

Update on ABMs

IMS UCM 17.2

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Lisbon, 21.10.2021



- **Status and evolution**
- **Usage**
- **ABM-related activities and developments**
- **ABM and Advanced Analytics Workshop 7**
- **Artificial Intelligence (AI) and Machine Learning (ML)**
- **EMAT prototype**
- **ABM interfaces & ABM admin functions**

- **Position analysis**
- **Detection of a pattern/behaviour**
- **Alerting/Reporting**



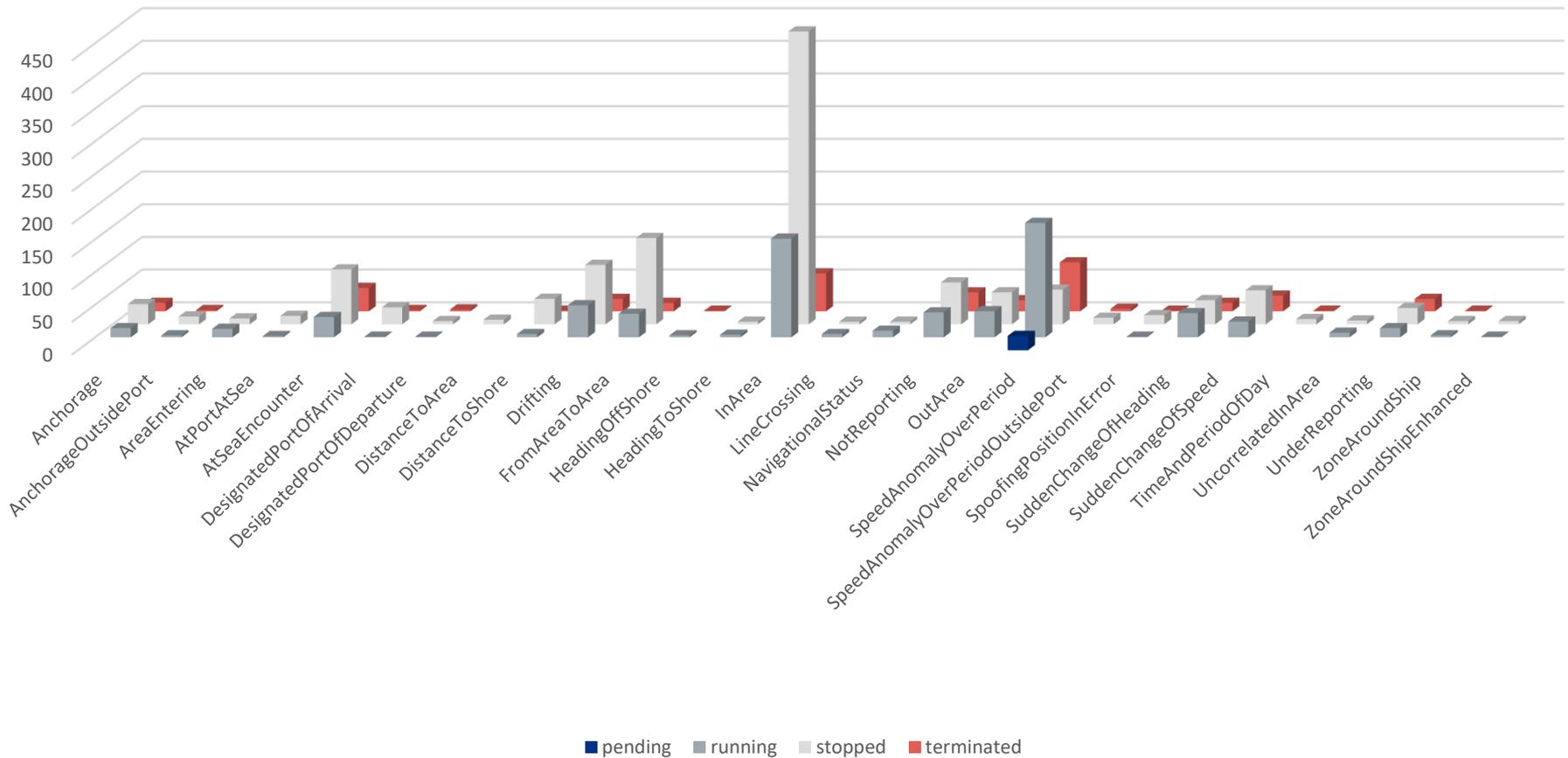
- They may be **helpful in the VTMIS context**, for the verification of the reporting obligations or for early warning on potentially dangerous situations affecting safety of navigation.
- They may also **reduce workload of the maritime surveillance operators** by providing better maritime situation awareness and automatized alerting.

