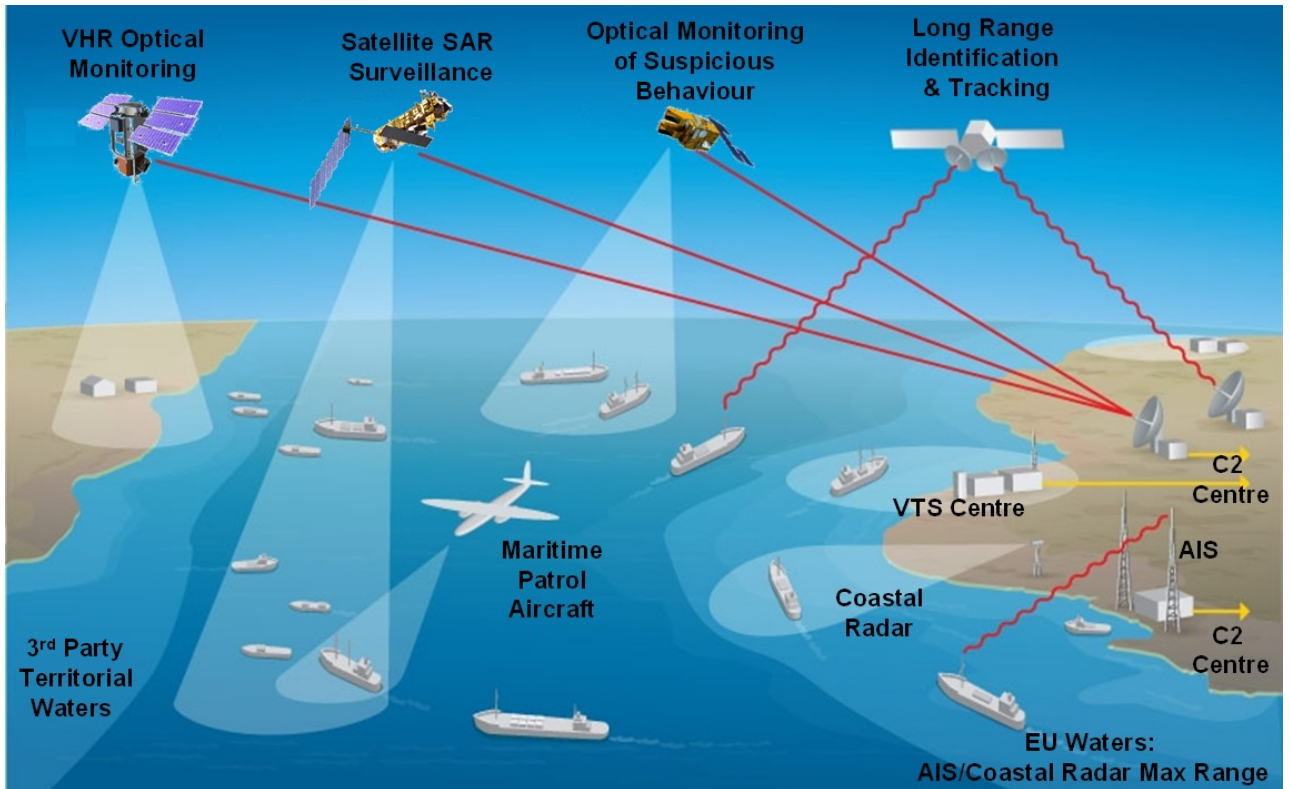


# European Maritime Security Services

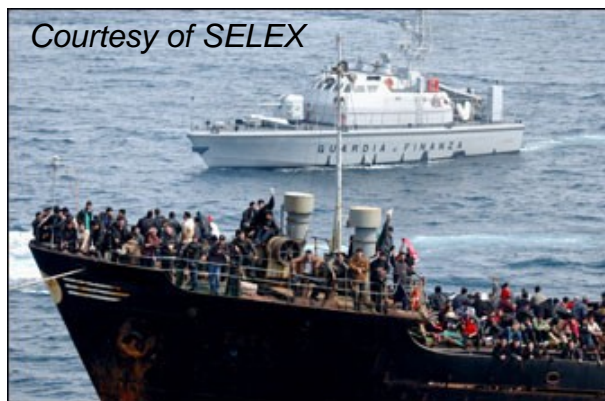


*The integration of satellite based surveillance and monitoring for enhanced operational maritime border control and maritime domain awareness*

