European Maritime Safety Agency

Appendix A – Objective and description of the future IT tool

Background:

In 2019 EMSA carried a series of regional workshops (table-top exercises) to test the resilience of the regional and sub-regional oil spill response capacities to a Tier 3 marine oil spill in European waters. The aim was to simulate a major oil spill where the pollution response assets from Member States and EMSA are pooled together and put to action to minimise the impacts of oil pollution. For this assessment, a dedicated software tool was developed to estimate the amount of recovered oil and associated costs for removing the oil from the sea surface by using the oil pollution response resources from EMSA and Member States. The experience gained with the development of the tool, the feedback collected at these table-top exercises and the replies received to a specific questionnaire on desired functions, have been used as the starting point to define the objective and describe the future IT tool.

Objective:

The tool is to support Member States in their preparedness and in the logistical and operational decision-making process of mobilising and deploying oil pollution response equipment and resources in response to an oil spill at sea. As an added value the tool is expected to provide information on the operational efficiency and the optimal use of oil pollution response resources.

The aim is to have a tool that suits the needs of all EU member states. Therefore, it should be flexible, allow the integration of national sources of data (national and regional oil spill models and local environmental data sources) and allow the modification and addition of new elements to the databases used by the tool.

The final output from the simulator should be presented to the user in charts and lists that the user may customise. The data should be exportable in excel format. The output of the oil spill model should be exportable, e.g. shape files and excel format.

Description:

The tool shall predict the trajectory, dispersion and weathering of oil spills at sea considering the metocean conditions at the spill site and display it on GIS (geographic information system). Sub-surfaces releases of oil shall also be covered by the tool to address the oil spill scenario of a sunken vessels releasing oil. It shall integrate a database of oils that are frequently transiting European waters. The database shall gather the physical and chemical properties of the oils required for the oil spill model. The tool shall facilitate the selection of an adequate oil, by assisting the user on the selection of the oil or by classifying the oils in the database (e.g. heavy oil, low viscous oil).

The quality of the environmental data will have a strong impact on the accuracy of the output of the tool. By default, the tool should have some default European data sources. In addition, it should be possible the integration of other regional or local sources of environmental data from EU member states.

The output of the 3D oil spill model shall serve as basis for the simulator to estimate the amount of oil removed, dispersed or burned from the sea surface by the deployment of oil pollution response equipment and resources.

For that the tool shall integrate a database of European oil pollution resources and equipment (georeferenced) with the technical details and location of each asset. The user shall be able to modify the assets' technical

details and add new assets to the database if needed. From this database the user shall select the response assets to be in the simulation.

The simulator shall account the several time steps related to the logistics and the deployment cycle of the response assets at the spill sea:

- Mobilisation
- Transit to scene
- Operations (including decanting for some assets)
- Transit time from scene
- On-scene stand-by
- Discharge or reload

All these different steps related to the logistics and deployment cycle of the response assets are essential to estimate the actual time the asset spends removing, dispersing, or burning the oil from the sea surface. The window of opportunity for oil spill response operations is short and depends strongly on the weathered surface oil and the weather conditions on-scene. The simulator should provide this information in a user-friendly way, to support the response authorities to decide and select on which assets to mobilise.

In order to support the user on the selection of the most adequate assets to be used, the simulator should highlight (or short list) the adequate response resources and equipment from the database to be deployed on-scene considering:

- the time it takes to arrive at scene considering the shortest route by sea for vessels and by land and by air (for EMSA EAS equipment) for equipment to be used for vessels of opportunity. (i.e. select or short-list vessels that can be at spill site within 36h / 48h.);
- the technical characteristics of the asset in respect to the characteristics of the weathered oil in particular viscosity (i.e. the oil that is at the sea surface for some time has been subject to wind and sea currents actions that have changed its original physical and chemical properties);
- the weather conditions on-scene.

The user can then decide and select which assets should be mobilised. The user should also have the possibility to disregard the short-list of assets identified by the tool.

