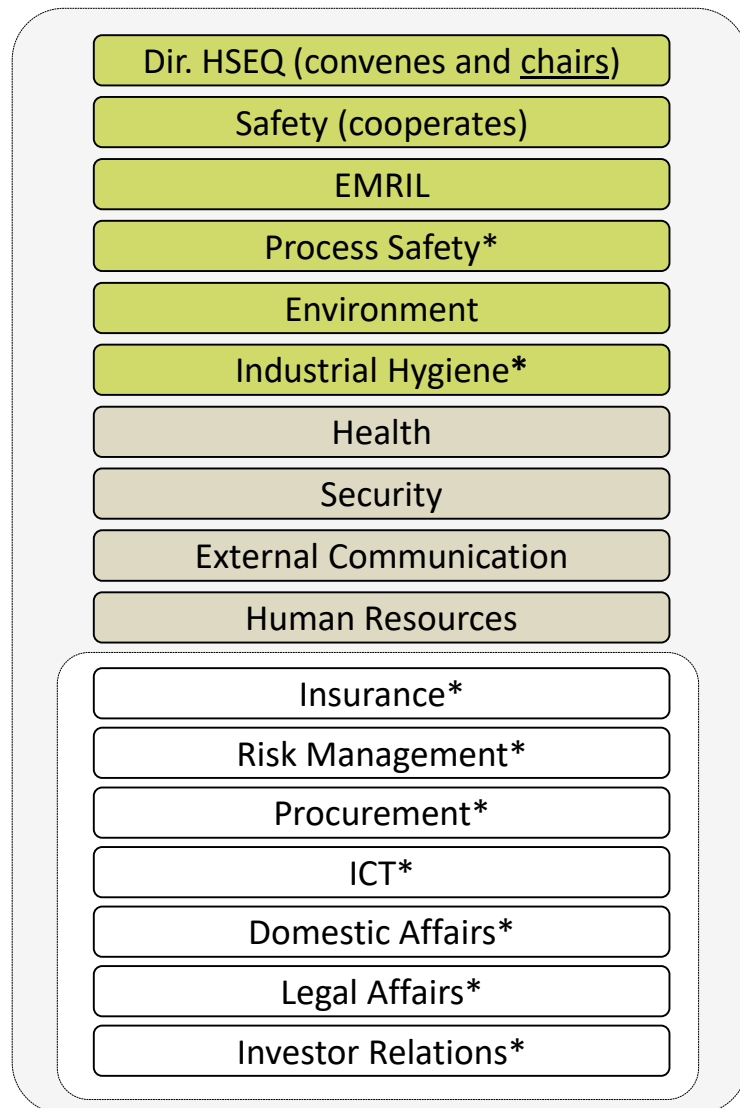
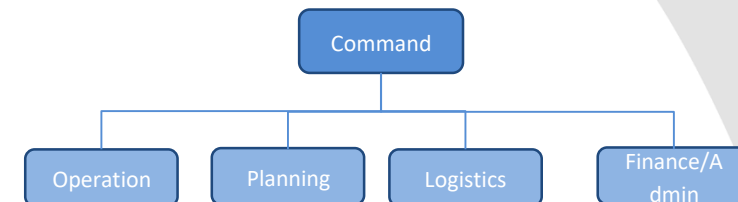


Effective **Incident Management** requires the ability to establish command and control. An IMS facilitates C&C by organizing leaders, functions, response teams and other resources through a scalable, fit-for-purpose organizational structure with pre-identified roles, responsibilities.

