



# Automated Behaviour Monitoring (ABM) algorithms

Workshop 2  
Actions from Workshop 1 and  
future plans

Yann Le Moan - Senior Project Officer

Digitalisation and Application Development,  
Unit C.4

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# Actions ABM Workshop 1

No	Action	Responsible	When	Status
1	Consider and propose a generic framework and architecture for anomaly detection in maritime surveillance systems.	EMSA	Proposal to be presented during 2016	<b>Completed</b> <ul style="list-style-type: none"> <li>• General Framework for IMS via IFCD</li> <li>• IMS Group Terms of Ref to be discussed at next HLSG</li> </ul>
2	Examine options for supporting the cooperation and developments in the area of the expanded anomaly detection and ABMs.	EMSA	To be consulted with the COM and MS before/during one of the SSN HLSG meetings in 2016	<b>Completed</b> <ul style="list-style-type: none"> <li>• General Framework for IMS via IFCD</li> <li>• ABM included in IMSTraining</li> </ul>

N	Action	Responsible	When	Status
3	Explore and reflect the MARNIS project experience as a reference for the future developments in the anomaly detection and ABMs.	EMSA and UK	To be presented at the next meeting in 2016	<b>Pending</b>
4	Examine possibility 'open source' approach for ABMs, (outcomes of the projects and developments could be shared).	EMSA and MS	Results to be presented at the next meeting in 2016	<b>Pending – awaiting feedback</b>
5	Agree on the next meeting of the active Anomaly Detection Systems and Automated Behaviour Monitoring users.	EMSA and MS	/	<b>Completed</b>

N	Action	Responsible	When	Status
6	Modification of existing + new requirements should be analysed + Feasibility and implementation	EMSA	To be presented at the next meeting in 2016	<ul style="list-style-type: none"> <li>• <b>Completed</b> (see following slides)</li> </ul>
7	To implement some of the high-priority Use Cases identified during the workshop using the existing ABM framework and perform a validation campaign with a few MS users	EMSA	During 2016	<b>Completed</b> (8 new ABMs planned for 2017) Validation campaign to be performed.
8	Prepare and distribute MoM ABM WS1.	EMSA	During January 2016	<b>Completed</b>

# **ABMs requirements from WS1 – Analysis and Status**

# Actions from ABM 1

N°	community	requirement	Comment/additional elements or improvements	Status
1	All	<p>ABMs should cater for both:</p> <ul style="list-style-type: none"> <li>• back-office, less regular, off-line users, and</li> <li>• the users accessing the system via on-line interfaces.</li> </ul>	<p>New</p> <p>Availability, timeliness and alert policies should reflect different kind of users</p>	<p><b>Pending</b></p> <p>- Detailed requirements to be discussed at ABM WS2 Agenda point 5.</p>
2	All	<p>Specific data set access rights should be reflected in ABMs</p>	<p>Existing e.g. as per access right set by each MS (access to VMS, LRIT, etc.)</p>	<p><b>Completed</b></p>
3	All	<p>ABMs users should be divided into:</p> <ul style="list-style-type: none"> <li>• administrators, setting specific anomaly detections (e.g. Member State or EU level) and</li> <li>• clearly defined end-users who are entitled to receive specific alerts.</li> </ul>	<p>New</p>	<p><b>Completed</b></p> <ul style="list-style-type: none"> <li>- ADMIN functions are being transferred to the MS and EU bodies</li> <li>- to be discussed at ABM WS2 Agenda point 4.</li> </ul>

N°	community	requirement	Comment/additional elements or improvements	Status
4	All	There shall be a high quality of data ensured in the reference sources of information linked to ABMs (to avoid false detection/alerting and unnecessary burden to the system.)	New Additional validation of data, quality, related monitoring and checks should be applied to the reference sources of data.	<b>Pending</b> - Link to the Central databases e.g. CSD
5	Environment, All	Monitoring vessels entering and exiting Marine Protected Areas (MPA)	Modification of the existing ABM Allow upload of the MPA areas by the ABM admin.	<b>Pending</b> – may require update of the MPAs by the National authorities to the CGD
6	Environment, All	Monitoring traffic in the vicinity of pipe lines/underwater cable lines	Modification of the existing ABM Consider feasibility of the modelling of the areas of interest in the vicinity of the pipe lines/underwater cable lines	<b>Pending</b> – may require update of the to the CGD by the National authorities

N°	community	requirement	Comment/additional elements or improvements	Status
7	Fisheries, All	<p>Add another filter level for the definition of the vessels of interest:</p> <p><b>Length Over All</b> (LOA) in all surveillances</p>	New	<p><b>Pending</b></p> <p>- require connection to the relevant databases (registry files from EFCA) and/or CSD</p>
8	Fisheries, All	<p><b>Improve the speed anomaly detection ABM</b> to detect the temporary change of speed to a certain value (e.g. 5 knts)</p>	Bug-fixing of the existing ABMs	<p><b>Completed</b></p> <p>– to be operationally validated with the <i>'change of speed above or below a limit set'</i> ABM</p>
9	Fisheries, All	<p><b>Combine the existing ABM to reflect new types of behaviours</b></p> <p>e.g. change of speed with at sea encounter or 'InArea' - leaving one area of interest and entering another specified area of interest.</p>	New	<p><b>Pending</b></p> <p>- current implementation does not allow combination of the ABMs.</p> <p><b>Under Development -</b>                      Vessel leaves Area of Interest X and enters Area of Interest Y                      Planned IMDatE 2.1</p>