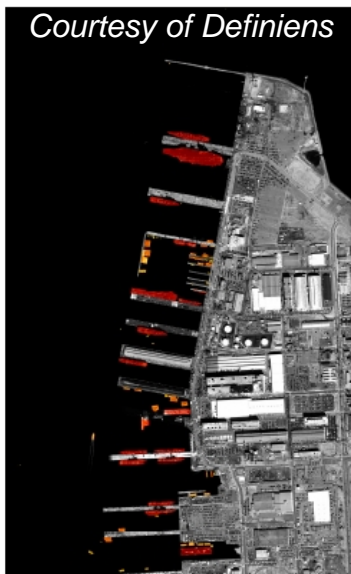


## European Maritime Security – an evolution

European waters are threatened by illegal trafficking of persons, drugs, weapons and contraband. Enhanced surveillance is a top political priority. The recently agreed Maritime Policy identifies integrated surveillance of European waters as a critical element to be put in place – this will include the response of European member states to the European Council request to propose an Integrated System for Monitoring Europe's Southern Maritime Borders. In parallel, national navies and the European Defence Agency are presently defining requirements and implementation architectures for an effective maritime surveillance system. In this context, it is important to ensure that all suitable technologies are effectively combined to give the best possible enhancement for surveillance of European waters.



Courtesy of Definiens



## Current Systems and their limitations

At present, vessel tracking in European waters depends on the combination of coastal monitoring and airborne or surface craft patrol. Coastal monitoring includes the use of coastal surveillance radar, Automatic Identification System receivers and local Vessel Traffic Monitoring Systems (eg for ports).

The main limitation is that these systems have limited coverage. In addition, fishing vessels must also carry identification systems that transmit location data via satellite telecommunications link (the so-called VMS). The AIS and VMS are so-called cooperative systems – although they contain significant levels of information, they can be tampered with and switched off. In addition, not all vessels are required to carry appropriate transmission equipment leading to a partial understanding of the vessel movements within national waters.

Maritime Patrol Aircraft can detect vessels over a wider area than coastal systems but in most cases are still not capable of providing total coverage over all national waters. In addition, such platforms have only limited time on station.

## The contribution of MARISS

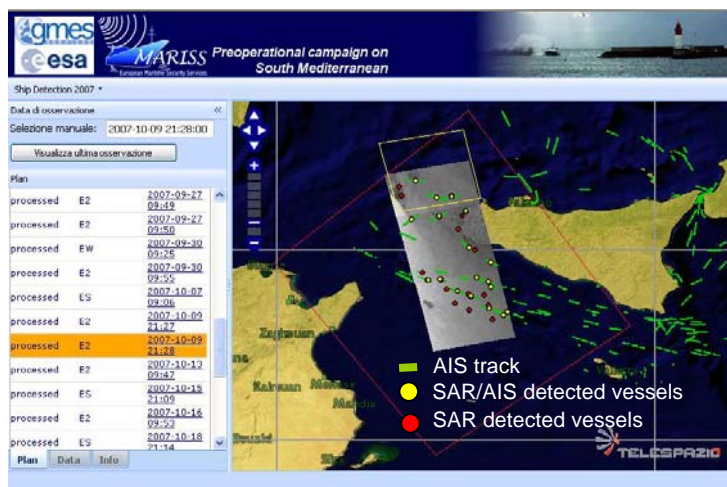
Satellite based synthetic aperture radar (SAR) enables the detection of vessels in areas beyond the range of conventional identification systems. In addition, areas that constitute potential sources of threat can be regularly monitored using satellite based high resolution radar and optical imagery.

Within MARISS, the Recognised Maritime Picture is enhanced through the integration of satellite based vessel detection with data streams such as:

- coastal radar
- Automatic Identification System (AIS)
- Vessel Monitoring System (VMS)
- Vessel Traffic System (VTS)

Satellite based synthetic aperture radar (SAR) enables the detection of vessels in areas beyond the range of coastal monitoring systems for support to tactical monitoring. In addition, like coastal radar, satellite radar is a non-cooperative surveillance technology and as such does not rely on the transmission of identification data by vessels. By combining the cooperative identification systems with non-cooperative monitoring and detection, a more comprehensive Recognised Maritime Picture can then be generated.