The ABM implementation provides two types of capabilities:

1. **‘Near real-time’ algorithms (NRT- ABMs)**, detecting specific or anomalous behaviours and alerting users within around fifteen minutes.
2. **‘Historical’ ABMs (H-ABMs)**, where algorithms use archived position reports or form a database of specific, detected situations and events (e.g. detecting port calls globally). Not time-critical.

- **360 ABM admin accounts** granted to **21 Member States**, **1 candidate country**, **5 EU Bodies** and **EMSA**.
- NRT ABMs - **700 running** (actively used) ABM algorithms; +1,500 other ABMs were used over last year (now either stopped or terminated).
- Distributed via **over 300 distribution lists** to **more than 800 users**.
- Daily, over **8,000 alerts** are provided to ABM users.
- PL and FX use NRT ABM **s2s services** (ES- Navy works on s2s connection).

Most popular ABM algorithms



Obtain

Obtain detected port calls for the verification of the declared security notification (at EU and non-EU port calls)

Obtain

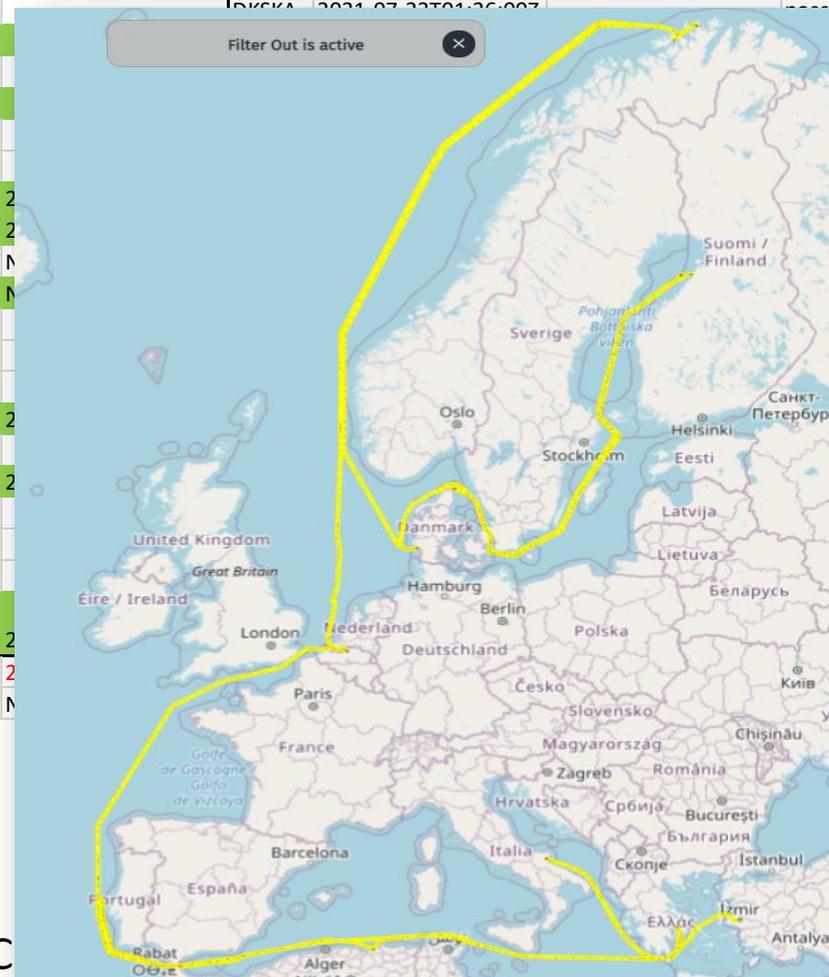
Obtain detected port calls for the verification of the declared last port of call at EU and non-EU

