

Meeting: 15th IMS Group User Consultation Meeting (UCM#15)

Place and date: Lisbon, 22 October 2020

Agenda item: 4.2 – Advanced analytics prototype

Document number: IMS 15.4.2

Submitted by EMSA

Summary	This paper provides an overview of the EMSA Advanced Analytics Tool prototype. The objective of the tool is to serve as basis for further discussion on the data, analytics information products and their priorities linked to the functionalities and tools needed by Member State national authorities.
Action to be taken	As per Section 4
Related documents	ABM and Advanced Analytics 5 Workshop report.

1. Background

Development of an Advanced Analytics Tool is linked to various legal documents and technologies in place at EMSA, including VTMISS, the SafeSeaNet Ecosystem, Integrated Maritime Services (IMS), Automated Behaviour Monitoring (ABM) algorithms and Advanced Analytics, the Tripartite Working Agreement (TWA) and the EMSA-Frontex Service Level Agreement (SLA). It also responds to the requests of the end users, as documented in the IMS User Consultation and ABM Workshop meetings' reports. It is also underpinned in the Single Programming Document (SPD) for 2020-21, requiring EMSA to: [...] '...Advance the collaboration with the IMS Member State and EU bodies within the context of the "Automated Behaviour Monitoring and Advanced Analytics" Working Group, to further develop the portfolio of ABM services and define the requirements for Data Analytics tools and products...'; with a planned 2020 output: '...further look into data analytics exploitation tools..' [...].

2. Advanced Maritime Analytics Tool Prototype: Objective, Scope

The objective of the EMSA Advanced Analytics Tool prototype is to provide analysis that, thanks to the combination of different data sets, may support the 'Risk Assessment' activities of the Member States (MS) and EU Bodies. What makes the tool unique is the possibility of combining and aggregating data that is traditionally presented separately. Accordingly, the tool is not expected to be used in (near) real time/operationally, but rather more strategically e.g. in supporting the identification of shipping patterns in the last 24 hours, 7 or 30 days. The tool also aims to inspire all communities to further analyse their business needs (requirements) for data analytics and related products.

In terms of business scenarios, it is going beyond ship positioning only and using additional information, namely the so-called 'enrichment data'. The following scenarios were defined, based on the priorities stated by the end-users during the IMS UCM meetings and ABM Workshops. They cover aggregated statistics on:

- 'Black Flag'¹ ships operating around the EU;
- 'Black Flag'¹ ships not reporting regularly (8 hours gap between positions in the consolidated vessel track), around the EU;
- Ships drifting in key EU areas - based on ABMs configured for that purpose;
- Ships Not Under Command in key EU areas - based on the analysis of the 'navigational status' transmitted by vessels and their positions.

For each scenario the tool uses vessel positioning data, ship identifiers and additional attributes. The 'enrichment data' covers information on the classification of flags by the Paris MoU, analysis of the gaps in subsequent position reports, ABM algorithms' alerts for vessels drifting in selected areas, analysis of the reported 'navigational status' as in AIS messages. The data is presented equally for each scenario, in four tabs with (I) general statistics, (II) list of ships, (III) bubble map and (IV) heat map. All these tabs have a user-friendly presentation and filtering options. These are presented further in the Annex 1.

3. Next steps

The prototype can be now rolled out to a limited number of users from MS - mainly volunteers or the active IMS or ABM administrators who participated or contributed to the discussion on the scenarios definition. The feedback of these users aims to support:

- The validation of the prototype i.e. its existing functionality and available data sets;
- The definition of future Maritime Advanced Analytics business scenarios;
- The definition of KPIs for the future operational tool(s).

4. Action

IMS Member States are invited to take note of the above information on the advanced analytics prototype.

¹ Classification by Paris MoU <https://www.parismou.org/detentions-banning/white-grey-and-black-list>

Annex A – EMSA Advanced Maritime Analytics Tool, Prototype for External Users: Access, Basic Functionalities

Information / Access

The tool can be accessed using the URL <https://analytics.emsa.europa.eu> in the web browser. Upon using the URL, user will be requested to provide access credentials (see Figure 1).

