



Space-based support to Maritime Surveillance

Harm Greidanus
European Commission
DG-Joint Research Centre

*Joint
Research
Centre*

Maritime Surveillance



To govern our seas we need:

Maritime Situational Awareness

- Which ships are on the sea?**
- What are they doing?**
- Do they pose a threat or problem?**



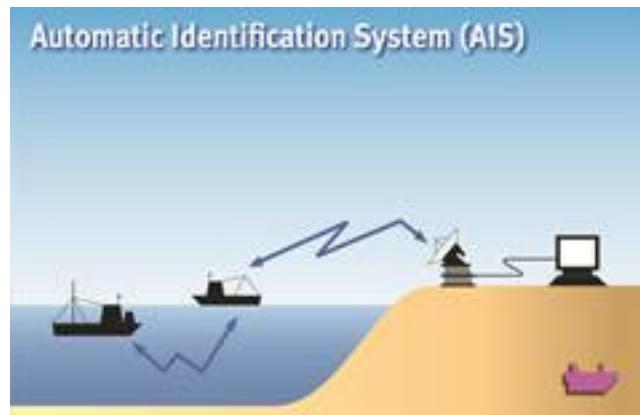
Tools for maritime surveillance



1. From the coast

- Visual
- Cameras
- Radar
- AIS messages from ships

Out to some 30 km



A screenshot of the Marinetraffic.com website. The top navigation bar includes "Live Map", "Vessels", "Ports", and "Gallery". The "Live Map" tab is active, showing a map of West Africa (Guinea, Sierra Leone, Liberia, and parts of Nigeria and Ivory Coast). The map displays various shipping routes and vessel positions. A sidebar on the left is titled "Ships Map" and contains a list of vessel types with checkboxes: Passenger Vessels, Cargo Vessels, Tankers, High Speed Craft, Tug, Pilot, etc., Yachts & Others, Fishing, Navigation Aids, Unspecified Ships, Ships Underway, and Anchored/Moored. Below this is a "Quick Links" section with links to an iPhone app store, an IMO receiver offer, and receiving stations. A "Supported By:" section lists Google and the IMO. A text box in the center of the map area states: "With AIS, ship continuously broadcast their position on VHF, for all to receive. Globally mandated by IMO on big (>300 tons) ships." The map shows coastal roads and national borders.

Coastal AIS is inexpensive and easy to install and operate. The **MSSIS / SeaVision network** enables sharing of the picture

Tools for maritime surveillance



1. From the coast

- Looking out
- Cameras
- Radar
- AIS messages from ships

Out to some 30 km

2. *Going to sea*

- **Patrol boat**
- **Maritime Patrol Aircraft**

Expensive, but also allows intervention



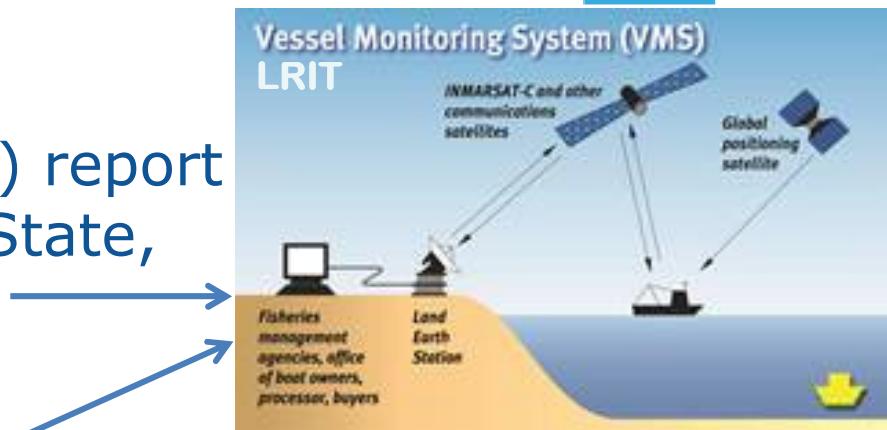
Tools for maritime surveillance



3. Ocean-wide

- **LRIT**

- **Merchant ships** (>300 ton) report every 6 hours to their Flag State, globally mandated by IMO