<http://www.ipieca.org/resources/good-practice/incident-management-system-ims/>



Emergency preparedness: crisis unit

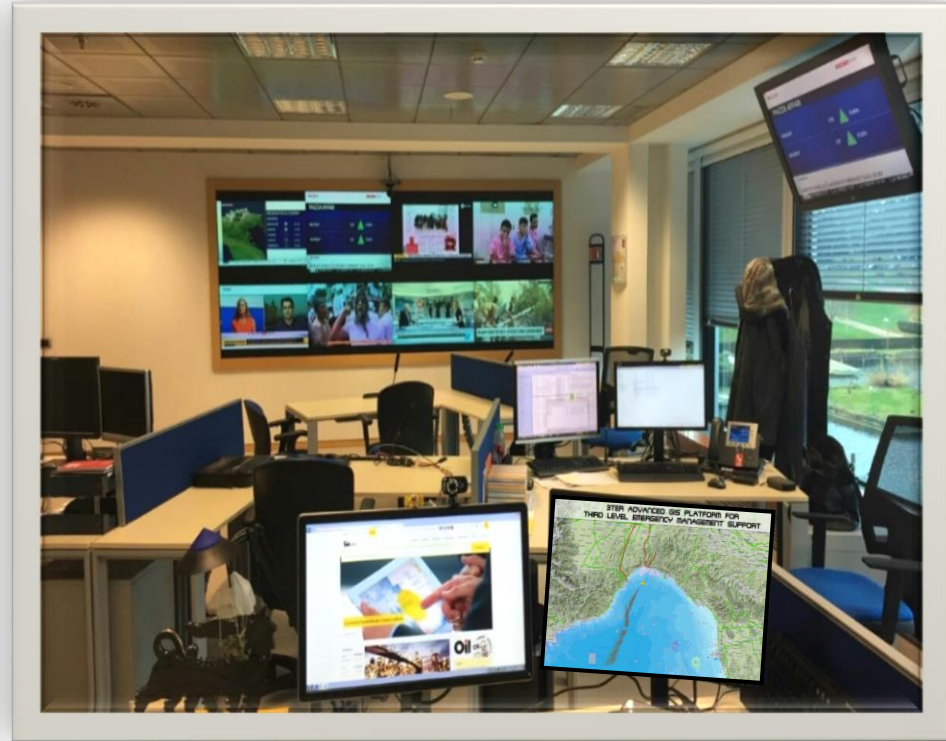


* Not permanently but on call



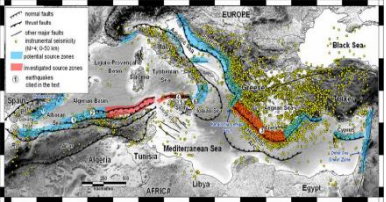


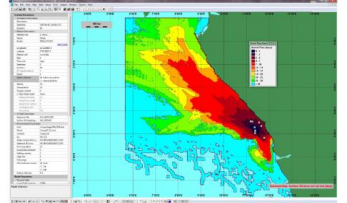





Emergency Preparedness: tools

In order to ensure efficiency and effective management of level three emergencies an integrated crisis center with an *emergency room* has been set up



Emergency Preparedness: tools

 <p>Integrated Crisis Center HSEQ & SECURITY</p>	<p><u>Web GIS</u> <u>3Ter Advanced</u></p> 	<p><u>3Ter Advanced</u></p> <p>Vessel tracking Oil spill modeling Sensitivity maps</p>	<p>Tsunami Alert System</p> 	<p><u>EXERCISES</u></p> 
<p>Vessel tracking</p> 	<p>Oil spill modeling</p> 	<p>Sensitivity maps</p> 	<p>Pipeline-Sensitivity maps</p> 	<p><u>COOPERATION</u></p> 

Emergency Preparedness: tools

3Ter Advanced

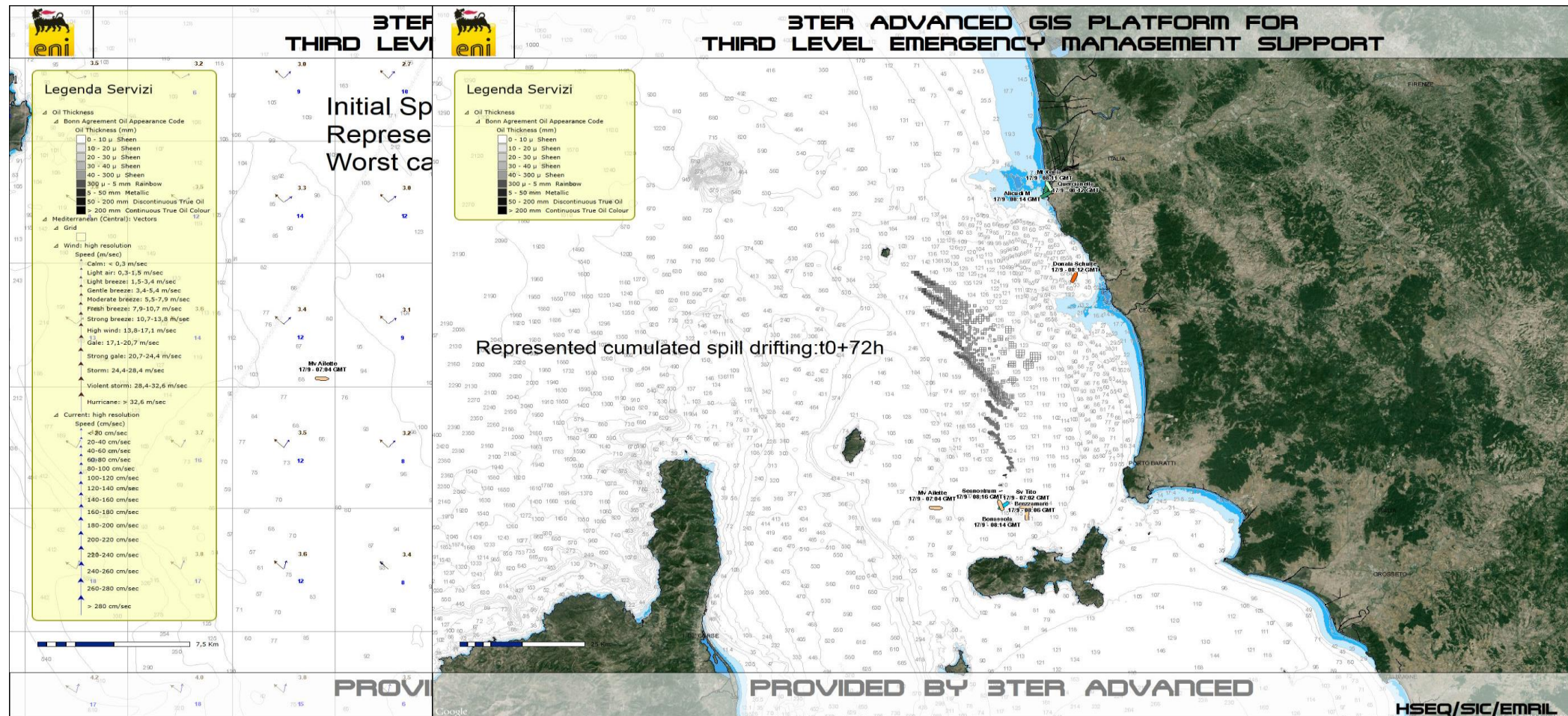
Supporting Information System for Tier 3 Emergency Response

