

Update on ABMs

IMS UCM 17.2

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- **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**



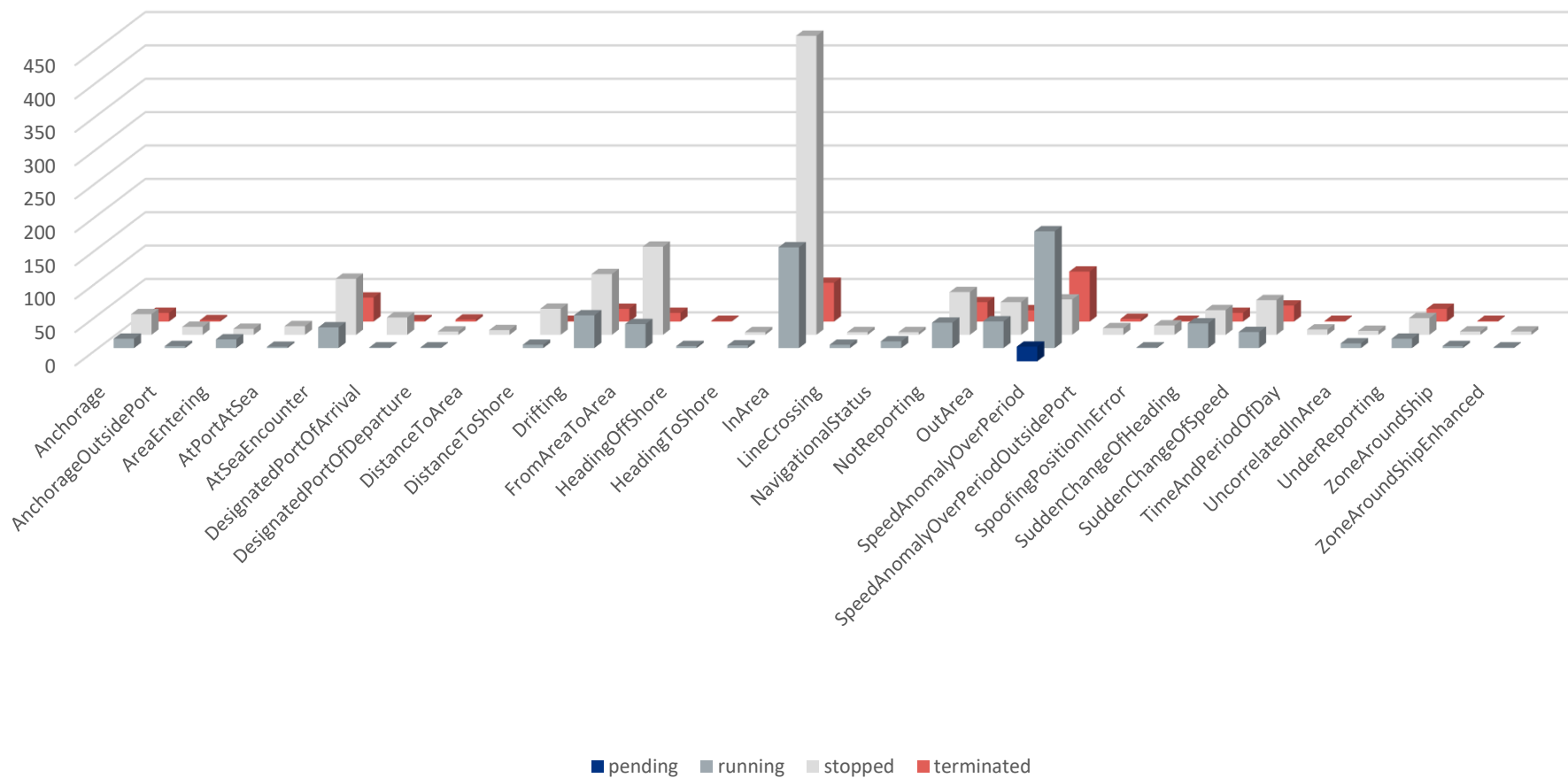
- They may be **helpful in the VTMIS context**, for the verification of the reporting obligations or for early warning on potentially dangerous situations affecting safety of navigation.
- They may also **reduce workload of the maritime surveillance operators** by providing better maritime situation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



