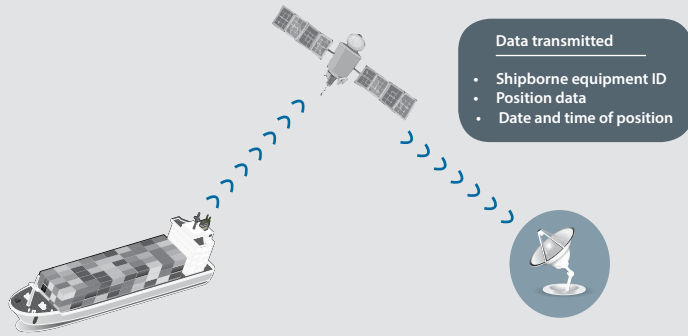# VESSEL TRACKING GLOBALLY
An insight into the value of LRIT

An overview of the global vessel tracking process

Data transmitted

- Shipborne equipment ID
- Position data
- Date and time of position

Ships report their position regularly via shipborne satellite communications equipment. This data is received by the Communication Service Provider which guarantees its secure transfer to the Application Service Provider (ASP).

ASP   EU LRIT CDC   Contracting Governments

Data added by ASP

- Ship ID & Name
- Time ASP receives information
- Time ASP forwards information
- LRIT DC Identifier

Data added by EU LRIT CDC

- Time LRIT info is received by LRIT DC
- Time LRIT info is forwarded to LRIT Data User
- LRIT DC Identifier
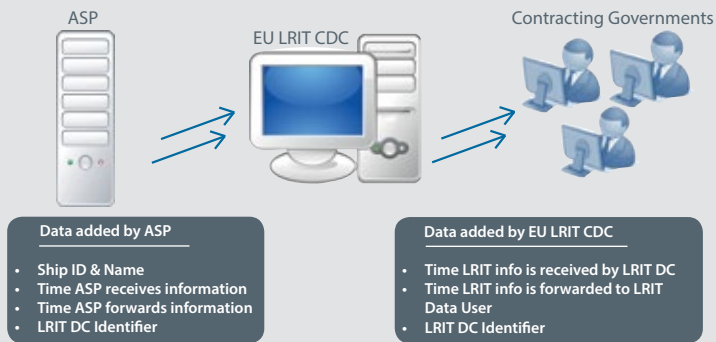
The Application Service Provider, in turn, makes the data available via a special interface to the EU LRIT Cooperative Data Centre. The EU LRIT CDC collects and adds complementary data and then distributes this to Contracting Governments according to the access rights and rules set out in the LRIT Data Distribution Plan.

IMO Data Distribution Plan   EU LRIT CDC   Ship database
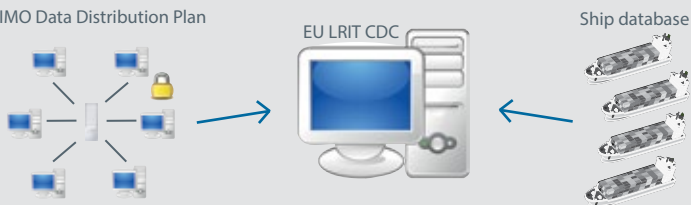
The LRIT Data Distribution Plan determines which users can receive which information. Its server is run by the IMO and is populated by SOLAS Contracting Governments. All ships required to report to the EU LRIT CDC are registered in a ship database which contains information uploaded by the participating countries.

Data Centres   Data Centres

IDE
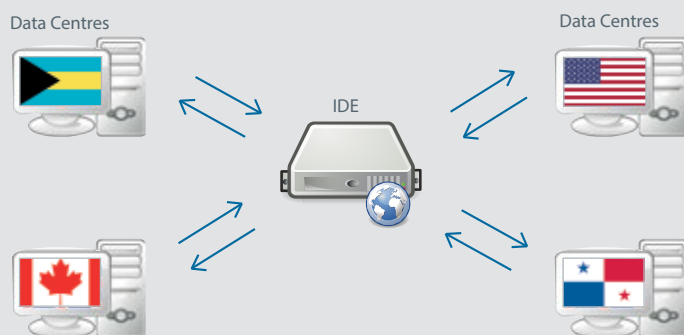
The International LRIT Information Data Exchange (IDE) operated by EMSA is the hub of the LRIT network connecting all LRIT Data Centres worldwide and providing a more complete record of communications for auditing purposes.

