



MARITIME SURVEILLANCE IN PRACTICE

USING INTEGRATED
MARITIME SERVICES

GETTING 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 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. Users are now able to access vessel behaviour patterns as well as meteorological and oceanographic data, for example. 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

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 various purposes including environmental monitoring, search and rescue, and traffic surveillance. 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 now includes meteorological and oceanographic data, as well as automated behaviour algorithms. These algorithms are configurable to provide alerts responding to user defined policies. In addition, the service allows users to display, share and exchange further information.



MARITIME BORDER CONTROL SUPPORT FOR FRONTEX

This 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 (Eurosur). 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 is correlated against satellite aperture radar and optical imagery derived vessel detections.



ANTI-PIRACY SUPPORT FOR EU NAVFOR OPERATIONS

This 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.



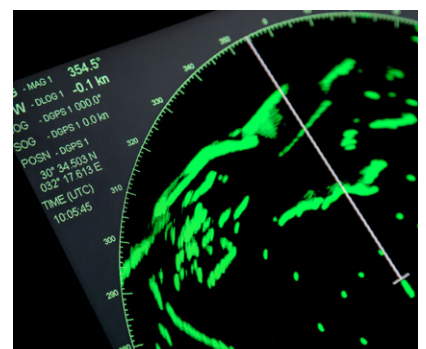
FISHERIES MONITORING SUPPORT FOR EFCA

This service provides support to the European Fisheries Control Agency's coordinated Joint Deployment Plan operations (JDP) for fisheries activities in the Mediterranean Sea, North & Eastern Atlantic, Western Waters, North Sea and Baltic Sea. It includes a real time maritime awareness operational picture fusing and correlating VMS, terrestrial and 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 to fisheries monitoring centres in Member States, and drives the fisheries monitoring activity assessment and follow-up performed by EFCA.



COUNTER-NARCOTIC OPERATIONS SUPPORT FOR MAOC-N

This service provides support to the Maritime Analysis and Operations Centre – Narcotics (MAOC-N) for their counter narcotic operations. MAOC-N is an international agency set up to coordinate anti-drug trafficking action by several European Union states (France, Ireland, Italy, the Netherlands, Portugal, Spain and the United Kingdom) with financial support from the European Commission and an operational relationship with the US authorities. The service provides integrated vessel monitoring information and a permanent maritime surveillance service to assist MAOC-N to support their on scene assets in monitoring activities for specific operations around the world.



CASE STUDIES

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

SEARCH AND RESCUE

ITALY

An Italian Coast Guard plane involved in a Frontex joint operation detected a rubber dinghy in distress with migrants on board in Italy's SAR area on 19 April 2013. 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 ten 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.

TRACKING VESSELS OF INTEREST

REQUESTING MEMBER STATE

To support the fight against the spread of the Ebola virus, EMSA has been providing Member States with a weekly list of ships that have departed from Ebola affected countries and are subsequently detected in and around EU waters. Member States can also, on request, be provided with early warnings whenever notifications are received that ships from Ebola affected countries are bound for EU ports. The information is based on terrestrial and satellite AIS data, some external sources, and a special watchdog functionality that has been set up as part of EMSA's Integrated Maritime Services.

ANTI-PIRACY

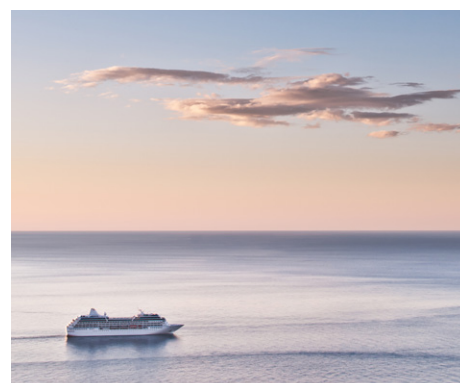
EU NAVFOR

A Moldovan flagged cargo ship, en route from Bosaso to Mogadishu, was under attack from a group of pirates on 16 October 2014 while at sea 475 miles north east of Mogadishu after an engine problem. Following a failed attempt to board the ship, aerial and naval forces immediately closed in on the sea area to locate the suspect pirates. The attack on the Moldova flagged ship 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.

