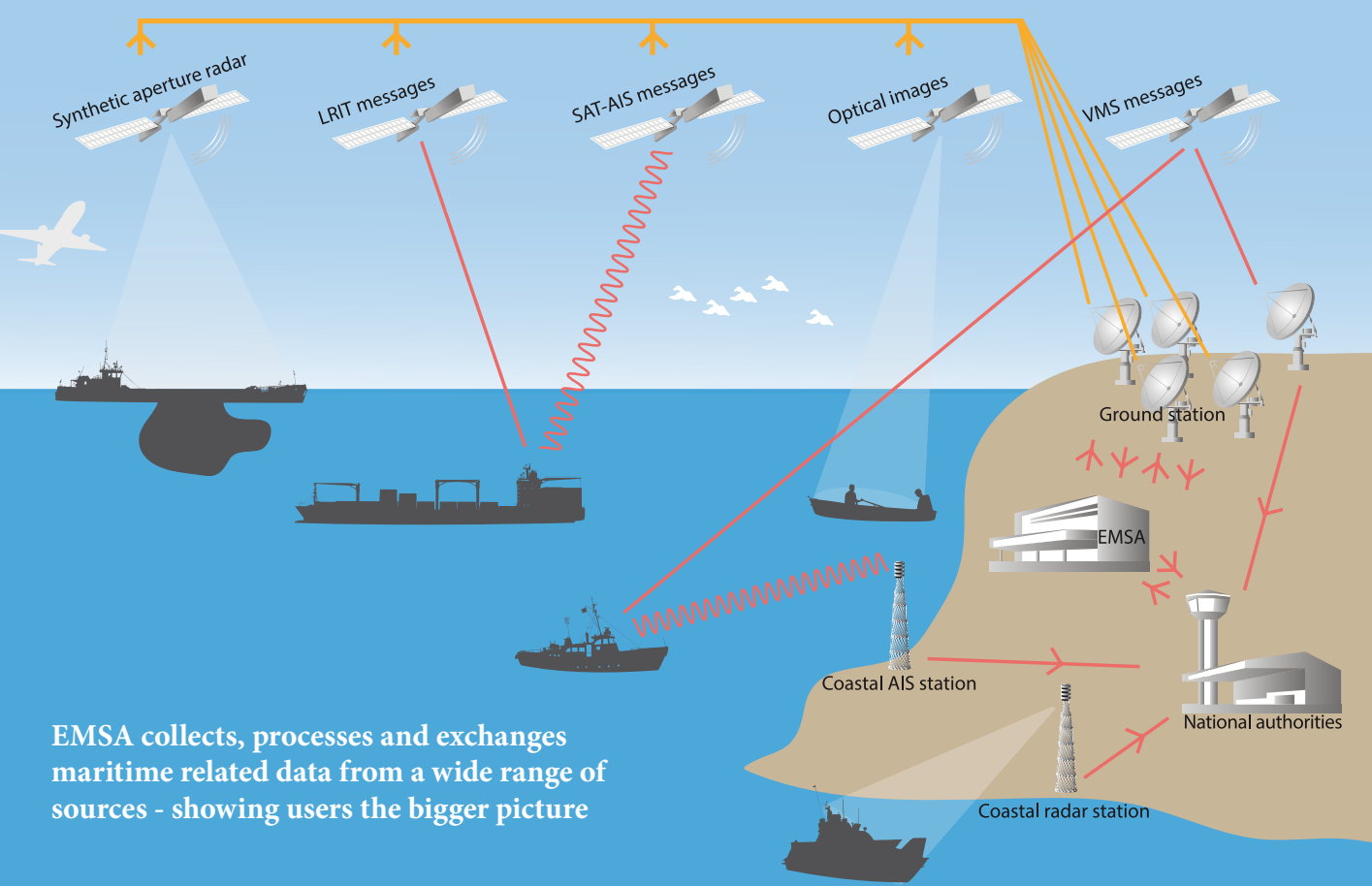


MARITIME SURVEILLANCE IN PRACTICE

Using integrated maritime services





AN OVERVIEW OF MARITIME ACTIVITIES

Getting a comprehensive overview of activity at sea is a challenge for most countries. To implement maritime policies effectively, governments and authorities need detailed, reliable knowledge about what happens at sea, in real time.

