



# Copernicus Maritime Surveillance Service

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Earth Observation Services

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## Existing Integrated Maritime Services

- **EMSA currently provides integrated maritime services for Fisheries Control, Law Enforcement and Maritime Safety users**
- **Services have not contained Earth Observation (EO) information to date**

## Copernicus Maritime Surveillance

- **Establishes an EO component in existing services**
- **New EO component provides added value by:**
  - ✓ Addressing new user needs (currently not covered)
  - ✓ Increasing the variety of information (expanding the existing data sources)
  - ✓ Expanding the volume of information and geographical scope of services
- **User driven component**
  - ✓ EO Services tailored to end-users requirements

A large school of tuna swimming in blue water. The fish are silvery with dark fins and are moving in a coordinated pattern. The text "Fisheries control" is overlaid in the center.

# Fisheries control

## European Fisheries Control Agency

- **Fusion and correlation of vessel data with cooperative sources and specific information from EFCA operations**
- **More than 300 users in 21 Member States**
- **EO capabilities in support of operational activities**
  - ✓ Monitoring of fishing grounds
  - ✓ Monitoring of fish cages / farms
  - ✓ Monitoring of fishing ports
- **CMS supports operations in the following areas:**
  - ✓ Atlantic Ocean (NAFO and NEAFC)
  - ✓ Mediterranean and Canary Islands
  - ✓ North Sea and Western waters
  - ✓ Baltic Sea
  - ✓ Pacific Ocean
  - ✓ North East Atlantic





## Monitoring of Fishing Grounds

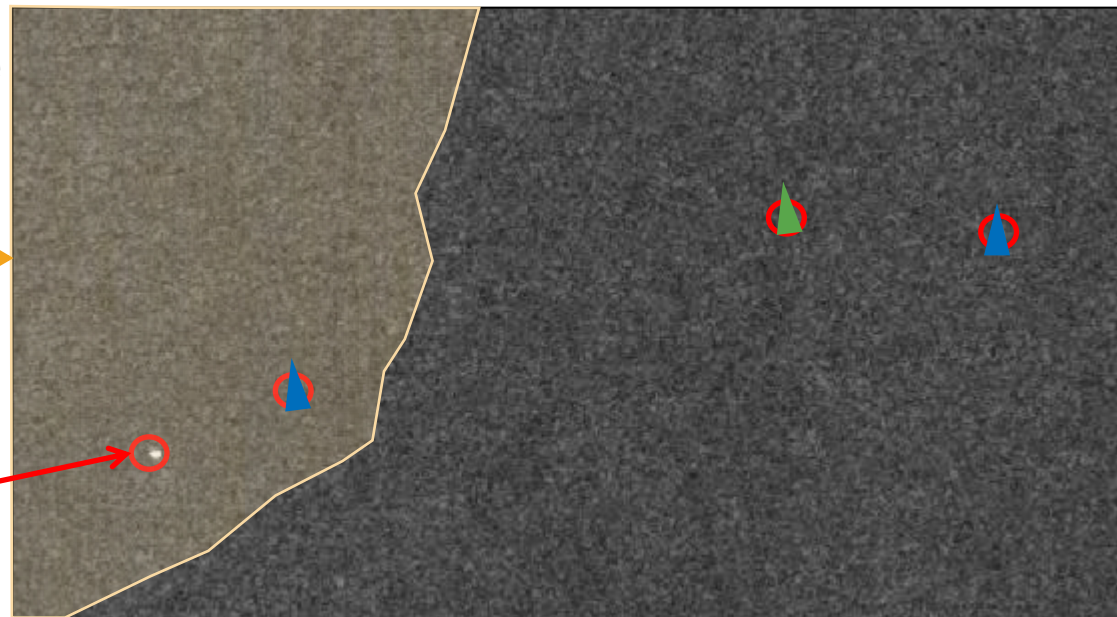
- ✓ Provide situational awareness picture
- ✓ Monitor fishing effort
- ✓ Monitor discard bans
- ✓ Cross check monitored fishing activity with recording obligations
- ✓ Access and vessel behaviour monitoring in restricted areas