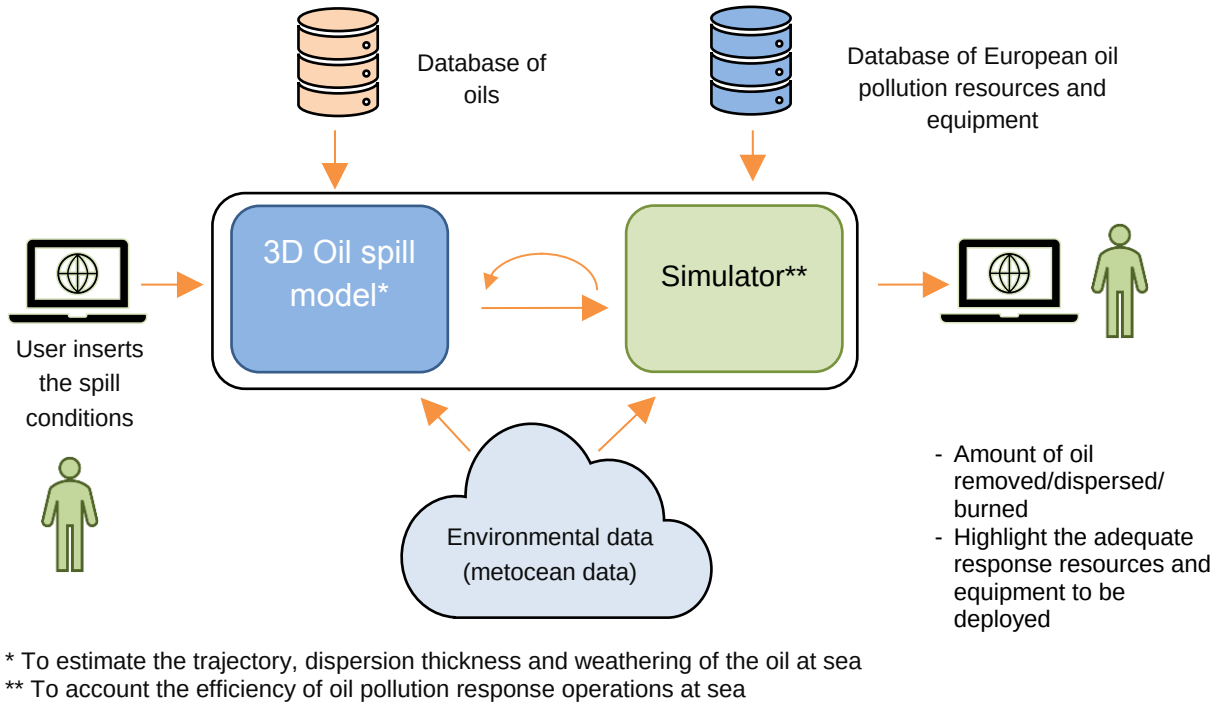
Based on the user's choices (i.e. the response assets selected) the simulator should estimate the amount of oil removed, dispersed, or burned from the sea surface. These calculations should consider:

- the technical the characteristics of the asset (e.g. operational pumping rate, storage capacity, decanting capacity, operational speed …)
- the characteristics of the oil when it is recovered
- the weather conditions at the spill site.

Note that the two last conditions are variable in time and also in space. All parameters are interlinked and influence the efficiency of the oil recovery operations at sea. Therefore, their incorporation in the tool will be challenging to implement but it will also bring added value to the tool.

The simulator should integrate the changes in time to the surface oil due to weathering and due to the response operations. As the spill progresses in time, the removal, dispersion and burning of the surface oil should be deducted from the remaining weathered oil at sea surface. From time to time the spill model should be refreshed in order to reflect the result of the response operations on the remaining oil. From time to time the spill model should be refreshed in order to reflect the result of the response operations on the remaining oil.

In addition, the oil spill response operations at sea are dependent on the scattering of the oil at the sea surface. The larger is the area to cover, the less efficient will be the response operations at sea. The encounter rate of the response asset with the oil slick should be incorporated in the simulator. Ideally the simulator should be GIS based to depict geographically the location of the asset in respect to the trajectory and dispersion of the slick. It should also depict the progress and deployment of the response assets in time (i.e. display in a Gantt chart the deployment of assets in time).



* To estimate the trajectory, dispersion thickness and weathering of the oil at sea
** To account the efficiency of oil pollution response operations at sea

The tool will be available to all EU member states and EFTA states. The access to the tool will be done through EMSA's maritime portal. For more information on EMSA's IT systems see Appendix C EMSA System and application technical landscape.

Preferably the tool should use open source code, to avoid vendor lock-in and to give EMSA flexibility for future developments of the tool with other IT companies.

EMSA will own the software therefore will have the intellectual property rights of the future tool.