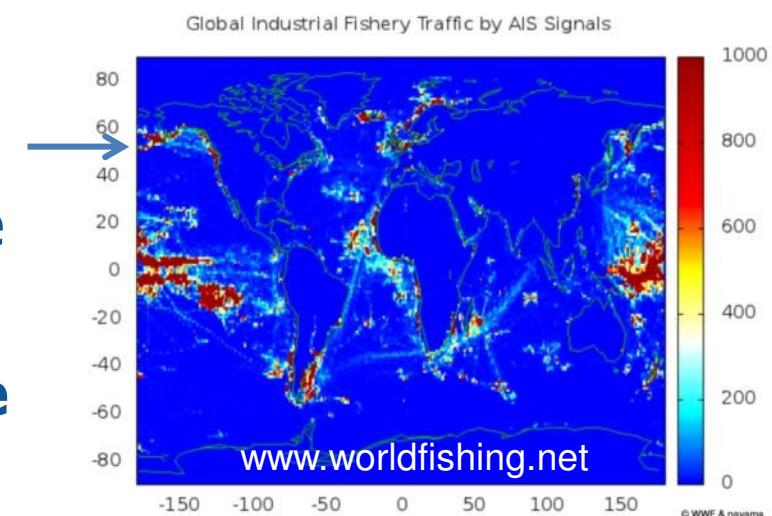


- **VMS**

- Medium – big **fishing ships** report every 2 hours to their Flag State, mandated at national level