### ■ EO elements

- ✓ SAR Vessel Detection Service

- Restricted Fishing area →
- Satellite detected vessels
  - ▲ Correlated targets- Fishing (VMS)
  - ▲ Correlated targets- Cargo (AIS)
- Non-correlated vessel:  
Target of interest for further analysis →



## Monitoring of fish cages/farms

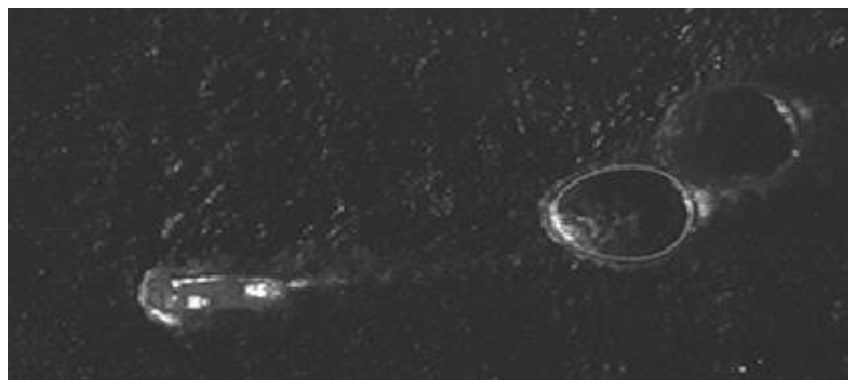
- ✓ Monitor operations and vessels close to fish farms
- ✓ Reveal unreported fish farming in 3rd countries
- ✓ Detect tug vessels towing cages

### ■ EO elements

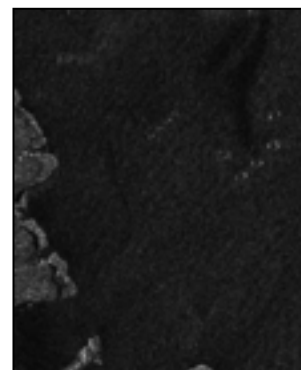
- ✓ SAR images
  - ✓ Vessel Detection
- ✓ Optical images
  - ✓ Optical High Resolution images for visual interpretation
  - ✓ Vessel Detection



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Blue Fin Tuna controls –  
location of cages



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## Monitoring of fishing ports

- ✓ Monitor recording and reporting requirements of EU fleet
- ✓ Monitor 3rd countries' ports
- ✓ Detection of non-reporting vessels combined with intelligence information



## ■ EO elements

- ✓ Optical Images
  - ✓ Activity Detection Service- activities close to the fishing vessels
  - ✓ Optical High Resolution images for visual interpretation
  - ✓ Vessel Detection

Small Fishing vessels <10m



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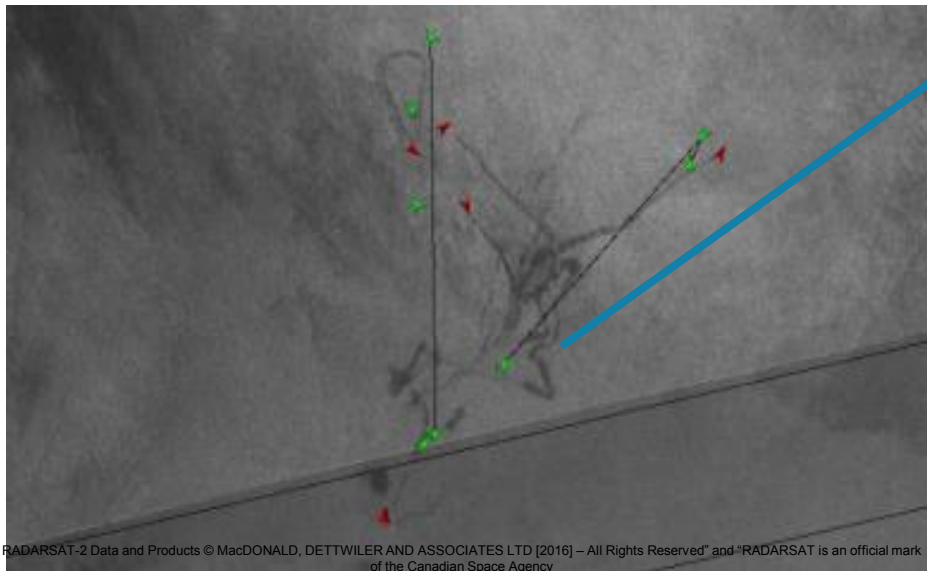
Medium size Fishing vessels >20 m



