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2007-2013



SeaTec Helsinki

17-19 April 2012

Oil shipping safety and security: from risk assessment to smart response

R. Aps

University of Tartu

Estonian Marine Institute



EUROPEAN UNION
EUROPEAN REGIONAL DEVELOPMENT FUND
INVESTING IN YOUR FUTURE



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OUTLINE

- **Notions of safety and security**
- **The Total Safety Concept**
- **Safety and security risk management**
- **Security risk management: the legal background**
- **From environmental risk assessment to Web based decision support system for safety & security risk management**



- ***A safety critical system is one whose failure could do us immediate, direct harm***
- **Basic intuition – a system is not safe if it can harm us**
- ***A security critical system is one whose failure could enable, or increase the ability of, others to harm us***



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- The Total Safety Concept imply both the
 - 1) reduction of the risk of accident, and
 - 2) minimization of the risk of real damage would the accident still happen
- The safety levels are determined by the strategy for allocation of response resources





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Safety and security risk management



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Maritime transport in the Gulf of Finland

Safety risk management

- *AIS*
- *GOFREP*
- *VTS (vessel traffic service)*

Security risk management

- *ISPS Code of SOLAS Convention*





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Security risk management: the legal background



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International Convention for the Safety of Life at Sea (SOLAS), 1974

- Adoption: 1 November 1974; Entry into force: 25 May 1980





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Chapter XI-2 - Special measures to enhance maritime security

Regulation XI-2/3 of the chapter enshrines the International Ship and Port Facilities Security Code (ISPS Code). Part A of the Code is mandatory and part B contains guidance as to how best to comply with the mandatory requirements.

Regulation XI-2/8 confirms the role of the Master in exercising his professional judgement over decisions necessary to maintain the security of the ship. It says he shall not be constrained by the Company, the charterer or any other person in this respect.





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Chapter XI-2 - Special measures to enhance maritime security

Regulation XI-2/5 requires all ships to be provided with a ship security alert system.
Regulation XI-2/6 covers requirements for port facilities, providing among other things for Contracting Governments to ensure that port facility security assessments are carried out and that port facility security plans are developed, implemented and reviewed in accordance with the ISPS





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The International Ship and Port Facility Security Code (ISPS Code) is a comprehensive set of measures to enhance the security of ships and port facilities, developed in response to the perceived threats to ships and port facilities.

The ISPS Code is implemented through chapter XI-2 Special measures to enhance maritime security in the International Convention for the Safety of Life at Sea (SOLAS). The Code has two parts, one mandatory and one recommendatory.



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- **ISPS Code takes the approach that ensuring the security of ships and port facilities is a risk management activity and that, to determine what security measures are appropriate, an assessment of the risks must be made in each particular case. The purpose of the ISPS Code is to provide a standardised, consistent framework for evaluating risk, enabling Governments to offset changes in threat with changes in vulnerability for ships and port facilities through determination of appropriate security levels and corresponding security measures.**





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Different security levels referred to in the ISPS Code



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Security level 1: normal, the level at which the ship or port facility normally operates.

Security level 1 means the level for which minimum appropriate protective security measures shall be maintained at all times.





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- **Security level 2: heightened, the level applying for as long as there is a heightened risk of a security incident.**
- **Security level 2 means the level for which appropriate additional protective security measures shall be maintained for a period of time as a result of heightened risk of a security incident.**





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- **Security level 3: exceptional**, the level applying for the period of time when there is the probable or imminent risk of a security incident.
- **Security level 3** means the level for which further specific protective security measures shall be maintained for a limited period of time when a security incident is probable or imminent, although it may not be possible to identify the specific target.






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- **Convention for the Suppression of Unlawful Acts Against the Safety of Maritime Navigation, Protocol for the Suppression of Unlawful Acts Against the Safety of Fixed Platforms Located on the Continental Shelf (SUA Convention)**

- Adopted 10 March 1988; Entry into force 1 March 1992; 2005 Protocols: Adopted 14 October 2005; Entry into force 28 July 2010



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The main purpose of the SUA is to ensure that appropriate action is taken against persons committing unlawful acts against ships.