- web GIS (Geographic Information Systems) where Eni assets are superimposed on territorial data (nautical charts, satellite maps etc.) managing the information on resources and equipment available in Eni and enabling the use of specific tools like oil spill models, databases etc.
- Eni Mediterranean Safe Terminal And Routes project (2010): results available in 3Ter Advanced and partially in MEDESS-4MS (EU project) through **REMPEC**
- **Tracking** of time charter oil/chemical tankers, supply and crew vessels



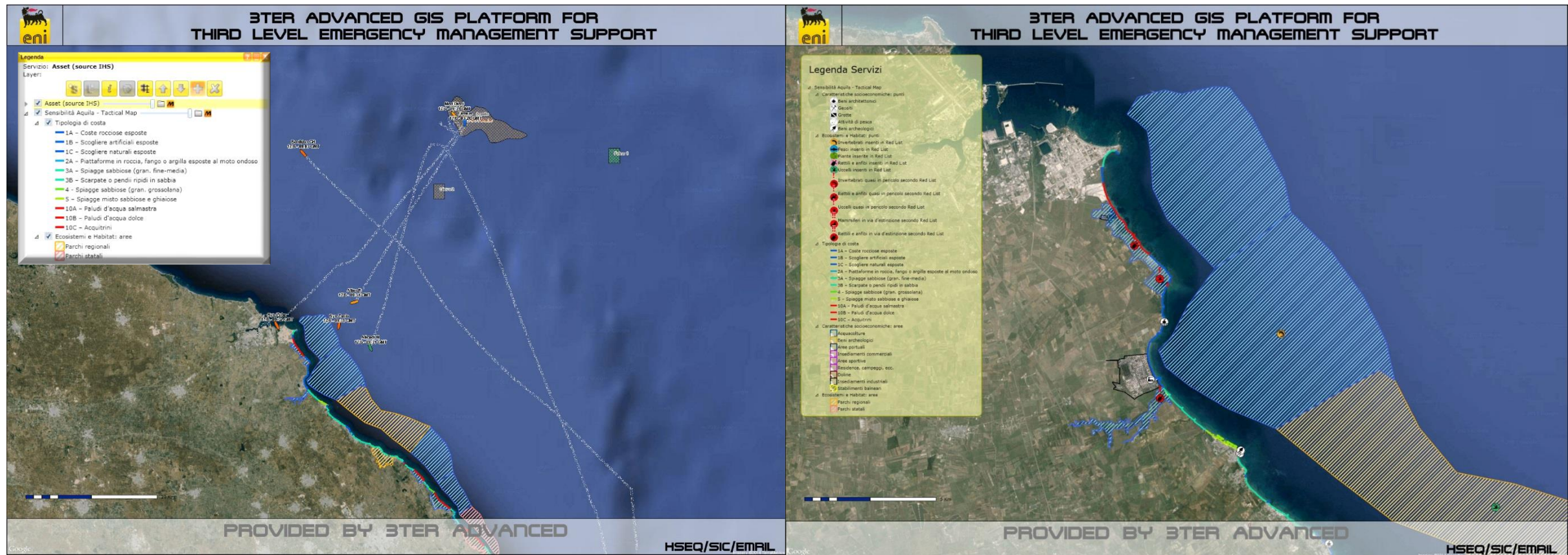
Emergency Preparedness: tools - oil spill modeling

OSCAR (*Oil Spill Contingency And Response* by Sintef) is a 3-dimensional oil spill forecasting tool which can be used for Contingency planning and Response. The experimentally validated database used by OSCAR features physical and chemical properties required by the model to run. Meteo marine forecast (input) and OSCAR results are integrated in Eni 3Ter Advanced web-GIS.



Emergency Preparedness: tools - sensitivity maps

Sensitivity mapping of the various types of environments and resources potentially exposed to oil spills enables the identification of the most sensitive sites or resources, thus providing a basis for the definition of priorities for protection and clean-up, and information to plan the best-suited response strategy.



Emergency Preparedness: tools - from sensitivity maps to NEBA and SIMA

NEBA (Net Environmental Benefit Analysis) describes a process used by the oil spill response community for guiding **selection of the most appropriate response option(s)** to minimize the overall impact of spills on the environment and other shared values.