Provide

Provide a possibility for monitoring of pleasure crafts and their calls at EU and non-EU ports

Example (1) ISPS- SSN- H-ABMs - EU VTMIS

Security Notification			SSN Voyages			H-ABMs- detected port calls			
Port	Arrival	Departure	Port	ATA/ETA	ATD/ETD	port	ARRIVAL	DEPARTURE	Category
Aliaga (TRALI)	2021-07-06Z	2021-07-10Z				TRALI	2021-07-03T12:36:12Z	2021-07-10T06:18:19Z	alongside
						ESTRF	2021-07-16T06:19:42Z		passing
						DKSKA	2021-07-23T01:26:00Z		passing
Raahe (Brahestad) (FIRAA)	2021-07-29Z	2021-08-03Z							passing
Esbjerg (DKEBJ)	2021-08-07Z	2021-08-09Z							passing
Havoysund (NOHAV)	2021-08-14Z	2021-08-18Z	Havoysund (NOHAV)	2021-08-14 07:50:00Z	2021-08-18 07:50:00Z				passing
Antwerpen (BEANR)	2021-08-23Z	2021-08-25Z	Antwerpen (BEANR)	2021-08-23 19:43:00Z	2021-08-25 19:43:00Z				passing
			Rotterdam (NLRM)	2021-08-24 14:30:00Z	2021-08-24 14:30:00Z				passing
Djen-Djen (DZDJE)	2021-09-05Z	2021-09-06Z	Djen-Djen (DZDJE)	2021-09-01 22:00:00Z	2021-09-01 22:00:00Z				passing
GRELE	2021-09-14Z	2021-09-16Z							passing
			Eleusina (GREEU)	2021-09-14 06:10:00Z	2021-09-14 06:10:00Z				passing
Manfredonia (ITMFR)	2021-09-20Z	2021-09-24Z	Manfredonia (ITMFR)	2021-09-20 13:45:00Z	2021-09-20 13:45:00Z				passing
Izmir (TRIZM)	2021-10-03Z	2021-10-06Z							passing
Ceuta (ESCEU)	2021-10-12Z	2021-10-13Z	Ceuta (ESCEU)	2021-10-12 20:39:00Z	2021-10-12 20:39:00Z				passing
			Cuxhaven (DECUX)	2021-10-19 12:00:00Z	2021-10-19 12:00:00Z				passing
			Esbjerg (DKEBJ)	2021-10-20 09:00:00Z	2021-10-20 09:00:00Z				passing