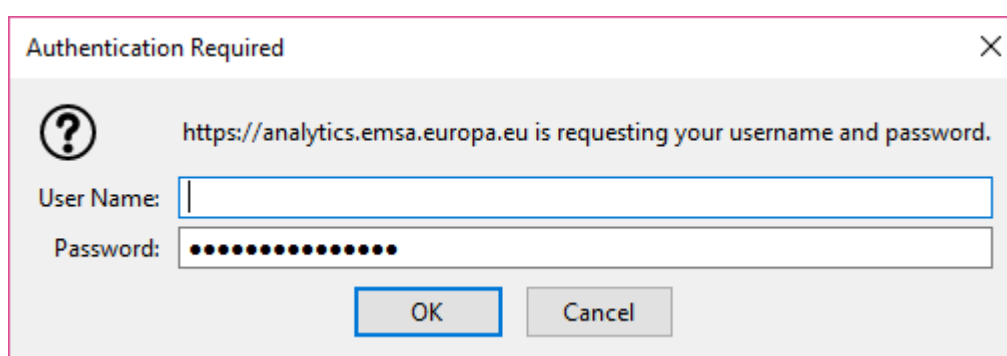


Figure 1 – access to the EMSA Advanced Analytics Tool

Due to its prototype nature, is not implemented under EMSA's single-sign-on (SSO), therefore credentials are provided separately.

Access to the dashboards is possible upon click on the 'IMDatE' item on the left panel (see Figure 2) .

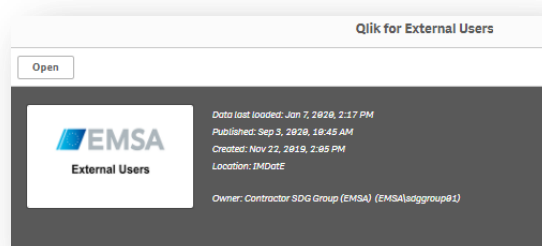


Figure 2- Access to dashboards

As a result, a new tab is opened in your web browser providing a dashboard view of the analytics scenarios (see Figure 3) .

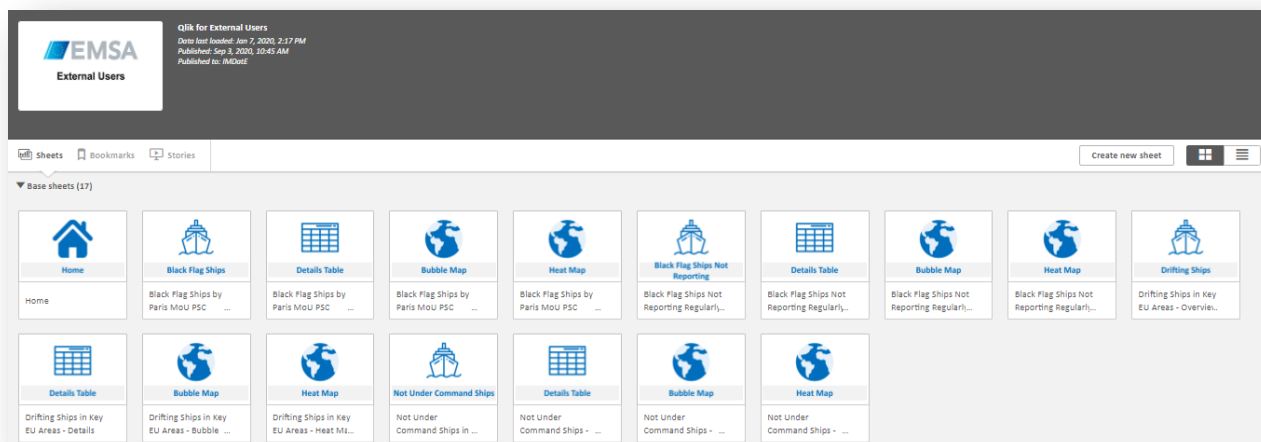


Figure 3 – Dashboard view

For each scenario the tool processed vessel positioning data, ship identifiers and additional attributes. The 'enrichment data' used cover: information on the classification of flags by the Paris MoU, analysis of the gaps in the subsequent position reports, ABM algorithms' alerts for vessels drifting in selected areas, analysis of the reported 'navigational status'. The data is presented equally for each scenario, in four tabs with (I) general statistics, (II) list of ships, (III) bubble map and (IV) heat map. All these tabs having easy to configure filtering.

Under the 'Home' tab all the scenarios are aggregated.