Concurrently, the oil and gas industry began a debate on the appropriate use of the acronym, NEBA. Given that the selection of the most appropriate response action(s) has in practice been guided by more than just environmental considerations, the industry is seeking to transition to a term that better reflects the process, its objectives, and the suite of shared values which shape the decision-making framework, including **ecological**, **socio-economic** and **cultural aspects**.



Spill impact mitigation assessment (SIMA)

IPIECA

energy **API**

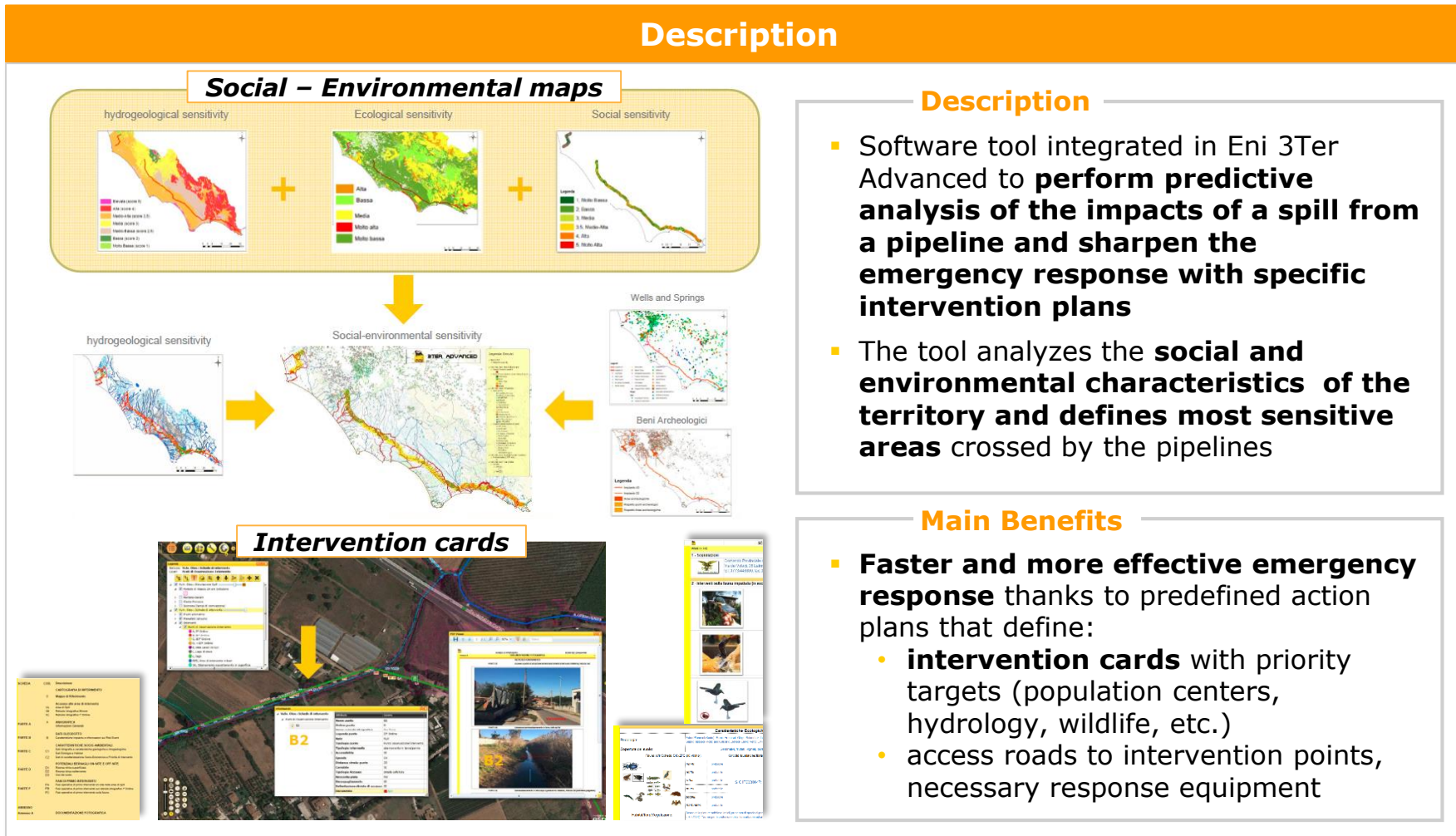
IOGP

International
Association
of Oil & Gas
Producers

Emergency Preparedness: tools - pipeline social- environmental sensitivity maps

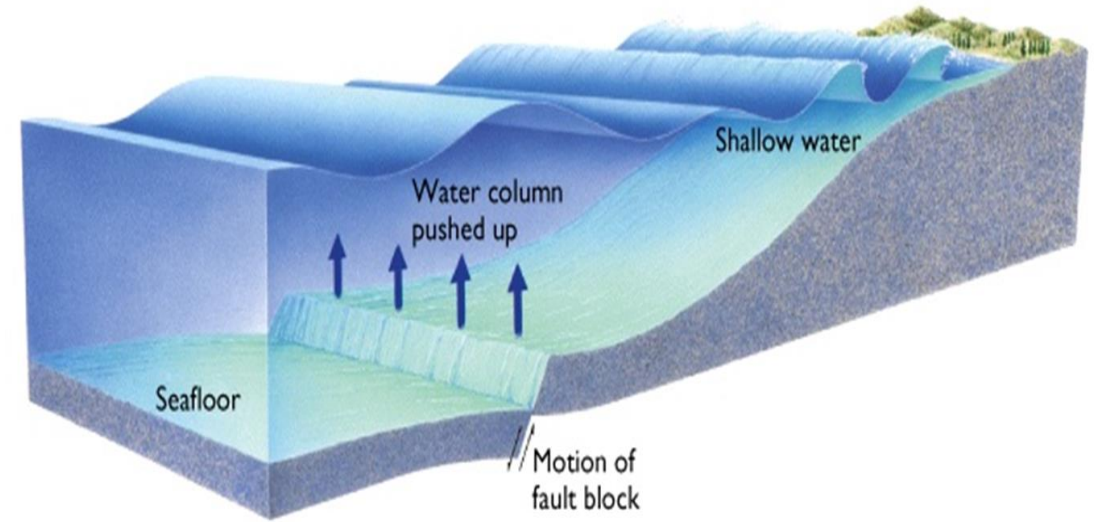


Description

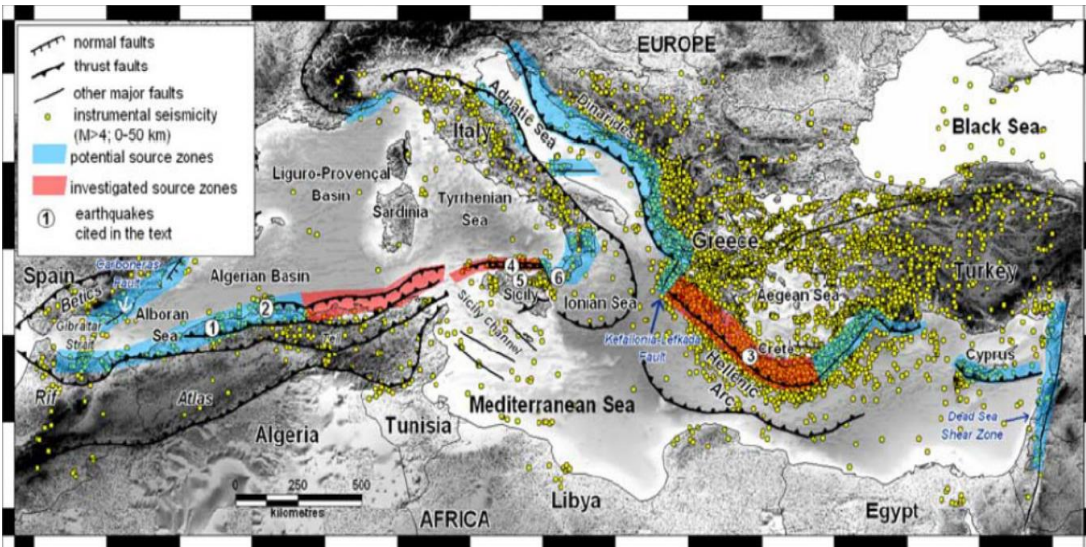


Emergency Preparedness: tools - Tsunami Risk in the Mediterranean Sea

A Tsunami of **tectonic origin** normally is a **series of waves** due to a vertical impulse caused by a submarine earthquake (distal or proximal to the coastline) that involves **the entire water column**.



The Mediterranean basin presents **many seismic offshore & onshore sources**. These have demonstrated to have a **great seismic potential** generating high magnitude (**up to $M=8.5$**) shocks for centuries.



Emergency Preparedness: tools - Tsunami Risk Management, the Italy case

In 2005 IOC formally established the **ICG/NEAMTWS**, Intergovernmental Coordination Group for the North-Eastern Atlantic, the Mediterranean and Connected Seas Tsunami early Warning and Mitigation System.

- PTWS – Pacific Tsunami Warning System
- IOTWS – Indian Ocean Tsunami Warning System
- CARIBEEWS –Caribbean Early Warning System
- **NEAMTWS**

The 'SiAM' – National Tsunami Alert System is formally composed by three organizations and operates for **civil protection emergency preparedness & management scopes**.

INGV, Italian Geological Survey, hosts the Mediterranean '**CAT**' – **Tsunami Alert Center** for real time earthquakes detection.