These acts include the seizure of ships by force; acts of violence against persons on board ships; and the placing of devices on board a ship which are likely to destroy or damage it.





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**From environmental risk
assessment**

- OILRISK Web -

to

**Web based decision support
system for safety & security risk
management**

- SmartResponse Web -

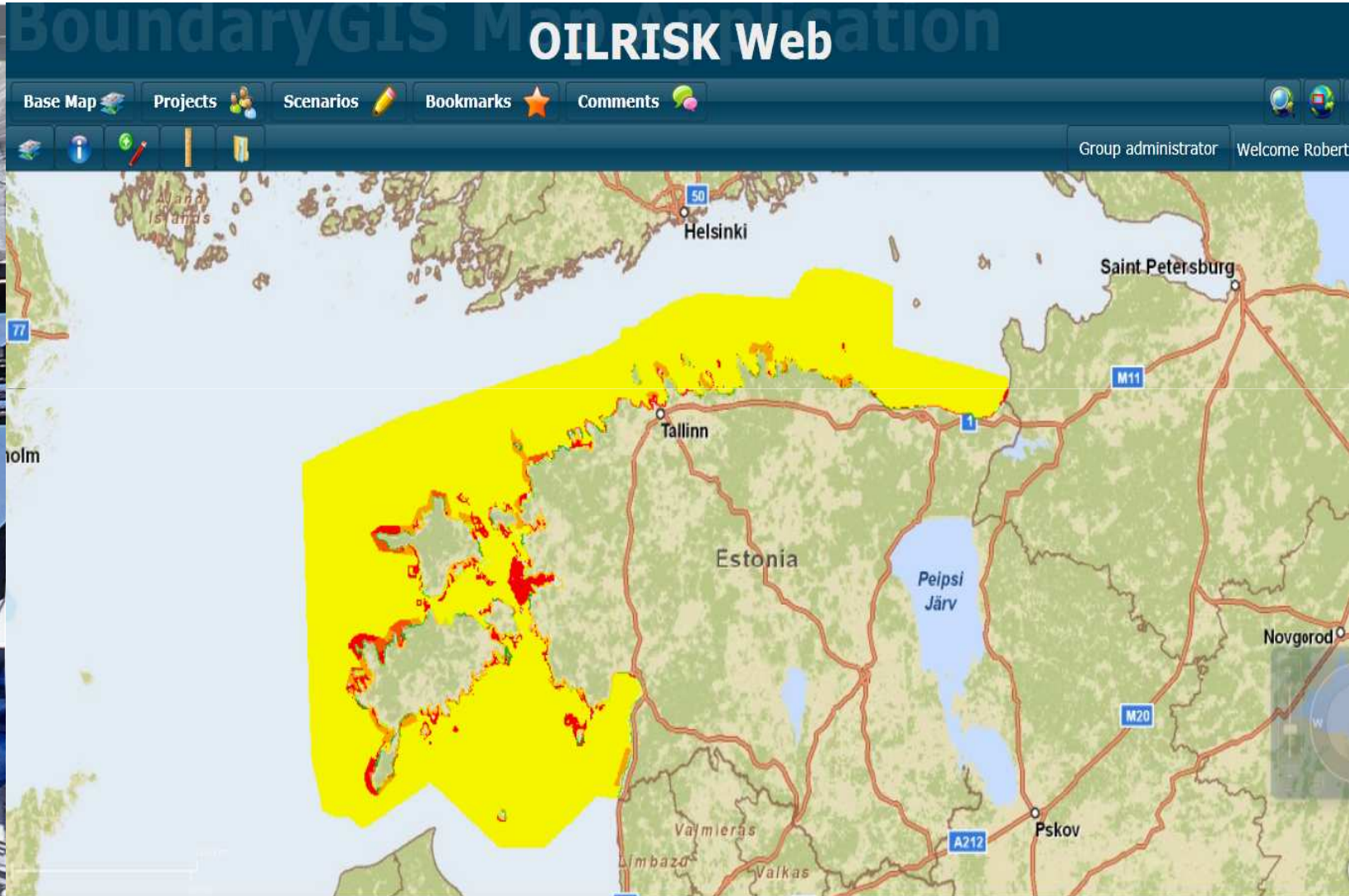


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OILRISK Web

Base Map | Projects | Scenarios | Bookmarks

Group administrator | Welcome Rob

OILRISK Web

- Maameti aluskaart
- Nafta tundlikkus
- Rannatüübid
- rannatüübid
 - alborand
 - liivarand
 - müüriand
 - millrand
 - pankrand
 - tahorand

Custom	Comment	Attached Document	PERIMETER	ZONE
<input checked="" type="checkbox"/>			8.791157055143	IIIA kulutus
<input checked="" type="checkbox"/>			8.9697249006197	IIIA kulutus

PERIMETER: 8.791157055143
ZONE: IIIA kulutus-kuhjeline õgurannik
TYPE: liivarand
FID: 97



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BoundaryGIS geoportal - Windows Internet Explorer

boundarygis.eu

OILRISK Web

Base Map Public Projects Projects Scenarios Bookmarks Comments

Group administrator Welcome Madis

ELF_vabatahtlikud (by MKohti)

- Maasmeti aluskaart
- Raiffe landidekood
- faali_landidekood
- keevad_landidekood
- veel_landidekood
- soola_landidekood
- Rannatõrjendid
- Rannajoon
- Sagavevee johtid
- Ekosüsteemi taastamine (austama)