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Obtain

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

Obtain

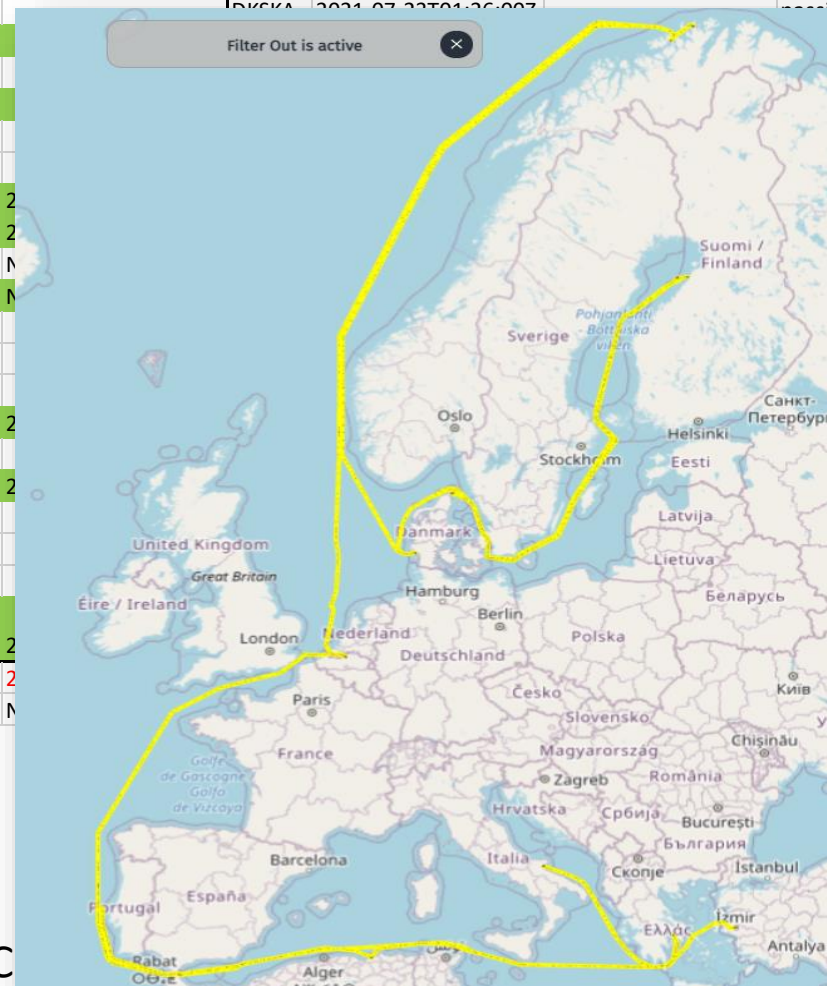
Obtain detected port calls for the verification of the declared last port of call at EU and non-EU

