The SafeSeaNet Ecosystem and Integrated Maritime Services (IMS)

EU online course on maritime law

Module 1: Digitalisation and simplification

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Lisbon / 29 September 2021

EMSA
European Maritime Safety Agency

SafeSeaNet Ecosystem Legal Framework

Introduction to SSN ecosystem and IMS

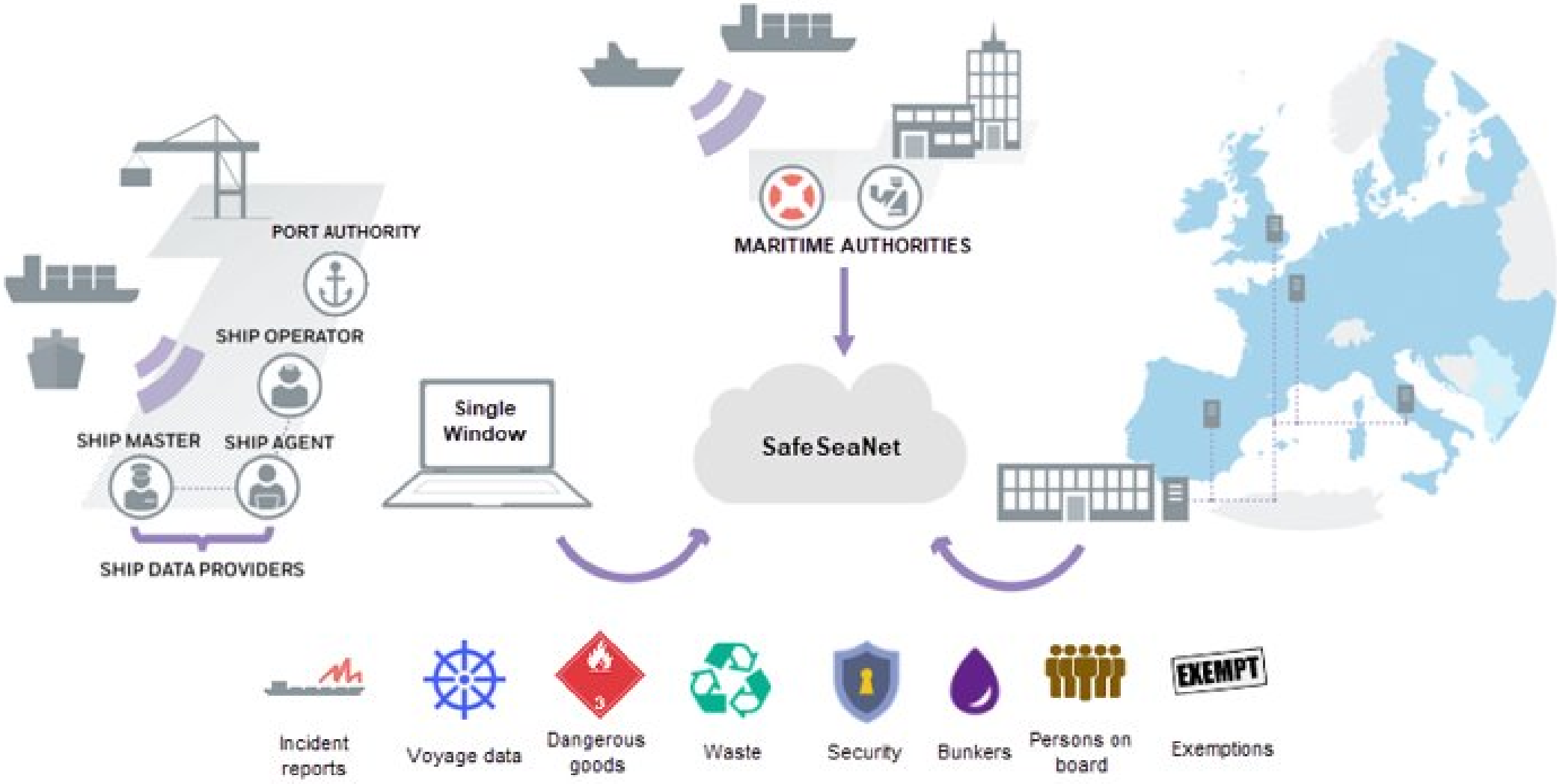
SafeSeaNet Legal Framework:

- **Directive 2002/59/EC as amended** establishes the "Union maritime information and exchange system (SafeSeaNet) ".

SSN also aims at exchanging information for e.g. :

- **Directive 2000/59/EC (on port reception facilities for ship-generated waste and cargo residues);**
- **Directive 2009/16/EC (on port State control);**
- **Directive 2010/65/EU (on reporting formalities for ships arriving in and/or departing from ports of the MSs) and;**
- **Regulation (EC) No 725/2004 (on enhancing ship and port facility security);**

SafeSeaNet: illustrating the legal framework



IMS Legal Framework:

- Directive 2002/59/EC annex III mentions that EMSA is responsible for:

  - “development, operation and integration of the electronic messages and data…/…
  - maintenance of the interfaces with the central SafeSeaNet system, including AIS data collected by satellite…/…”

The SSN Interface and functionality Control Document (IFCD):

- **Referred to in Dir 2002/59 EC as amended (annex III)**
- **Agreed by the SSN High Level Steering Group (SSN HLSG)**
- **Objective:**
  - Describe the central and national SSN
  - Describe IMS
  - Identify access rights

The SSN Interface and functionality Control Document (IFCD):

- **IMS definition:** Configurable, voluntary, functionalities
  - promoting regional, national and local cooperation,
  - providing an enhanced maritime picture, using the integration capability
  - following the agreed access rights and
  - responding to users' specific needs.
  - …/...
  - IMS are offered to Member States, following a functional approach (authorities having a function in the maritime domain). They are also offered to users of several EU entities

The SSN Interface and functionality Control Document (IFCD):

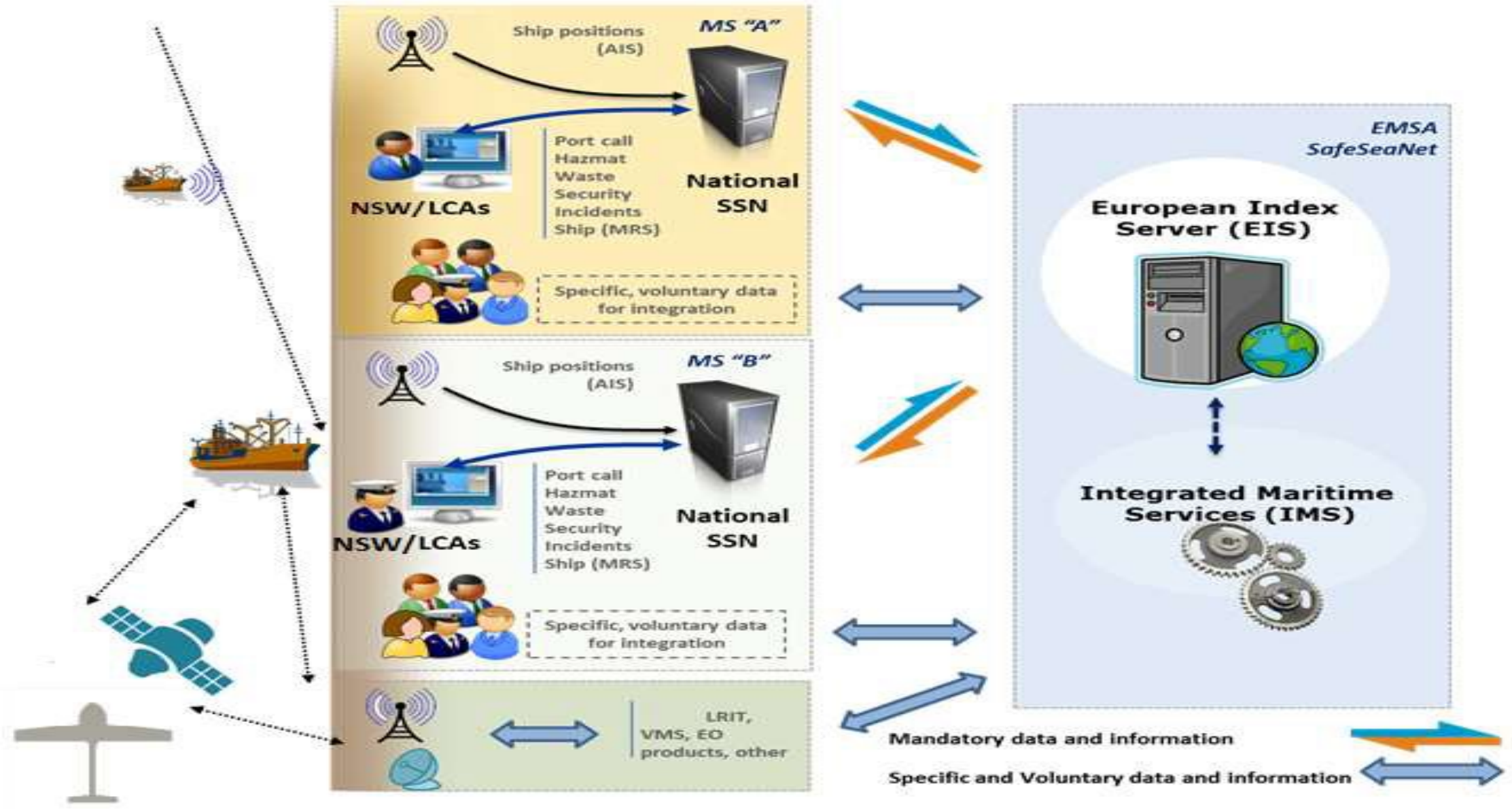
- **SSN/LRIT group:**
  - responsibility for managing technical and operational issues relating to SSN and LRIT

