ATLANTIC AREA
Transnational Programme
INVESTING IN OUR COMMON FUTURE

European Union
European Regional Development Fund

ARCOPOL PLUS

Modelling Training Guide

Activity 3: Upgrading and transference of tools for HC and HNS detection, forecasting and risk analysis

Task 3.1.3: Guides for training forecasting exercises

ARCOPOLplus

Improving maritime safety and Atlantic Regions' coastal pollution response through technology transfer, training and innovation

Version:	2.2
Last updated on:	28/03/2014
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ARCOPOL PLUS

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1. SUMMARY

ARCOPOLplus, a follow up project of ARCOPOL, is co-funded by the Atlantic Area Transnational Programme. It aims to further improve maritime safety and Atlantic regions coastal pollution preparedness and response against oil and HNS through technology transfer, training and innovation activities.

Activity 3 of ARCOPOLplus is named "Upgrading and transference of tools for HC and HNS detection, forecasting & risk analysis". It aims to increase the awareness and the level of readiness by producing innovative materials that con be useful for improving the transmission of key information and tools to stakeholders and general public. Modelling tools play an important role to enhance preparedness at contingency planning stage and during response exercises. Spill modelling can also be a key tool to support the initial stages of response operations and to supplement tracking during periods where visual monitoring may be unavailable. So far, such tools are mostly used by highly qualified scientific personnel, spill combating services or specific scientific communities. Activity 3 will include training actions to wider the model user community.

This document is a developed version of the previous ARCOPOL+ Report: State of the Art of Forecasting Training regarding the experience of training exercises conducted during ARCOPOL+ Project, in order to provide some guidelines to set up and evaluate the use of models during a spill exercise.

2. INTRODUCTION

Nowadays, most of Contingency Plans take into account spill behaviour forecasting as part of the response. Even, in some cases, a forecasting team (permanent or set up for the contingency) is considered as a part of the responder team. An example is the Galicia Contingency Plan where "Unidade de Observación Próxima" (UOP), responsible for tracking and predicting the behaviour and evolution of pollution, is part of the organizational structure of the response system.

Regarding this, the forecasting team has to be trained as well as another team of the contingency plan. In this case, forecasting team is not only in charge of running a numerical model but to assure the communication since they received a notification until they distribute a clear, accurate, timely forecast to the right people.

As far as we know, there is no a specific guideline to set up modelling exercises. In one hand, the documents focused on the organization of training have a general purpose. In the other hand, reports, trainings courses or manuals on modelling are focused on learning to use the model, usually specific software for modelling. So, it is noticeable that there is a lack of information about how to train the forecasting team. The knowledge of a model is usually considered to be enough to use it during a contingency, but there are other aspects frequently ignored: the accuracy of the model inputs, bottlenecks during the transmission of the information or the capacity to synthesize several different outputs in a simple figure that helps to the decision table board to deal with the accident.

Fig. 1. Forecasting and Monitoring Unit (Unidad de Seguimiento y Predicción) during Vigo 2007 training exercise conducted by SASEMAR (Search and Rescue Spanish Agency)

The aim of this document is to provide a guide to organize specific drills for the modellers' team. The goal of this training will not provide the skill of a model to simulate the reality but the availability and the readiness of the modellers to give the best answer to the right person in short time. Thus, in this case, models will be thought as a respond tool similar to other used during an accident, as example a boom.

In order to test the different drafts of this guide, several exercises were conducted during ARCOPOL plus project. All of them, regardless they were succeed or not, contributed to improve this guide with valuable information. A short description of the conducted exercises is listed in Annex I.

3. BASIC GUIDELINES

GUIDING PRINCIPLES

- Ensure that management from the top down supports the exercise activity.
- Set clear, realistic and measurable objectives for an exercise.
- The thrust of exercising is to improve—not to impress.
- Simpler, more frequent exercises lead to faster improvements initially.
- Do not tackle complex exercises until personnel are experienced and competent.
- Too many activities, locations and participants can overcomplicate an exercise.
- Evaluating the exercise successfully is as important as conducting it successfully.
- Planning and conducting a successful exercise is a significant accomplishment.