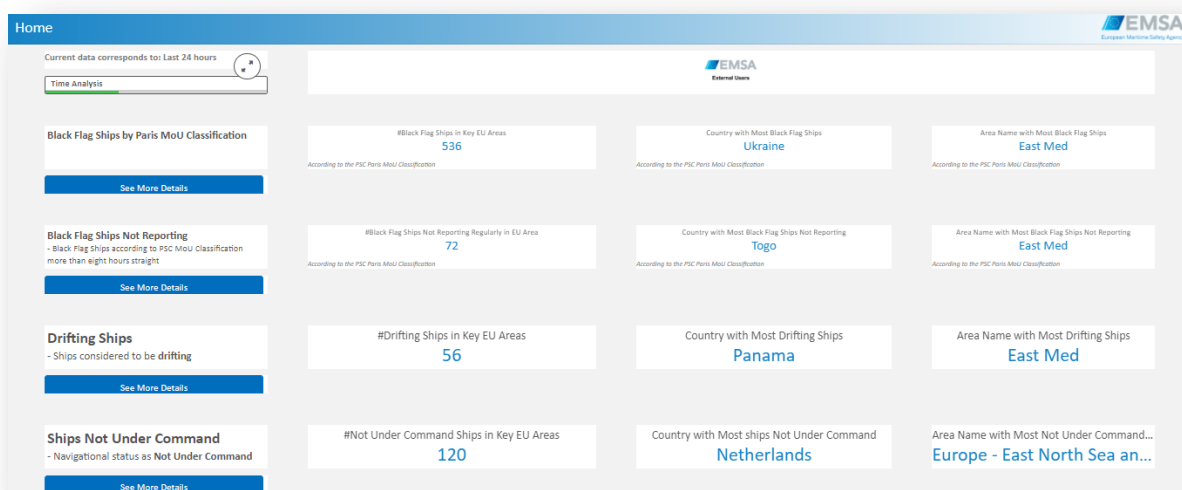


Figure 4 – Home tab – aggregated, top values for each scenario

The default time period covers the last 24 hours. User may select different time durations (see Figure 5).

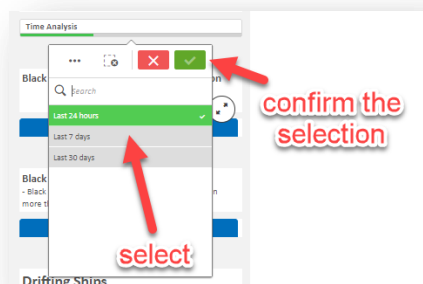


Figure 5 - Time selection

Note: In this prototype tool the data is aggregated daily, at midnight, for the previous day, and consequently the last 24 hours, 7 days or 30 days statistics are updated.

Each of the scenario dashboards can be loaded to the screen, by clicking on the 'See More Details' option (see Figure 6).

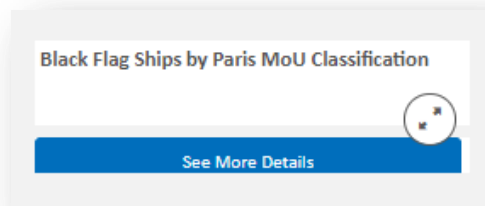


Figure 6 – Accessing each dashboard

Each of the dashboards is organised in the same way, with the general metrics and graphs per selected time period, with overall numbers, division by ship flag, vessel type and by the area of interest. (see Figure 7)

Note: the prototype uses generic areas in the Mediterranean Sea, the Black Sea and the North-West Atlantic Ocean, the North Sea and the Baltic Sea, as well as the approximate EEZ of the countries in these areas.