- **IMS Group:** Configurable, voluntary, functionalities
  - open to representatives from all MSs, the Commission and EMSA,
  - Has the responsibility for managing technical and operational issues of the voluntary additional system functionalities

EU Maritime Picture – SafeSeaNet and Integrated Maritime Services

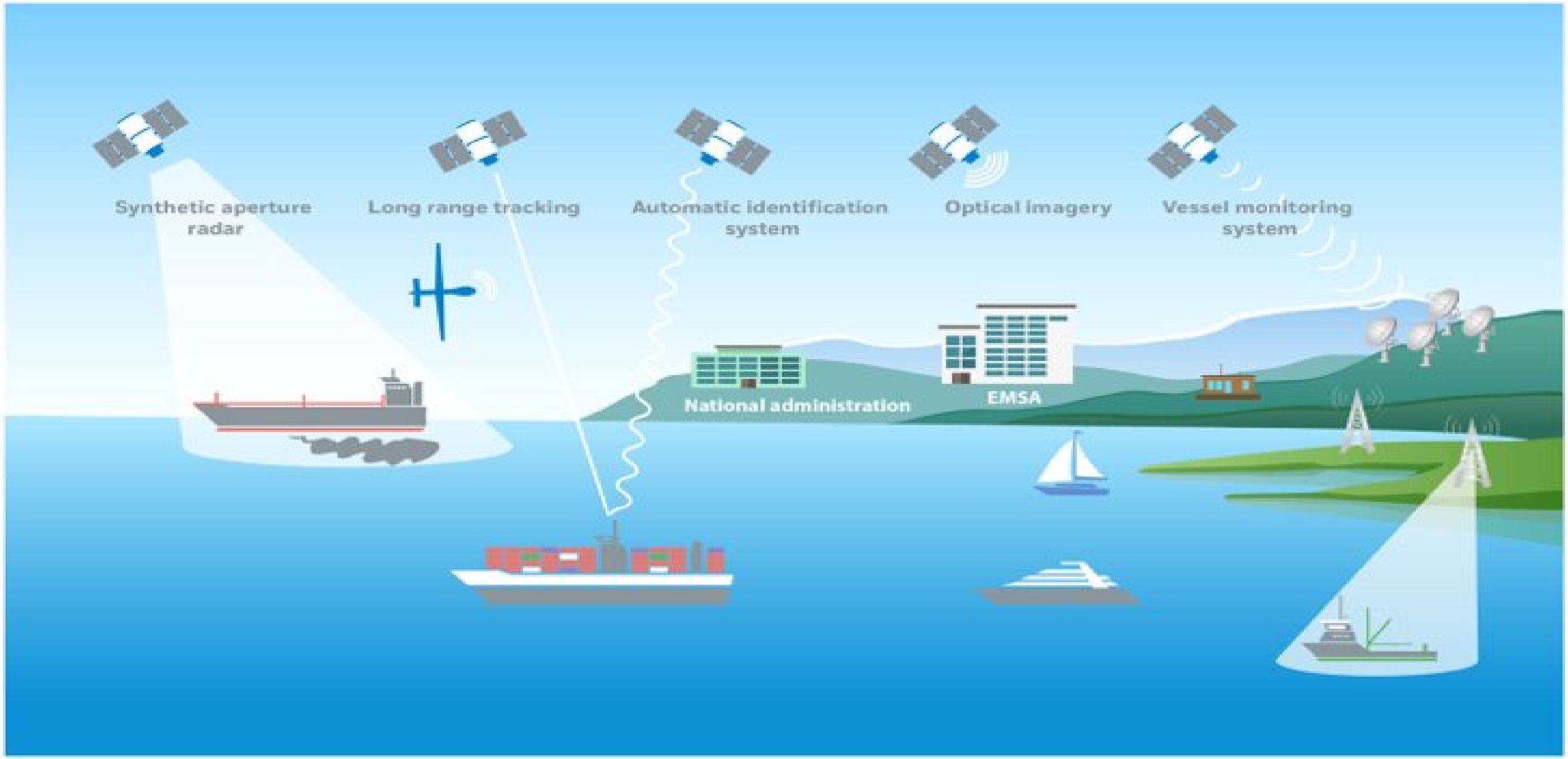
- Directive VTMIS (2002/59/EC), as amended
- Annex III – Electronic Messages And The Union Maritime Information And Exchange System (SafeSeaNet)
- High Level Steering Group for Governance of the Digital Maritime System and Services (HLSG)
- SSN Interface and Functionality Control Document (IFCD) – main functionalities, performance requirements and procedures
- SafeSeaNet/LRIT and IMS sub-groups of the HLSG – technical documentation, user consultation

The Union Maritime amd Information system (SSN ecosystem) as per IFCD



IMS: sources of information

Maritime Data Sources



EMSA service - SafeSeaNet

SafeSeaNet (SSN):

- **An European Platform for Maritime Data Exchange (Directive 2002/59/EC): Central SSN**
- **A network of National SSN systems and a central node (hosted by EMSA).**
- **Exchange of vessel positions, voyages, Incidents, Hazmat, Waste, Security reported by national SSN systems.**

- Over 20,000 ships tracked in MSs area of responsibility every day
- > 100 million AIS positions recorded per month
- 160,000 messages received per month

EMSA service - LRIT

IMO SOLAS amendment & EU Council LRIT Res. 2007

- Based on communication satellites

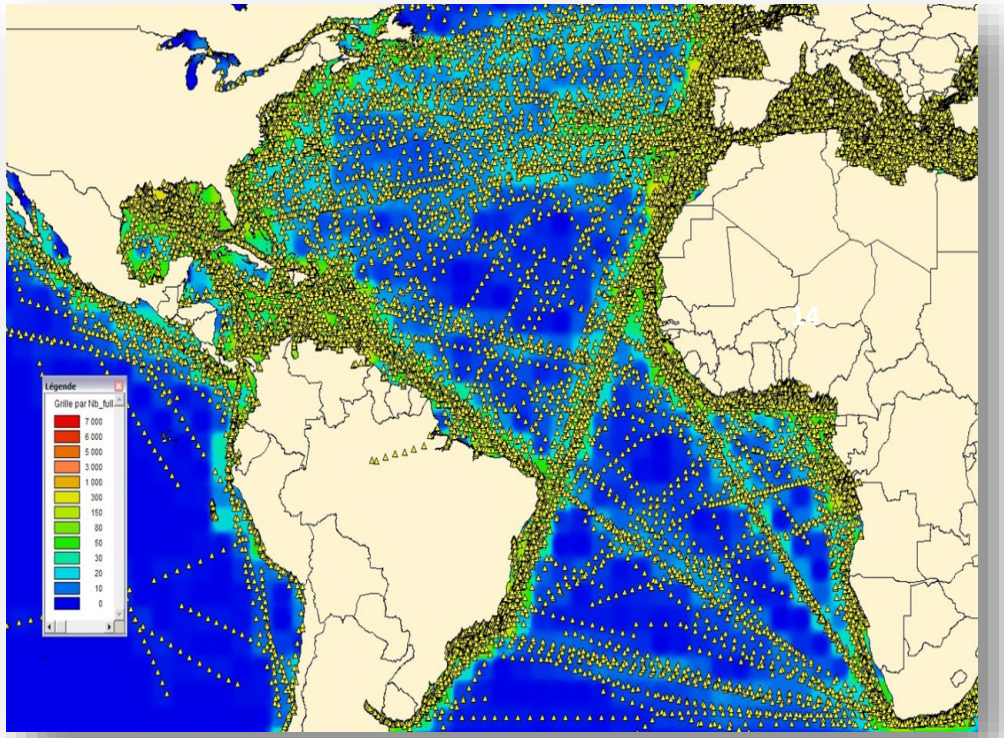
(Inmarsat, Iridium)

- Monitoring EU ships worldwide

- All ships within 1,000 Nm

- Approx. 500+ users (Flag State, Coastal State, SAR)

- Governance body = LRIT NCA's Group (MS+COM).