- Reostus I
- Puustuse koostis

MaxX:2859813.3822
MaxY:8325047.1538

K: 530
Geographic: Show on map
Lat: 59° 39' 31" 778 N
Long: 25° 40' 26" 879 E

Query Result Chart for rannatõrjendid

Length: 0.79 km

Measurement results: Kanna X

59° 39' 31" 778 N
25° 40' 26" 879 E

Kanna 100
Reostuse KP
Lõunahalgia 100
linnule

Puruse tsoonil piir

Oil properties

Volume: 0.40 m³3
Viscosity: 4386.20 cSt
Density: 950.00 kg/m³3

Water content

Oil at shore: 58.3

Oil at sea bed

Dispersed

Oil at surface

Evaporated: 40

Wind

3.70 m/s

Current

0.04 knots

esri

Done Internet | Protected Mode: On 100%

BoundaryGIS geoportal ELF_02_12_2011 Vabast koolitus Kom Skype - madi kohti ET 14:00





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Web based decision support system for safety & security risk management



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Vision: SmartResponse Web

- Rich built-in ESRI functionality
- Possibility for “smart” calculations using the ESRI Spatial Analyst software
- Cutting edge oil spill simulation using Seatrack Web input
- “Smart response” algorithms and WMS for safety and security risk management



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- **Today: SmartResponse Web includes OLRISK module ready to use**
- **Allow the routine environmental risk assessment provided that appropriate WMS are available**
- **Planned: Enhanced interfaces (Seatrack Web and PISCES2) and “smart response” algorithms**



