HAZRUNOFF

PROJECT

Integration of sensing and modelling technologies for early detection and follow-up of hazmat and flood hazards in transitional and coastal waters

Funded by
European Union
Civil Protection
and Humanitarian Aid

HazRunoff at a Glance

Programme: Directorate-General for European Civil Protection and Humanitarian Aid Operations

Start date: January 2018
End date: December 2020

Total budget: 643,770.10 €
EU Grant: 482,827.57 € (75%)

Main Aim:

To increase preparedness and response capacity on floods and pollutant hazards in rivers, transitional and coastal waters, through the development of a situational awareness and emergency response framework and associated tools, capable of supporting civil protection units and water pollution authorities

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Partners and associated partners

- Instituto Superior Técnico, IST (*Coordinator*)
- Bentley Systems Portugal
- Câmara Municipal de Loures
- Portuguese National Authority for Civil Protection

- Centre de documentation, de recherche et d'expérimentations sur les pollutions accidentelles des eaux, CEDRE
- French Navy

- Centro Tecnológico del Mar - Fundación CETMAR
- Augas de Galicia

- EOMAP GMBH & CO KG
- BfR -German Federal Institute for Risk Assessment

- Public Health England (PHE)
- UK Maritime Coast Guard Agency

Contact:

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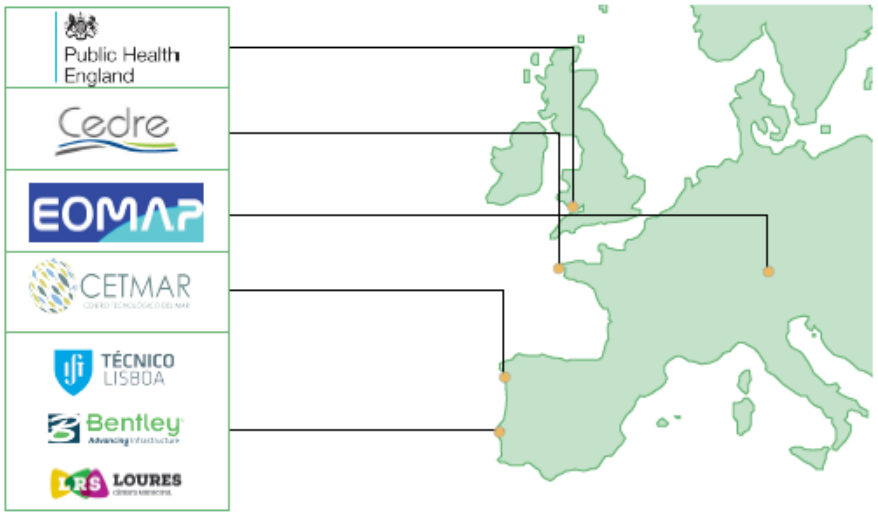

http://www.hazrunoff.eu/

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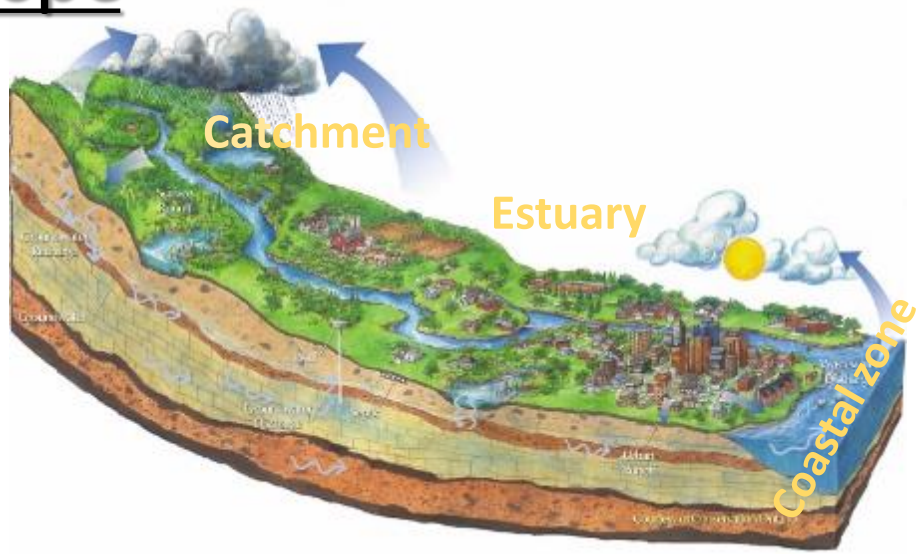
HazRunoff objectives & scope