N°	community	requirement	Comment/additional elements or improvements	Status
10	Security, All	<p><b>Add exclusion criteria in the existing ABM</b></p> <p>i.e. alert for all vessels but exclude specific identification or vessel type</p>	New	<p><b>Under Development:</b></p> <p>- Use of negative criteria Planned IMDatE 2.1</p>
11	Security, All	<ul style="list-style-type: none"> <li>• <b>Alerting for ship coming from a particular port/area and entering areas of interest</b></li> <li>• <b>Ship heading to a particular port/area and passing areas of interest;</b></li> <li>• <b>Ship leaving one specific port/Area and entering in a another area/port</b></li> </ul>	New	<p><b>Under Development:</b></p> <p>- Vessel leaves Area of Interest X and enters Area of Interest Y – Planned IMDatE 2.1</p>
12	Security, All	<p><b>Include the Terrestrial AIS coverage area</b></p>	<p>Modification of the existing ABM</p> <p>The Terrestrial AIS coverage areas needs to be provided by MS.</p>	<p><b>Pending</b></p> <p>- may require update of the coverage areas by the National authorities to the CGD</p>

N°	community	requirement	Comment/additional elements or improvements	Status
13	Security, Safety, All	<p><b>Detect when AIS transponder has been switched off.</b></p> <p>Additional attributes to be considered for the detection are:</p> <ul style="list-style-type: none"> <li>• T-AIS coverage area and</li> <li>• No-reporting duration</li> </ul>	New	<p><b>Under Development</b></p> <p>- new ABM: Vessel is switching off transponder – Expected IMDatE 2.1</p>
14	Security, All	<p><b>Improve the detection of the change of heading and speed</b></p>	Improvement of the existing ABM	<p><b>Completed</b></p> <p>- to be tested operationally by the end-users</p>
15	Security, All	<p><b>Detection of the identity spoofing</b></p>	New	<p><b>Pending</b></p> <p>- may require connection to reference databases , (e.g. CSD)</p>

# Actions from ABM 1

N°	community	requirement	Comment/ additional elements, improvements	Status
16	Security, All	<b>Detection of the geographical position spoofing</b>	New	<b>Under development</b>  - linear distance between consecutive positions > than a threshold distance value (calculated using the max. speed). Planned in IMDatE 2.1
17	Security, Safety All	<b>Ship Profile changes alerting</b> E.g.for the selected vessel alert when vessel related attributes changes are detected (e.g. owner, flag, PSC report/ data changes, deficiencies, crew, vessel with a certain age, etc.)	New	<b>Pending</b>  - may require a connection to the reference databases
18	Security, All	<b>Detect the deviation of the most used/economic route</b>	New	<b>Pending</b>  - may require a connection to reference services containing the calculated routes

# Actions from ABM 1

N°	community	requirement	Comment/additional elements or improvements	Status
19	Security, All	<b>Vessel stationed / idle in the AOI (e.g. close to Port) without entering port for a long time</b>	New	<b>Pending</b> - under assessment
20	Security, All	<b>Change of the voyage related data:</b> ETA, destination,	New	<b>Pending</b> - may require a connection to the reference services - SSN EIS, for example. Reference databases have to be defined for the non-EU ports
21	Security, All	<b>Improve detection of the at sea encounter, exclude specific vessels/ criteria</b>	Improvement of the existing ABM	<b>Under Development</b> – negative selection

N°	community	requirement	Comment/additional elements or improvements	Status
22	Safety, All	<b>Lost target – lack of position reports of any kind</b>	New	<b>Under Development</b> - new ABM: Vessel is switching off transponder
23	Safety, All	Public media monitoring for the detection of the unreported incidents/accidents	New	<b>Pending</b> - under assessment
24	Safety, All	Change of the specific AIS attributes in the transmission	New	<b>Pending</b> - under assessment, lack of the available services at this moment

N°	community	requirement	Comment/additional elements or improvements	Status
25	Security	<p><b>Apply a combination of several algorithms</b>                      e.g. sudden change of heading with rendezvous at Sea and</p> <p><b>apply a set of algorithms for vessels of interest.</b></p>	New	<p><b>Pending</b></p> <p>- current ABM implementation does not allow combination.</p>
26	Security	<p><b>Discrepancies between declared voyage and track of a ship</b>                      e.g. the vessel track and its current location does not match its destination.</p>	New	<p><b>Pending</b></p> <p>- may require a connection to the reference services containing the calculated routes</p>



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