



Integrated Maritime Services

UCM#7

Agenda item 7.2.3 – ABM WS Report

Lukasz Bibik / Senior Project Officer
Department C: Operations/Unit C.4

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Automated Behaviour Monitoring (ABM) tools:

- computer-based systems analysing real or near real time vessel position reports (as made available in EMSA's operational maritime applications)
- for the detection of abnormal and/or user specific behaviours
- to support the maritime surveillance operators, and to provide an increased maritime situation awareness, by providing automatic tools to detect vessels with suspicious or anomalous behaviour

Demo video

Lisbon, 02 December 2016 - **Maritime Anomaly Detection Systems and Automated Behaviour Monitoring Workshop**

Objectives:

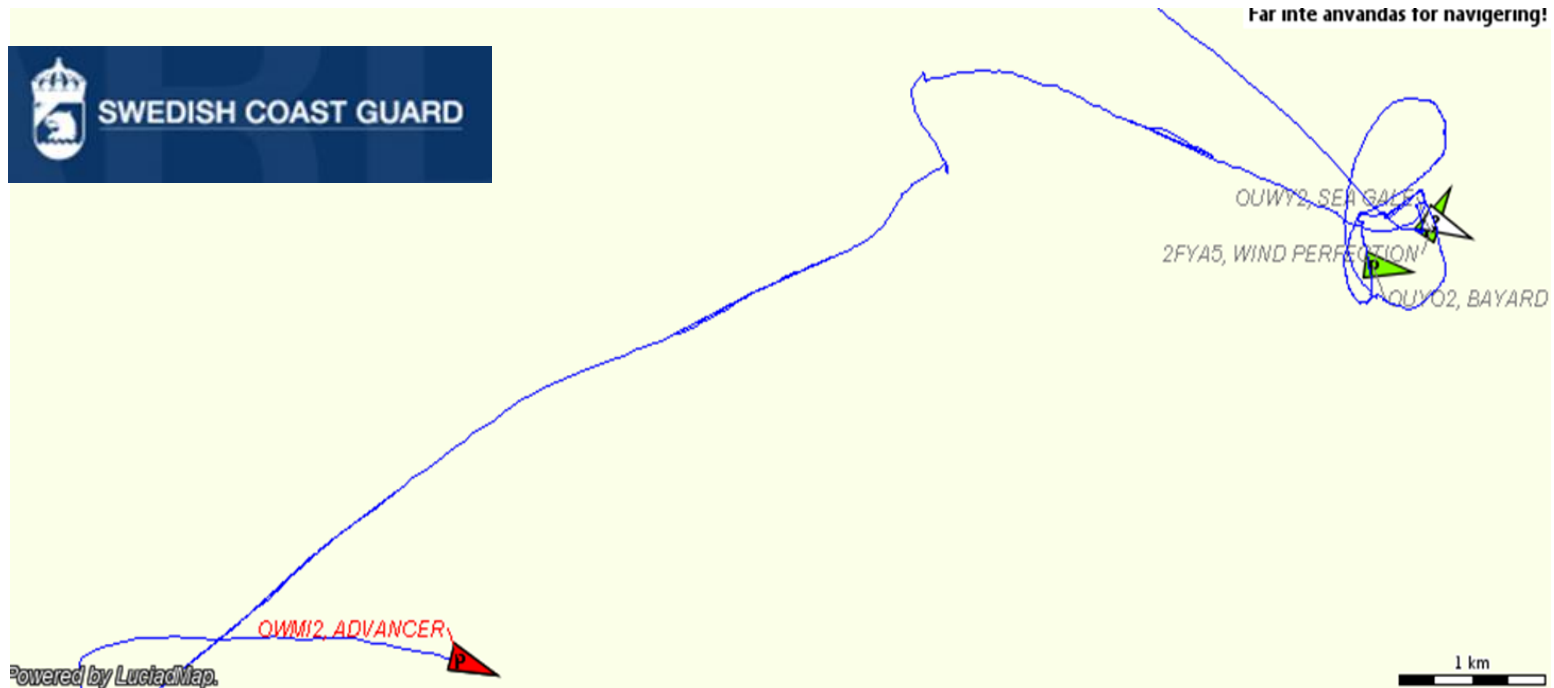
- Gather and share **knowledge on the ABMs**
- **Practical applications**
- Note **new requirements** for the related existing and future functionalities
- Discuss a possible framework for the **future**

Representatives:

Ireland, Italy, Malta, Sweden and United Kingdom,
European Agency for the Management of Operational Cooperation
at the External Borders (**Frontex**).