•To fill the gaps around knowledge and preparedness involving early warning & detection, follow-up, and response to flooding and hazmat contamination in inland, transitional and coastal waters, including urban areas



•To provide a fast, reliable, flexible and comprehensive framework to face different or combined types of flooding and hazmat pollution integrating:

-in-situ sensing technologies
-airborne (UAV/drones) and satellite remote sensing
-holistic high resolution modelling
-operational tools for situational awareness and crisis management
-improved contingency planning and adapted protocols for response and communication

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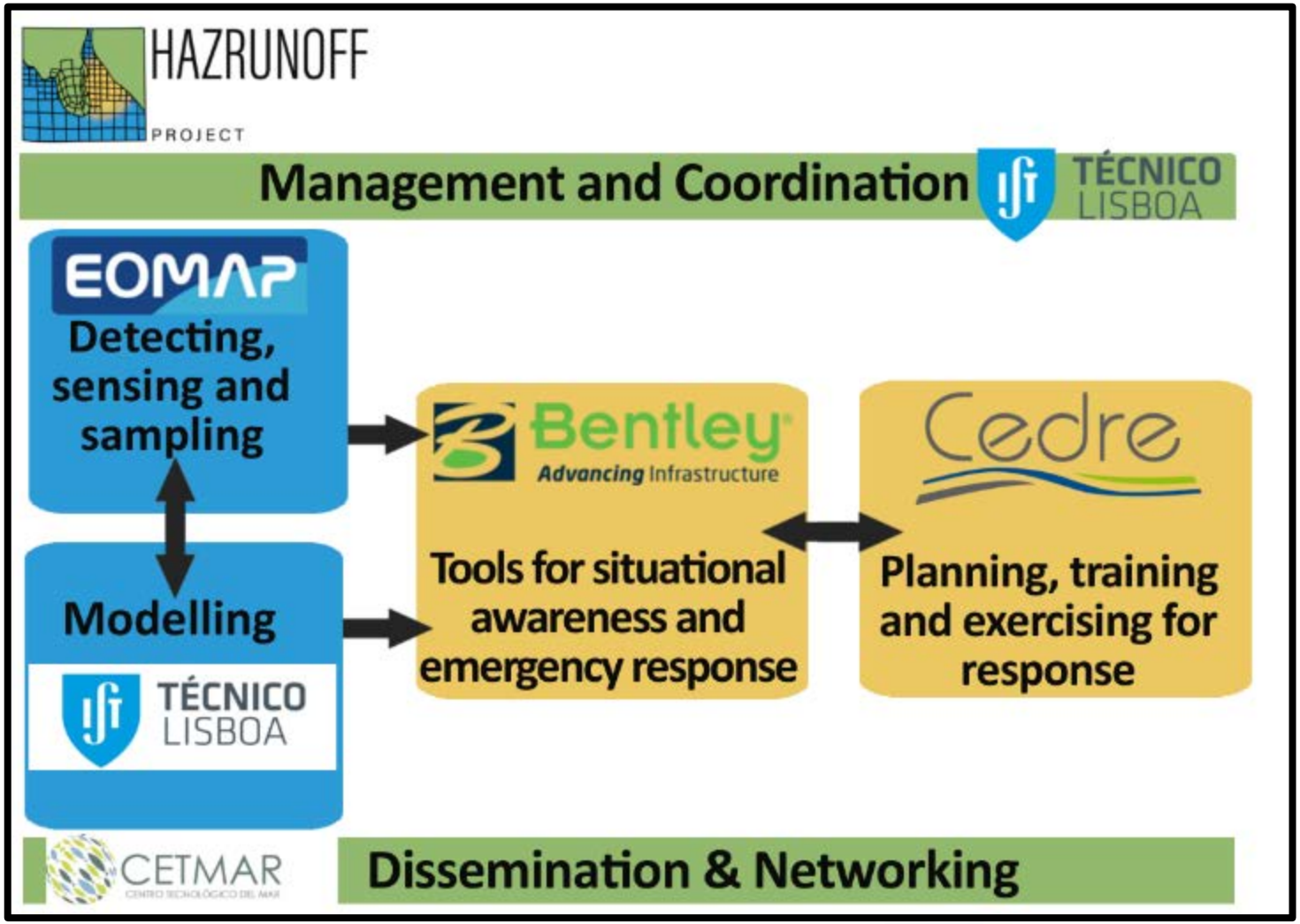
HazRunoff Work Streams



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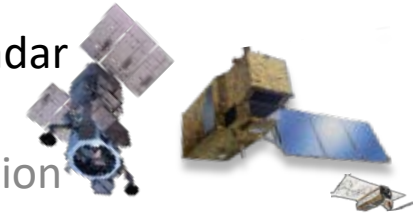
Detecting, sensing and sampling

