Smart Emergency Response Systems (SmartERS) the Oil Spill use case not only sensing and sharing but also Smart
Responding to a natural or artificial emergency (earthquake, flood, oil spill, etc.) requires to **access, exchange, share** and of course **understand** many types of geospatial information provided by several types of sensors. The emergencies community since years has been developing the concept of **Common Operating Picture (COP)**.

A Common Operating Picture (COP) is a Geospatial tool that **gathers** and **provides** a single source of information for **situational awareness**, to support emergency management and response personnel involved in an incident.
1. **Preparedness.** This phase is characterized by planning the emergency capabilities, the data identification and acquisition.

2. **Response.** The focus of this phase is to put in place the initial response activities, damage limitation, resource acquisition.

3. **Recovery.** This phase deals with the actions for containing and cleaning-up the contaminated area.

4. **Mitigation.** The necessary measures to mitigate the risk that an accident could happen are put in place during this phase.
The **strategic** coordination team *decides what should be done* for responding to an emergency, and *how to communicate to the public*.

The **tactical** coordination team *turns the orders from strategic team into actions* to be executed by the **operational team**, which *responds to the emergency situation*. 

Operational coordination takes place at the location of the accident; the strategic and tactical coordination take place in coordination centres.
Focus on:
- "tanker in transit"
- "offshore platform"

ERS shall be smart enough to help Emergency teams to take the right decision at the right time

- COP shall be driven by several **contextual considerations**.
- COP shall provide coherent **semantically meaningfully maps**.
- COP shall provide a **continuously updated** overview of an accident.
Oil spills emergencies have provided lessons learned and identified issues to be addressed as:

1. Lack of agreement on what data needed to be tracked and transmitted;
2. Vast geography of the response area of operations;
3. Lack of availability of appropriate technology to exchange information;
4. Limited ability to push real-time data, throughout the response organization
5. Different computing standards.
Despite the effort that Private Sector and Public Administrations have been putting since years, the goal to provide an exhaustive picture of the situation during an Emergency Response is still far to be reached.

European Interoperability Framework viewpoints:
- **Legal**: *(legal framework)* Copernicus; CISE; IMP; INSPIRE etc.
- **Organizational**: *(business process alignment)* Service Level Agreement
- **Semantic**: *(exchange meaningful information)* Standards
- **Technology**: *(linking information systems)* Service Oriented Architecture (request/response communication style- Spatial Data Infrastructures).
Performance: Near real time

Planning

Acquisition and Processing

Features Analysis

Product Processing and Alert Generation

Earth Observation Service Providers

EMSA EO Data Centre

Analysis Results (EO derived information)

Phone and email alert (Alert Report)

Data dissemination

ancillary data

T0 = End of scene acquisition

T = T0 + 30 min

Satellite images are acquired in segments up to 1400 km long. 30 min are for a 400 km long image.
Emergency Response is not only sensing, and sharing but it should be smart enough to encompass intelligent actions. “smart Emergency Response System” (SmartERS).

@Limited ability to push real-time data.

Therefore:

1. Rapid collection and processing of contextual data from different sources based - semantic web;

2. Internet of Things (IoT) as platform for Emergency Response Systems;

3. Publish and Subscribe Architectures for Emergency Systems
Enablers

Authoritative Sensing
SDI, EODC

- crucial but not enough

Citizen Sensing
social networks

- Regarded as not reliable

Business Sensing
UAV

- Huge volume and variety

Internet Of Things

Event Driven & ROArchitectures

Data Mining
Semantic Web

Vessels as Sensors
fluorometer sensors

Huge N. sensors

Intelligent Actions

Open Data

Smart ERS
The following use cases have been exploiting based on semantic web mining:

- User Driven EO acquisition.
- Gather from web contextual information;
- Multi-Sensors Oil Spill Monitoring;
Smart ERS

not only sensing and sharing but also smart

Gianluca Luraschi
gianluca.luraschi@gmail.com
EO Lessons Learnt

Performance

High

low

Requirements

Targets the user needs
Release n.0

Release 1.0

High

Interoperability

low