GMV’s
EO SERVICES AND EXPLOITATION PLATFORMS for a World Market
About us

- Creators of **client-oriented** solutions that support people processes
- **Technology innovators** with middleware managed solutions
- Offering services, consultancy and support in **geo-related activities**
- Provision of **standardized solutions** according to INSPIRE, OGC, OASIS and applicable regulations
Our expertise

- Multi-source data blending (i.e. AIS, EO SAR and/or OPTICAL, LiDAR, climatic and agroclimatic data...)

- Maritime Traffic Monitoring Systems

- Forest Management

- Precision Farming: Irrigation Needs, Crop Monitoring, Chlorophyll and Biomass Mapping

- Homeland Security, Satellite based Support to European External Actions and Critical Infrastructures Protection (CIP)

- Emergency Response, Humanitarian Relief and Crisis Management EO-based services

- Land Use, Land-Use Change and Forestry (LU/LUCF)
Our applications

- Climate change
- Land monitoring and climate change
- Water management
- Emergency management
- Security
- Forestry and precision farming

Research & Development

Information exploitation

Information distribution
Our activities in the world
GMV: SECURITY BACKGROUND

GMV experience in the security domain lasts for almost 10 years.
SECURITY – LAND BORDER

Objective
- Preparedness for migration emergencies
- Strategic pre-frontier intelligence analysis

Products
- 6-hour Fast Delivery – FD
- 48-hour Complete Product – CP

Service
- Reference maps
- Coastline monitoring
- Prefrontier monitoring
- Accessibility - transit routes

Sites
Land borders of Spain, South Mediterranean, Poland, Greece, Bulgaria
SECURITY – MARITIME SURVEILLANCE

Objective

- Detection, monitoring and tracking of ships
- Strategic maritime picture

Products

- Real time cooperative based products
- < 30 min for detection based products

Service

- Ship Detection
- Ship Categorization
- Track correlation and processing
- Track extrapolation

Sites

The Mediterranean Sea, Baltic Sea, NAFO, European Atlantic approaches, West & East Africa Coast, Strait Malacca, Tokyo Bay
SECURITY – MARITIME SURVEILLANCE: SIMONS

• SHIP DETECTION
  • Wavelet analysis for SAR and Segmentation for Optical
  • Confidence to quantitatively measure detection reliability.
    • $C < 0.4 \rightarrow$ ship-alike sea features (wave crests)
    • $0.4 < C < 0.7 \rightarrow$ less dispersive ships
    • $C > 0.7 \rightarrow$ ships visible by eye inspection.
SECURITY – MARITIME SURVEILLANCE: SIMONS

Omega Theodore (Oil Tanker)

Stena Poseidon (Bulk)

- SHIP CLASSIFICATION
  - Validation with AIS polls
SECURITY – MARITIME SURVEILLANCE: SIMONS

A Data Fusion Module (DFM) has been developed and fully operational for the European Maritime Safety Agency (EMSA):

- Target AIS-VDS Correlation
- Consistency Checker
- Track reconstruction with constraint avoidance (coastline, corridor...)
- Track Interpolation
- Track Extrapolation
SECURITY – MARITIME SURVEILLANCE: SIMONS

Specifications:

* Real length vs estimated length

** Real length vs estimated length with factorization of resolution cell

<table>
<thead>
<tr>
<th>Quality descriptor</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processing Time</td>
<td>• 5-6 min for a 40x40 km stripmap image</td>
</tr>
<tr>
<td></td>
<td>• 7 min for a 10x10 km spotlight image</td>
</tr>
<tr>
<td></td>
<td>• 10 min for a 100x100 km scansar image</td>
</tr>
<tr>
<td>Probability of Detection</td>
<td>&gt; 95 % for ships with length &gt; 4*image res.</td>
</tr>
<tr>
<td>Absolute Length accuracy*</td>
<td>~75 %</td>
</tr>
<tr>
<td>Relative Length accuracy*</td>
<td>~90 %</td>
</tr>
<tr>
<td>Categorization rate</td>
<td>~70 % for ships with length &gt; 12*image res.</td>
</tr>
<tr>
<td>AIS Fusion</td>
<td>Yes → large range of formats admitted</td>
</tr>
<tr>
<td>Band restrictions</td>
<td>No → any band and sensor is admitted</td>
</tr>
<tr>
<td>Area restrictions</td>
<td>No → any area (coastal, harbour, open sea...) can be processed</td>
</tr>
</tbody>
</table>
SECURITY – MARITIME SURVEILLANCE: SIMONS
Integration of a complete HMI suite with advanced functionalities

Rule-based alarms & Anomaly handling
AIS track management
Historic queries
Alert handling
Statistics
Mission replay
Contingency planning during the Arab Spring 2011 in Benghazi, Libya
MARITIME SURVEILLANCE: GUARDIA CIVIL

✓ CAPSAT: Providing Satellite-based surveillance capabilities through EC’s EBF (European Border Funds) program at 2015.

✓ Prime: GMV is the unique contractor

✓ Installation of an operational system (HW and SW) providing EO-based ship surveillance services

✓ Prepared to support the INDALO campaigns in the Mediterranean Sea

✓ Users:

✓ Guardia Civil, GNR, ITCG

✓ GMV developed tasks of system implementation and maintenance, and of service provider in ship detection, ship categorization, track generation
Thank you

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MARITIME SURVEILLANCE: SIMONS

Demo Video