Data acquisition and measurements regarding flooding and water contamination. Early detection and warning and contribution to model initialization and validation

APPROACHES:



-**Remote sensing**: Satellite optical sensors, synthetic aperture radar (SAR) and hyperspectral

Water level, turbidity, oil slick identification and chemical spill detection

-**Integration of in-situ environmental data**:

Rivers control stations: water quality (pH, dissolved oxygen, temperature, conductivity and turbidity, etc.) and flowrate.
Laboratory measurements of chemicals behaviour and fate

-**Unmanned Aerial Vehicles (UAV)**:

Identification and mapping of floods (environmental parameters characterisation) and water pollution

-**Gap analysis and assessment of sentinels and indicators**

Review monitoring and detection technologies, key pollutants (and/or proxy indicators) for incident alerting and produce an automated tool to help assess and interpret monitoring data

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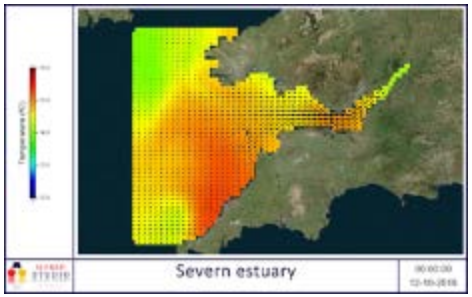
Modelling

To simulate and integrate the water continuum from the watershed to the estuary to reproduce and forecast the processes associated with floods and the dispersion of pollutants

«To be implemented in each pilot area»

Meteorological modelling	To simulate and forecast meteorological variables with the adequate horizontal resolution
Watershed modelling	To estimate river flows in regular and extreme conditions
Estuarine modelling	To simulate estuarine circulation including storm surge and floods
Urban storm water modelling	To simulate the water drainage in the main cities associated to the pilot study cases



Integrated flood modelling

To implement a method for full coupling watershed, estuarine and urban drainage models

Pollutants, thrash and debris dispersion modelling

- Radioactivity dispersion in water bodies
- Air dispersion modelling

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Tools for situational awareness & emergency response

To support flood and hazmat emergency responders by centralizing and integrating data from observation and prediction, decision making and communication

USER FRIENDLY WEB-BASED TOOLS AND MOBILE INTERFACES

-**Multi-hazard early warning system**:

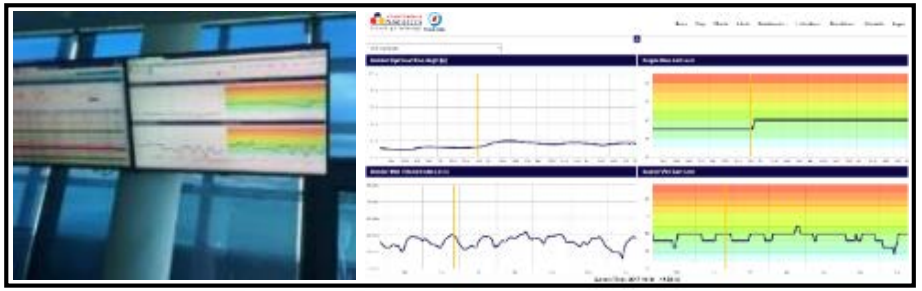
Daily reports / Event-triggered early warning notifications

-**On-demand pollutant dispersion system**:

Web-based multi-platform and mobile-friendly tool for the on demand simulation of fate and behaviour of objects and substances in transitional waters

-**Realtime dashboards for situational awareness**:

Online dashboards to present information about hydro-meteorological conditions, pollution indicators and different measured and modelled data coming from other project work streams



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Tools for situational awareness & emergency response

-**Communication and social media in crisis management**:

- Evaluation of social media and internet systems for early alerting incidents

  Development of search terms relevant to Hazmat and Flooding incidents in inland, estuarine and coastal water and bespoke selection of “key words” for social medial trial

-Alerting about aquatic incidents

-Increasing public participation

- Response communication protocols

  Crisis communications – Warning and informing message around priority pollutants. Impact assessment in social networks during incident, exercise or historical incidents (sentiment analysis)

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Planning, training and exercising for response

To contribute actively to an efficient preparedness and response to floods and hazmat response in transitional waters.