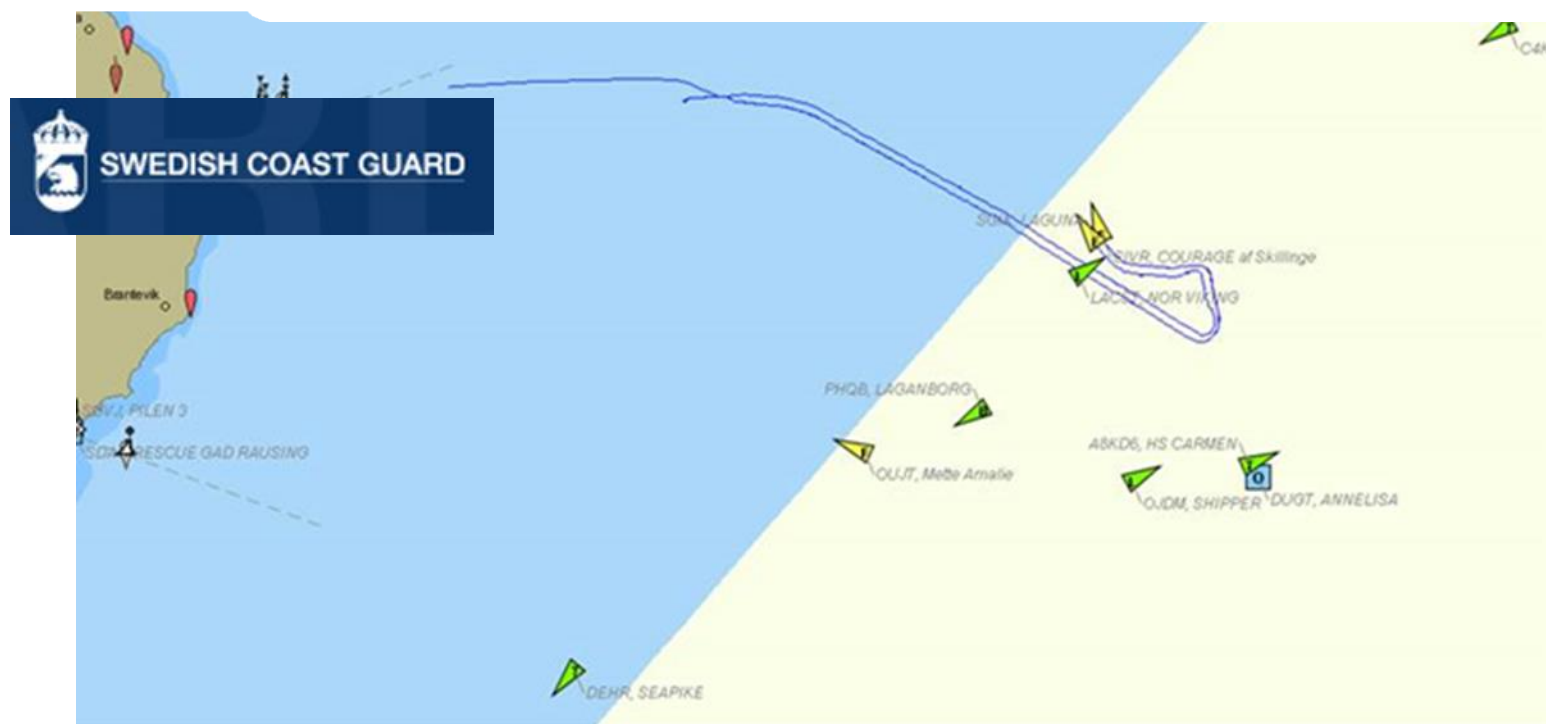
- Statistical Anomaly Detection and Visualisation (SADV) in the maritime domain – presented by Sweden
 - Movement pattern - Detects vessels performing abnormal manoeuvres, in terms of the number of stops and turns;
 - Rendezvous at sea - Detects meetings between two vessels at sea, when they are of a type not expected to meet;
 - Grounding risk - Detects vessels moving outside of normal fairways towards shallow waters.