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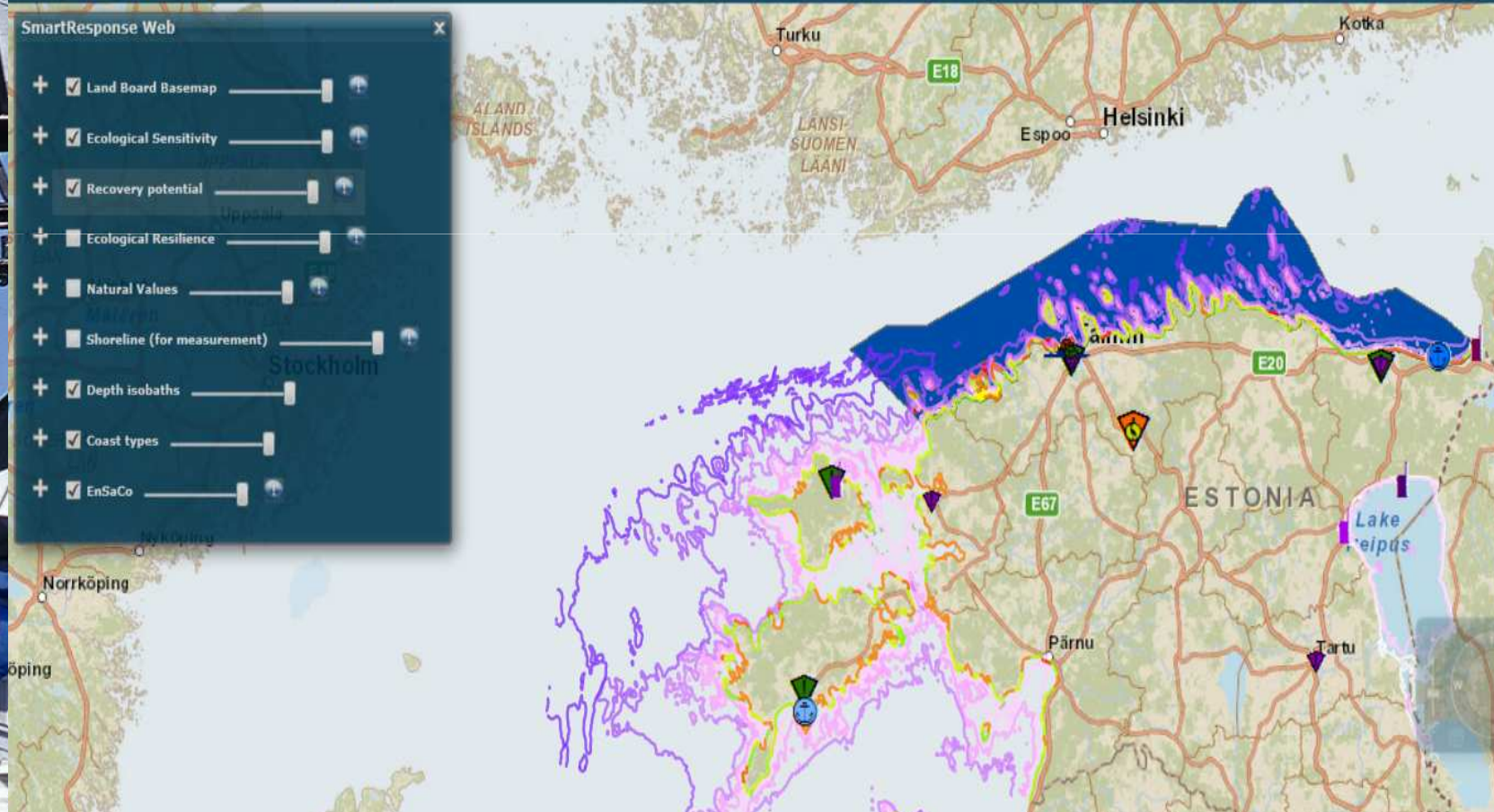
SmartResponse Web