GLOBAL MONITORING

OVERSEAS TERRITORIES

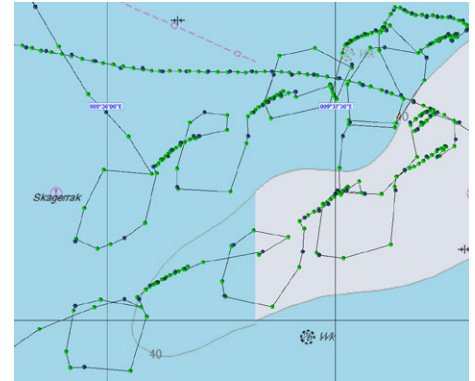
EMSA's services provide added value for monitoring France's large exclusive economic zone, particularly in overseas territories, where surveillance options are limited. The services, including the integration of satellite AIS data, allow real time and accurate localisation of ships even in remote areas. The service is used by Maritime Rescue Coordination Centre (MRCC) Noumea for a number of purposes, e.g., to monitor anchored vessels in coastal areas during hurricane alerts, and to coordinate medical evacuation from cruise ships during emergencies.



FISHERIES CONTROL

EUROPEAN FISHERIES CONTROL AGENCY

Fishing vessels can fish in defined areas, in accordance with allocated fishing rights. On 25 June 2014, EFCA used the EMSA operational service to provide detailed tracks of fishing vessels in the Skagerrak area (southern North Sea) to an inspection team on board a fishery patrol vessel. This information made it possible to define the actual number of individual fishing operations being undertaken by each fishing vessel. The inspection team boarded suspect vessels, and compared the information provided by the EMSA service with the logbook entries made by the skipper. During inspection of one of the vessels, this methodology revealed a mis-declaration of about one tonne of cod, which the logbook stated had been caught in an area in which the vessel, according to its track, clearly did not fish.



COUNTER-NARCOTICS OPERATIONS

MAOC-N

In September 2014, a Tanzanian-flagged merchant vessel was intercepted 13 nautical miles from Alborán Island by the Spanish authorities, following intelligence provided by the French authorities. Using the Integrated Maritime Services provided through EMSA, in conjunction with patrol assets deployed on scene, MAOC-N was able to successfully track the vessel and coordinate her interception. A total of 500 kg of cocaine was found hidden underneath an anchor chain.



VERIFICATION OF VESSEL IDENTITY

EUROPEAN FISHERIES CONTROL AGENCY

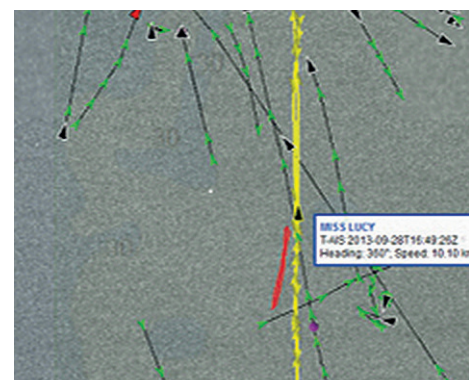
Three fishing vessels were detected transiting in group on 21 May 2013. The vessel identifiers seemed to be genuine but correlation through the integrated maritime services flagged an AIS identification anomaly for one of them. It was revealed that one of the vessel identifier numbers had been decommissioned 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.



POLLUTION DETECTION

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.



DATA SOURCES

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

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.



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 IMAGERY

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.



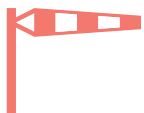
LONG RANGE IDENTIFICATION AND TRACKING

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.



METEOROLOGICAL-OCEANOGRAPHIC DATA

In situ remote sensing and model forecast meteorological and oceanographic data including wind, wave, temperature, currents, sea level, etc.



OPTICAL SATELLITE IMAGERY AND VIDEO

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



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.



DRONES

EMSA is currently exploring the possibility of using data from remotely piloted aircraft systems (unmanned aerial vehicles) for maritime surveillance purposes.



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).

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 and position reports from leisure crafts.