At EMSA, we have the flexibility to tailor maritime information according to unique operational requirements. Precise services can be provided responding directly to the specific needs of diverse maritime users across Europe.

INTEGRATED MARITIME SERVICES

The integrated maritime services offered are based on advanced maritime data processing, combining information from all of the agency's maritime applications as well as other external sources.

As part of a tailor-made maritime traffic picture, users can choose which information they want to receive, such as specific data sets and maritime activities in defined areas of interest. In future, users will also be able to access vessel behaviour patterns and meteorological and oceanographic data. Based on user feedback, EMSA refines and implements the individual services, ensuring that each one is focused on the key objectives specified.

Integrated data can be streamed directly to national systems, presented on a user-friendly graphical interface, and soon delivered on mobile devices. Data is distributed based on existing access rights.

Services are offered directly to EU Member States and organisations, sparing them the cost and complexity of buying and managing the underlying hardware and software, and hosting separate data integration systems.

Users have full operational support, 24 hours a day, 7 days a week, through EMSA's Maritime Support Services (MSS).

OPERATIONAL SERVICES

EMSA delivers a range of operational services to EU organisations and Member States.



INTEGRATED SERVICES FOR EU MEMBER STATES

Services are offered to all EU and EFTA Member States in accordance with existing access rights, and provide enhanced features for, among others, environmental monitoring, search and rescue, and traffic monitoring purposes. It allows Member States to make full use of the integrated vessel reporting information from terrestrial and satellite AIS, LRIT, VMS, as well as national vessel position data such as coastal radar, patrol assets, and leisure craft. The service is being developed, and in future will also include meteorological and oceanographic data, as well as automated behaviour algorithms. These algorithms will be configurable to provide alerts responding to user defined policies. In addition, the service allows users to display, share and exchange additional information.

MARITIME BORDER CONTROL SUPPORT FOR FRONTEX

This operational service provides support to the European Agency for the Management of Operational Cooperation at the External Borders (Frontex) operations under the auspices of the European Border Surveillance System (Eurosir). The service includes system-to-system interfaces for real-time vessel position information exchange and automated vessel behaviour monitoring. Vessel information originates from both terrestrial and satellite-based systems as well as other available positioning data, and are correlated against satellite aperture radar and optical imagery derived vessel detections.



SUPPORT FOR EUNAVFOR'S ANTI-PIRACY ACTIVITIES

This operational service provides support to the EU Naval Forces anti-piracy operations off the coast of Somalia and the Indian Ocean area for the EU merchant fleet. It includes the correlation and integration of a wide range of vessel reporting information (LRIT, coastal AIS, satellite AIS, shipborne AIS, ship reporting systems) as well as intelligence led information such as merchant vessel piracy risk profiles, into a customised maritime picture. On-demand, satellite vessel detection data (both radar and optical images) can also be integrated in order to detect non-correlated targets in the area of interest.



FISHERIES CAMPAIGN MONITORING FOR EFCA

This operational service provides support to European Fisheries Control Agency (EFCA) coordinated Joint Deployment Plan operations (JDP) for fisheries activities in the Mediterranean, North & Eastern Atlantic and the North Sea waters. It includes a real time maritime awareness operational picture fusing and correlating VMS, terrestrial AIS, satellite AIS, and LRIT position reports together with visual sightings, as well as establishing a common fishery vessel registry. The service provides a tool for behaviour analysis, risk assessment and classification of possible non-compliance targets, and drives the fisheries monitoring activity assessment and follow-up performed by EFCA.