- **AIS received by satellite**

- From coastal to global coverage



- **Earth observation from satellite**

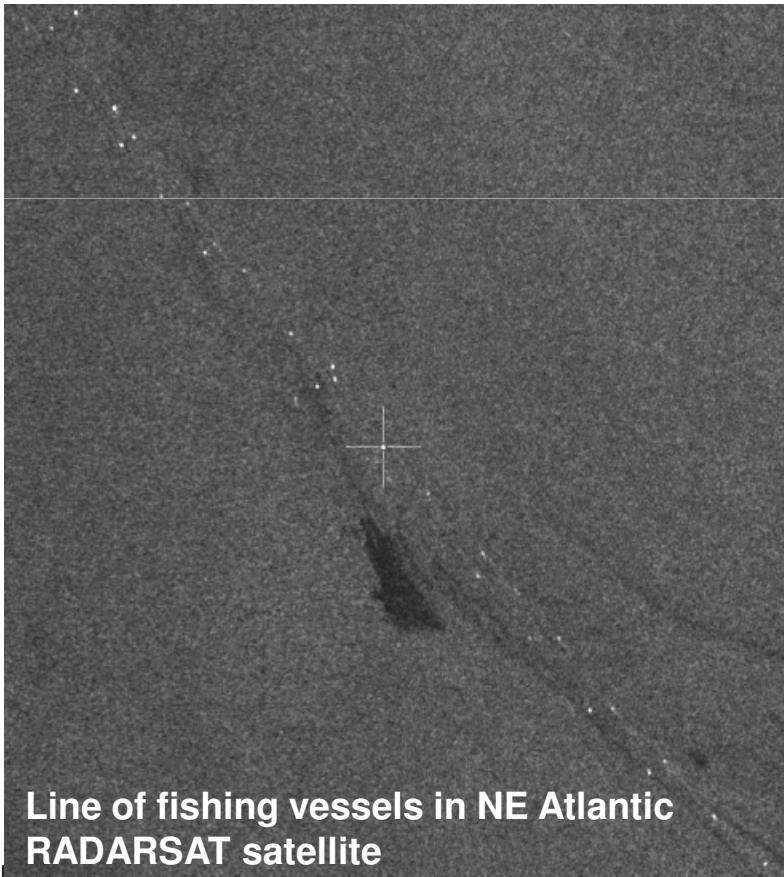
- To also find non-reporting ships

Satellite images: Optical or Radar



Radar satellite images

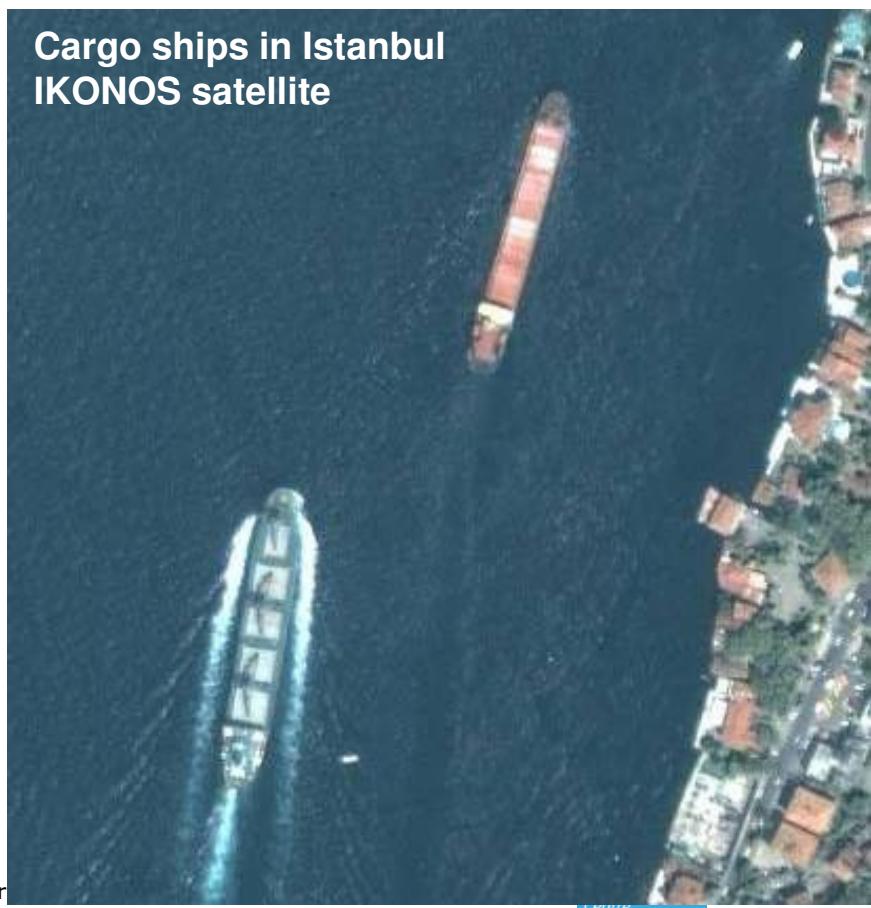
- Independent clouds, night
- Less details on targets
- Preferred for **detection** and **wide area surveillance**



Line of fishing vessels in NE Atlantic
RADARSAT satellite

Optical satellite images

- Daytime, clear skies
- Easier to interpret
- Preferred for **recognition** and **small focus area monitoring**