EMSA service - CleanSeaNet

Legal basis: Directive 2005/35/EC

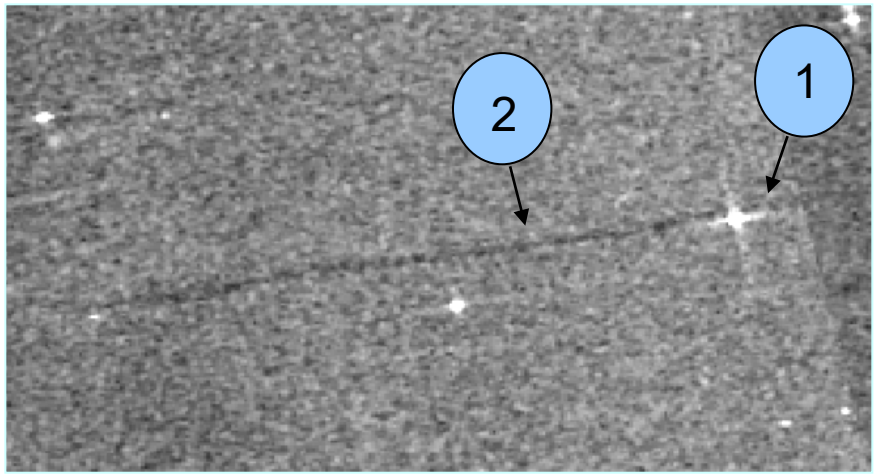
- Objective:
  - detect possible oil on the sea surface
  - identify potential polluters and
  - monitor the spread during maritime emergencies
- Use satellite detection (SAR and Opticals)
- > 8000 services*/year
- Delivery timeline less than 20 min
- Detection of 7500 possible spills annually
- Approx. 500+ users (Pollution control)

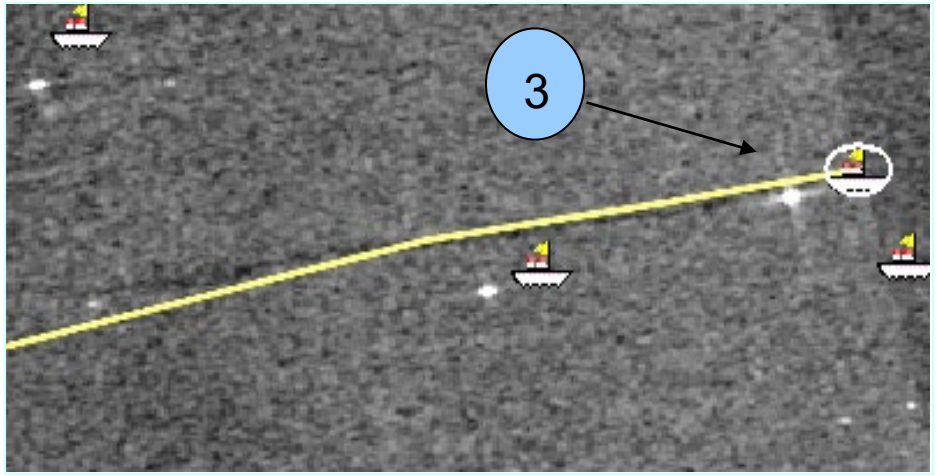
* Services include satellite image and value-added products (e.g. spill detection, vessel detection and SAR met-ocean information

CleanSeaNet: Polluter identification

- Ship detected on SAR image (Bright Spot)
- Possible spill matches the track of the vessel
- Vessel identified using AIS information

1
2
3





Copernicus service

EU Programme aimed at developing European information services based on satellite Earth Observation and in-situ data

- Maritime Surveillance using satellite imagery and derived data products
- Restricted access. Delivered directly and securely to user
- Copernicus images (SAR and Optical) and products available via IMS

Contact: Copernicus@emsa.Europa.eu

RPAS portfolio

Emission monitoring

230kg, >4h, EO/IR, sniffer

230kg, >4h, EO/IR, sniffer

<15kg, >50min, EO/IR, sniffer

Multipurpose Maritime surveillance

150kg, >8h, EO/IR, Mar. radar, SATCOM

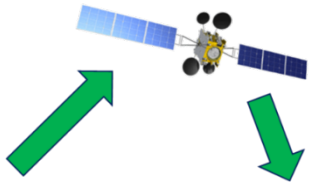
230kg, >4h, EO/IR, opt. scanner

Pollution response

<5kg, >35min, EO/IR

SAT-COM

- RPAS-ground / Ground to ground



RPAS service use cases

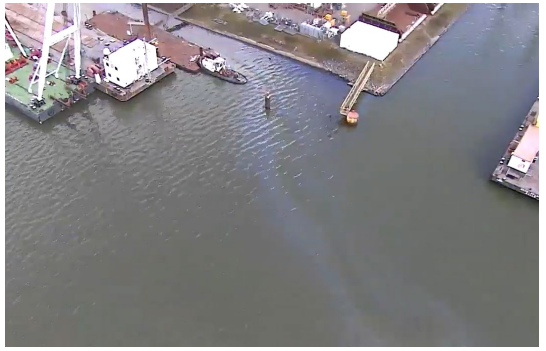
Support to **search and rescue** operations

Vessel monitoring

Small boat detection during day and night

SOx and Nox **emission monitoring**

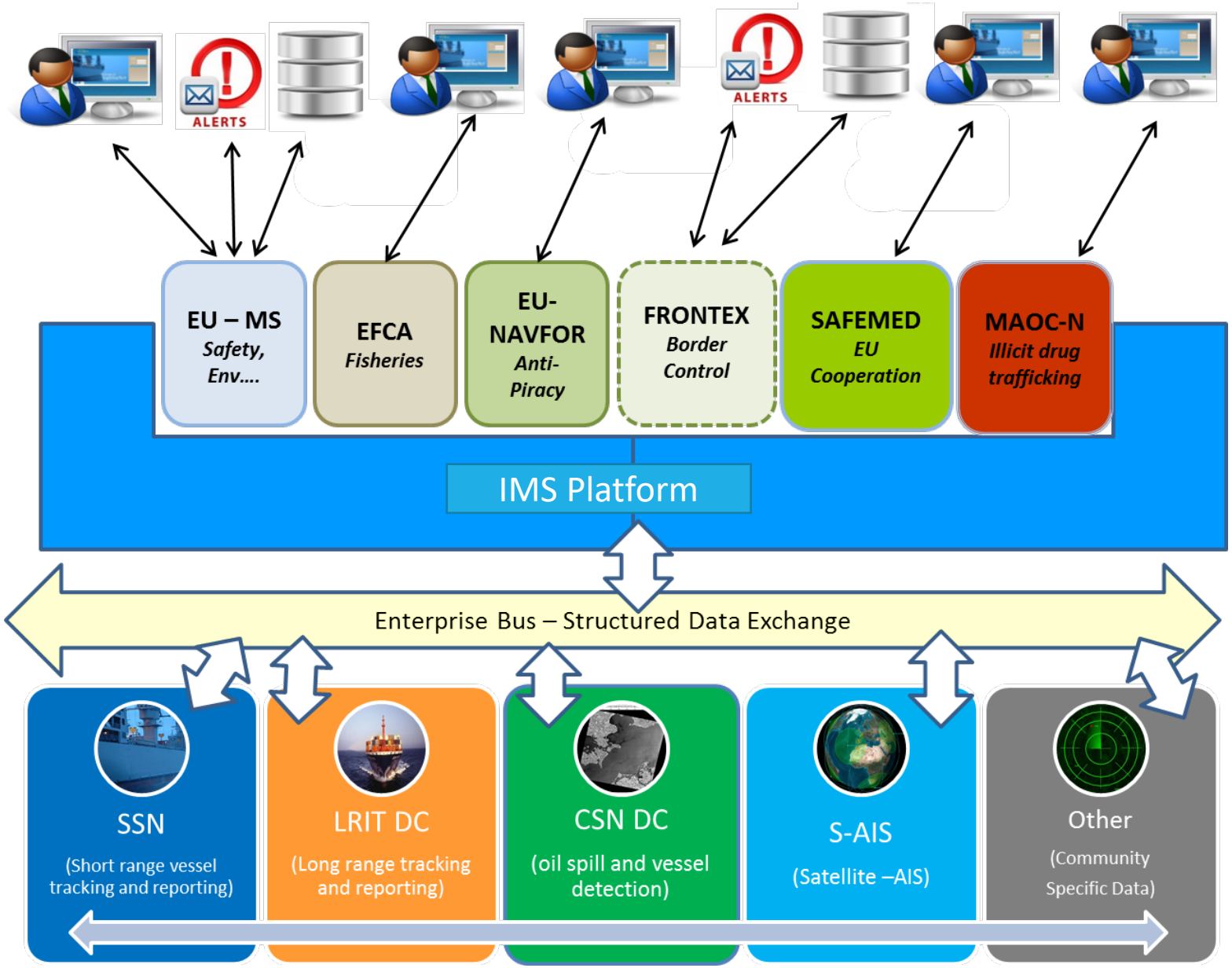
Support to **pollution response** operations