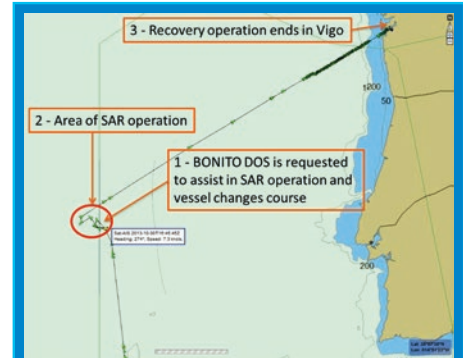
CASE STUDIES

Integrated maritime services are used to support a range of different maritime activities. Some recent examples are provided below.

SEARCH AND RESCUE

SPAIN

On 31 October 2013, the *FV Frances* Spanish fishing vessel started to take on water from a leak and began sinking approximately 270 nautical miles from shore. The crew had to abandon ship, and embark on the vessel's two small liferafts. Coordinators in the Maritime Rescue Coordination Centre (MRCC) Madrid, using satellite AIS data made available by EMSA, immediately identified another Spanish fishing vessel nearby, the *Bonito Dos*. The Spanish MRCC operators contacted the *Bonito Dos* to request immediate assistance for a SAR operation. The *Bonito Dos* was quickly diverted to the scene, and rescued the seven crew members of the *FV Frances*, which by that point was almost completely submerged. The Portuguese Coast Guard sent a helicopter and a plane to the site, but determined there was no further action to be taken. The crew members were transported to Vigo by the *Bonito Dos* for further treatment.



Area centric tools can use satellite AIS data, and other means if available, to locate vessels in the vicinity of an accident



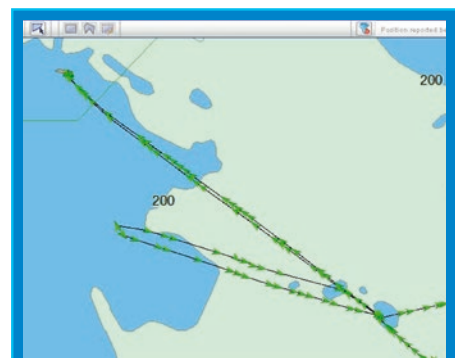
The capacity to closely track vessels which are distant from the coast improves accuracy and saves costs during life-saving operations

IRELAND

The Irish Coast Guard used integrated maritime services to perform a medical evacuation on 19 October 2013. The *Tarago* vessel was located approximately 300 nautical miles from the coast, at the far edge of the Irish Search and Rescue area, and beyond the reach of coastal AIS. This distance was within range for the newly acquired Irish Coast Guard helicopters, but was the first time one of the helicopter assets had been tested to these limits. The helicopter took off, with a fixed wing aircraft to provide cover. As it was essential for the aircraft to go directly to the vessel, without wasting any fuel, the Coast Guard operator tracked the vessel closely using satellite AIS combined with LRIT, in order to direct the helicopter to the vessel by the shortest path possible. The operation was a success, and the casualty was winched successfully and flown back to Ireland for treatment.

ITALY

On the 19 April 2013, an Italian Coast Guard plane operating in a Frontex joint operation detected a rubber dinghy in distress with migrants on board in Italy's SAR area. The Italian Coast Guard immediately applied an area centric query to identify other vessels in the area. Based on the information retrieved, two Italian Coast Guard patrol boats and one merchant vessel, *Polaris 2*, were directed to the area. The dinghy, of about 10 metres in length, was dangerously overcrowded and was carrying 84 migrants in unsafe conditions. The 84 people were all taken on board the patrol boats, and transported to Lampedusa island, Italy.