LONG RANGE IDENTIFICATION AND TRACKING

The system

The LRIT system was set up under the framework of the International Maritime Organization (IMO). It is the first mandatory international ship tracking and data exchange system for all passenger ships, high speed craft, mobile offshore drilling units and cargo ships of over 300 gross tonnage. The LRIT system has been in force since 1 July 2009.

The system specifies that Flag States should ensure that a minimum of four position messages per ship per day (one every six hours) are sent, stored and shared with authorised users.

The LRIT network is composed of LRIT Data Centres, which collect and make available ship position reports to authorised users. The LRIT International Data Exchange (IDE) allows the exchange of LRIT information between Data Centres.

The purpose

The initial purpose of long-range identification and tracking of ships was to enhance security for government authorities. The system provides ship identity and location information in sufficient time for a government to evaluate the security risk posed by a ship off its coast and to respond if necessary.

The scope of LRIT has since been extended to include search and rescue (SAR), safety, and protection of the marine environment. Accurate information on the location of a ship in distress, as well as ships in the vicinity that could lend assistance, can reduce response time, supporting timely rescue and possibly minimising pollution along a coastline.

THE EU LRIT COOPERATIVE DATA CENTRE

The European Union LRIT Cooperative Data Centre (EU LRIT CDC) collects the identity and position data of ships belonging to Participating States. Participating States include all EU Member States, Iceland and Norway, and some Overseas Territories of EU Member States.

Users access the EU LRIT CDC via a User Web Interface (UWI) according to their access rights (Flag, Coastal, Port, or Search and Rescue). They are able to request and consult positions for specific ships, a list of ships, or for an area of special interest. The UWI allows the ships to be viewed graphically. Participating States can also receive the LRIT data in their own systems, using a system-to-system interface.

All EU LRIT CDC Participating States are able to request LRIT information from other Data Centres via the IDE. The request can be for information on a ship travelling within 1,000 nautical miles (NM) of their coastline, on a ship bound for one of their ports, or simply on a specific ship of interest.

MAIN ADDED VALUE FUNCTIONS

The LRIT system can be used for many different purposes, including:

- **Search and Rescue** – the location of a ship in distress and of other ships in the vicinity can be provided. This supports SAR responders in coordinating assistance, for response operations, for example. Search and Rescue Surface Pictures (SAR SURPIC), SAR polls and other functions in the EU LRIT CDC support SAR operations.

- **Tracking a ship of interest** – particular ships of interest, such as those transporting dangerous goods, with high-risk status in the Port State Control system, or of interest for security/border control purposes, can be tracked individually. This is done using archived position reports, polling the ships, or the use of a frequency rate change command to change the reporting rate of a ship.

- **Monitoring an area of interest** – areas of special interest, such as environmentally sensitive areas, high-risk areas (piracy), or high traffic density areas can be monitored. This is done through the geographical area function, or through activating a coastal standing order in the Data Distribution Plan (DDP) which provides early identification and monitoring of all ships transiting the coastal area of a country. This is done in support of a variety of objectives including:

    - Combating piracy
    - Enhancing seafarer and vessel safety
    - Supporting activities such as humanitarian aid and evacuation
    - Monitoring traffic in remote locations

- **Aggregated maritime traffic information** – statistical data can be generated on vessel traffic globally, including trends in the volume of ship traffic and types of vessels in different areas around the world.

EU LRIT CDC participating countries

Austria	Latvia
Belgium	Lithuania
Bulgaria	Luxembourg
Croatia	Malta
Cyprus	Netherlands Curaçao
Czech Republic	Poland
Denmark Greenland	Portugal
Estonia	Romania
Finland	Slovakia
France French Polynesia New Caledonia	Slovenia
Germany	Spain
Greece	Sweden
Hungary	United Kingdom British Virgin Islands Falkland islands Gibraltar
Ireland	Iceland
Italy	Norway

ITALY – ITALIAN COASTGUARD SAVES SAILORS IN DISTRESS

Situation: Two sailors attempted to break the 11-day record for crossing the Atlantic with a catamaran, sailing between Dakar and Guadeloupe. However, on 26 January 2013, the helm of the catamaran *Jrata* was damaged irreparably 1,000 NM off Cape Verde and the only hope of survival was rescue by another ship.