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## Activities 2016

- Atlantic (NAFO): 59 acquisitions (September / October)
- Atlantic (NEAFC): 44 acquisitions (September)
- North Sea and Western waters: 44 acquisitions (October / November)
- Baltic Sea: 13 acquisitions (November)
- Pacific Ocean: 2 acquisitions (November)



Fishing activity pattern



VDS targets



Reporting positions  
Sat-AIS

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## United Nations Office on Drugs and Crime (UNODC)

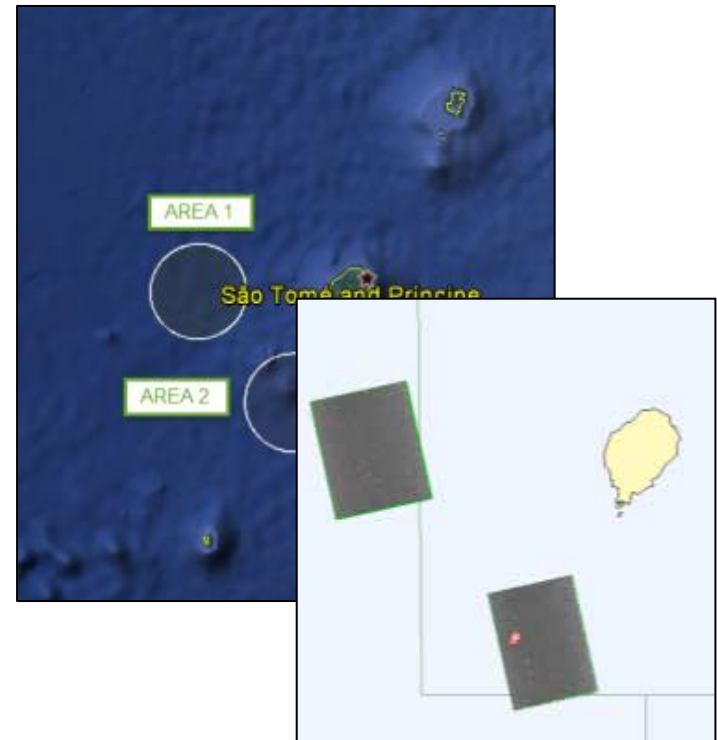
- Support to exercise on tracking illegal fishing vessels in São Tomé and Príncipe
- Two areas of interest close to São Tomé & Príncipe
- Acquisitions on 21-22 Sep 2016
- 4 images provided
  - ✓ 2 targets detected



*I would like to thank EMSA for the support.*

*What the maritime law enforcement agencies of São Tomé e Príncipe have done in two days, with the 4 images you sent, is worth months of capacity building, maybe years.*

UNODC





# Law enforcement

## Maritime Analysis and Operations Centre - Narcotics (MAOC(N))



- **MAOC(N)** is an international agency set up by several European Union states to coordinate anti-drug trafficking action
- **Area of Operations: Atlantic**
- **CMS service will provide:**
  - ✓ Monitoring of third countries' ports and shores for departure of specific ships
  - ✓ Detection of abnormal behaviour (e.g. transshipment of drugs from a larger vessels to small boats)
  - ✓ Search for non-cooperative targets



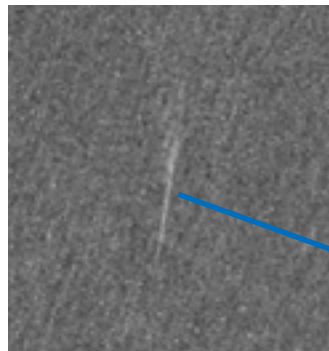


## Detection of non-cooperative targets

- **SAR images**
  - ✓ Vessel Detection
- **Optical images**
  - ✓ Very high resolution images
  - ✓ Vessel Detection Service
  - ✓ Activity Detection- At Sea Encounter