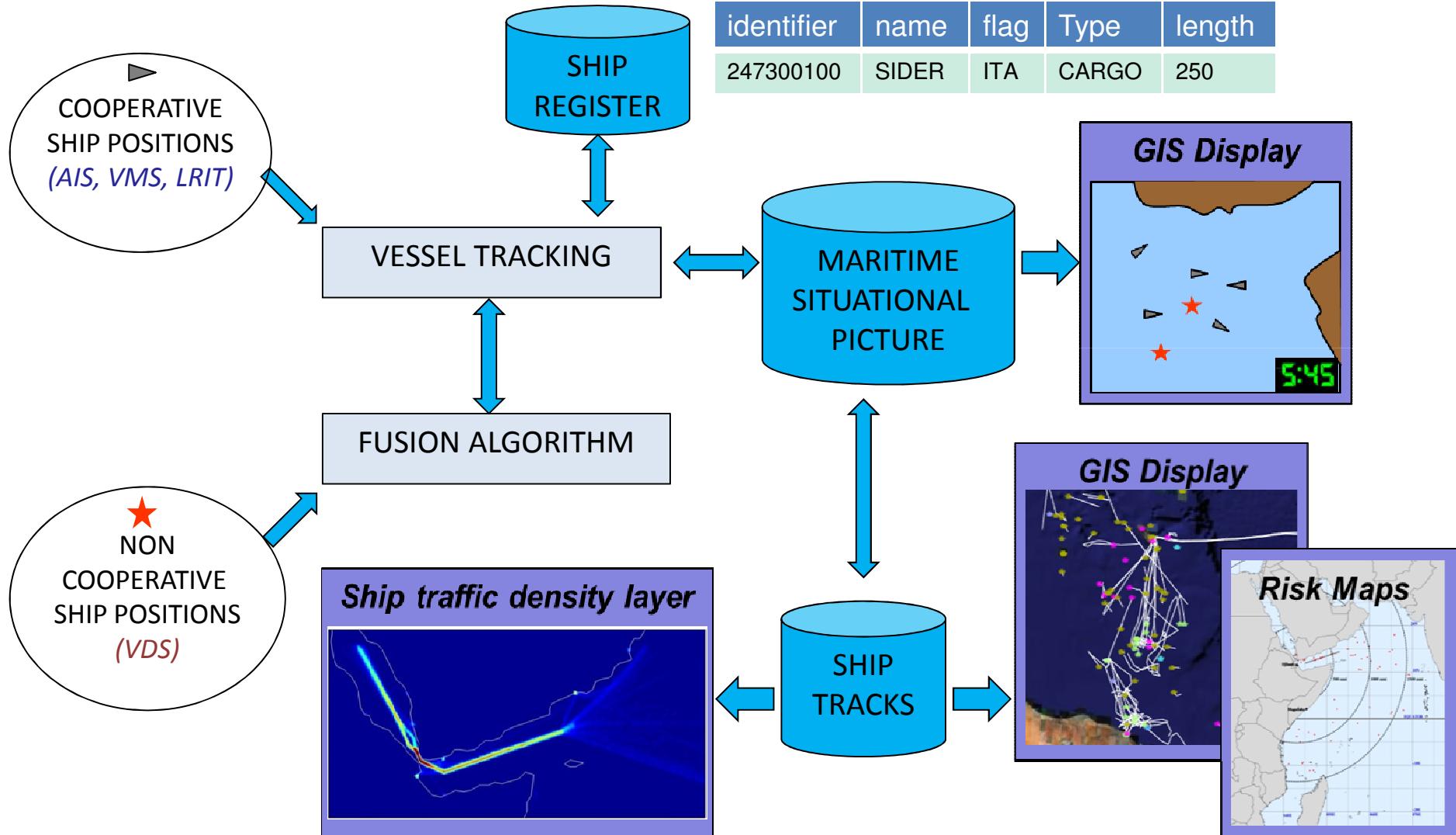
Cargo ships in Istanbul
IKONOS satellite

EU's PMAR project: Piracy, Maritime Awareness and Risks



- **Maritime awareness as capability for counter-piracy activities**
 - Integrating data from different sources
 - Using tools that can be used by maritime authorities in Africa
 - Part of "Regional Maritime Capacity Building"
- **Over Piracy-affected regions**
 - Gulf of Aden, Western Indian Ocean and Gulf of Guinea