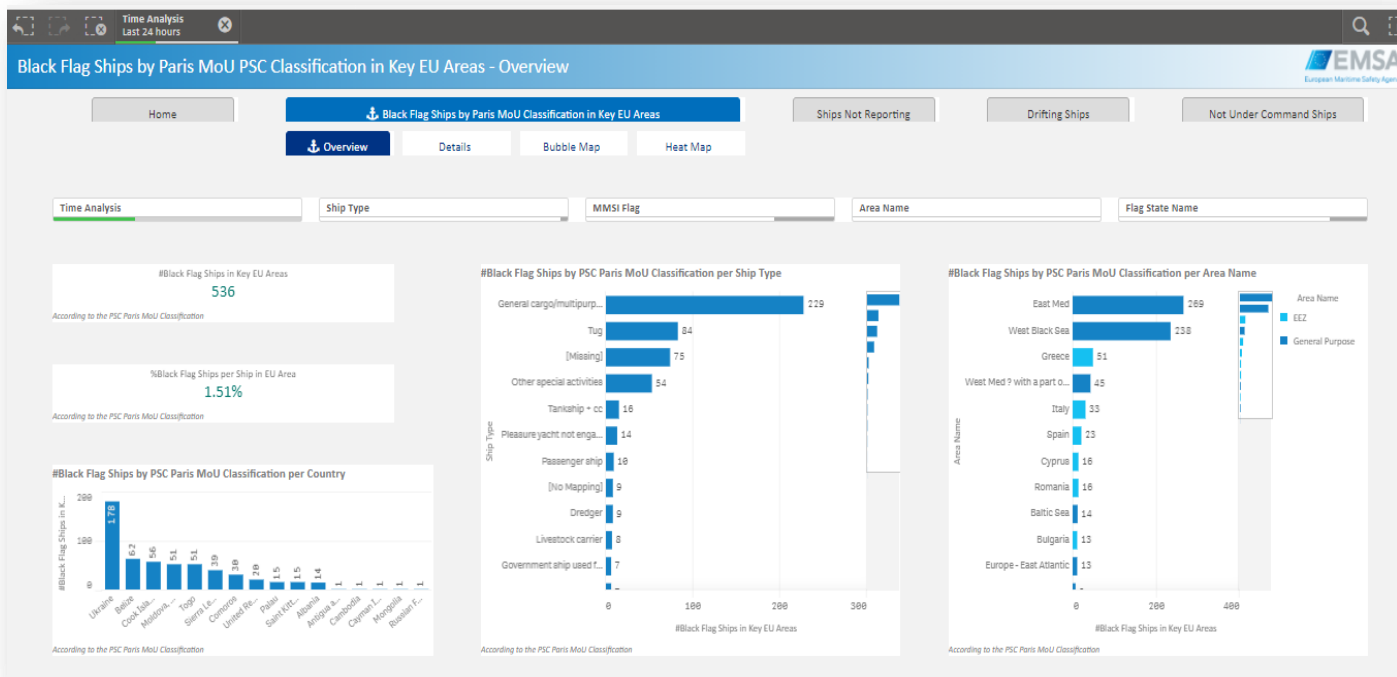


Figure 7 – Overview tab

Under 'Details' tab a list of ships can be obtained, while the 'Bubble Map' or the 'Heat Map' present data with geographical references, in clusters, on the map.