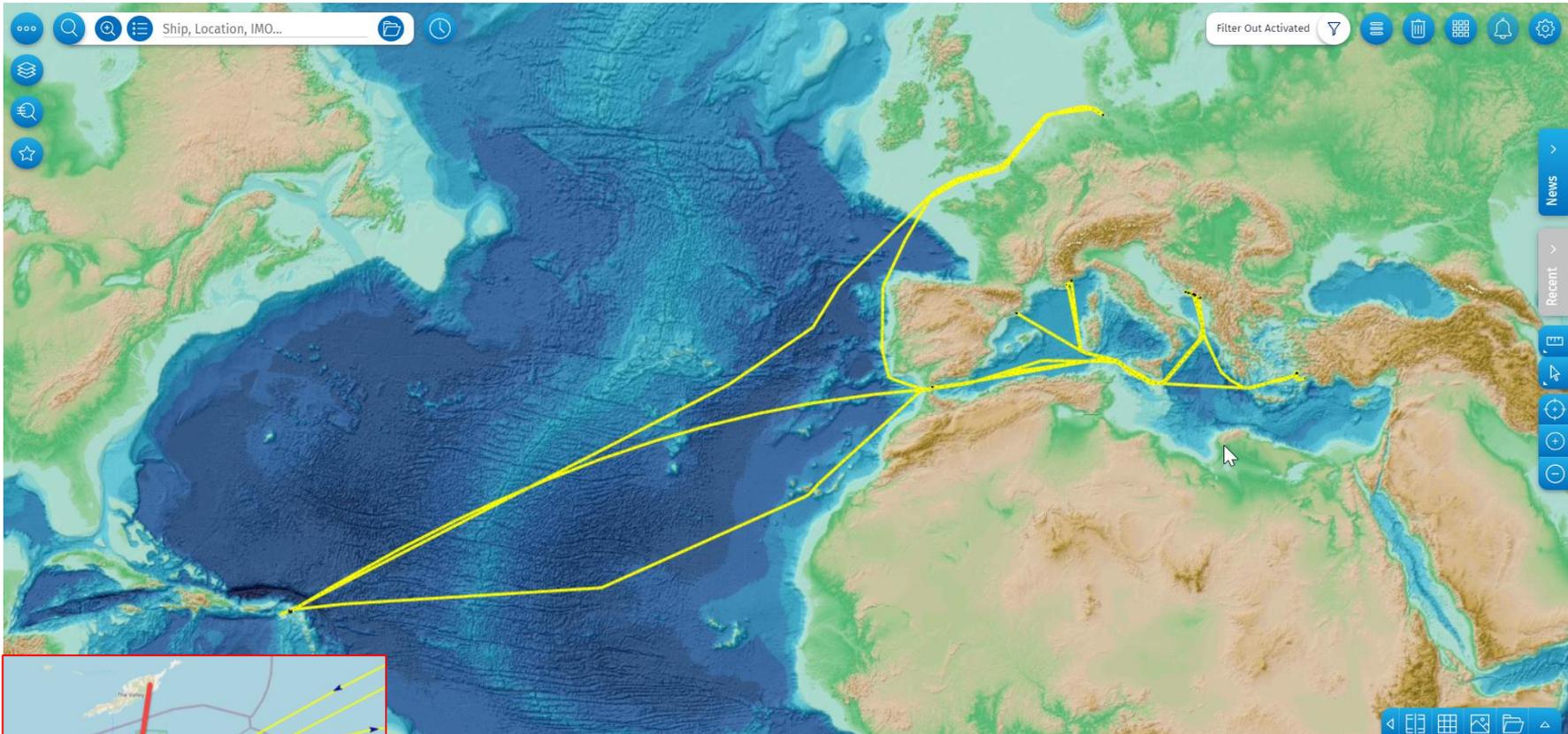
Example (2) – non-EU port calls

The screenshot displays a maritime tracking application interface. On the left, there is a sidebar with a ship image and various action buttons: Get Track, Get profile, User risk level, Get voyages, Get Incidents, Get Exemptions, PSC Inspections, Get Alerts (2 hrs), and See AIS Voyage Info. Below the sidebar, ship details are listed: MMSI, IR, SPEED, IMO, HEADING, FLAG, SOURCE, LATITUDE, NAVIGATIONAL STATUS, and CALL SIGN. The main area features a table with columns for port, arrival, departure, and category. The table lists 18 port calls, with the first 10 highlighted in yellow. The background shows a map of the Indian Ocean region with shipping routes.