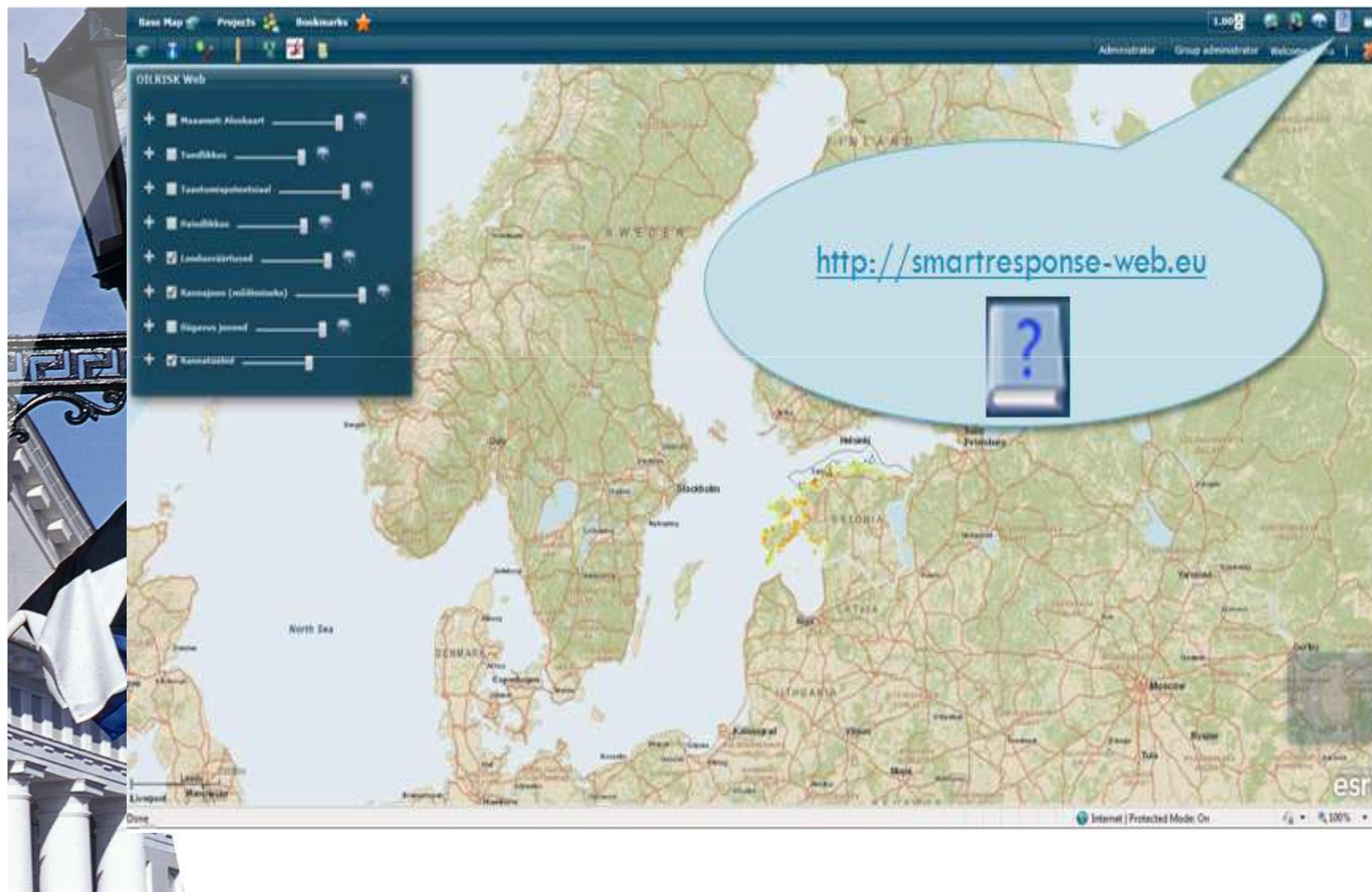
Base Map Projects Bookmarks

0.80

SmartResponse Web

- Land Board Basemap
- Ecological Sensitivity
- Recovery potential
- Ecological Resilience
- Natural Values
- Shoreline (for measurement)
- Depth isobaths
- Coast types
- EnSaCo





The screenshot displays a web-based GIS application interface. The main map shows Europe with a data overlay in the Baltic region, including parts of Sweden, Finland, and Estonia. A dark blue sidebar on the left contains a list of layers with checkboxes and sliders, titled "DIERISK Web". The layers listed are: Haasemõõd Aluskaart, Tundlikkus, Transpordipõlvkond, Kaitsealad, Lõikesõtkõrused, Kaitsejoon (mõõlmistiku), Sõjaplaneerimine, and Kaitsealad. A large light blue speech bubble is overlaid on the map, containing the URL <http://smartresponse-web.eu> and a question mark icon. The browser's address bar shows "Internet | Protected Mode On". The Esri logo is visible in the bottom right corner of the map area.



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Thank you!