-**Risk management**:

To develop maps and tools that help prioritising emergency response actions

-Hazard prioritisation framework to identify key pollutants

-Hazard mapping approach to identify main hotspot and vulnerable areas

-**Adapting response protocols in transitional waters**:

To identify past incidents in transitional waters, highlighting the main difficulties encountered, their specificities and preforming an analysis of equipment available according their characteristics and performance

-**Development of training activities**:

To help key staff in emergency response to HNS and oil incidents, specially adapted to the conditions in transitional waters

-**Exercises and demonstration**:

To test simultaneously the project techniques, methodologies and operational tools. Table top exercises on virtual hazard scenarios

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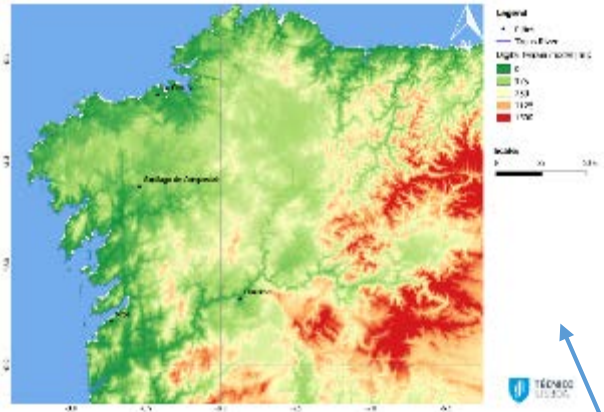
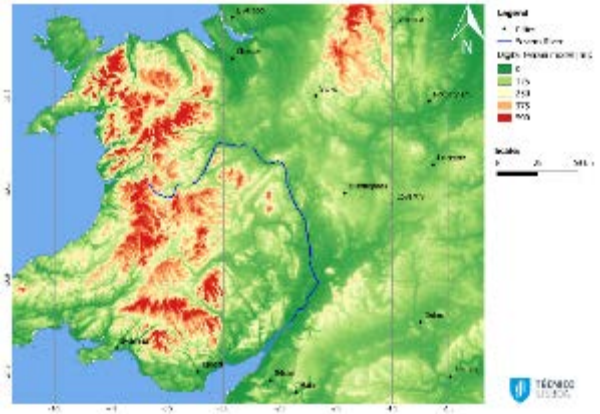
HazRunoff pilot areas