A forecasting exercise will be planned and conducted as a regular exercise. So, in order to develop these activities, it will be useful to follow a guide as IPIECA guide, PREP guideline or other. In this case IPIECA guide was mainly followed (view IMO/IPIECA Guide, 1996) and we encourage reading it. In order to facilitate the reading of this document, some basics of the planning and conducting drills referred there are wrote down here.

A current exercise can be categorized in:

Notification exercises: Notification exercises test the procedures to alert and call out the response teams and are conducted through telephone and other means of communication, as stipulated in the response plan. Such an exercise will typically last one to two hours and may be held at any time, day or night, announced or unannounced.

Tabletop exercises: Tabletop exercises normally consist of interactive discussions of a simulated scenario among members of a response team but do not involve the mobilization of personnel or equipment. They are usually conducted in a conference room or series of rooms connected by telephone lines. A tabletop exercise could typically between two and eight hours.

Equipment deployment exercise: Equipment deployment exercises involve the deployment of spill response equipment at particular locations in response to an oil spill scenario and in accordance with strategies laid down in the plan for a particular spill scenario. Such an exercise would typically last four to eight hours and should be repeated frequently until teams are acquainted with the equipment.

Incident management exercises: The complexity of incident management exercises usually falls on that they simulate several different aspects of an oil spill incident and involve third parties. Incident management exercises require significant planning in terms of availability of personnel, development of an adequate scenario and the physical arrangements for staging such events. Normally, an Exercise Steering Committee is formed to develop and run the exercise. These exercises often last one long day, typically 10–14 hours, followed by debriefing sessions on the second day.

Exercise **planning consists of four separate activities** that collectively describe the process for creating and running realistic and successful exercises:

Design: The design phase sets the objectives and scope and sets out the timetable necessary for completion.

Develop: The development phase describes those steps that are taken to create the exercise and prepare and organize fully for exercise activities. This phase must take into account the public affairs/media aspects of any exercise.

Conduct: The actual conduct of the exercise activity consists of initiating and maintaining the exercise by simulating, monitoring, controlling and facilitating activities to ensure that the exercise remains within the design parameters. It also involves documentation of the participants' activities and termination of the exercise.

Review: The review phase consists of collecting and analysing data, documenting findings and recommendations for improvement, and ensuring information is fed back to management. As the contingency plan is revised and updated, the exercise programme is similarly adjusted to take into account the lessons learned from prior exercises.

Several **actors** are crucial when a training exercise is performed:

Exercise Coordinator: The Exercise Coordinator is charged with the overall management of the exercise activity, including the design, development, conduct and review phases. Neither the coordinator nor those who may later assist him in running the exercise should participate as a player.

Steering Group: In a fuller scope exercise that has many objectives and involves several parties, it will be necessary to establish a small exercise Steering Group, chaired by the Exercise Coordinator and comprising four to six people representing the major participating organizations. The Steering Group has the responsibility of developing the exercise, arranging for all facilities and services, and coordinating its various parts and parties.

Evaluators: Evaluation of exercise activities begins during the exercise as the designated evaluators observe team members' responses and compare them with the expectations of exercise objectives. Evaluators should be elected carefully and provided with some training to allow them to perform their tasks well.

4. THE ROLE OF THE FORECASTING SYSTEM

In the event of an emergency situation in the marine or coastal environment that can lead to a pollutant spill, the responder has to address many questions to be able to face to the emergency. What is the situation right now? How this will evolve in the next hours and days? What is (are) the product(s) involved in the accident? What is the typical behaviour of the spilled products? Will it evaporate, float, sink or dissolve? What should be our first concern? Where is going to travel (drift, disperse) the product. Based on the vulnerability (sensitivity) of the coastline, how the spill is going to affect the receptors / receiving habitats? What is the best response option available for this particular event?

Many of these questions can be answered through the use of numerical models. Nowadays, numerical models can provide a relatively accurate picture of the situation in the near future (i.e. generate forecast). Increasingly in the past decade, operational modelling has being part of the decision making process. Numerical models can complement information beyond the present situation covered by observation systems, providing forecasts of the marine environment and predicting the transport, dispersion and fate of a pollutant spill. Numerical models can provide for example information of the potential hazardous areas near the incident, allowing the responders to take a better-informed answer.