port	arrival	departure	category
USNGZ	2020-05-01T19:42:04Z	2020-05-01T20:02:46Z	passing
USOAK	2020-05-01T20:16:44Z	2020-05-04T00:37:08Z	alongside
KRBNP	2020-05-25T05:44:30Z	2020-05-26T03:15:12Z	alongside
CNYSY	2020-05-30T07:34:19Z	2020-05-31T09:01:10Z	alongside
MYTKP	2020-06-07T14:44:19Z	2020-06-08T22:04:39Z	alongside
MYTPP	2020-06-07T14:44:19Z	2020-06-08T22:04:39Z	alongside
MYTBI	2020-06-07T14:44:19Z	2020-06-08T22:04:39Z	alongside
PTSIE	2020-06-25T14:36:23Z	2020-06-26T11:39:28Z	alongside
BEDEL	2020-06-29T19:32:17Z	2020-07-02T08:38:47Z	alongside
BELIL	2020-06-29T19:32:17Z	2020-07-02T08:38:47Z	alongside
BEANR	2020-06-29T19:32:17Z	2020-07-02T08:38:47Z	alongside
FRLEH	2020-07-03T03:14:19Z	2020-07-03T03:32:26Z	passing
FRLEH	2020-07-03T03:47:29Z	2020-07-04T12:55:50Z	alongside
GBFXT	2020-07-06T11:55:57Z	2020-07-08T09:36:28Z	alongside
ESALG	2020-07-12T18:42:21Z	2020-07-13T16:02:32Z	alongside
SGPPT	2020-08-01T19:38:50Z	2020-08-01T20:11:54Z	passing
SGSIN	2020-08-01T19:38:50Z	2020-08-01T20:11:54Z	passing
SGPAP	2020-08-01T19:38:50Z	2020-08-01T20:11:54Z	passing
SGPPT	2020-08-01T20:26:59Z	2020-08-04T05:20:59Z	passing

IMS Group 17th User Consultation Meeting (UCM) 21.10.2021, EMSA, Lisbon (on-line)

Example (3) – pleasure crafts at non-EU



Port	Arrival	Departure	Status
BLGUS	2020-06-10T12:17:40Z	2020-06-17T22:00:53Z	anchored
BLSBH	2020-06-10T12:17:40Z	2020-06-17T22:00:53Z	anchored
SXPHI	2020-06-08T21:22:57Z	2020-06-10T10:55:11Z	alongside
SXGES	2020-06-08T21:22:57Z	2020-06-10T10:55:11Z	alongside
SXGES	2020-06-08T20:35:20Z	2020-06-08T21:03:00Z	passing

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- **Use case(s)**
- **Algorithms used**
- **Results**
- **Feedback / assessment**
- **Further needs**

Historical ABM Surveillance Details

Overview

ID 334	Event Type InArea
Name Ireland West of TUSKAR Rock 2020 August 290921	Description Ireland West of TUSKAR Rock August 2020
Start Time 2020-08-01 00:00:00 GMT	End Time 2020-09-01 00:00:00 GMT
Number of Events 6	Status All Results

Area of Interest Filter

Area
PI[-6.208,52.202 -6.343,52.202 -6.344,52.138 -6.262,52.131 -6.208,52.202]

Vessel of Interest Filter

MMSI	EMSAId	Flag State	Ship Type
N.A.	N.A.	N.A.	340,341,353,352,355,354,360,361,367,374,375,384

Algorithm Parameters

Details:

Event Number 3 of 6	ID 00000000334_00002_00010_1632939288
Source T-MS	Status IN
Start Time 2020-08-29 23:42:03 GMT	End Time 2020-08-29 23:42:03 GMT

Vessels:

Overview:

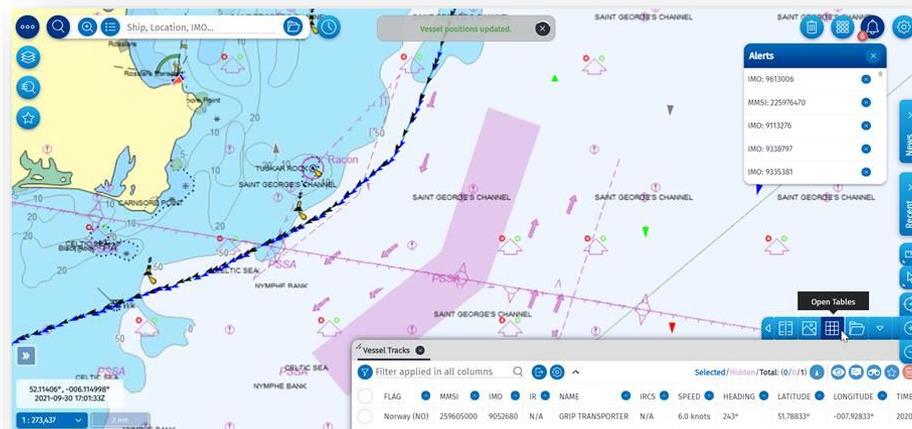
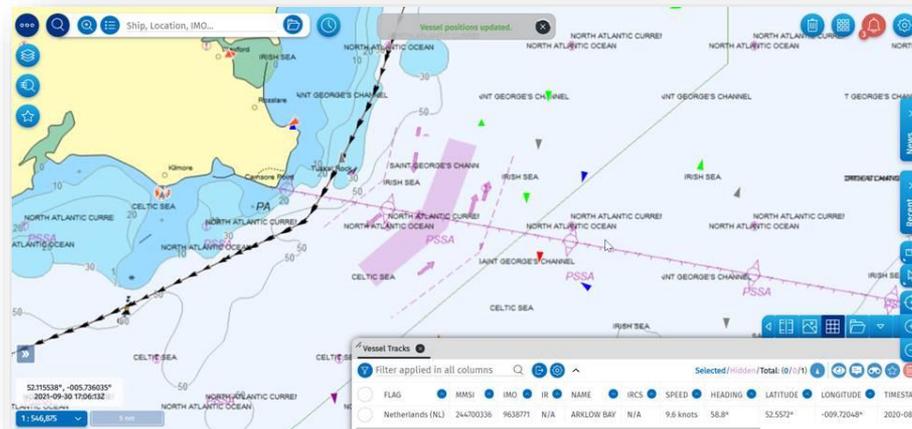
Main Vessel Yes	Navigation Status 0	
IMO 963871	MMSI 244700336	IR N/A
Type 360	Breadth 15	Length 119
Name ARKLOW BAY	Flag State NL	Call Sign FBPI

Last Port Call:

Port: IEMTL	Arrival Time: 2020-08-28 19:09:45 GMT	Departure Time: 2020-08-29 17:15:54 GMT
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Location (Google Maps):

Timestamp	Latitude	Longitude	Heading	Speed
2020-08-29 23:42:03 GMT	52.193985	-6.257767	208	14.1



- **The Historical (H) ABMs capabilities in SEG**
- **ABM administrators -own historical algorithms**
- **All users - results of the detected port calls in the ‘Command and Info’ (C&I) panel.**
- **New NRT ABMs (with combined scenarios and the enrichment)**
- **Technical adaptations**

Provisional date 07.12.2021

Online

**The event is for the existing and new ABM users.
Member States and EU agencies are invited.**

Objectives of this Workshop are:

- 1) To reflect on the ABM-related developments, reflecting on the business use cases and priorities.*
- 2) To share best practices in operational usage of ABMs by different communities, Member States and EU bodies.*
- 3) To discuss the status of the EMSA's Advanced Maritime Analytics prototype tool;*
- 4) To present the work conducted by EMSA in the Artificial Intelligence (AI) and Machine Learning (ML) in IMS and ABMs.*

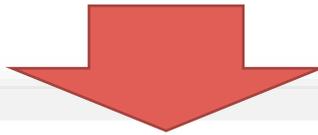
EMSA is tendering consultancy services/ study on how to implement AI and ML in IMS.

- Outcome: feasibility analysis, summary of the AI and ML in transport modes, business requirements, evolution of the use cases.
- Operational objective - reduce the workload by automatizing certain analysis.
- The related data shall be presented in a user-friendly and aggregated form' supporting ad-hoc analysis.