Action: The sailors sent a distress call with their satellite phone to the Italian coastguard in Rome. Using the EU LRIT CDC, within a few minutes the coastguard officers located vessels in the vicinity, and the tanker *Genmar Argus* (Marshall Islands flag) was diverted to the scene. The crew of the *Jrata* was taken safely on board.

Result: This successful search and rescue operation is a great example of how the EU LRIT CDC ship tracking service offered to European maritime rescue and coordination centres (MRCC) can enhance the safety of seafarers worldwide.
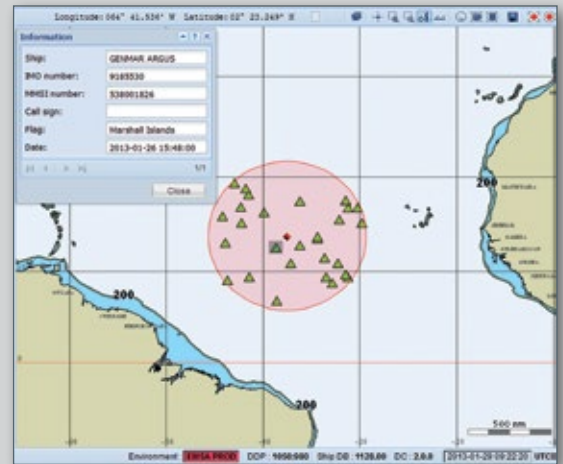

Figure 1: Screenshot of the EU LRIT CDC and SAR SUPRIC request to identify vessels in the vicinity of the *Jrata*

SPAIN - CANARY ISLANDS SEARCH AND RESCUE OPERATION

Situation: The *PS Vita* was taking part in the Talisker Atlantic Challenge, rowing from the Canary Islands to Barbados. Due to bad weather conditions on the evening of 14 December 2011, the vessel ran into difficulties and started sinking 480 NM southwest of the Canary Islands. The crew abandoned the boat on *PS Vita*'s emergency life raft, activating the Emergency Position Indicating Radiobeacon. The distress signal was received by MRCC Falmouth and MRCC Dakar. Given the proximity to the Canary Islands, the Spanish maritime safety agency coastguard (SASEMAR) was also contacted to assist.

Action: The *PS Vita* was located in Senegal's search and rescue area but MRCC Falmouth took coordination of the operation, with the cooperation of MRCC Madrid. The Talisker Atlantic Challenge support vessel *Aurora* was located in the Canary Islands and was unable to assist. SASEMAR therefore made SAR SURPIC requests around the *PS Vita* vessel to identify which other vessels were in close proximity and able to give assistance.

Result: The cruise ship *Crystal Serenity* was located in the immediate vicinity and assisted in the rescue of the two crewmembers, who were located after they sent up a flare. Both crewmembers disembarked at the cruise ship's next port of call in St Maarten in the Caribbean.

Figure 2: Screenshot of the SAR SURPIC in the EU LRIT CDC showing the location of the *PS Vita* and the *Crystal Serenity*

LITHUANIA - VESSEL TRACKING FOR ANTI-PIRACY MEASURES

Situation: Two Lithuanian-flagged vessels - *Argo*, located off the port of Douala Cameroon, and *Saturnas*, anchored in Nigerian territorial waters - were boarded by pirates. The master of the *Argo* was kidnapped, as was the master of the *Saturnas* along with five other crewmembers.

Action: During these two events, the Lithuanian Maritime Safety Administration used the EU LRIT CDC to check the vessel positions and coordinate subsequent actions. Real time positions and historical ship reporting positions (with a standard reporting frequency of every six hours) for the days prior to the incident were used.

Result: The pirates had not destroyed the radio communication equipment in either case, and once the pirates left the vessels, chief officers were able to communicate directly with the ship owners by satellite telephone and email. Hostages were released, mainly due to diplomatic efforts and negotiations between the parties involved. A warning was given to other Lithuanian-flagged vessels in this region to stay alert for pirate activity.

Figure 3: A view on the port of Douala in Cameroon

ITALY – MONITORING DURING A VESSEL HIJACKING OFF LIBYA

Situation: During civil unrest in Libya in 2011, the Italian tug, *Asso 22*, was hijacked. The Italian coastguard closely monitored the hijacked tug; no communication was possible with the ship.

Action: The EU LRIT CDC was used to monitor the vessel during the period it was hijacked. Reporting frequency was increased to once every 15 minutes to enable closer monitoring.