Provide

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

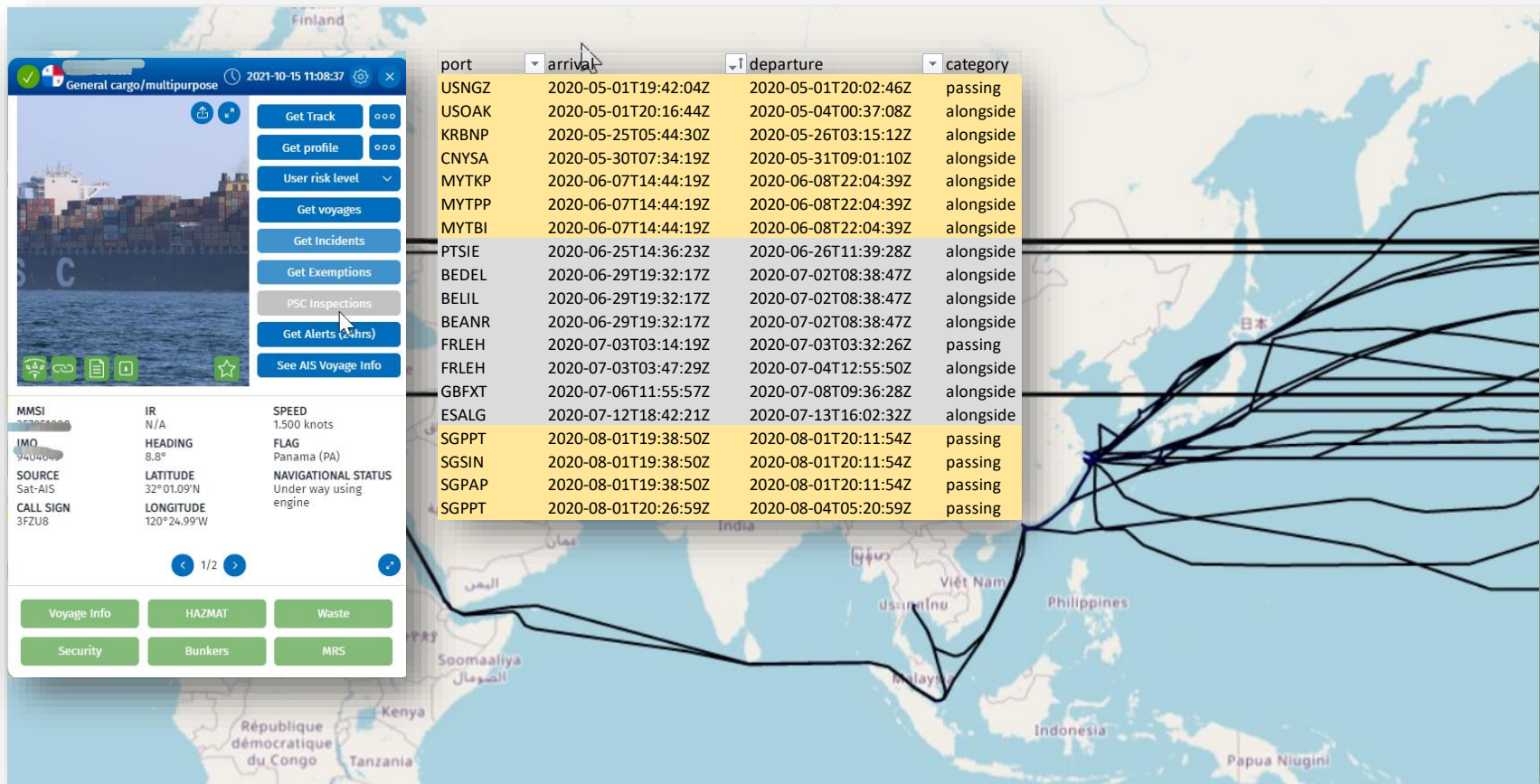
Example (1) ISPS- SSN- H-ABMs - EU VTMIS

Security Notification			SSN Voyages			H-ABMs- detected port calls			
Port	Arrival	Depearture	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	alongsie
						ESTRF	2021-07-16T06:19:42Z		passing
						DKSKA	2021-07-22T04:36:00Z		passing
Raahe (Brahestad) (FIRAA)	2021-07-29Z	2021-08-03Z							ng
									ng
Esbjerg (DKEBJ)	2021-08-07Z	2021-08-09Z							ng
									ng
Havøysund (NOHAV)	2021-08-14Z	2021-08-18Z	Havøysund (NOHAV)	2021-08-14 07:50:00Z	2				ng
Antwerpen (BEANR)	2021-08-23Z	2021-08-25Z	Antwerpen (BEANR)	2021-08-23 19:43:00Z	2				ng
			Rotterdam (NLRTM)	2021-08-24 14:30:00Z	N				ng
Djen-Djen (DZDJE)	2021-09-05Z	2021-09-06Z	Djen-Djen (DZDJE)	2021-09-01 22:00:00Z	N				ng
GRELE	2021-09-14Z	2021-09-16Z							ng
									ng
			Eleusina (GREEU)	2021-09-14 06:10:00Z	2				ng
									ng
Manfredonia (ITMFR)	2021-09-20Z	2021-09-24Z	Manfredonia (ITMFR)	2021-09-20 13:45:00Z	2				sie
									ng
									sie
Izmir (TRIZM)	2021-10-03Z	2021-10-06Z							sie
Ceuta (ESCEU)	2021-10-12Z	2021-10-13Z	Ceuta (ESCEU)	2021-10-12 20:39:00Z	2				sie
			Cuxhaven (DECUX)	2021-10-19 12:00:00Z	2				
			Esbjerg (DKEBJ)	2021-10-20 09:00:00Z	N				