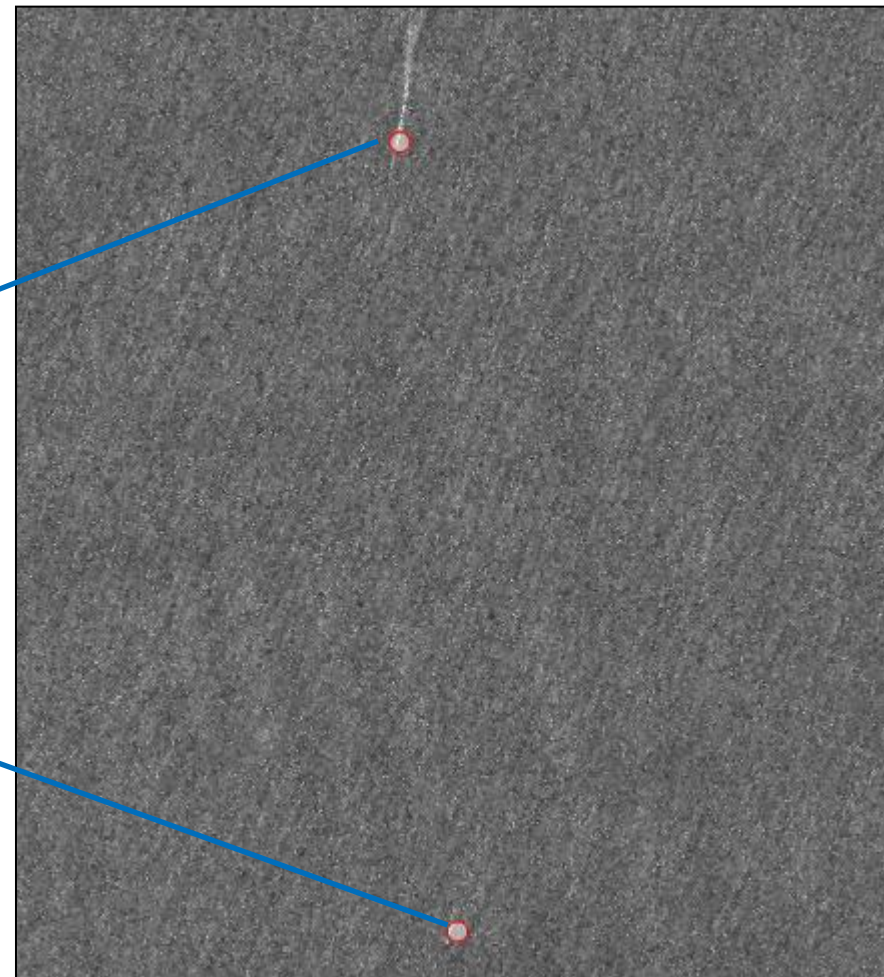


Pleasure Yacht  
Length: 14m



High Speed rubber boat  
Length: 12m

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## Detection of non-cooperative targets

- **SAR images**
  - ✓ Vessel Detection
- **Optical images**
  - ✓ Very high resolution images
  - ✓ Vessel Detection Service
  - ✓ Activity Detection- At Sea Encounter



High Speed boat  
Length: 9m



High Speed boat  
Length: 5m



Merchant Ship  
Length: 43m



Small vessels close to beach



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## Flagging suspicious vessels (Anomalous Behavior)

- ✓ Transshipment of drugs- At Sea Encounter
- ✓ High-speed crafts approaching shore

### ■ EO elements

- ✓ Optical Images:
  - ✓ Activity Detection
  - ✓ Optical High Resolution images for visual interpretation
- ✓ SAR Images



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## Activities 2016

- MAOC(N) requested VHR optical imagery 2 days before the acquisition
- MAOC(N) requested the capability to change the exact location of the acquisition less than 24 hours prior to the acquisition
- Preliminary information delivered to MAOC(N) less than 2 hours after the satellite acquisition
- MAOC(N) has requested archived data to verify Vessels of Interest location - no SAR acquisitions covered the requested areas