For strategic monitoring and threat identification, satellite imagery can complement traditional sources of intelligence by providing regular routine monitoring of potential threat areas as well as supporting the construction of statistics on heavily utilised trafficking routes.



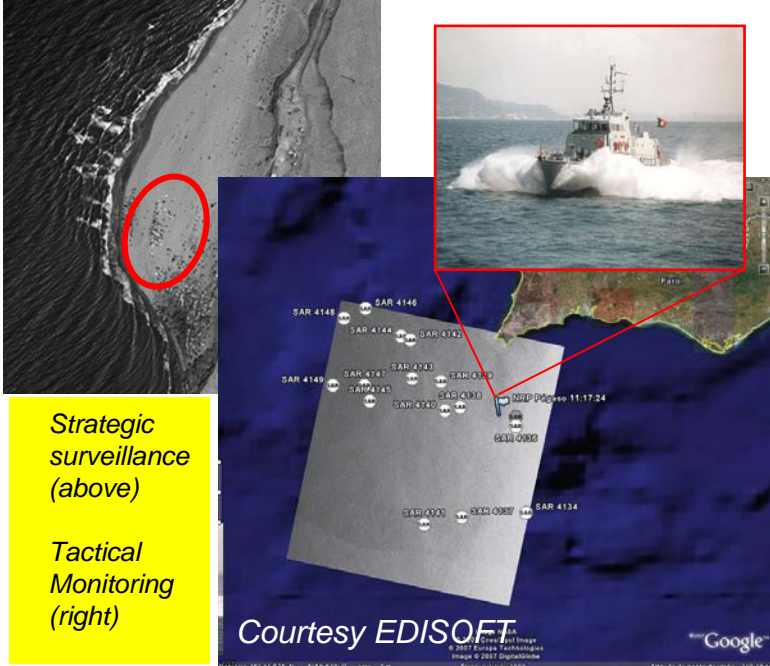
# The MARISS Service Portfolio

The MARISS consortium is developing two basic services within the overall portfolio. These are:

- near real time vessel detection for tactical support
- offline strategic surveillance for threat characterisation

The tactical support service is based on the integration of satellite SAR based vessel detection with AIS, VMS, coastal radar and other vessel detection and identification systems so as to provide the best possible Recognised Maritime Picture for operational maritime border control.

The strategic surveillance service is based on the use of high resolution imaging satellites (radar and optical) for the detection of suspicious activity and to build up an extended picture of the nature of threats that may encroach on European waters.



Strategic surveillance (above)

Tactical Monitoring (right)

Courtesy EDISOFT



## MARISS Users and Service Providers

The table below shows the users and service providers currently involved in the MARISS project.

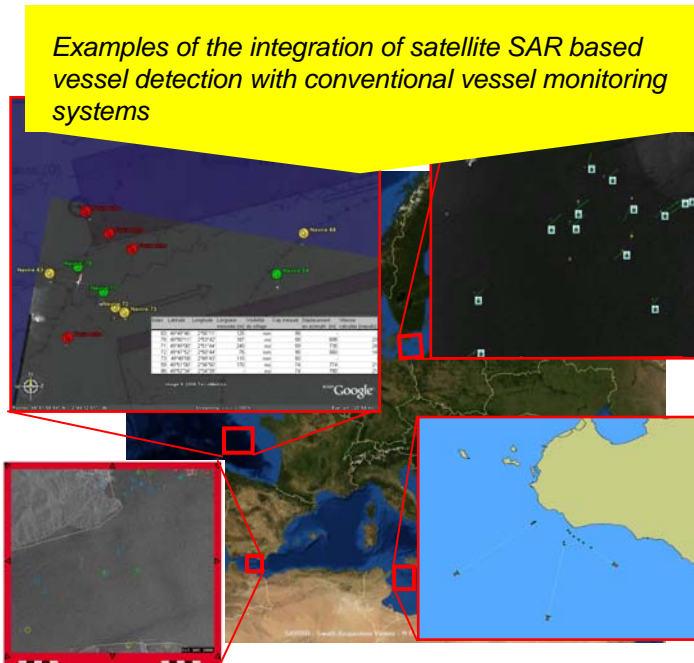
User	Service provider
Guardia Costiere (I) Ministero Dell'Interno (I)	Telespazio (I)
Guarda Civil (E) Navy (E)	GMV (E)
Maritime Administration (P)	Edisoft (P), Skysoft (P)
Departement des Affaires Maritimes (F)	CLS (F)
Hellenic Coast Guard (Gr) Eastern Sea Borders Centre (Gr)	Space Hellas (Gr)
Irish Naval Service (Ire)	QinetiQ (UK)
Swedish Coast Guard (Swe)	KSAT (N)
European Maritime Safety Agency (EU) FRONTEX (EU)	Telespazio (I), KSAT (N), Edisoft (N), GMV (E), QinetiQ (UK)