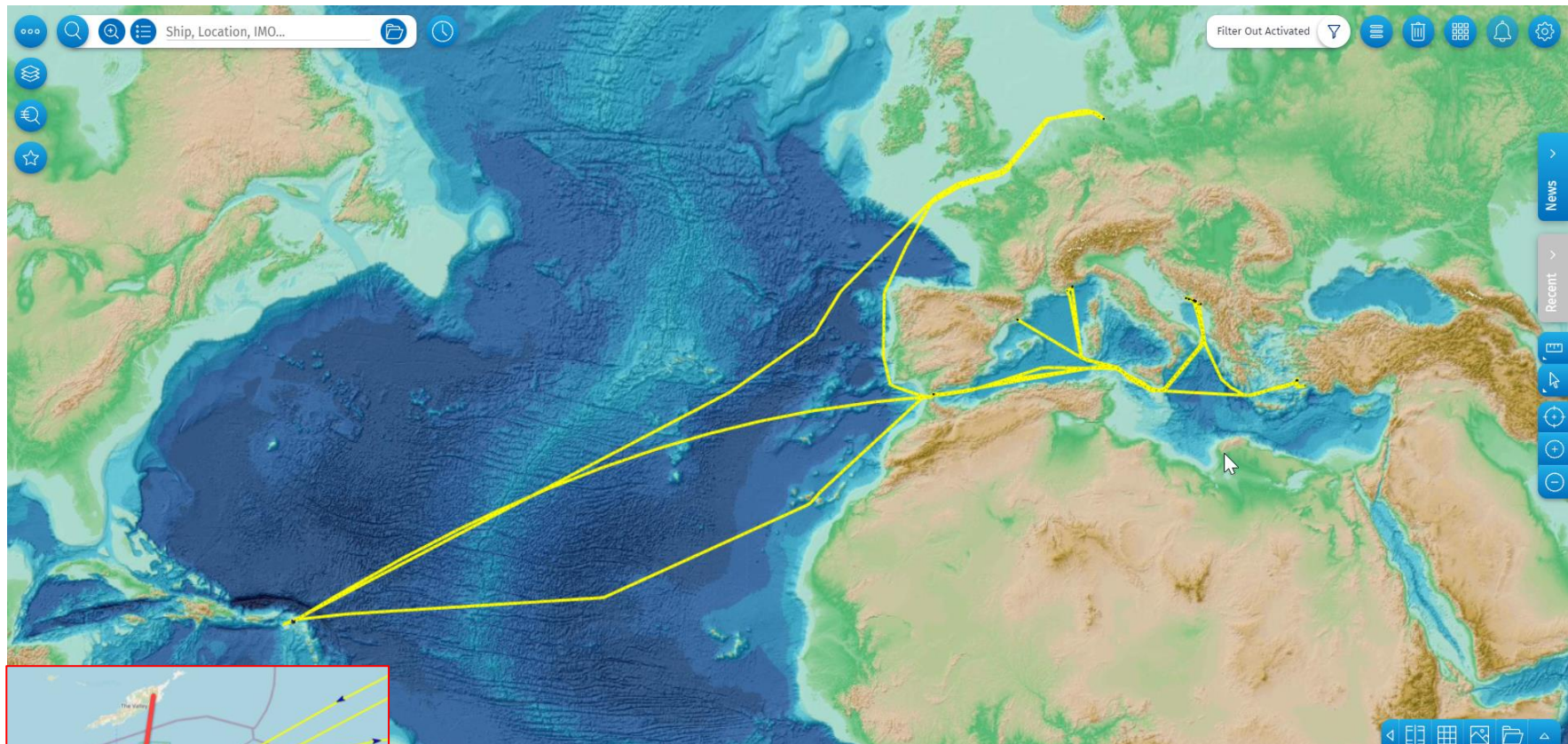
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Example (2) – non-EU port calls



