

# International cooperation for space-based global maritime surveillance – The next step

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# Maritime surveillance

For safety, security, sustainability



What?

Global

Space-based

International cooperation

Why?

1,000 miles away now, here tomorrow

Global coverage

No-one can collect enough data alone

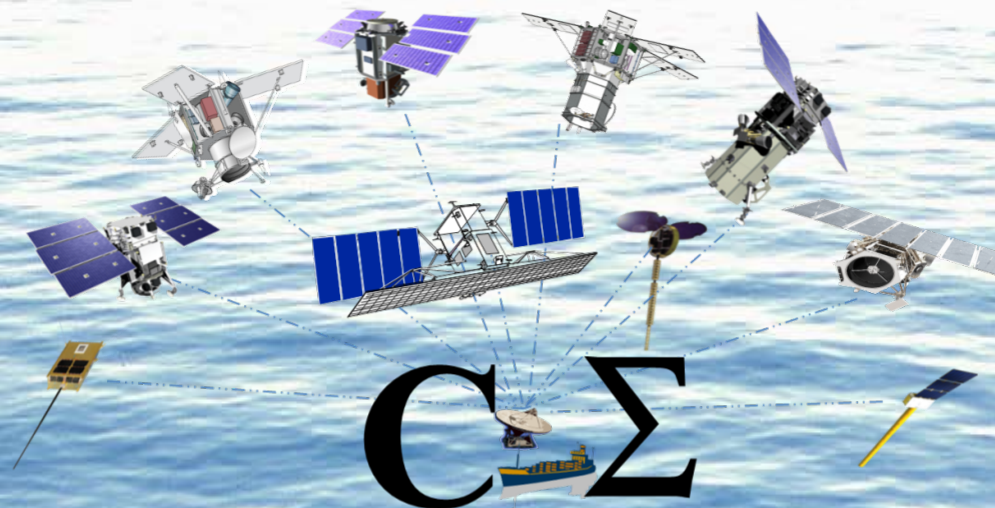


# Maritime surveillance

For safety, security, sustainability



Illegal immigration



Maritime Safety



Maritime Security

Collaboration in Space for International  
Global Maritime Awareness



Illegal fishing

# C-SIGMA



Maritime Traffic



Piracy



Oil pollution

# PMAR project: Piracy, Maritime Awareness and Risks



As example for the need for multi-source data

- Maritime awareness for counter-piracy off Somalia
- Constructing the maritime surface picture (ongoing ship traffic) from many data sources