# Maritime Safety





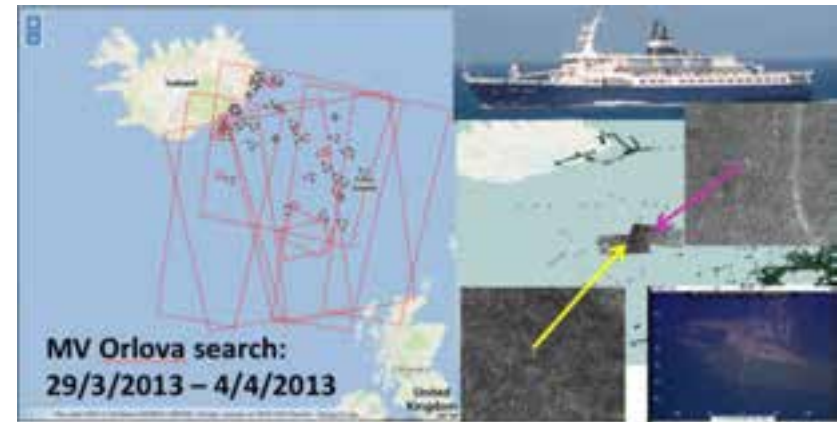


## Feasibility assessment and requirements gathering

- **Establish an EO component to EMSA's value adding services to Maritime Safety operations**
- **Objectives**
  - ✓ Track missing vessels
  - ✓ Support to Ice & Iceberg monitoring
  - ✓ Provide rapid surveillance for offshore installations & vessel when contact is lost or in case of distress
  - ✓ Monitor at-sea refuelling
  - ✓ Support to Search & Rescue Operations
- **Areas of Operation**
  - ✓ Global (Areas of EU interest)



Monitoring at-sea refuelling using Envisat ASAR data



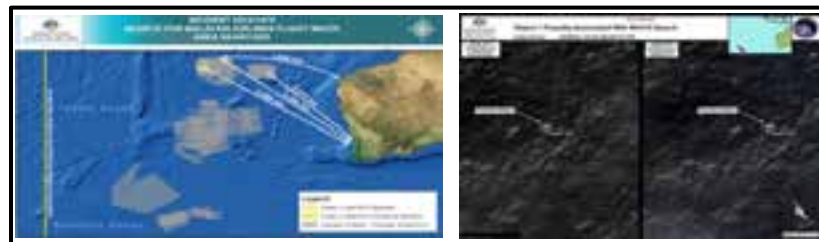
Tracking missing vessel / SAR data © Cosmo-Skymed, 2013

# CMS - Maritime Safety Future Products

- **Service evolution to be defined with users**
- **Potential products include:**
  - ✓ Detecting missing aircraft (debris, jet fuel spill)
  - ✓ Detection and tracking of lost containers
- **Technical and operational feasibility required**
- **Formal approval required:**
  - ✓ DG-GROW
  - ✓ Copernicus User Forum
  - ✓ Copernicus Committee



Drifting containers in December 2015 off the Portuguese coast / © Portuguese Navy, 2015



Flight MH370 Malasia Airlines search operation in March 2014 /  
© The Australian Maritime Safety Authority (AMSA), 2014

# CMS

## How to access?





## Authorized users only!

**EMSA**

EMSA Site	EU LRIT CDC
THETIS	IMdate
ETCW-15	SSN
CSN	CHD

**EMSA Maritime Applications**

Username

Password

Login

[Lost Password](#)

**Links**

- <http://www.enqsas.org>
- <https://www.parlamo.org/>
- <http://ec.europa.eu>
- <http://www.imo.org>

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<https://portal.emsa.europa.eu>





- **Contact your National Administration (responsible for Integrated Maritime Services)**
  - ✓ Questions on which administration represents your country in IMS → [ims@emsa.europa.eu](mailto:ims@emsa.europa.eu)
- **Fisheries Control services**
  - ✓ Contact EFCA (user access management coordination)
- **Questions, comments, suggestions & requirements**
  - ✓ Contact EMSA Copernicus team directly:

[copernicus@emsa.europa.eu](mailto:copernicus@emsa.europa.eu)



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