Figure 8 – Sub-tabs for each scenario

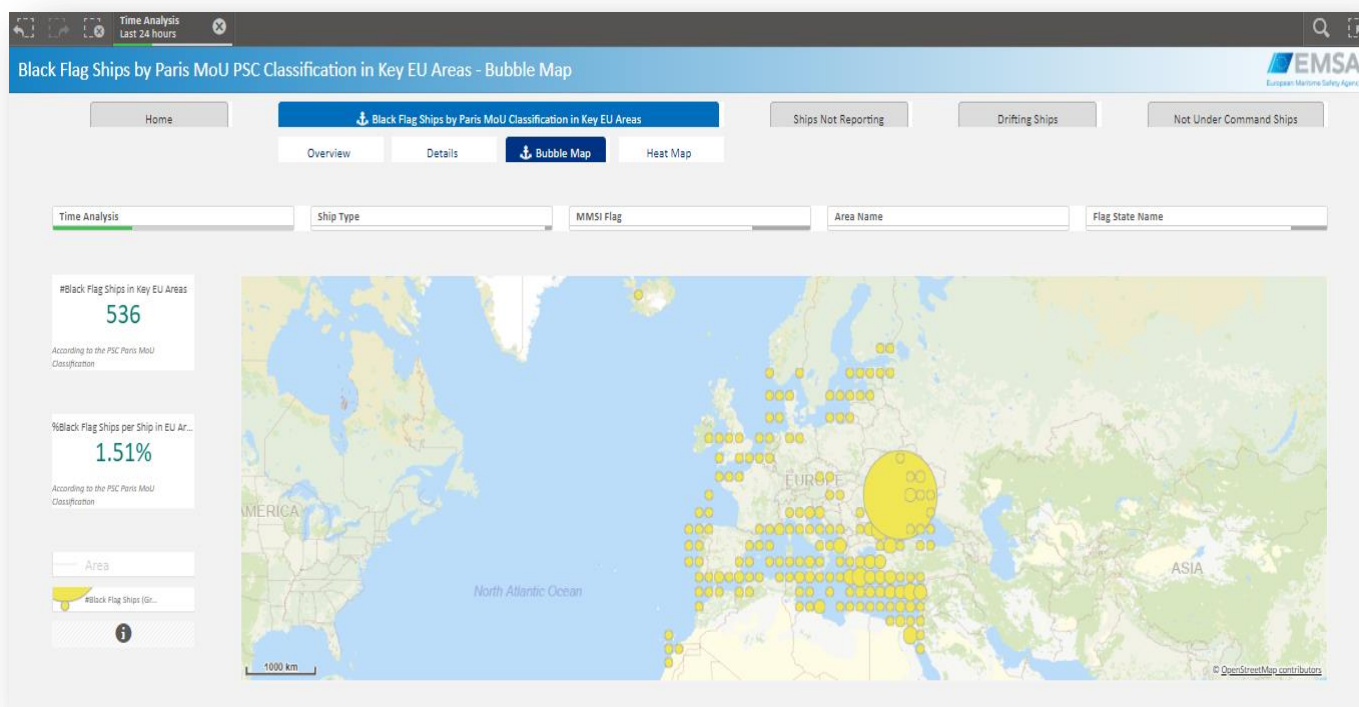


Figure 9 – 'Bubble Map' clustering for the selected scenario

The elements of the graphs, records in the tables and the clusters are selectable. Upon selection of the specific attribute or record all the reference metrics are updated. Please, refer to the example on Figure 10, where only one ship type was selected.

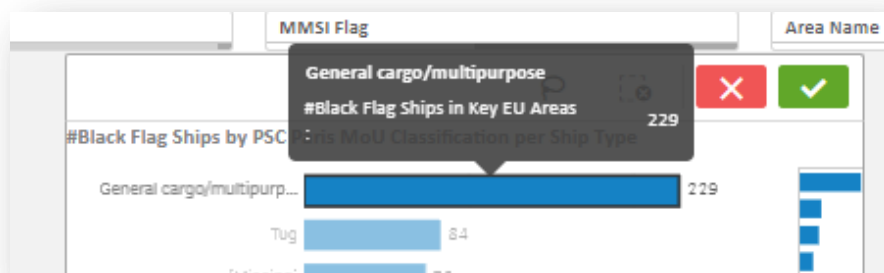


Figure 10 – Example, selecting ship type

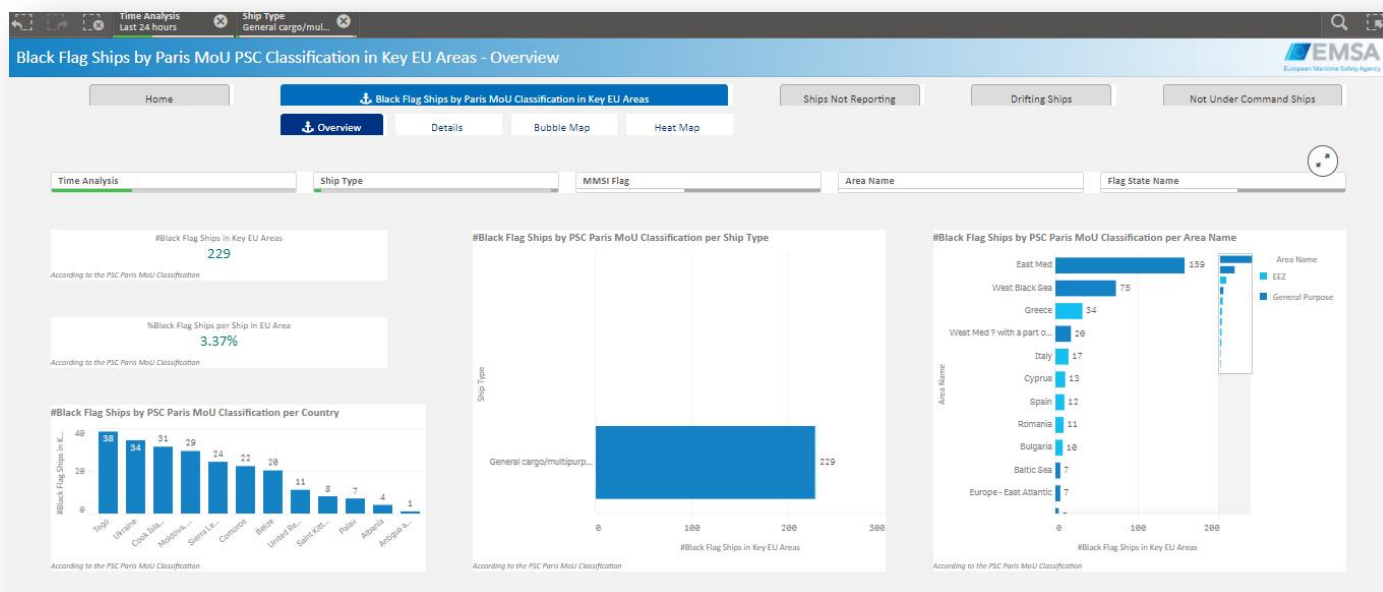


Figure 11 – Example, update of the metrics based on the selection