Authorities can react quickly using the interface which displays data visually on nautical charts, making it easier for users to obtain a clear overview of what is happening at sea

■ FISHERIES MONITORING

EUROPEAN FISHERIES CONTROL AGENCY

On 21 May 2013, three fishing vessels were detected transiting in group. Vessel identifiers indicated that all three vessels were French. Although the vessel identifiers seemed to be genuine, correlation through the integrated maritime services flagged an AIS identification anomaly for one of them. On further investigation, through automatic correlation with the fishing fleet register information, it was revealed that one of the French vessel identifier numbers had been decommissioned over one year previously. Follow-up action with the support of the French and Italian authorities resulted in the interception of that vessel. The real name and nationality of the vessel (Libyan) were established, and the authorities were able to ensure the vessel was not fishing in European waters using a false identifier.

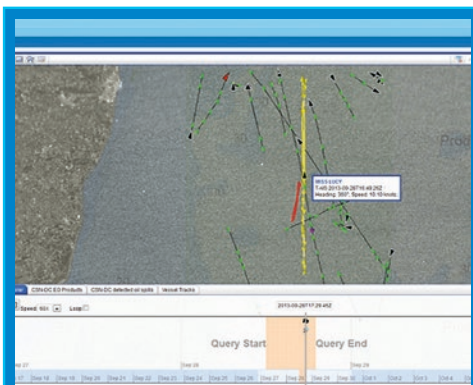


Accurate and up-to-date registries help authorities cross-check vessel information and catch irregularities

■ POLLUTION MONITORING

UNITED KINGDOM

On 28 September 2013, three reports were received by the UK authorities from different aircraft of a vessel discharging oil in the southern North Sea. A CleanSeaNet report was also received, the timing of which indicated that it was the same event. The slick was then investigated using the time explorer tool. Although there were a number of vessels in the area, the use of this tool enabled the identification of the vessel at the end of the reported slick. When contacted by the MRCC, the Master confirmed that there had been a tank washing operation following the unloading of a cargo of palm oil. Fortunately in this case, the discharge was legal, but nonetheless the information provided through the tailored interface enabled the authorities to identify and query the vessel without delay.

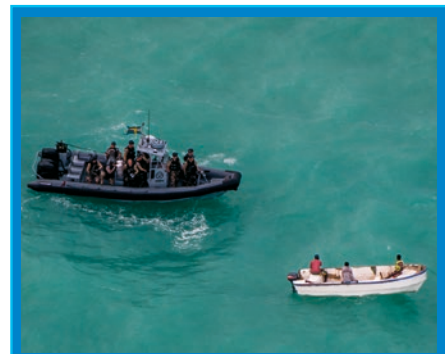


The time explorer tool allows events to be replayed, showing vessel patterns leading up to a pollution incident at sea

■ ANTI-PIRACY

EUNAVFOR

On 6 November 2013, a Hong Kong flagged chemical tanker, en route from Saudi Arabia to Mozambique, was under attack from a group of pirates while at sea 460 miles south east of Mogadishu. There were no reports of any injuries following the attack, but naval forces immediately closed in on the sea area to locate the suspect pirates. The attack on the Hong Kong flagged tanker was followed by actions taken by EU NAVFOR Naval Operations to secure the safety of merchant ships in the immediate vicinity. As part of this operation to make the ships within striking distance of the attack aware of existing danger to their vessels, the EU NAVFOR Maritime Security Centre together with the UK Maritime Trade Operations office conducted "See and Avoid" Operations to warn merchant vessels of this particular incident. LRIT and satellite AIS ship position data sources can be used to identify vessels in potential danger of attack and contact them.



Integrated maritime services make it possible to identify many of the vessels transiting a given area, helping authorities provide adequate warning of incidents and emergencies