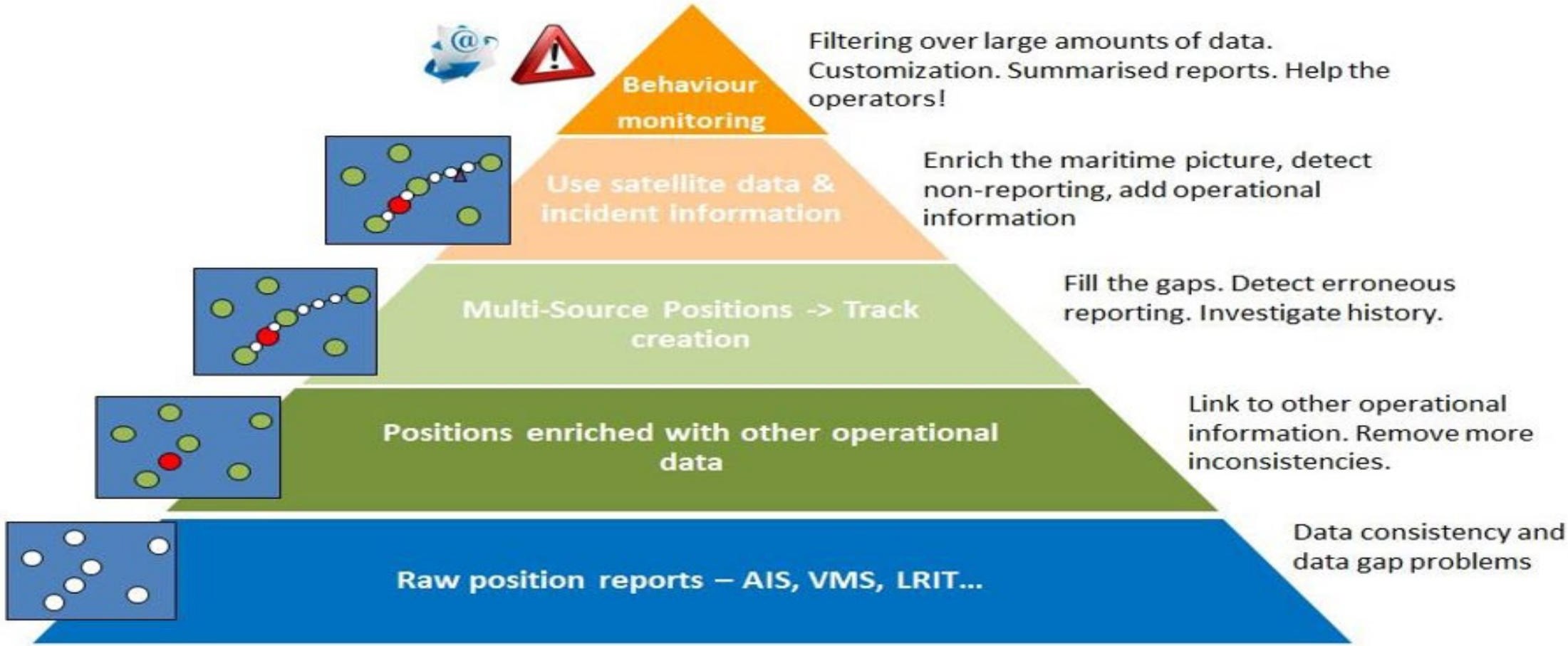
Port monitoring

IMS: how it is made available

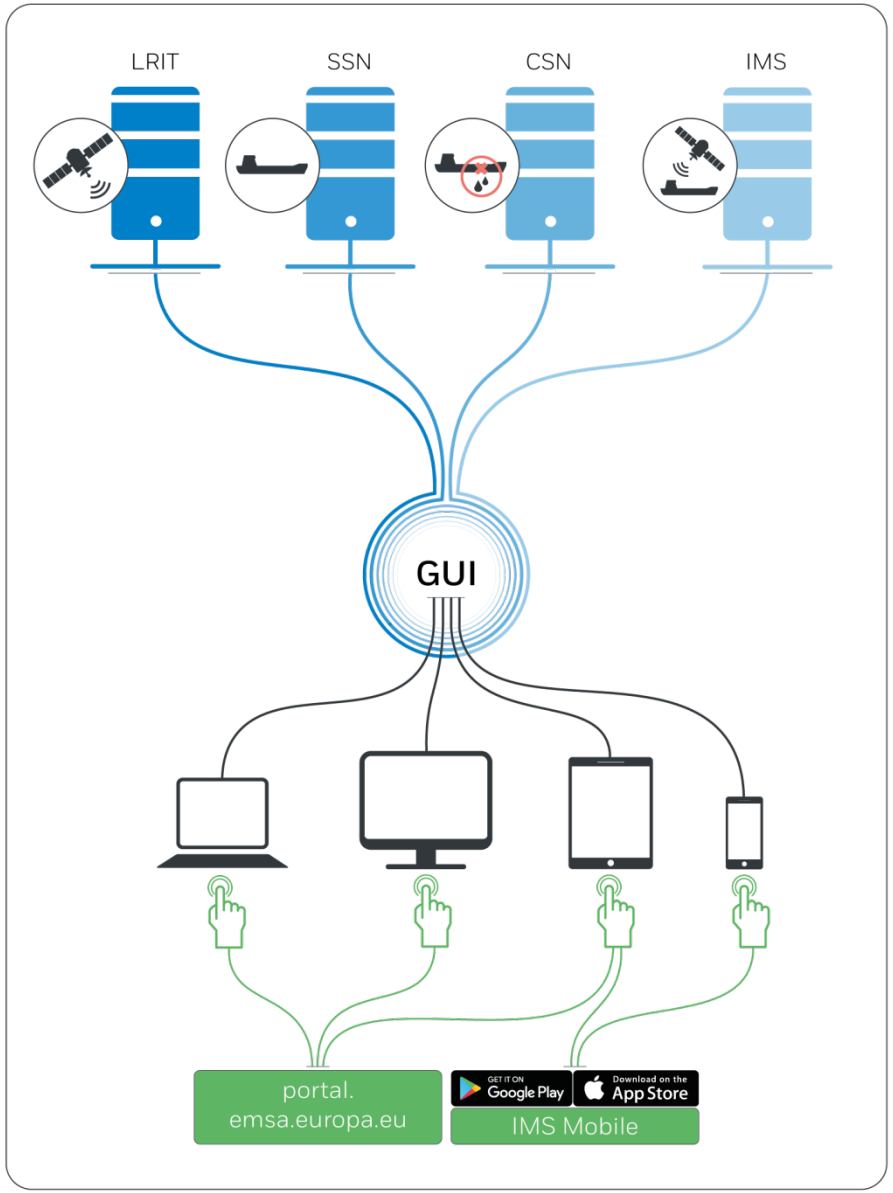
Integrated Maritime Services: IMS



Transforming "data" into "information"