Result: The vessel track was followed in the EU LRIT CDC until the tug was released and had reached a safe position, at which time the LRIT reporting was switched back to a lower frequency.

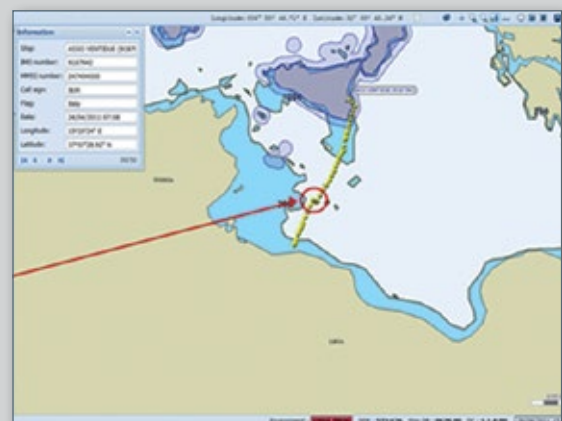Figure 4: The vessel track of the Italian tug *Asso 22* in the UWI of the EU LRIT CDC

Figure 5: The vessel track of the *Asso 22*. The arrow indicates when the vessel reached a safe position

EUROPEAN UNION NAVAL FORCES (EUNAVFOR) - COMBATING PIRACY

Situation: Since 2011, EMSA and EUNAVFOR have been cooperating to provide a permanent integrated maritime monitoring service to monitor and protect merchant shipping in the high risk area for pirate attacks off the coast of Somalia. The service integrates and fuses multiple sources of data in a real time environment. Data includes LRIT information from the EU LRIT CDC, the LRIT data of other Flag States, and satellite AIS data, as well as ship-specific risk information and Maritime Security Centre – Horn of Africa (MSCHOA) vessel transit registration data supplied by EUNAVFOR.

Action: The EUNAVFOR Operations Watchkeepers at the MSCHOA receive the positions for all identified ships travelling in the selected area.

Result: The LRIT data is combined with other data to provide an integrated picture which can be viewed on a dedicated interface. This provides an excellent example of civilian-military cooperation in developing Maritime Situational Awareness. It has facilitated the close monitoring of identified merchant vessels in the area, and the deployment of relevant EUNAVFOR assets to assist in the prevention and deterrence of piracy.
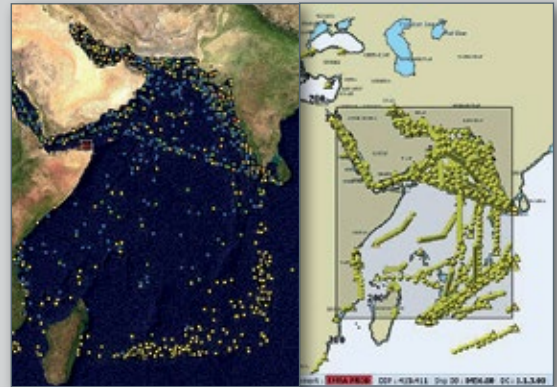

Figure 6: Screenshots of the EU LRIT CDC interfaces, showing combined data in the monitoring area

Figure 7: Naval Counter Piracy Forces conducting deterrent and disruption operations in the Indian Ocean

GREECE - SEAFARER AND VESSEL SAFETY FOLLOWING THE JAPANESE TSUNAMI

Situation: The 8.9 magnitude earthquake and the subsequent tsunami that struck the shores of Japan in March 2011 caused concern in the Greek maritime community. This was increased by the fact that during the first few hours after the tsunami, all communications were disrupted, making it extremely difficult to obtain a detailed report on the wellbeing of Greek seafarers.

Action: The use of the EU LRIT CDC provided a list of vessels navigating in the area. From this list, Greece was able to obtain further details on Greek flagged ships in the area, including some contact details.