1. User selects a vessel and wants to get a labelling for the **inconsistency** between the **destination declared and detected** (or predicted); potentially based on a **prediction of the vessel movement/route/ETA**, based on all available data sources.
2. User selects a vessel and a time criterion and wants to obtain a list and tracks of **vessels** that were **following similar (trading/routing) patterns**.
3. User selects a vessel and wants to get an information if the **ships conducts unsustainable/ not viable economic activity** or not.
4. User selects and area and wants to obtain an **aggregated list** of vessels with **detected anomalous or specific situations focusing on potential incidents** (e.g. fires on board of ships), close-quarter situations, and addressing also discrepancies ETA/Destination detected vs. declared; analysis of the draught; filtering per destination or last port of call.

Usage scenario – VTMISS incident reporting verification

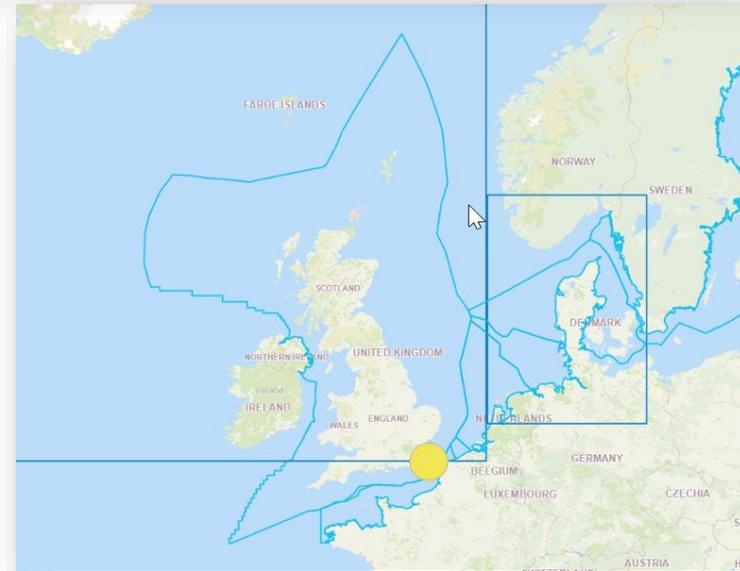
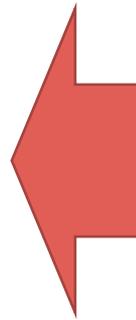
HELENA SCHIEPERS (Portugal) Oct 14 -- Fully cellular containership *Helena Schiepers* (IMO No: 9584007, Class: Bureau Veritas, 10318 gt, built 2012), enroute from Rotterdam to Lisbon, Portugal, **not under command** with 12 people on board, needs to replace the engine fuel injector near Falmouth, United Kingdom, in position lat 51 31 00.0N, long 001 54 23.0E, at 1625 UTC, Oct 14. The vessel is proceeding to the northeast of the Falmouth to drift and carry out the engine fuel injector change. The repair is expected to be completed in one hour. The vessel has 227.5 Metric Tons of VLSFO, 427.9 Metric Tons of LSMGO, and 13770 Litres of LO.



Not Under Command Ships Details			
IMO	Ship Name	Ship Type	Flag State
9584007	HELENA SCHIEPERS	Container	Portugal



Incident report as per VTMISS obligations



- New scenarios to verify VTMISS reporting obligations, or
- AIS compliance scenarios (invalid MMSI, invalid position reports)

EMSA encourages MS to further elaborate potential new use cases based on the combination of the position data as well as the enrichment information from various sources.

Interfaces

- NRT ABM S2S
- H- ABMs – S2S
(GET/REST; JSON)

Ref. documentation:

ICD for STAR ABM

Open API specifications (H-ABMs)

ABM admin panel in SEG

- NRT ABMs
- Historical ABMs
(pending)
- Email Alert
- On-screen Alert
- Mobile App Alert
display

- **Take note of the current ABM status**
- **Remember about the ABM WS7**
- **Analyse operational needs + communicate them to EMSA (ABM WS 7 and UCM)**



Volunteers are needed

- Further validation of the new ABMs algorithms (near-real time), EMAT or AI and ML implementations.



Integrated Maritime Services
Showing the bigger picture

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 **EMSA**
European Maritime Safety Agency