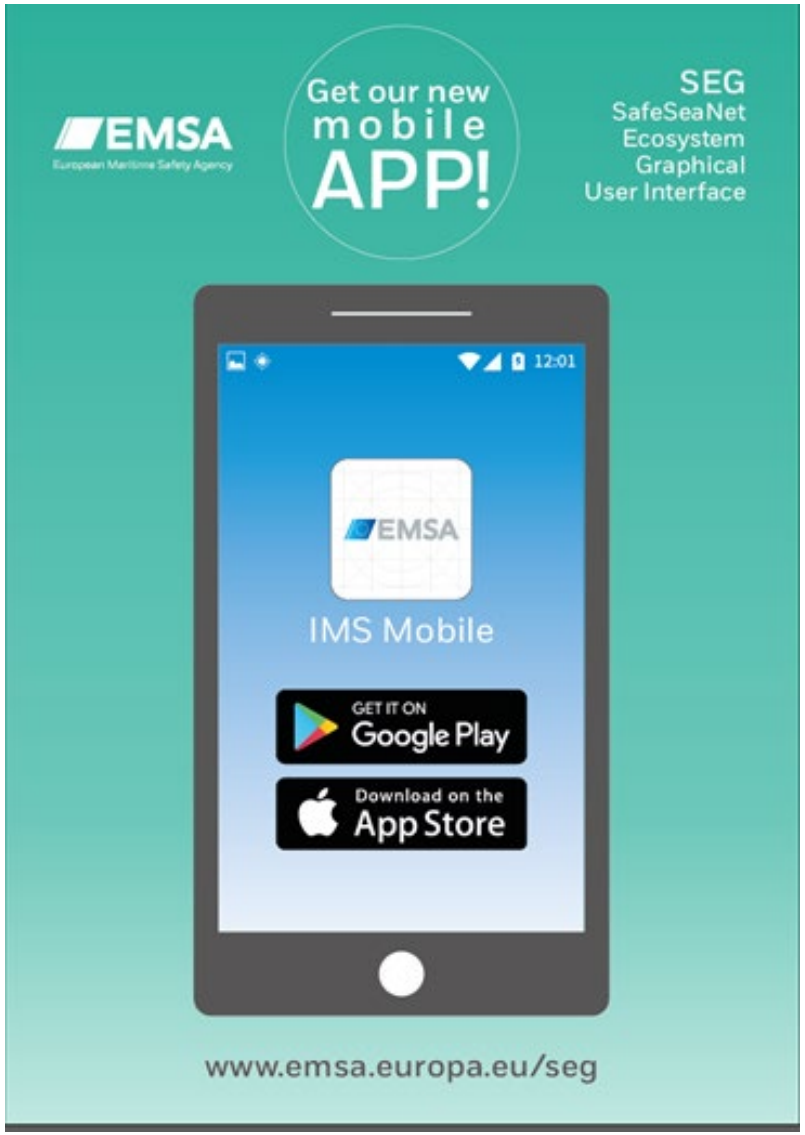
New Common Graphical User Interface

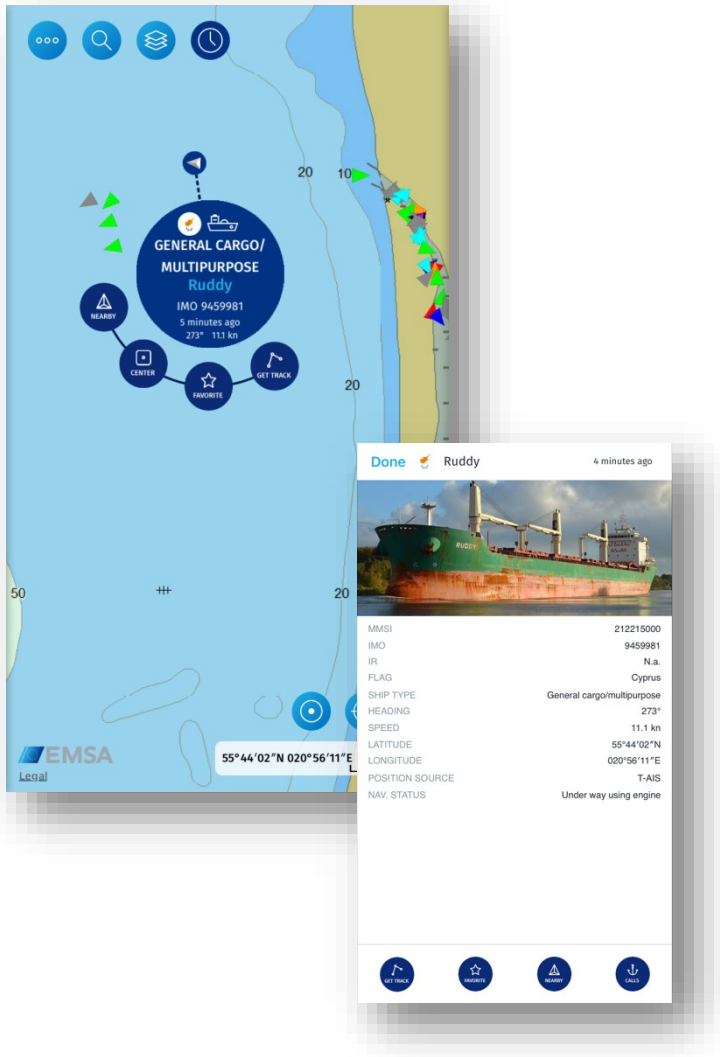


Graphical User Interface and the Mobile App

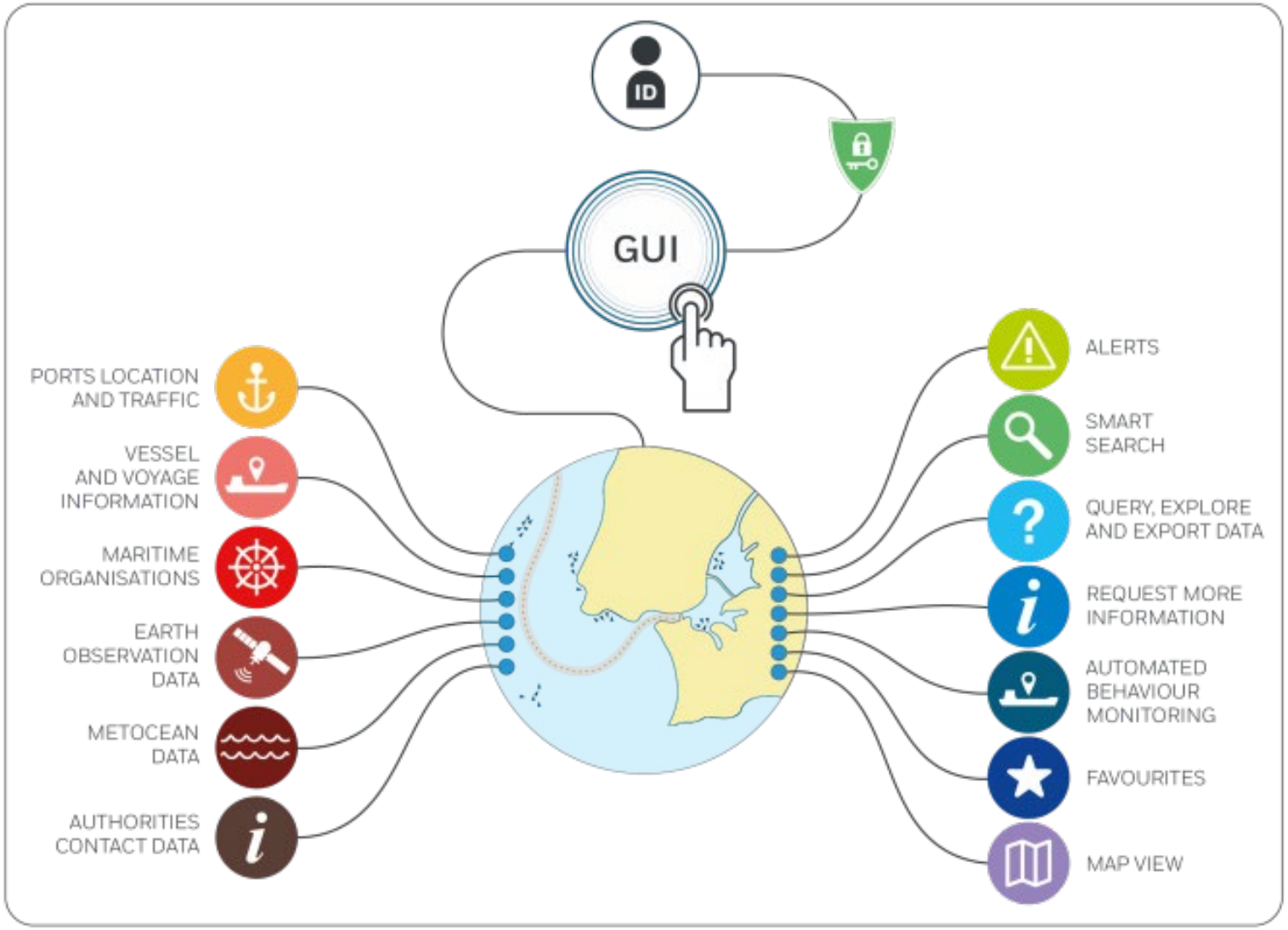
- Simple map centred layout
- Functions are easy to find and to use
- Enabled for mobile and touch screen devices
  (No right mouse click available)