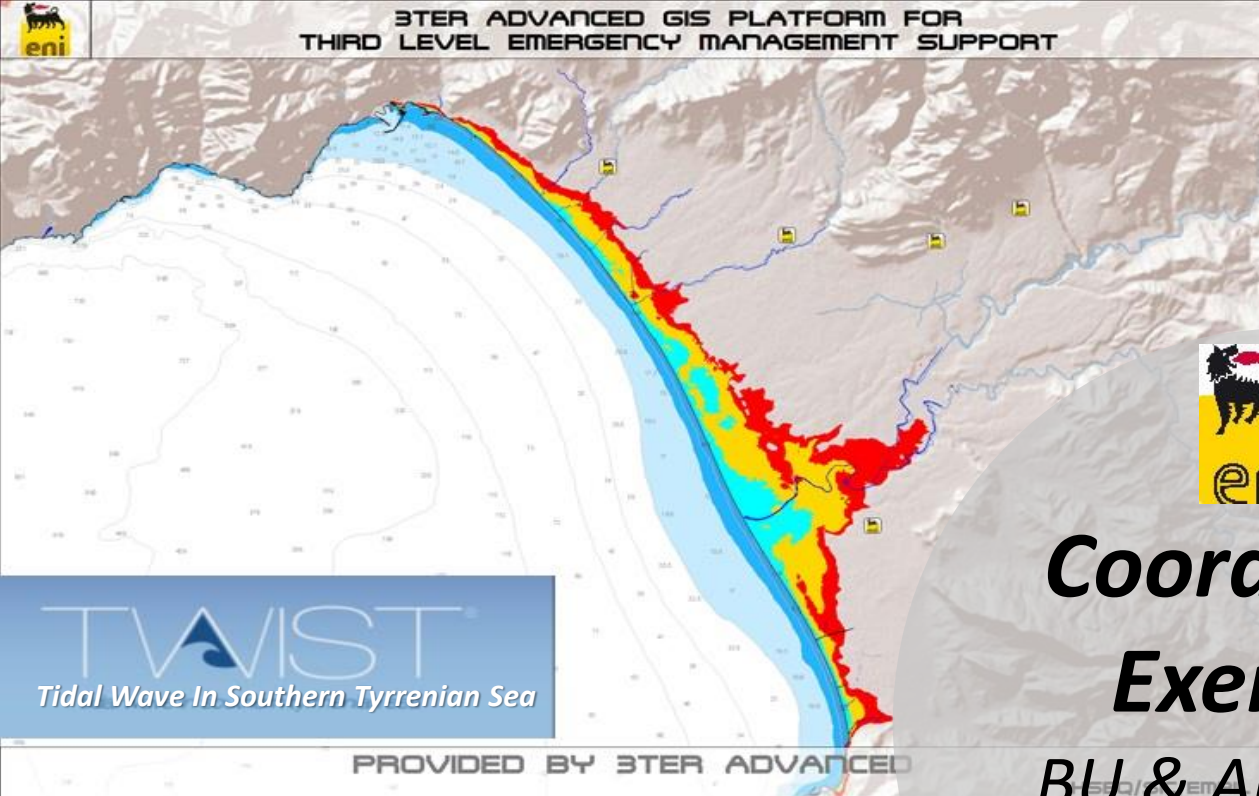
ISPRA, Environmental Protection & Research Institute, manages and provides data from national network for marine observation.

DPC, Italian Civil Defence, secures alerts dissemination to the structures of national civil defence service.

Source: website «Dipartimento della Protezione Civile - Presidenza del Consiglio dei Ministri»

Eni developed guidelines for alert management and actions have to be taken by Italian coastal sites



