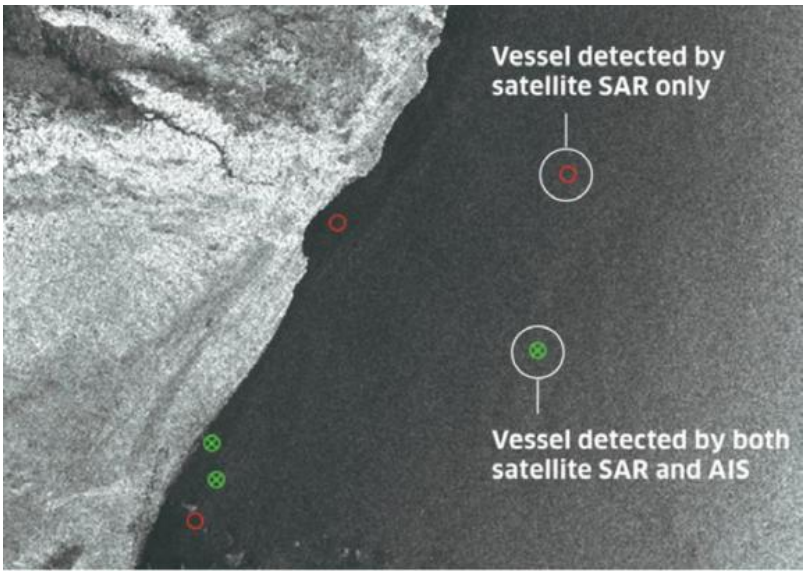
Monitor ships movements

Applications
Vessel tracking

The world’s seas embody vital communication, commerce and transport routes, which makes maritime safety of utmost importance to the international community. The multifaceted nature of challenges posed to the maritime environment asks for an effective wide-area maritime surveillance and international approach to maritime security. Piracy, terrorism, illegal drug trafficking, gun-running, human smuggling, maritime theft, fraud, illegal fishing and pollution disrupt the marine environment and maritime supply chains and cause heavy economic losses and even loss of human life. Satellite remote sensing plays an important role in addressing key security challenges.

Satellite surveillance of maritime traffic is an essential part of the European Maritime Security strategy. In the framework of the International Convention of Safety of Life At Sea (SOLAS 1974), the International Maritime Organization (IMO) has introduced the Long-Range Identification and Tracking system (LRIT) which aims to obtain ship identity and location information in sufficient time to evaluate the security risk posed by a ship off its coast and to respond, if necessary, to mitigate risks. Apart from maritime security LRIT covers search and rescue, safety, and protection of the marine environment and is mandatory for all passenger ships, high speed craft, mobile offshore drilling units and cargo ships of over 300 gross tonnes. Every 6 hours ships are required to issue reports, which are received by satellites, and securely transferred to data centres which manage LRIT information on behalf of flag States.

There are a wide variety of vessel tracking systems including Vessel Monitoring Systems (VMS), Automatic Identification Systems (AISs) and LRIT which are designed to provide information about the ship to other ships and to coastal authorities automatically. This information should include the ship's identity, type, position, course, speed, navigational status and other safety-related information. These systems however require active cooperation of the vessels. Because VMS cannot be used to monitor vessels that do not have VMS on board or whose system is switched off or malfunctioning, the EU JRC and EU Fisheries Council have promoted the use of remote sensing as an additional control tool. Consequently a number of space-based satellite earth observation technologies are emerging which address communication and global positioning for ship traffic surveillance and the identification of security threats. Since these satellite technologies do not depend on the willingness of ships to cooperate, remote sensing overcomes the lack of independence of transponders and complements active detection systems with passive measurements for non cooperating ships.



Example of vessels detected with RADARSAT-2 outside the coast of Somalia and correlated with AIS data. Green circles indicate positions of vessel reported with Satellite AIS. Red circles indicate positions of non-reporting vessel, only detected in the satellite image (RADARSAT-2 SCANSAR Narrow Mode © MacDONALD, DETTWILER AND ASSOCIATES LTD., 2009) Credit: Kongsberg

Ship detection and classification is possible with the use of optical and synthetic aperture radar (SAR) imagery. While SAR imagery from for example Cosmo-Skymed, TerraSAR-X, RADARSAT-2, and ALOS is advantageous due to its ability to scan large areas and its independence from cloud and light conditions, high resolution imagery from for example Quickbird, IKONOS, SPOT and EROS allow for individual identification and more detailed classification of vessels. Optical imagery however has shortcomings in coverage because of limited swath- and weather-windows. While SAR imagery is more suitable for wide-area surveillance, optical imagery allows for monitoring of more specific areas such as ports or straits. SAR imagery can be used at night and can penetrate clouds during the day. SAR imagery can pick up the wakes of ships, with the shape and trajectory of the wake helping to determine ship speed and location. Combining information from different satellite platforms and other available vessel tracking systems (VTS, AIS, LRIT, VMS, etc), improves the overall accuracy and allows for detection of non-reporting vessels.

To ensure maritime security international cooperation is essential. Globally there are a number of policy sectors, information services and user communities involved to protect the maritime environment. In 2011 NATO adopted a new Alliance Maritime Strategy in order to secure and protect its member countries' maritime resources and international commerce from potential threats. Cooperation with other relevant international maritime actors, such as the United Nations, the European Union and the International Maritime Organization helps to achieve regional security and stability. The EU GMES services for Security applications aim at supporting the border and maritime surveillance through the implementation of EUROSUR, the European Border Surveillance System, by supporting the mapping and monitoring of border areas. The European Maritime Safety Agency assists the European Commission and Member States in the development and implementation of EU legislation on maritime safety, pollution by ships and maritime security and has operational tasks in the field of vessel monitoring and long range identification and tracking of vessels.

Products

Products	Source	Descriptions	Product Standards	Ref. Project
Monitor Ships movements		Near real time maritime surveillance Fleet and vessel monitoring (customers: insurance, shipping, oil industries)		MyOcean Project
marine surveillance				Dolphin
maritime surveillance		Developing pre-operational service capabilities for Maritime Surveillance		NEREIDS

Success Stories

GlobWave Data and Piracy

References

Topic	Description	Keywords	Reference