IMS App – simplified GUI

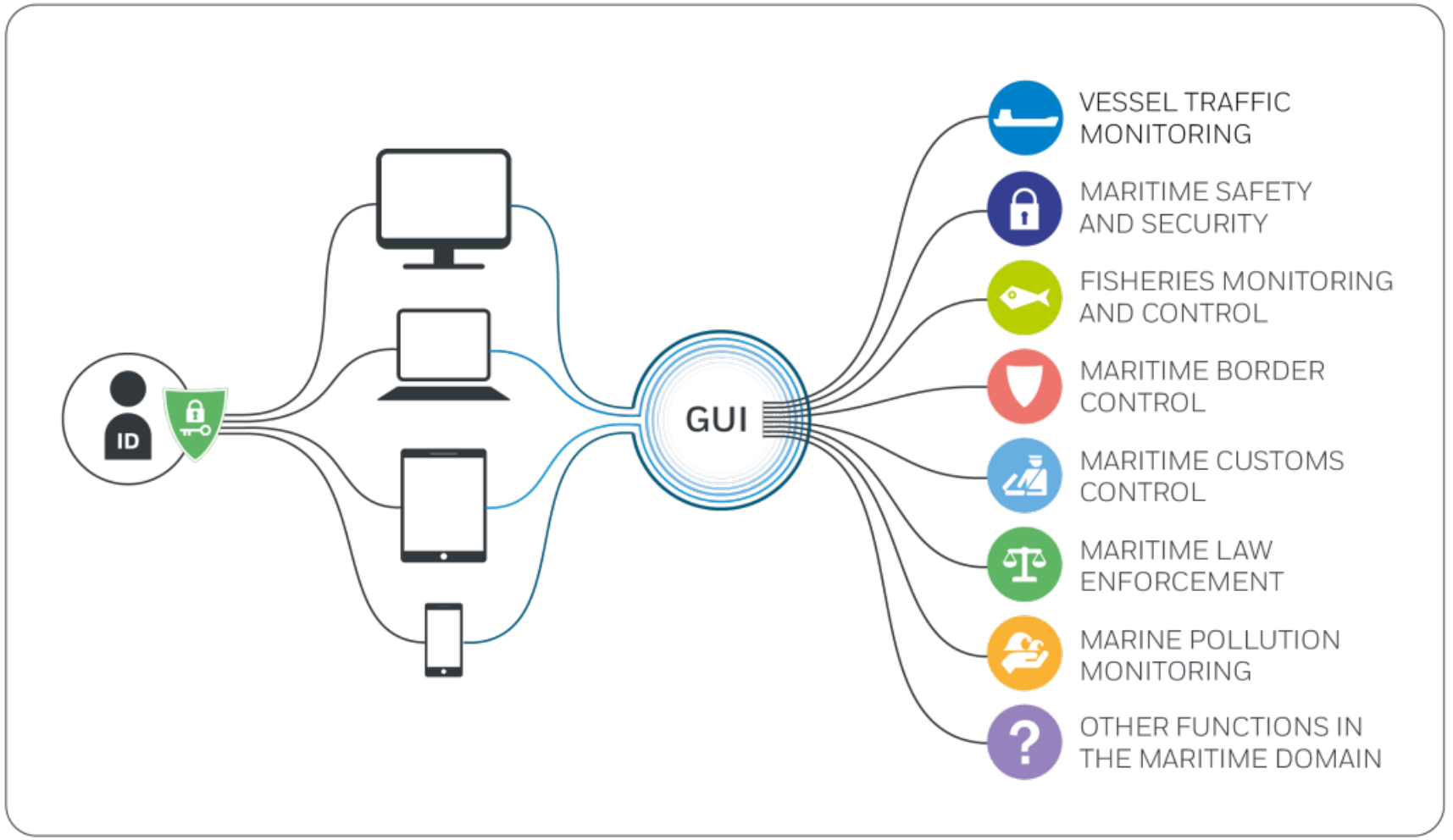




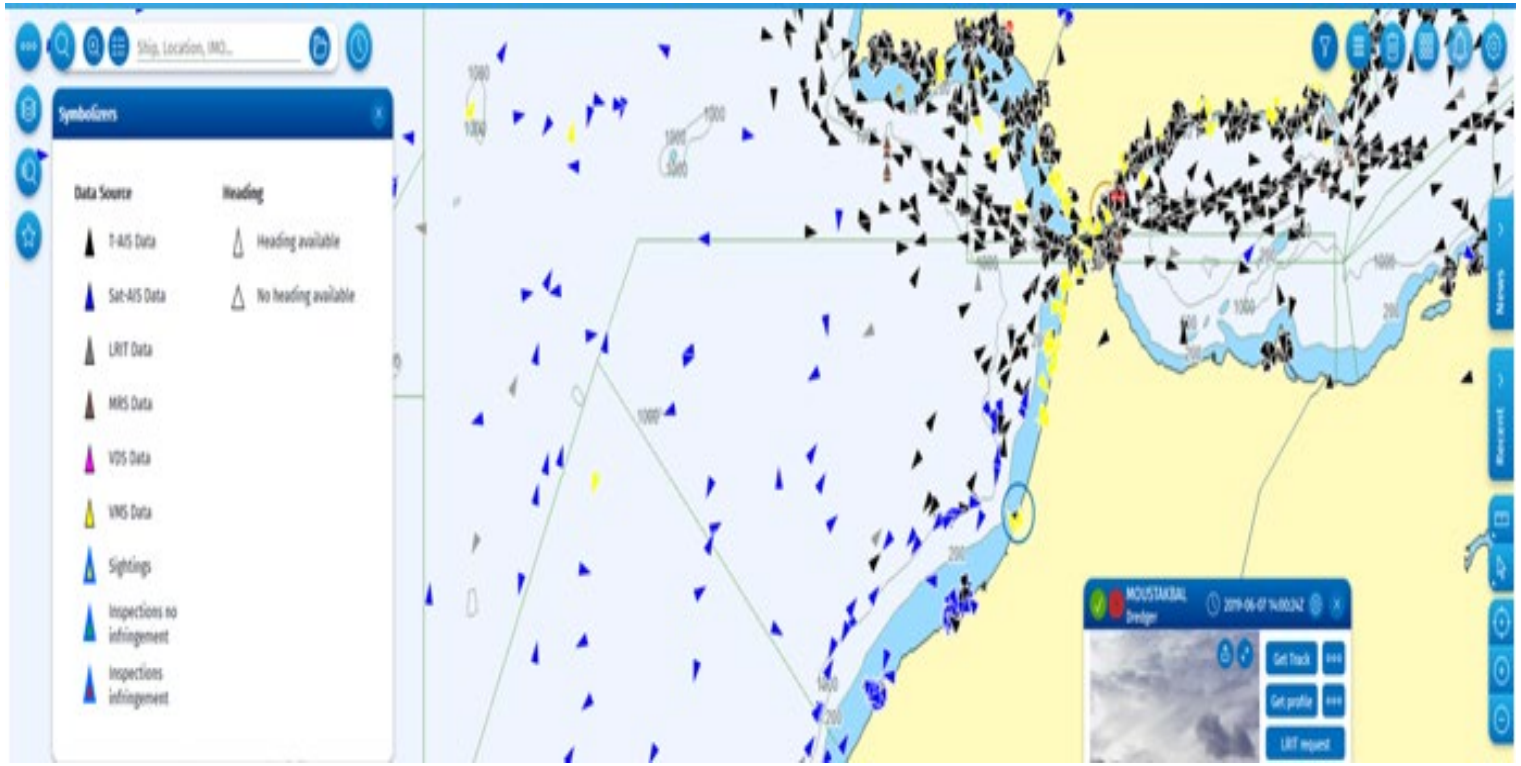
Information Layers & Functions

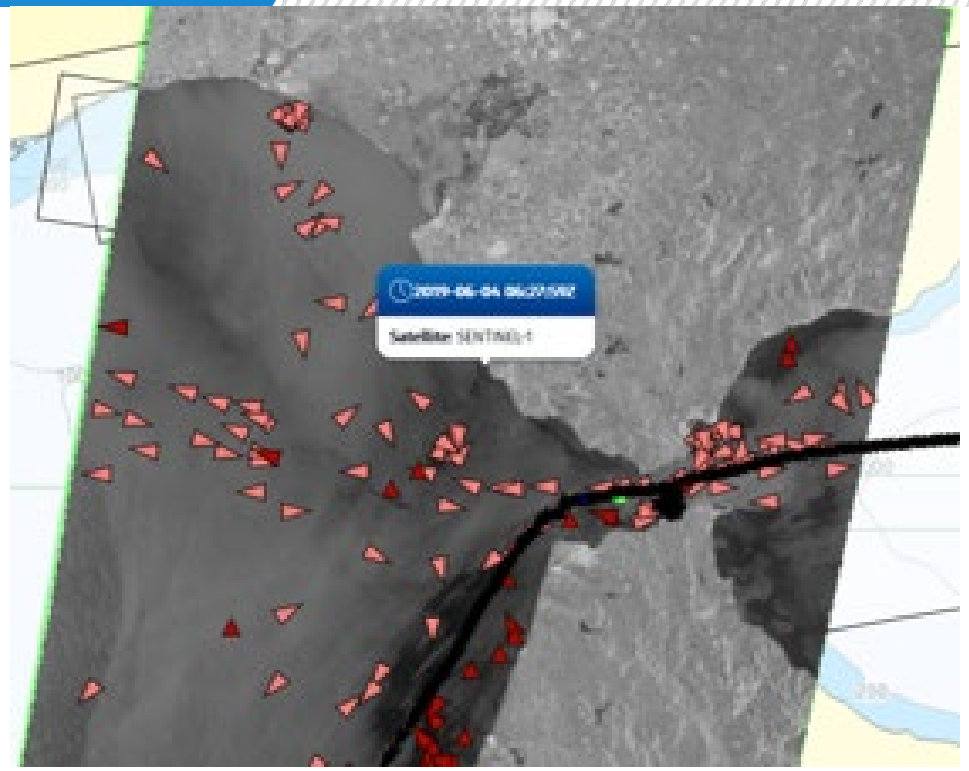


Who may use it? Multiple user domains



SEG views, positions and SAR image





Common access right policy: IMS for Member States

Subject to approval (LRIT NCA or National fisheries authorities)