While the science progresses, the responders are encouraged to request more from the operational modelling. It is important to note that, in addition to their scientific accuracy and operational availability, the model results should be integrated with the existing observational system and provide meaningful information. To achieve this, operational modelling has to integrate state-of-the-art numerical models and technological solutions that facilitate the near-real-time communication between different types of systems, observations, models and decision making.

Moreover, since when a spill happened, the early hours are crucial to draft a response plan, decision support tools must be ready in order to give a timely answer. Also, all the gaps and bottlenecks in the communication chain must be previously solved. This issue involves the quickness of the numerical model, but also the readiness of the forecasting team as well as the pre-processor tools (to ingest spill and met-oceanographic data) and the post-processor system (to disseminate outputs, maps, reports…). These issues that usually are not considered by modellers become critical when the numerical forecast is inserted in a contingency plan.

Next figure summarize this idea. Here, the spill forecasting response is seen as a whole with four parts: Detection and Monitoring, Numerical Forecast and Dissemination of the forecast.

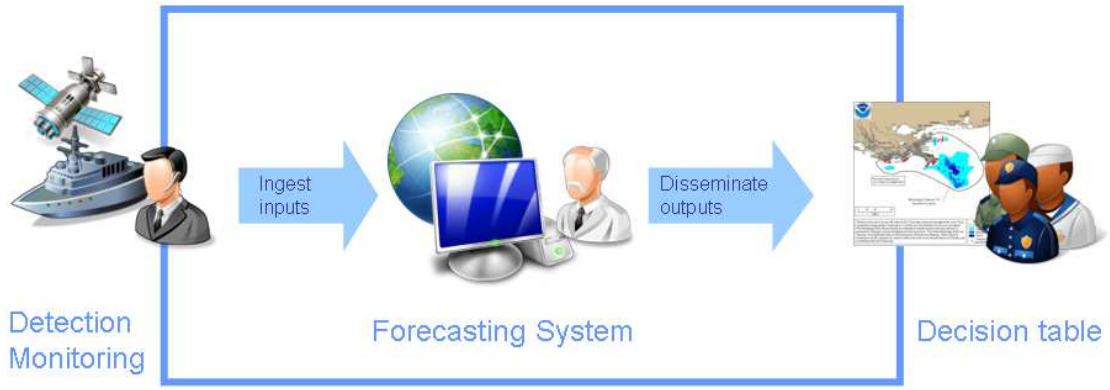

Fig. 2. Forecasting system considered as a whole, composed by Detection and Monitoring ingesting procedures, Modelling core and Dissemination of outputs to the decision table.

In this schema, Detection and Monitoring were referred together since the procedures to ingest data from them are very similar.

To clarify concepts, we can define the forecasting system as a set of hardware, software, people and procedures with the mission to create a picture of current situation of a spill, forecast the drift and the behaviour of it, and distribute clear, accurate and timely information about it.

The forecasting system is formed by the forecasting equipment, a set of computational elements (hardware, software, network, etc.) and the forecasting team, specialized people using the equipment to create a reliable forecast.

On the other hand, the forecasting equipment is composed by three elements:

Numerical model/s system: It is the actual core of the system. It consists in one or several programs in charge to solve numerically the equations of the spill behaviour in order to give a forecast. Usually, this/these numerical model/s were feeding with forecast outputs from meteorological and hydrodynamic models. These models could be run by the same equipment or download routinely from another numerical modelling institution. It is noticeable that meteorological and hydrodynamic model usually consume much computational time than spill models. That means that it should be run before the contingency in order to give a quick forecast.

Ingesting and pre-processor tools: Set of procedures and tools to transform notifications and data (included outputs from meteorological and hydrodynamic models referred above) in order to be usable by the numerical models. Examples of these procedures could be the transformations of the coordinate system where the spill location was notified or the modification of hydrodynamic and meteorological outputs formats in order to be used by the spill model. All these tasks are time consumers during a contingency and they should be minimized.