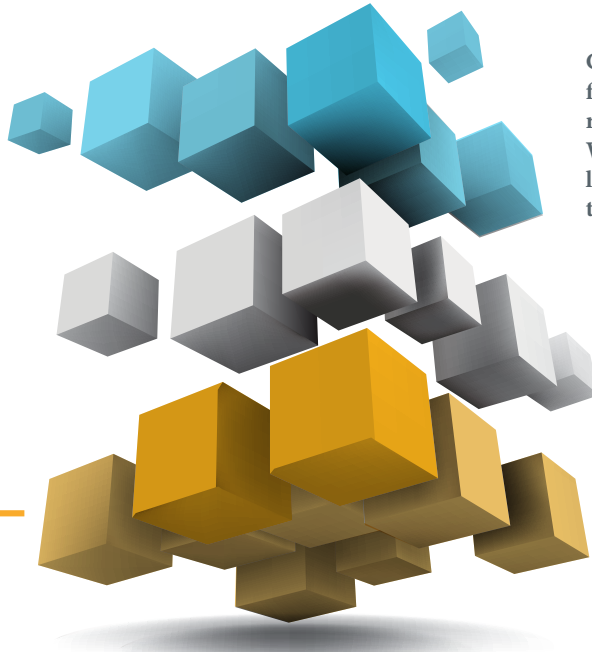
Integrated maritime data

DATA SOURCES

Automatic Identification System, Earth Observation, Long Range Identification & Tracking, Vessel Monitoring System

FUNCTIONS/APPLICATIONS

Integrated ship tracking
Monitoring areas of interest
Vessel behaviour monitoring (under development)



Choose the maritime data source, system or function depending on your national operational requirements and organisation business model. Whether a provider or a receiver with full, partial or limited technical capacity, EMSA can deliver services tailored to your needs

SYSTEMS

SafeSeaNet, Long Range Identification & Tracking, CleanSeaNet, THETIS

DATA SOURCES

One of the main attributes of integrated maritime services is the ability to combine information from a range of different data sources, and as such greatly enrich the maritime domain awareness picture.

These include data and operational functionalities directly contracted by EMSA:

AUTOMATIC IDENTIFICATION SYSTEM (AIS)

AIS is a maritime broadcast system, based on the transmission of very high frequency radio signals. Ships send reports with ship identification, position, and course, as well as information on cargo. In Europe, the exchange of AIS messages is done through the SafeSeaNet system.

LONG RANGE IDENTIFICATION AND TRACKING

LRIT is a global ship identification and tracking system based on communications satellites. Under IMO regulations, passenger ships, cargo ships (300 gross tonnage and above), and mobile offshore drilling units on international voyages send mandatory position reports once every six hours.

ADDITIONAL SHIP AND VOYAGE INFORMATION

Member States also exchange a range of additional data through the SafeSeaNet system, including: port notifications (e.g. arrival and departure times), Hazmat notifications (carriage of dangerous and polluting goods), ship notifications (additional information sent in mandatory reporting areas), and incident reports (e.g. pollution reports).

Other data sources from national systems can also be integrated:

VESSEL MONITORING SYSTEM (VMS)

VMS uses communications satellites for tracking commercial fishing vessels. Vessels are equipped with on-board transceiver units which transmit messages every two hours.

COASTAL RADAR

Member State vessel traffic services constantly track vessels movements along their coastline with the aid of local radar.

SATELLITE AIS

New systems are being developed to enable satellites to receive AIS position messages. This extends the geographical range over which ships can be tracked using the AIS system.

SYNTHETIC APERTURE RADAR SATELLITE IMAGES

Satellite radar sensors measure the roughness of the sea surface independent of weather and sunlight conditions. On the satellite image, oil spills appear as dark areas, and vessels and platforms as bright spots. This is used in vessel detection systems (VDS) as well as pollution monitoring.

OPTICAL SATELLITE IMAGES

Earth observation imagery from satellite sensors operating in the optical spectrum, providing high resolution images of vessels or coastal areas.