## • Ship reporting systems

- LRIT: 27 EU Flags
- AIS: LuxSpace/OrbComm, exactEarth, AISSat-1, NORAIS, MSSIS

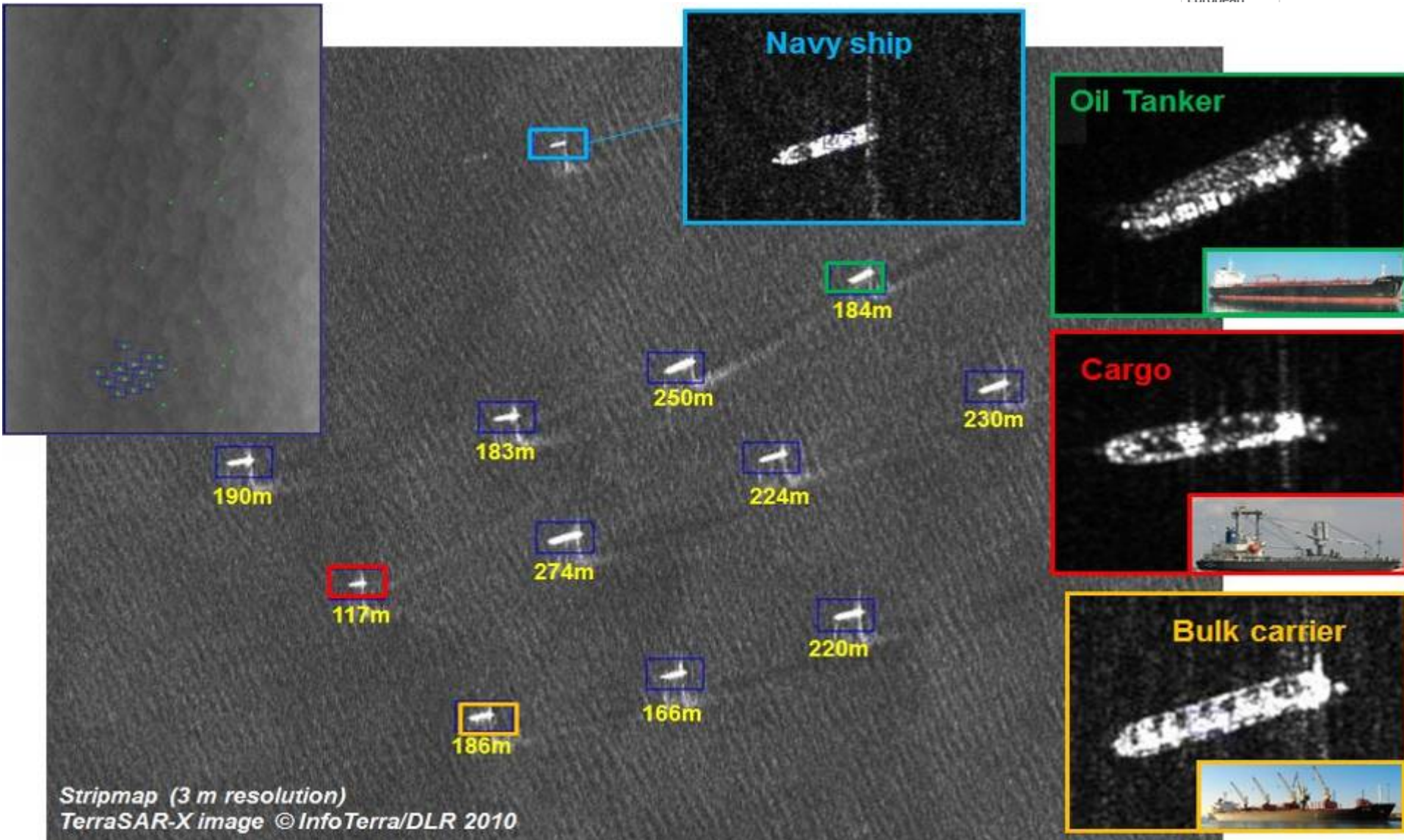
## • Observation systems

- ENVISAT, TerraSAR-X, CosmoSkyMed, Radarsat-2

Commercial  
Institutional

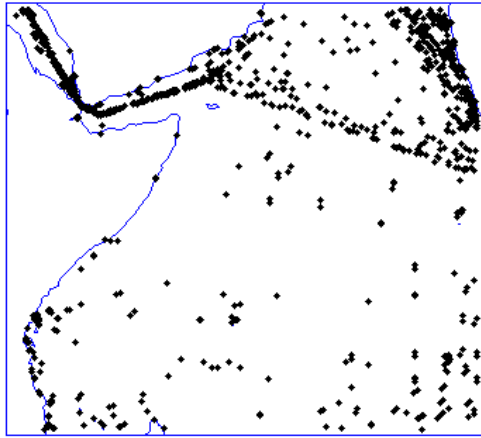
Cooperation with:  
FFI (NO), EMSA, EUSC, ESA,  
NURC, Italian Coast Guard,  
EU Flag States, DLR (GE), US  
Navy, SPAWAR, GD (US), ...