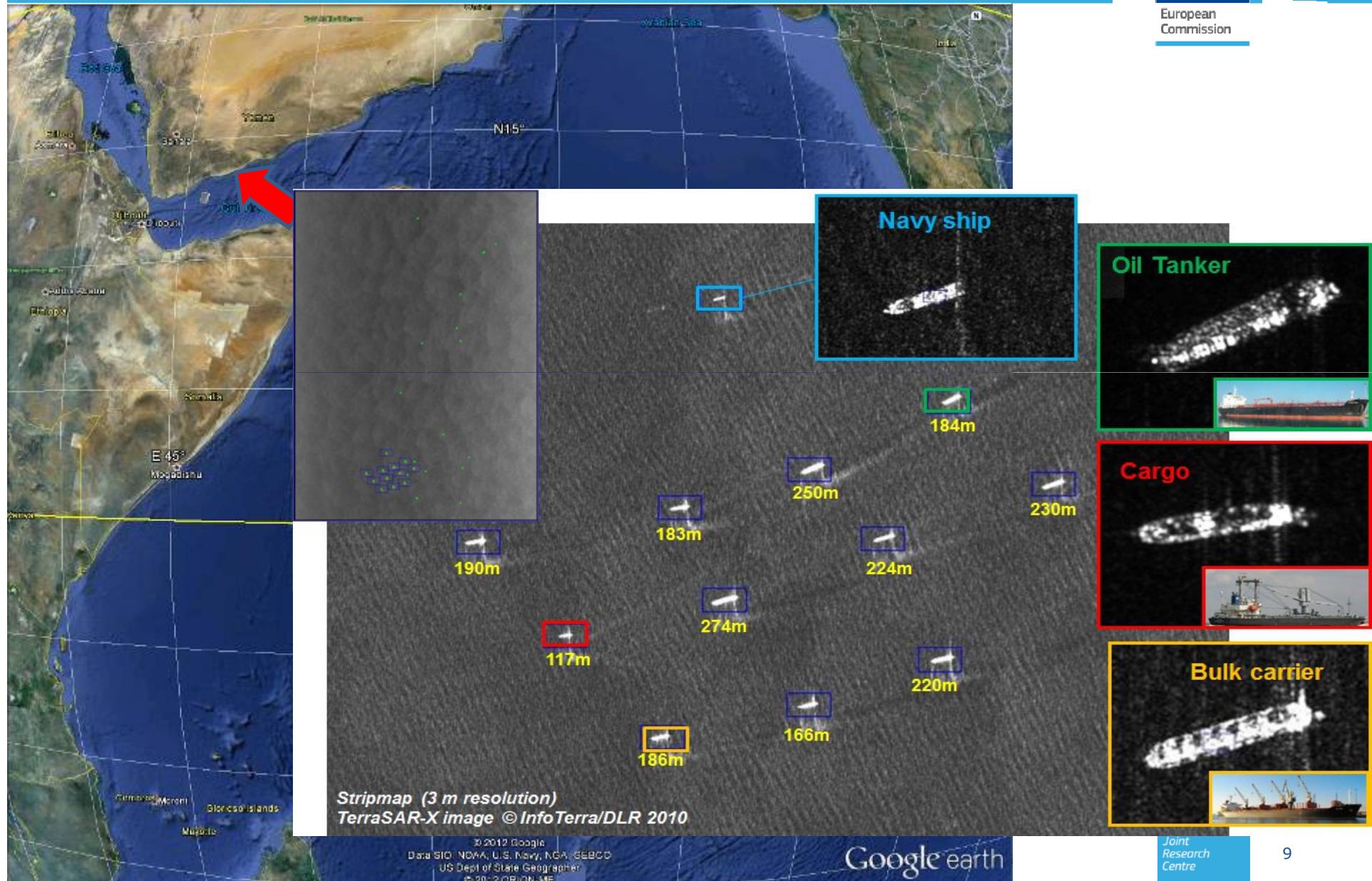
Building the Maritime Situational Picture