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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**

Examples

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
P[-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 000000000334_00002_00010_1632939288
Source T-AIS	Status IN
Start Time 2020-08-29 23:42:03 GMT	End Time 2020-08-29 23:42:03 GMT

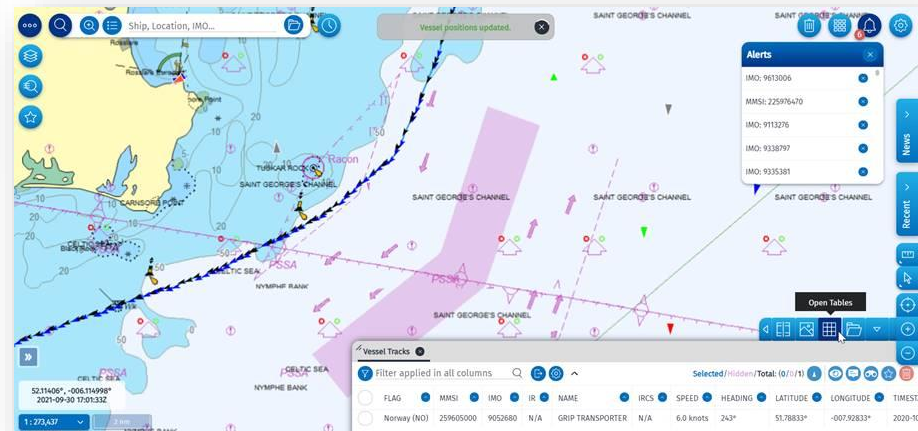
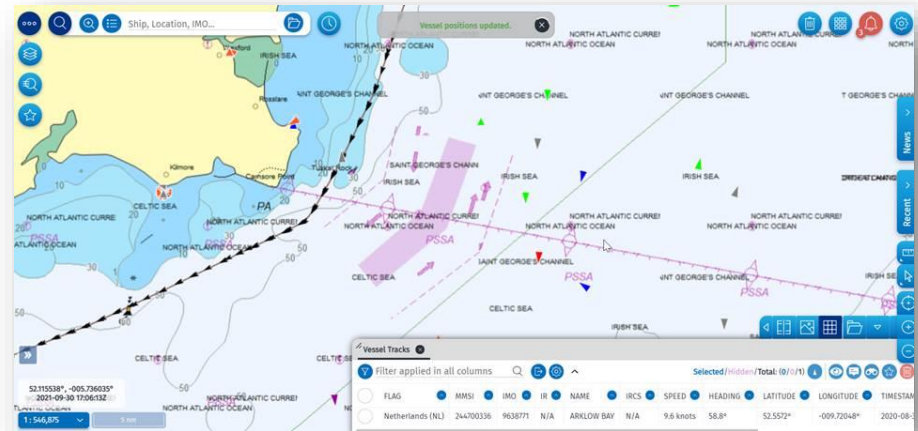
Vessels:

Overview:

Main Vessel Yes	Navigation Status 0	
IMO 9638771	MMSI 244700338	IR N/A
Type 360	Breadth 15	Length 119
Name ARKLOW BAY	Flag State NL	Call Sign PBP1
Last Port Call: Port: IEMTL	Arrival Time: 2020-08-28 19:09:45 GMT	Departure Time: 2020-08-29 17:15:54 GMT

Location ([Google Maps](#)):

Timestamp	Latitude	Longitude	Heading	Speed
2020-08-29 23:42:03 GMT	52.193985	-6.2577667	208	14.1



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- **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:

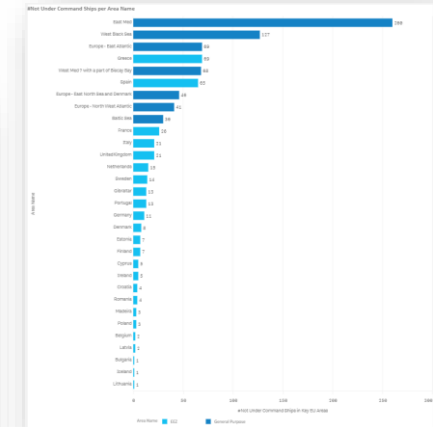
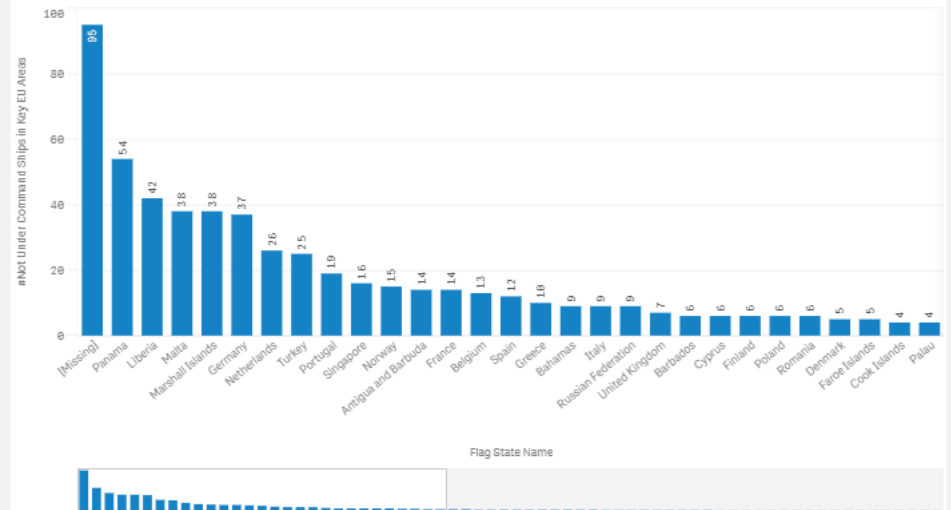
- 1) *To reflect on the ABM-related developments, reflecting on the business use cases and priorities.*
- 2) *To share best practices in operational usage of ABMs by different communities, Member States and EU bodies.*
- 3) *To discuss the status of the EMSA's Advanced Maritime Analytics prototype tool;*
- 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.

- Dashboards
- Aggregated data
- Simple data 'drilling' options



Usage scenario – VTMISS incident reporting verification

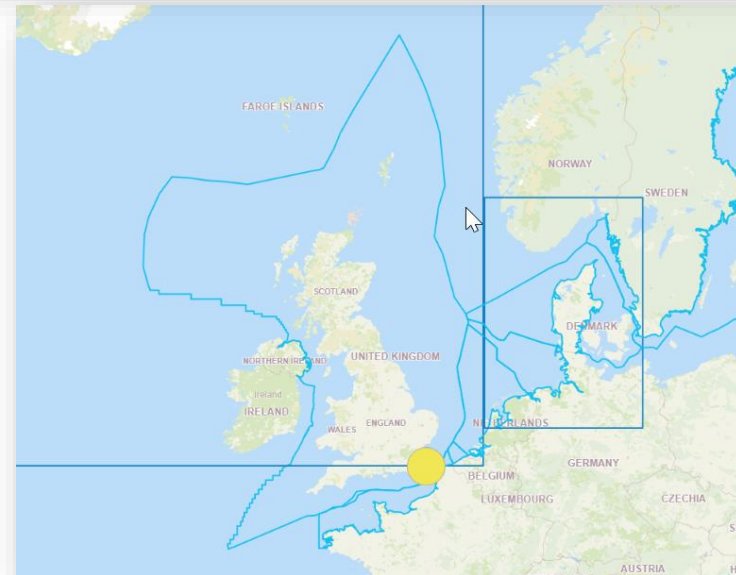
HELENA SCHIEPERS (Portugal) Oct 14 -- Fully cellular containership *Helena Schiepers* (IMO No: 9184427, Class: Bureau Veritas, 10318 gt, built 2012), enroute from Rotterdam to Lisbon, Portugal, **not under command** with 12 people on board, needs to replace the engine fuel injector near Falmouth, United 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	
9584	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.



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