# Ships identified in Satellite SAR image using Satellite AIS



# Ship reporting systems and satellite reception

dynamic MapFul 2011-11-16 OnePlat



Lon

**1 day  
1 satellite**

**1 day  
7 systems**

dynamic MapFul 2011-11-16 AllPlat



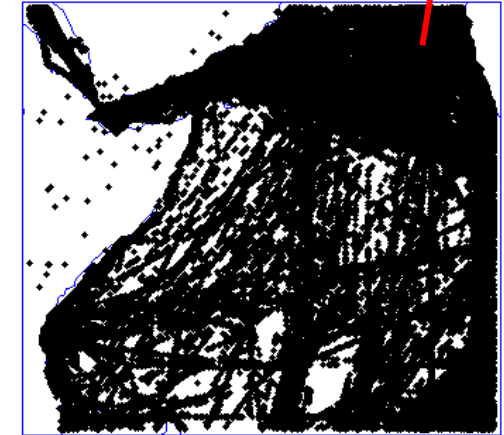
Lat (76749 pos)

Lon

**1.5 million ship  
position reports**

**1 month  
7 systems**

dynamic AOI 2011 11 15-12 15 MapFul platid all



Lat [1728825 inside= 100.0 %, 0 outside= 0.0 %]

Lon

**Wide ocean coverage and tracking  
are becoming possible for the  
larger (say, >40 m) ships**

# Multiple Satellite-SAR images and detections



## Legend

PORTS



VDS



West Bound Lanes



East Bound Lanes



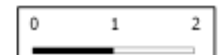
SAR image frames



SAR sensor	SAR scenes		VDS targets			total
	total number	with detections	small	medium	large	
COSMOSKY	57	21	1	31	87	119
RADARSAT	30	28	9	242	214	465
TERRASAR	23	21	7	168	81	256
Envisat ASAR	15	1		2	51	53
	<b>125</b>	<b>71</b>				<b>893</b>

900 targets

10 days in the Gulf of Aden



# Ship surveillance from imaging satellites



→ We need all the data we can get!  
Gathering, access, sharing



## Supply side:

- **Satellite derived information available on a structured, systematic and operational basis**
- **Administrative issues are already arranged**

## User side:

- **Maritime authorities know which data to use, and how to access the data on a routine basis**
- **The data can be immediately ingested into their operational systems**

## In a global framework

# Benefits of cooperation – including data sharing



- **Avoid re-doing work already done → save costs**  
"efficiency"
- **More information used → better results**  
"effectiveness"

**Benefits need to come to both users and suppliers!**  
**(gov't & commercial)**

- **More streamlined access to data → bigger market**

# Is this new?



- **No – Data sharing is ‘in fashion’ since a few years**  
(for good reasons)

## For example:

- **EU**
  - INSPIRE, EDA Wise Pens, Integrated Maritime Policy, SafeSeaNet, EUROSUR, CISE (Common Information Sharing Environment), ...
- **US**
  - MSSIS, CSTARS, Presidential Policy Directive 4, Sea Power in the 21<sup>st</sup> Century, ...
- **Global**
  - GEO/GEOSS

**Basic inhibitor: The value of the information.  
If it's worth something, you don't want to give it  
away for free!**

- **Recoup incurred costs (investment, running)**
- **Make a profit**
- **Compensation for effort**
- **Allocation of scarce resource**
- **'Exclusivity' value – if (specific) others have the same information, its value is lost**

# To overcome the challenges



- **Find ways that sidestep the challenges**
- **Incremental approach**

## **Some suggested options:**

### **1. International Charter on Disasters model**

Providers make limited amount of data available following an incident

### **2. Discovery service**

Global colleagues find out which data is already there

### **3. Exploit underutilised satellite capacity**

Buyers' consortium to negotiate low prices for exploitation over sea

### **4. Better standards**

See also geospatial data community

- **Web forum for community discussion and ideas**
  - APAN hosted: <https://community.apan.org/c-sigma/default.aspx>
  - NURC hosted: <http://geos3.nurc.nato.int/CSIGMA/>
- **Work on standards and infrastructure**
- **Align US- and EU-funded projects that are about to start up**
- **C-SIGMA administration office**
  - Operated from the new ESA Maritime Surveillance Project Centre, Cork, Ireland
- **Line up with related developments**
  - GEO/GEOSS, INSPIRE (spatial data policies), CISE, GMES





Collaboration in Space for International  
Global Maritime Awareness

## C-SIGMA

Your ideas and feedback are most welcome on:  
<https://community.apan.org/c-sigma/default.aspx>  
<http://geos3.nurc.nato.int/CSIGMA/>

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