Result: The use of the EU LRIT CDC made it possible for the Greek Maritime Administration to locate the ships and establish satellite communication with each of the vessels. Once located, information on the safety and wellbeing of all seafarers was communicated to their families.
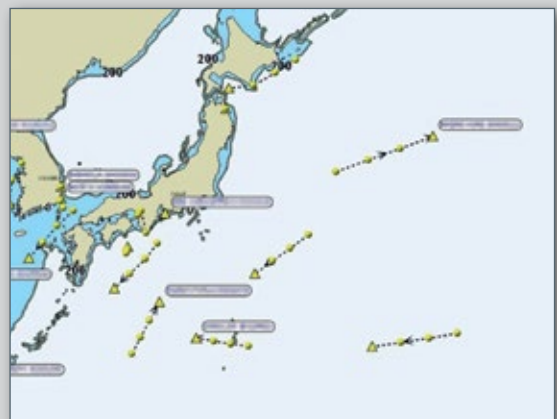

Figure 8: A screenshot of the UWI showing vessels located in the area where the tsunami occurred

GREECE & ITALY – MONITORING VESSELS GIVING HUMANITARIAN AID AND TRANSPORTING/EVACUATING CIVILIANS

Situation: During 2011, civil unrest in Libya made the monitoring of Greek and Italian flagged vessels in the area imperative. Several Greek vessels were chartered to transport civilians and humanitarian aid to and from the major ports of Libya. Italian vessels were also transporting Italian and foreign citizens being evacuated from Libya.

Action: The Greek and Italian coastguards monitored the area, using the EU LRIT CDC to follow vessels evacuating civilians and transporting humanitarian aid. The ships were closely monitored both inside the Libyan ports and in the area of Libyan waters.

Result: The EU LRIT CDC supported both the Greek and Italian coastguards. Through the UWI, it was possible for vessels to be monitored as they carried out these emergency activities.

Figure 9: Screenshot of the EU LRIT CDC showing the geographical area functionality (Sirte Gulf)

Figure 10: Greek vessel travelling from Libya to Crete

GREENLAND - COASTAL STANDING ORDER USED TO MONITOR TRAFFIC IN A REMOTE LOCATION

Situation: LRIT is currently the only surveillance system which can give an overview of maritime traffic in the Arctic Area. Greenland, an overseas territory of Denmark, is a Participating State of the EU LRIT CDC independently. Greenland has established a permanent area with a custom coastal standing order in the Data Distribution Plan, within Greenland's exclusive economic zone.

Action: Through this standing order, Greenland is able to monitor all ships entering the area, and continue monitoring as long as the ships remain in the area or until the Greenland operator deactivates the standing order. This is useful to track support and supply vessels giving assistance to offshore drilling operations and to monitor other vessels nearby. Greenland uses the LRIT to create a clear picture of traffic in the area, and has a particular interest in monitoring cruise ships and ships which can pose a potential environmental danger, such as loaded tankers.

Result: The EU LRIT CDC allows regular monitoring of vessel traffic in the area in order to reduce the likelihood of incidents and to facilitate successful drilling operations. LRIT is therefore a very valuable and cost effective tool to improve surveillance in the remote Arctic region, and allows Greenland to have a complete maritime picture of vessel activity in its waters.

Figure 11: Screenshot of the EU LRIT CDC including the custom coastal standing order which is activated in the DDP and showing vessels in the area of the offshore installation

AGGREGATED MARITIME TRAFFIC INFORMATION

The User Web Interface of the EU LRIT CDC can be used for various statistical and vessel traffic monitoring purposes. Users can compile data for ships of their own flag for anywhere in the world and, if they have standing orders activated, they can also view ship positions for non-EU ships entering certain areas.

Depending on the user access rights, data can be viewed focussing on specific regions or areas, and is therefore useful to analyse trends as well as to compare LRIT data with other data sources such as terrestrial AIS and satellite AIS.

Figure 12 shows how a Flag user could view ships globally. Figure 13 shows ship traffic in the system over a period of time within a given area. This could be used for studying aggregate traffic patterns and traffic density, mostly limited to Flag or Coastal users.
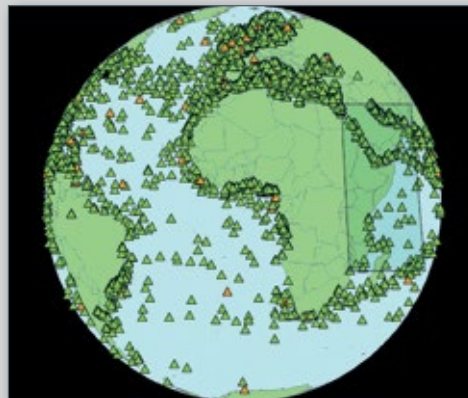

Figure 12: EU LRIT CDC screenshot showing a global view including an area monitored for anti-piracy

Figure 13: Shipping traffic off Tunisia, Italy and Greece over a specific period of time

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.

Get in touch
for more information