Movement pattern – Example 1



Slow down sea, 8 times in 2 hours 49 minutes, expected 0 [0 - 7]

Rendezvous at sea – Example 2



1: Ship Meetings	Non-authority meeting with vessel LAGUNA (id 295), duration 66 seconds, distance 24.0 meters	SIVR	COURAGE	Fishing ship	2015-11-09 10:26:22	N55°34.618'	E14°38.244'	N
1: Ship Meetings	Non-authority meeting with vessel COURAGE AF SKILLINGE (track 2795780), duration 61 seconds, distance 11.9 meters	SGIK	LAGUNA	Fishing ship	2015-11-09 10:25:47	N55°34.612'	E14°38.214'	N

Grounding Risk – Example 3

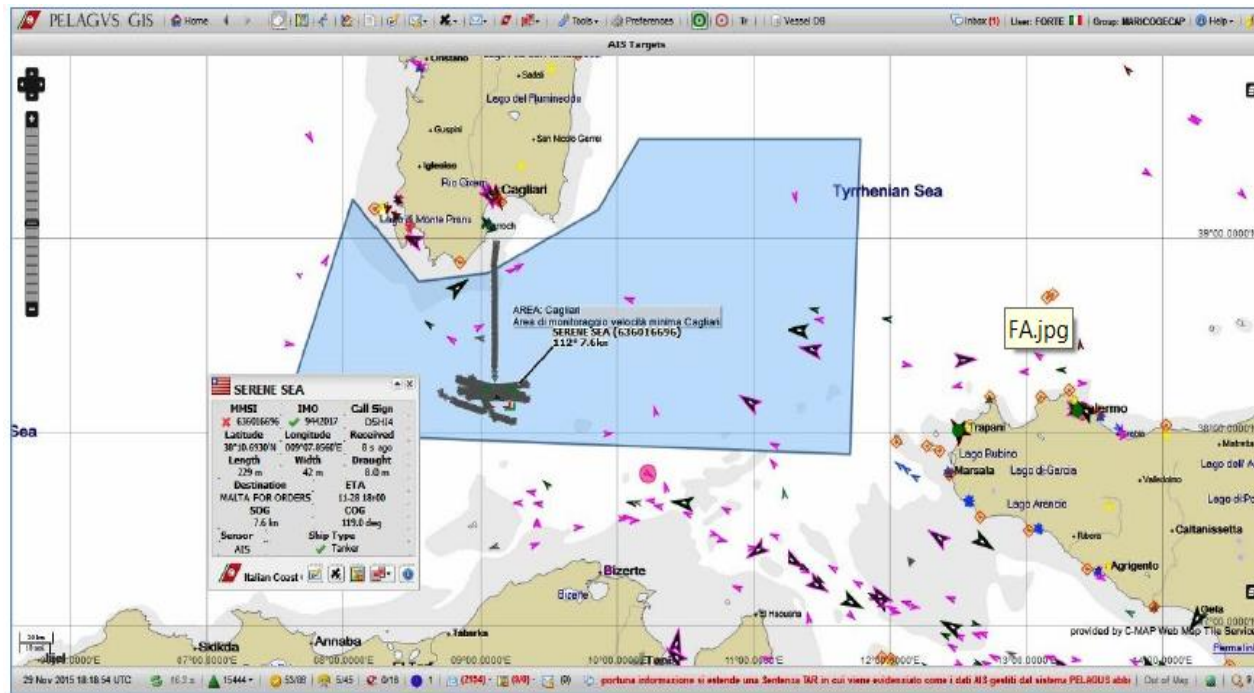


Detects when a vessel is outside of the usual fairways and approaching shallow waters (but not as close to the shore to be an intentional mooring).

Combines rule-based detection to decide that a vessel is approaching waters of depth less than the vessel draught, and statistical detection to decide if the vessel is outside of the normal fairway.

Can predict the risk of grounding about three minutes in advance.

- All participants (MS) shared operational experience and or described National solutions – e.g. IT ICG



- **FX** presented use of S2S interface for ABMs + specific border-protection related use cases

Wrap-up

- 26 requirements (18 new, 8 modifications)
- Covering: environment, fisheries, safety and security communities separately or all of them
- Monitoring specific areas (MPA, Wrecks, Pipelines, underwater installations)
- Use the reference data base (Ship DB - CSD)
- Combine some ABMs (leaving one area -> entering another one)
- MARNIS project experience (will be analysed)
- Exclusion criteria (to be added – vessels not like...)

Short –term plans

- Improve existing ABMs
- Business/Operational Validation at EMSA and with MS

Mid –term plans – new algorithms

- Vessel leaves Area of interest X and enters Area of Interest Y
- Vessel reports position outside an Area X (Off area)
- Transponder switched off – under reporting
- Existing Algorithm (under/over reporting) to be separated

Long-term planning

- Observe stability and reliability of the ABMs
- Continue with operational validation of the existing and new algorithms
- Examine options for the ‘statistical’ approach implementation
- Examine options for supporting the cooperation and developments in the ABMs through dedicated WS/ WG
- Follow an ‘collaborative’ approach for development of ABMs – share experience and solutions
- Next ABM meeting – possible around September 2016
- Interested MS are invited to contact Lukasz Bibik



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