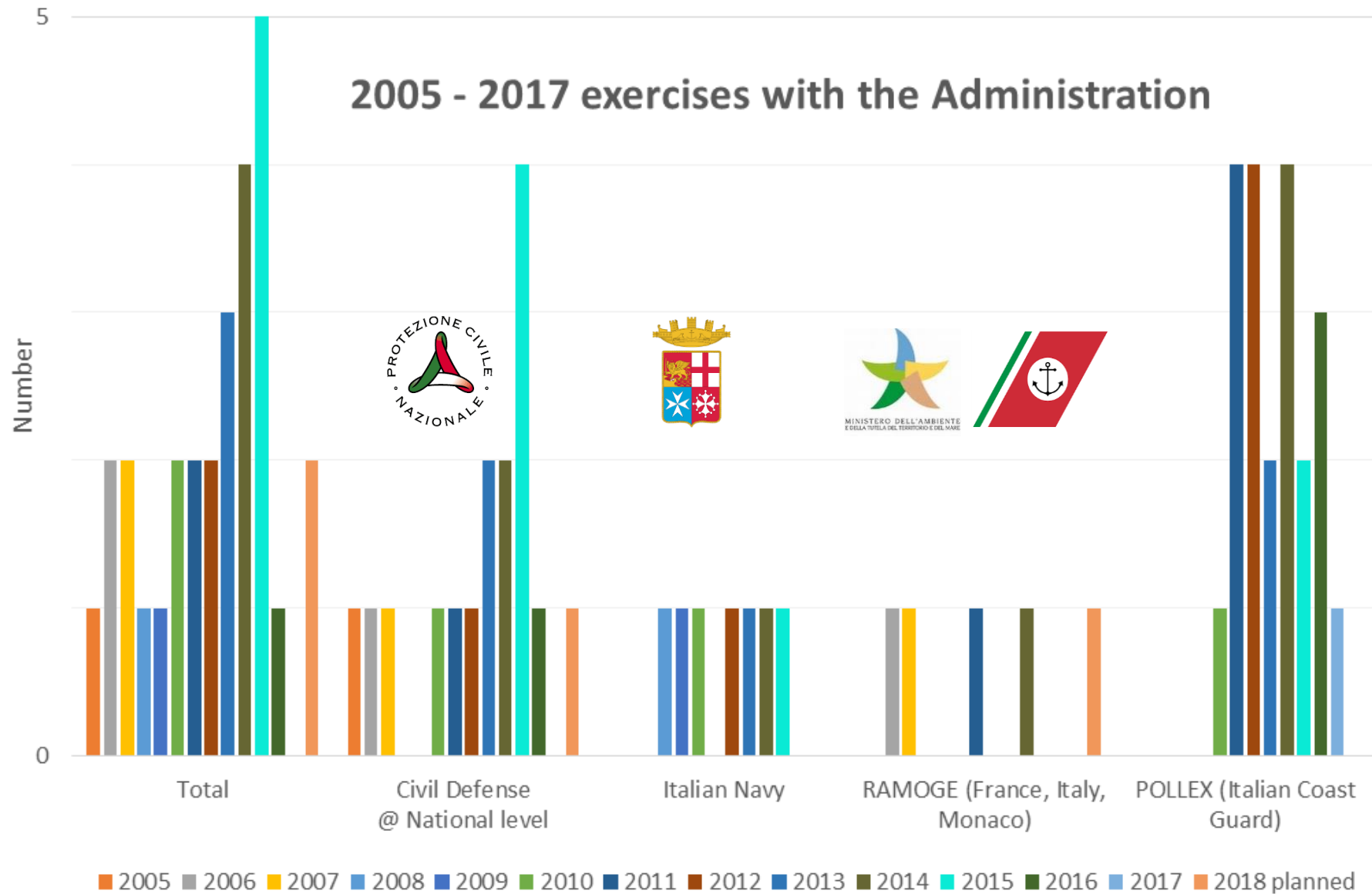


Coordinated Exercises BU & Authorities

3TER ADVANCED GIS PLATFORM FOR



Coordinated Emergency Drills – focus on Italy



Emergency Response

Tiered Response needs tiered contractors and mutual aid

- **Regional coastal response: local and centralized contractors**
(for Italy only: four centralized contractors)



- **Oil Spill Response** worldwide contractor
- Mutual aid:
 - ✓ IPIECA **O**il Spill **W**orking **G**roup
 - ✓ **REMPEC** (*Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea*)
- **Eni Emergency Response Kit** for offshore blow out events

Emergency Response for offshore blowout events

Following 2010 Gulf of Mexico blowout, industry and regulators focused on the upgrade of response capability on subsea offshore blowout.

Eni approach was to join international consortiums for main equipment and to develop in-house technologies to improve the intervention capability.

Eni Emergency Response Kit consists of:

Outsourced equipment contracted by Eni Headquarters

- Access Agreement to Subsea Capping Equipment consortium
- Access Agreement to Global Dispersant Stockpile consortium

Eni Headquarters proprietary equipment

- Rapid Cube
- Killing System



Subsea Capping Equipment Service & Global dispersants stockpiles

Access Agreement to «**Subsea Capping Equipment**»

« *Well CONTAINED* » system includes:

- *Subsea Capping Stack*
- *Subsea Dispersant Application Kit*
- *Subsea Debris Removal equipment*

Two set of equipment available in **UK** and Singapore



“**Global dispersants stockpiles**”

Agreement grants the access to 5000 cubic meters dispersant stockpile stored in strategic locations around the world.

Focus on **UK** and **France** stockpiles



Dispersant Type	Volume (m ³)	Location
Dasic Slickgone	500	OSRL UK Southampton
Finasol OSR 52	500	OSRL UK Southampton
	1,500	Vatry, France



Proprietary equipment for the Emergency Response Kit

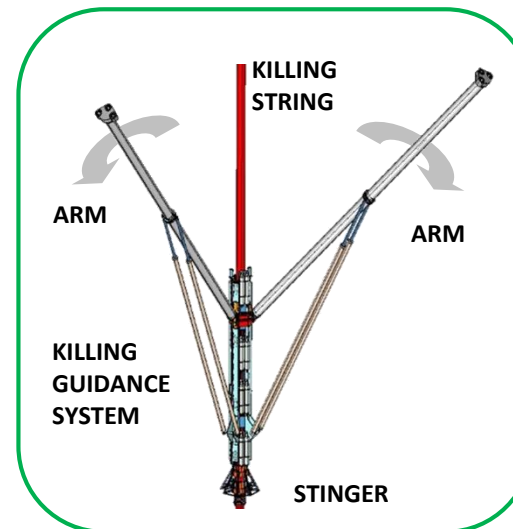
Eni Safety Competence Center – Gela Sicily



"Killing System"

Emergency Response Kit:

- *"Killing System"* intended to guide the re-entry of a killing string in a flowing well; operated by an acoustic sensing system and a combined control of 2 ROVs
- *"Rapid Cube"* subsea oil recovery system (no seal type)



"Rapid Cube"

Conclusions

Eni emergency preparedness and response covers many other emergencies related to process safety accidents and Natech ones.