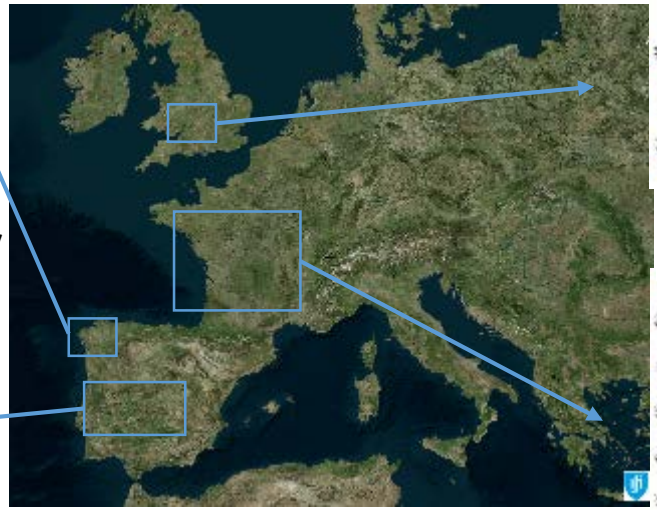
http://www.hazrunoff.eu/case-studies/

Spain – Ulla and Sar Rivers \ Ría Arousa

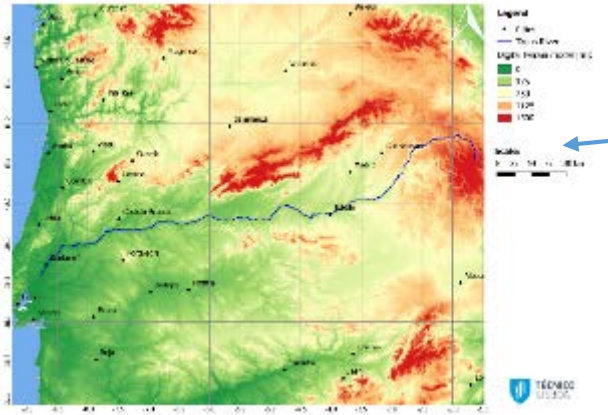


UK - Severn river \ estuary

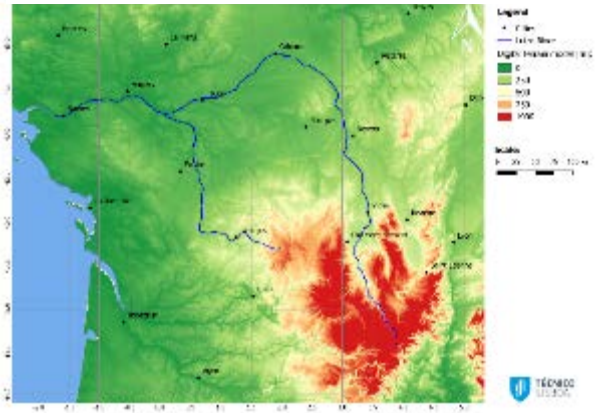




Portugal - Tagus river \ estuary



France - Loire river \ estuary



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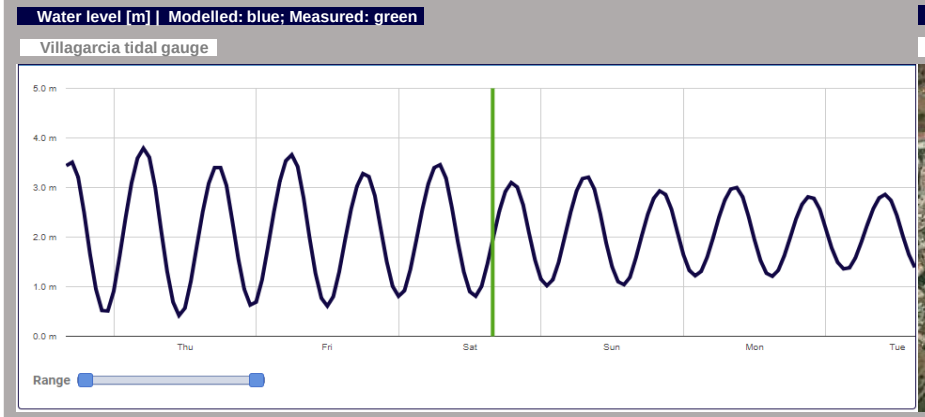
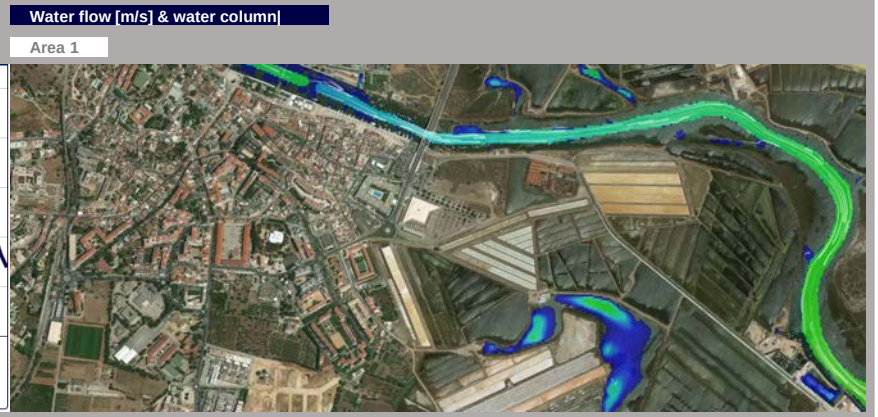
Products \ Tools

- Operational tools for situational awareness and crisis management
- Risk management tools to support contingency planning and decision making
- Response protocols adapted for transitional waters
- Training material and courses to help key staff in emergency response
- Communication and social media in crisis management





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HazRunoff expected impact

To Speed up and improve the early warning and detection, follow-up and response to floods and multiple hazmat contamination in transitional waters.

Specifically this result will achieved by:

- Earlier detection of hazmat incidents (oil and chemicals) and a more efficient follow-up of pollution in transitional waters

  Based on remote, in-situ techniques and pollutant dispersion modelling

- Increase preparedness and knowledge on multiple types of floods

  Based on a modelling strategy of simulating flash floods, storm surges, etc.

- Increase awareness on marine pollution originated in inland waters or estuarine environments

  Based on automatic data analytic on social media

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HazRunoff expected impact

•Stronger and safer capacity for identification and monitoring of contaminated areas

Based on remote techniques avoiding human direct contact with pollution

•Improved contingency planning

Based on hazard mapping for multiple types of hazards

•Improved knowledge on chemical properties and behaviour on transitional waters

Based on lab measurements in 20 chemical substances

•Improved knowledge and awareness on hazards as a consequence of new training material, courses and exercising

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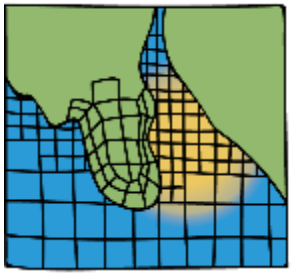

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