METEOROLOGICAL-OCEANOGRAPHIC DATA

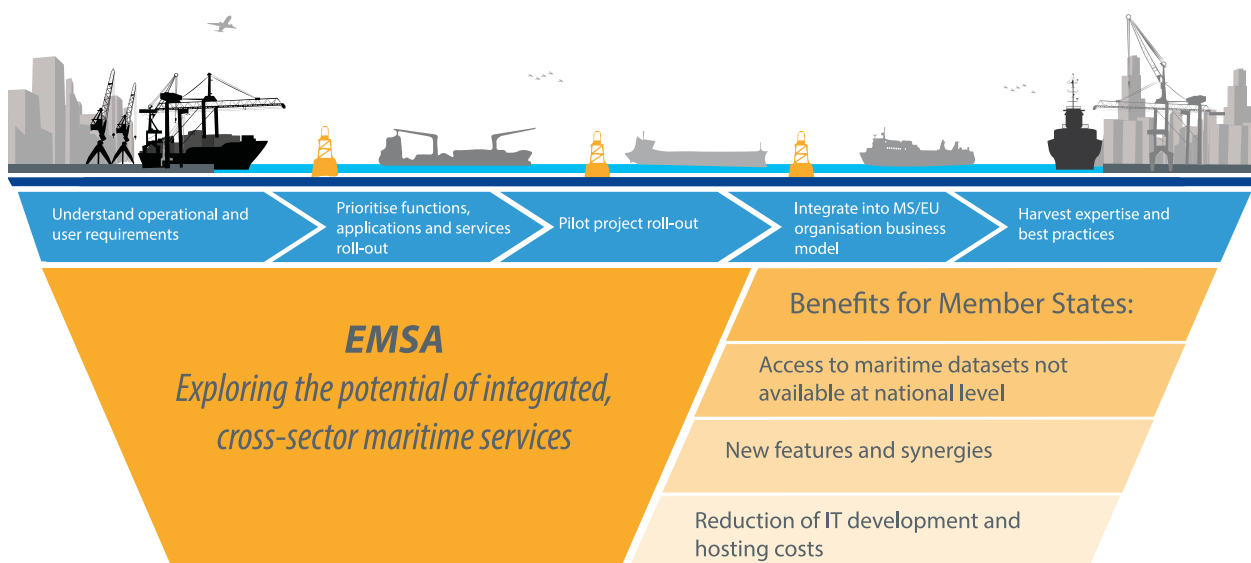
This is under development and will include a range of fields: wind speed and direction, wave height and direction, wave period, etc.

USER SPECIFIC DATA

EMSA can also process other varied forms of national data provided by users. To date, this has included encrypted position reports from patrolling vessels, position reports from leisure crafts, and additional meteorological-oceanographic data provided by buoys.

Operational maritime services

A step-by-step approach to giving daily support based on user requirements



CAPABILITIES

Integrated maritime services deliver relevant, complete and up-to-date information at the right time. New developments facilitate data exchange and distribution, through the promotion and implementation of both standard and semantic services.

Information can be shared easily and selectively based on a set of unique capabilities:

■ TYPES OF DATA

User tailored services have a unique capacity to process, integrate, correlate and distribute many different types of maritime data and information.

■ SCALE AND GEOGRAPHICAL COVERAGE

Different levels of detail can be shared at different geographical scales. Users can choose to receive a general overview or specific data covering the areas of most interest to them.

■ DATA SERVING DIFFERENT FUNCTIONS

Integrated maritime services respond to the needs of users from a wide range of different functions: maritime security; maritime safety; fisheries control; law enforcement; and environmental protection. Users can share relevant and function-specific information with others carrying out the same tasks.

■ DATA FROM USERS

Users may also provide their own data which can be correlated with other data, then sent back to them, and to those with whom they choose to share it.

■ ACCESS RIGHTS MANAGEMENT

Distribution policies are set by the data and information owners, complying with complex landscapes of access rights management.

ABOUT THE EUROPEAN MARITIME SAFETY AGENCY

The European Maritime Safety Agency is one of the EU's decentralised agencies.

Based in Lisbon, the Agency provides technical assistance and support to the European Commission and Member States in the development and implementation of EU legislation on maritime safety, pollution by ships and maritime security.

It has also been given operational tasks in the field of oil pollution response, vessel monitoring and in long range identification and tracking of vessels.

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