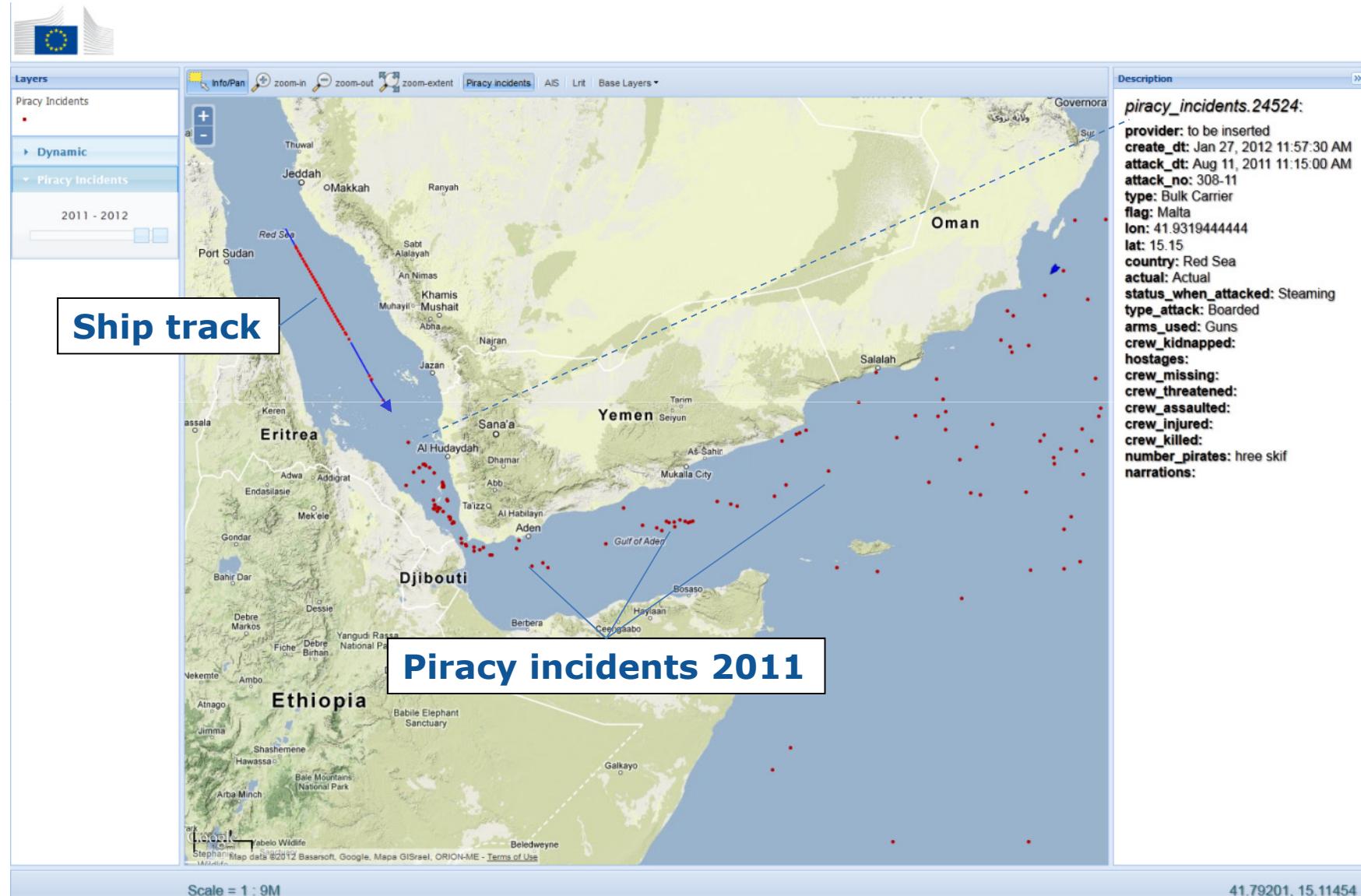
Ship surveillance from imaging satellites



European
Commission



Use for risk assessment



Conclusions



- **Continuous (partial) surveillance of coastal zone is possible with AIS**
 - Low-cost, easy to maintain **coastal AIS receivers**
- **Recent technology (LRIT, Satellite-AIS) enable Maritime Situational Awareness over wide areas**
- **The continuous picture from the reporting ships can be complemented with detections from satellite imagery, on an incidental basis**
- **Technology accessible to entities also in Africa**
- **Finding (+track/classify) *small* boats remains a challenge**



THANK YOU

More information:
harm.greidanus@ec.europa.eu