Post-processing and dissemination tools: These tools and procedures are in charge to transform numerical outputs, usually binary data files in a timely, clear and accurate forecast to be used for planning the response. Moreover, this information must be quickly and safely disseminated to the personnel designated by the contingency plan. These tools are usually conversion tools, GIS, databases or graphic software but also internet services, WebPages or, nowadays, tablet and Smartphone apps.

Operational management system: It is in charge to maintain and keep ready the system to be used when necessary.

Next image summarizes the compounds of a forecasting system described above:

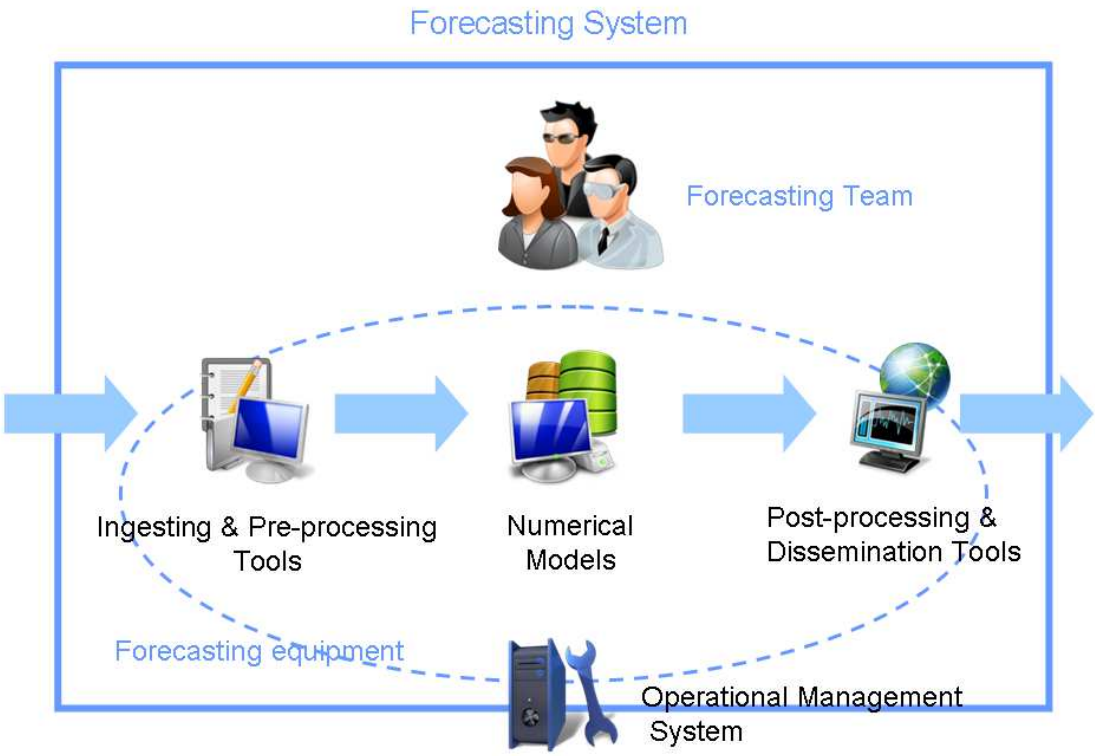

Fig. 3. Description of a forecasting system, formed by a forecasting team and the forecasting equipment, and maintained by an Operational Management System. Blue arrows indicate the direction of the information.

Regarding this schema, a forecasting exercise should train not only the numerical model but the capability to ingest information from outside and to deliver a clear forecast to the right people in time as well as the readiness of the system to respond to an unexpected spill at any time.

5. CLASSIFICATION OF FORECASTING EXERCISES

As a usual spill exercise, forecasting training exercises can be classified as:

- Notification exercise: In this case, the availability of the forecasting team will be tested. At the same time, communications for ingesting inputs and share outputs will be also checked as well as the readiness of the procedures and tools to run efficiently a model. At least once a year, a notification exercise should be conducted during no-business hours.
- Tabletop exercise: The best ways of modelling a simulated scenario will be discussed around a table, regarding several inherent aspects of a contingency: lack and inaccuracy of the input data, dependency of specific boundary conditions, resolution, etc. and the quickest and more efficient way to share the results. Models will not be run during this kind of exercises.
- Equipment deployment exercise (Forecasting exercise): Forecasting system will be used to simulate a scenario. Some specific aspects will be how long it takes to give an answer, the format of inputs or how to synthesize all the output data in understandable and usable information. It is noticeable that, since the forecasting system is based on communications, people and software, very big exercises can be performed without displacements of personnel and equipments, and so without a big budget. This fact can be an advantage when an exercise is programmed, but also, it can take realism and motivation off the exercise.
- Incident management exercise: In this kind of exercise, the model team will be inserted in the response team to help the decision board. Moreover, simulations will be used to give realism to the exercise, drawing the most probable movement of the spill.