## Experience to date – impacts, benefits & limitations

Within the near real time tactical support services, the positions of vessels detected from the satellite SAR imagery can be integrated with conventional vessel monitoring data within 20-30 minutes of the satellite overpass. This correlation enables vessels transmitting their positions to be removed from the analysis, leaving only non-cooperative vessels. Using this information, Maritime authorities can then optimise their airborne and surface patrol routes to focus interception on the potentially suspicious vessels.

For strategic surveillance, wider areas can be monitored than would be the case with conventional intelligence, enabling the early detection of potential threats such as transfer operations, mustering and embarkation facilities or other anomalies.

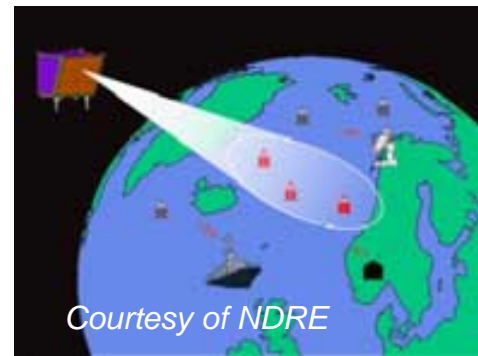
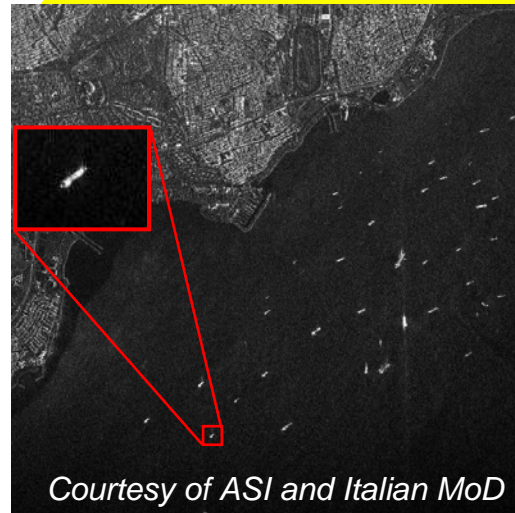
The main limitation to date is the update time between successive satellite overpasses. However with the launch of several new satellites, by mid 2008 it is expected that update times will be reduced to less than 6-8 hours for the Mediterranean region and shorter time scales for areas further north.



## Future Outlook

MARISS was originally set up as a two year consolidation activity under the ESA GMES Services Element to better understand the contribution that space based technology could bring for European Maritime Security. As a result of the extensive positive feedback from the user community, options are currently under investigation for continuation and expansion of the MARISS service portfolio. This would include addressing the following key areas:

- extension of the coverage of current MARISS services to include all areas and time periods of interest to the core user community
- extension of the MARISS service portfolio in response to user requests for new information products
- expansion of the MARISS partnership to include additional service providers and infrastructure operators
- integration of new Earth Observation satellite systems such as Cosmo-Skymed, TerraSAR-X and Radarsat 2
- integration of new complementary space technologies such as satellite AIS and Long Range Identification and Tracking systems



Satellite AIS

## For Further Information

The MARISS project is financed by the European Space Agency and is led by Telespazio. It involves industrial service providers from Italy, Spain, France, Portugal, Greece, UK and Norway. If you would like further information on the MARISS project, please contact one of the following:

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