Additional LRIT and VMS information

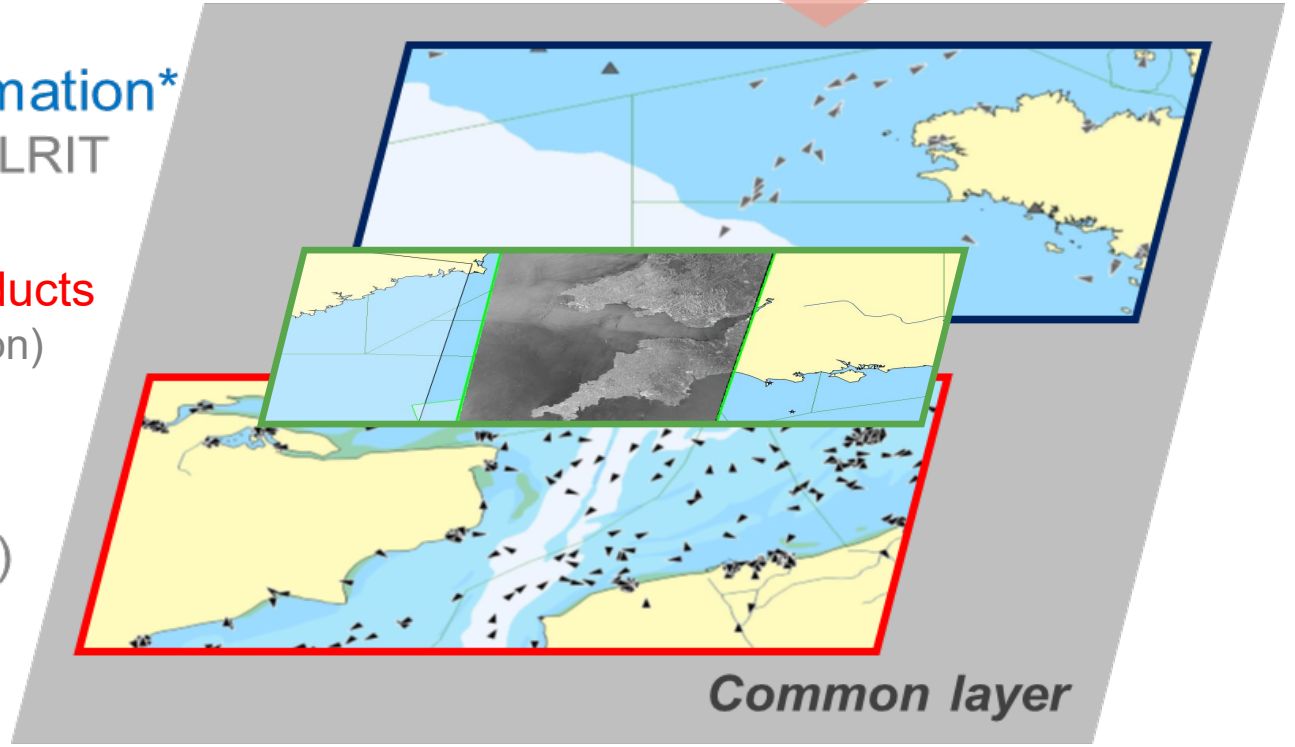
Subject to SSN NCA approval

SSN Details (Hazmat, Waste, Security, MRS and Incidents)

Ship LRIT information*
(only MS agreeing to share own LRIT flag ships)

Satellite products
(images, oil spill and ship detection)

Ship AIS positions + voyage information
(T-AIS + S-AIS, SSN notifications)

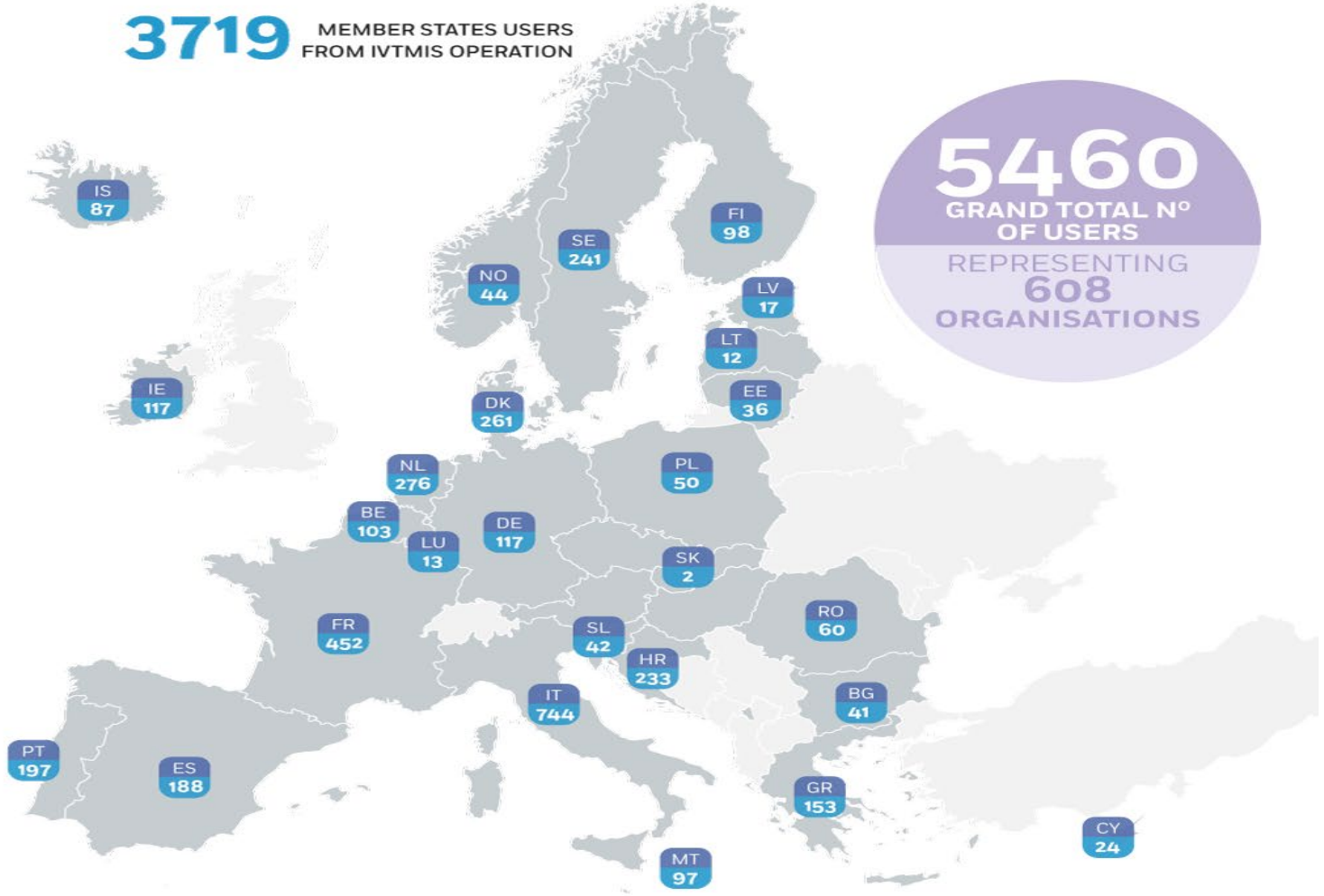


IMS users June 2021

IMS: NUMBER OF USERS PER AUTHORITY TYPE

THEMATIC SERVICE	
FISHERIES MONITORING	(1035)
- EFCA	59
- MEMBER STATES	976
BORDER CONTROL	(227)
- FRONTEX	222
- MEMBER STATES	5
LAW ENFORCEMENT	(53)
- EUROPOL	28
- MAOC-N	23
- MEMBER STATES	2
ANTI-PIRACY	(25)
- EU NAVFOR	25
OTHERS	
EU	(302)
- EMSA	199
- DG MARE	54
- OLAF	26
- EEAS	9
- DG MOVE	7
- EEA	3
- ERCC	2
- DG HOME	1
- ECDC	1
NON EU	(99)
- INSTRUMENT FOR PRE-ACCESSION ASSISTANCE	34
- SAFEMED	42
- BLACK & CASPIAN SEA	23