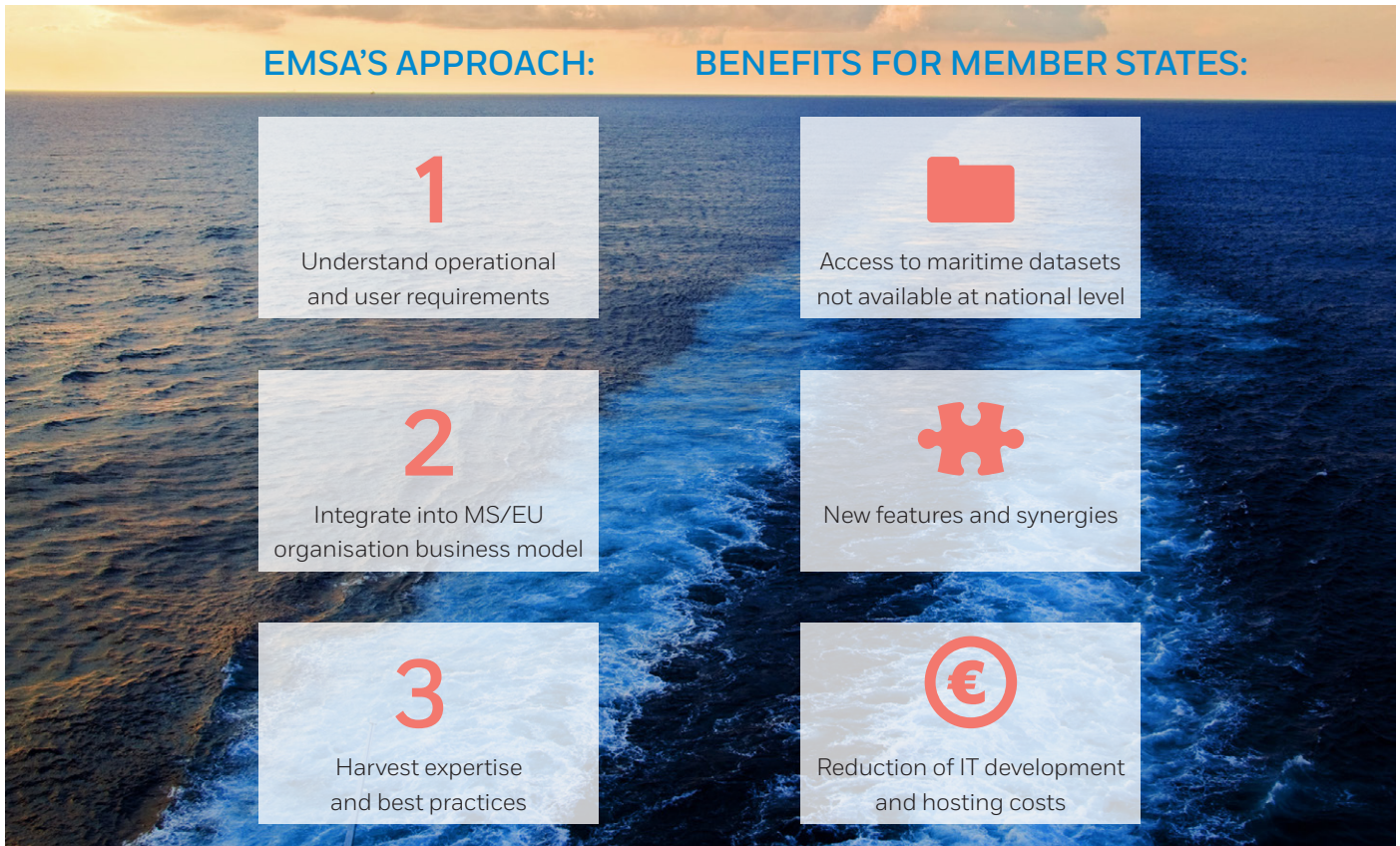


NATIONAL AUTHORITIES



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 European Union's decentralised agencies. Based in Lisbon, the agency's mission is to ensure a high level of maritime safety, maritime security, prevention of and response to pollution from ships, as well as response to marine pollution from oil and gas installations. The overall purpose is to promote a safe, clean and economically viable maritime sector in the EU.

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