Today we have mainly described our effort in oil spill combat to ensure the protection of the marine environment.

We are looking forward to explaining more if you like. Thanks.



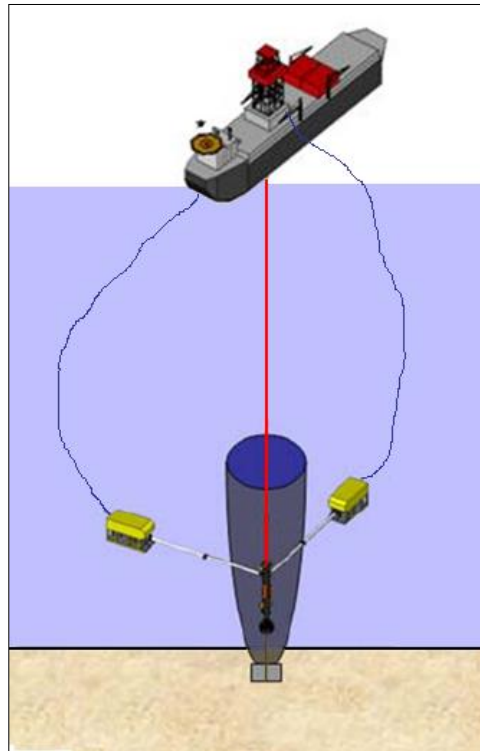
Back up



Eni HQ proprietary Equipment

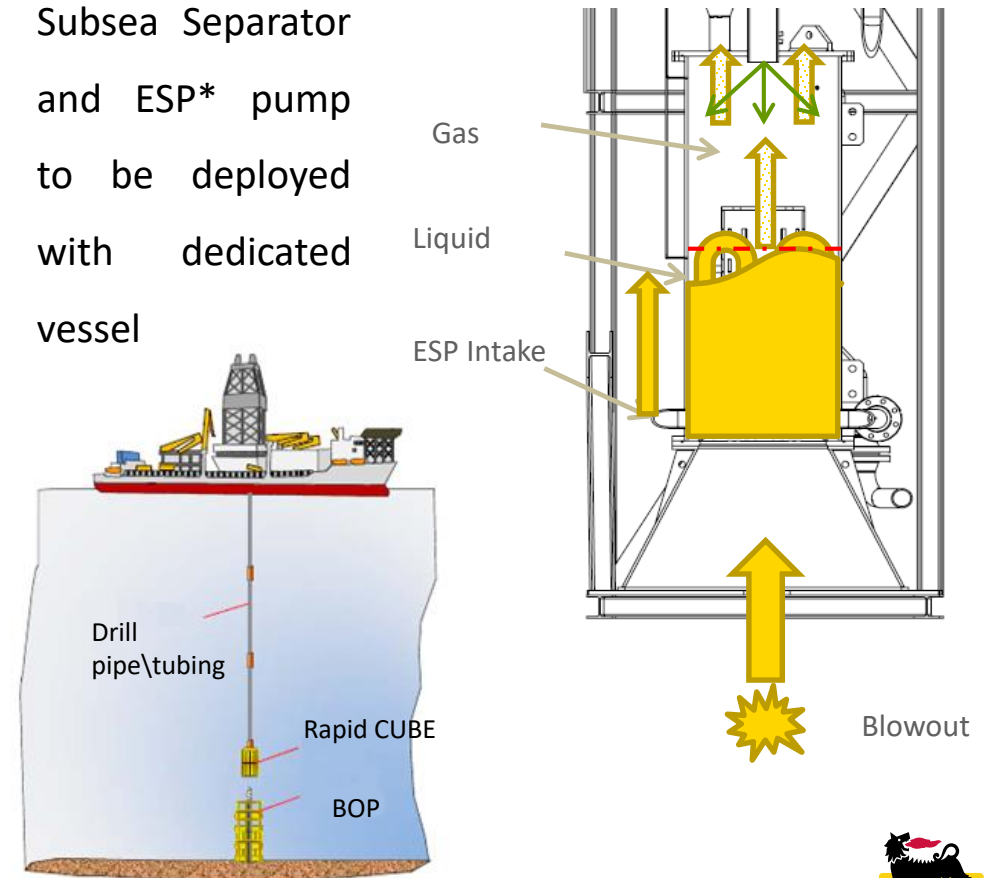
Killing System

- Response tool devoted to assist and enhance vertical well re-entry on a deepwater well, during a blowout
- Intended to guide the re-entry of a killing string in a flowing well; operated by an acoustic sensing system and a combined control of 2 ROVs



Rapid Cube

- Subsea **Oil Recovery System – no seal type**
- Subsea Separator and ESP* pump to be deployed with dedicated vessel



*electrical submersible pumping (ESP) systems