3719 MEMBER STATES USERS FROM IVTMIS OPERATION



5460
GRAND TOTAL Nº OF USERS
REPRESENTING
608
ORGANISATIONS

IMS: Live Demo

IMS: Automated Behaviour Monitoring - ABM

Automated Behaviour Monitoring

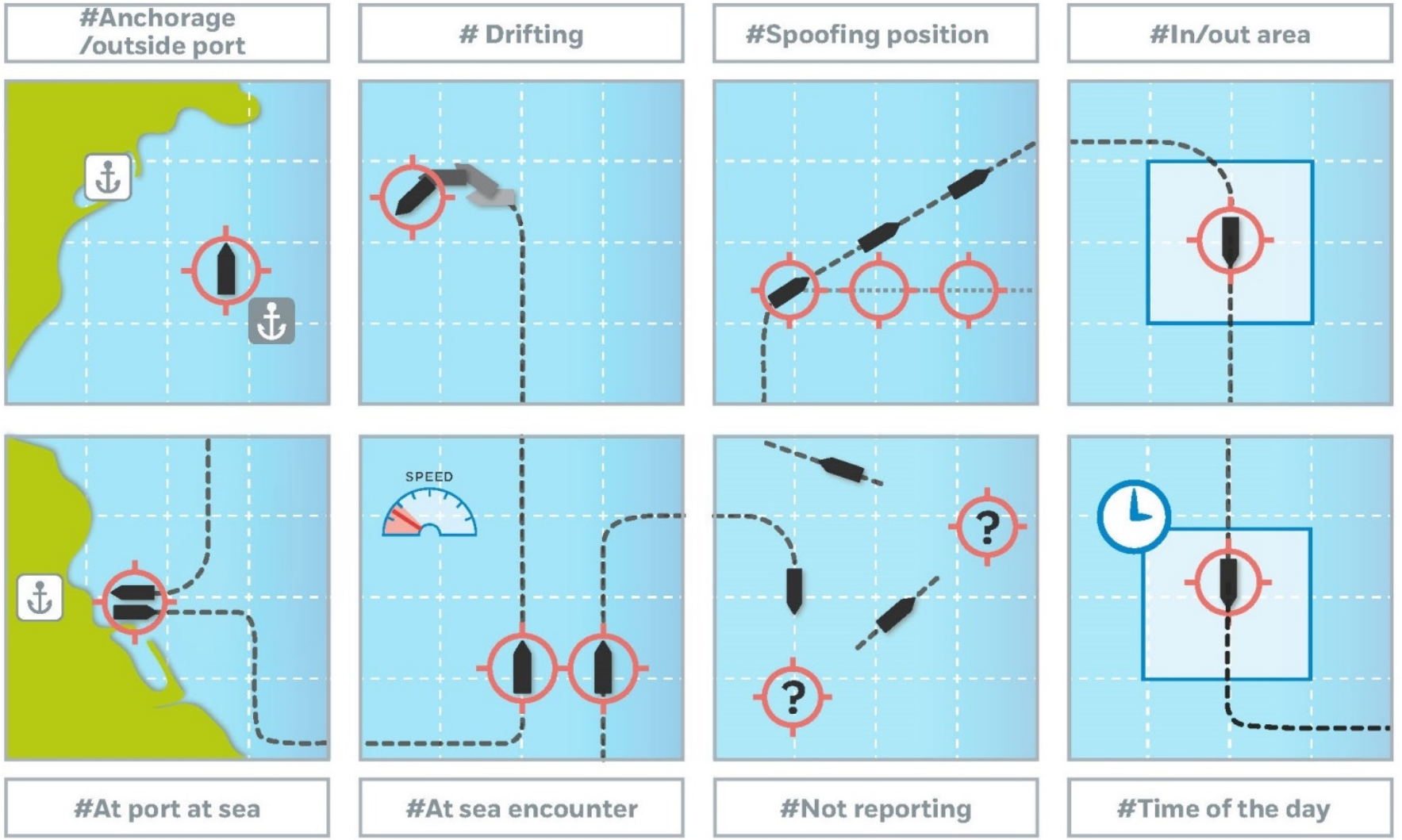
Automated Behaviour Monitoring (ABM) tool is a computer, rule-based system analysing vessel positions for the detection and alerting of abnormal and/or user specific vessel behaviours.

To support Integrated Maritime Service users in their maritime surveillance functions.

When specific, user-defined criteria are met, operators are alerted: in the graphical interface (and IMS Mobile App) and by means of e-mail notificaons.

IMS: Automated Behaviour Monitoring

AUTOMATIC DETECTION AND ALERT TRIGGERING OF SHIP BEHAVIOUR

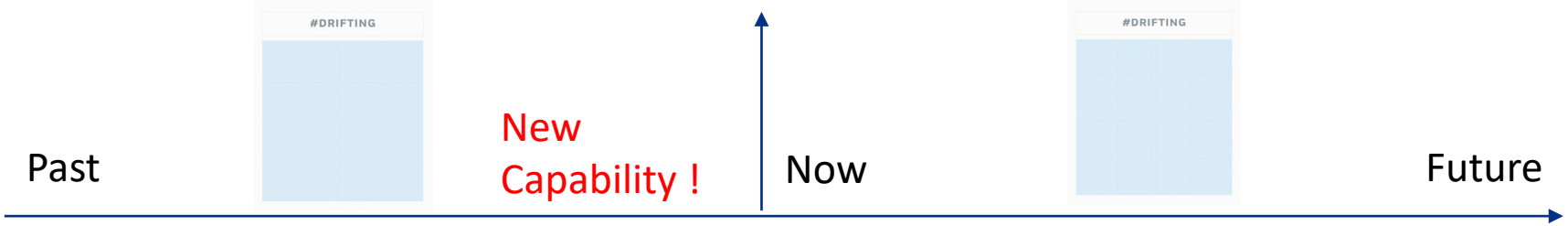


Historical ABM capabilities (tests on going)

New, ABM-related developments in the Cloud.

Using - High Performance Integrated Maritime Services (HP-IMS) Long Term Storage (LTS) infrastructure (Cloud).

Implement essential historical capabilities of the Automated Behavior Monitoring (ABM), including automatic detection of the port calls, at the global scale.



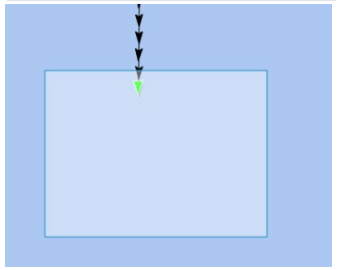
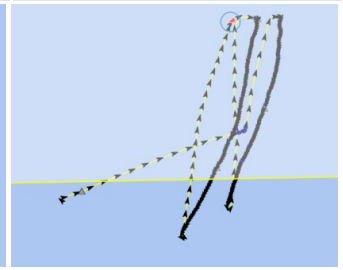
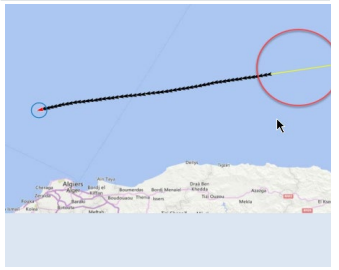
Use Cases Description (H-ABMs)

Anomalous vessel behaviour specific situations in the past, based on historical position reports:

- Entry to an area (In area);
- Drifting;
- At sea encounter;
- Speed anomaly;
- Not reporting;
- Zone around ship;
- Port Calls* (separate service supported by 'Interoperability')

VTMIS- Dir. 2002/59/EC, as amended context:

- Improving quality of the SSN mandatory reporting (contribution to response to accidents);
- Verification of the obligation of the ship as regards the reporting of the destination/arrival/port call.
- Verification of the reporting of incidents and accidents at sea
- Identification of ships posing a potential hazard to shipping
- Helping in monitoring of the IMO AIS performance standards requirements

Vessel entered area of interest	Vessel was drifting	Vessels were approaching each other	Vessel changed of speed in area of interest	Vessel stopped reporting
				

Future evolution of the IMS

Build around

Additional data services e.g. weather data

Combination of different data sets – vessel, port, activity(ies)

New technologies

Potential usage of the Data Lake for advanced analysis and combining various data sets

Artificial Intelligence (AI) and Machine Learning (ML)

For filtering, analysing data, reducing workload, predicting patterns or providing early warning

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