6. PLANNING AND CONDUCTING MODELLING EXERCISES

As it was mentioned before, the planning process of a forecasting exercise will have the same four activities as a regular exercise: Design, Develop, Conduct and Review with the same actors and tasks as a usual exercise (view IMO/IPIECA Guide, 1996). In this part we will focus on some aspects that a forecasting exercise should take into account:

- Design: This activity sets up the objectives and scope. Usual objectives will be:
    - Speed of response: How long does it take for the forecasting team to give a first preliminary forecast? And a second more extensive forecast?
    - Forecasting team expertise: Is the team prepared to give a forecast? And to overcome some uncertainties and doubts? Do they know the limits of applicability of some implementations of models and boundary conditions? How to decide between several simulations?
    - Adequacy of forecasting equipment and its deployment: Is the system (not only the model core) prepared to give a quick response? Is the implementation of the model adequate to be used in that case?
    - Management and Dissemination of information: This is a critical task, since the forecasting team has to assure that the information is precise and useful, short and effective. Is the spill notification clear and accurate? Are these reports received by the right personnel and in an adequate way? Are the formats of the reports and maps clear and easy to understand?
    - Management of complaints and claims: Is the forecasting team available to justify its decisions? How to deal with complaints?
    - Relations with external agencies: Is the team integrated in the response team? Is the team capable to integrate information of other external agencies?
    - Relationship with general public: Is the forecasting information being sharing with public? Is forecasting in the Contingency Plans a subject to external scrutiny?

  All of these objectives can be tested in one only exercise or separately. It is highly recommended that exercises "initially be kept simple with relatively few objectives to allow team members to become acquainted with the plan and gain experience. Similarly, it is wise to test internal elements first before involving external agencies and activities. Two or three primary objectives are better than a long list of secondary objectives" (IMO/IPIECA, 1996)

- Develop: In this case, the Exercise Coordinator will be established and the virtual incident details will be provided. It is very important that the Coordinator has strong experience

dealing with contingencies in order to provide a realistic situation. Therefore, some situations and specific aspects will be simulated as lack of information, not detailed location of spill, stress of public media, etc.

- Conduct: As the same as a regular exercise, firstly every participant should receive some instructions about the exercise, and then the exercise will be initiated and conducted. Since a modelling training exercise will be carried out mostly in offices, conductors should try to perform the virtual incident as realistic as possible, maintaining the pressure and introducing some aspects of a real crisis.
- Review: In this case, tasks as collecting data, analysing events, finding reports and giving recommendations should be focused on modelling aspects. The evaluation will be guided by the objectives of the training exercise. This evaluation must check a) the accuracy and skill of the model to forecast the movement of a spill; b) if the information reached right players in the right format and on time; c) the ability of the modelling team to provide a forecast and d) the capacity of the rest of the players to integrate and use the information coming from the modelling group.

In order to set some criteria keys to evaluate the modelling team, the following file cards were elaborated:

OBJECTIVE

Speed of Response:
To evaluate the capability to send a forecast report in time

SUB-OBJECTIVE	EVALUATION CRITERIA KEYS
To discover the neck bottles Since a forecast is required until forecast report arrives to management team	Pre-processor delay (from the notification time to run the model)
	Time to run the model
	Time to give a first preliminary forecast
	Time for a second more extensive forecast
	Postprocessor delay: to prepare a forecast to send

OBJECTIVE

Modelling team Expertise:
To evaluate the expertise of modellers to give a reliable forecast

SUB-OBJECTIVE	EVALUATION CRITERIA KEYS
To evaluate the capability of use the system model and overcome doubts and uncertainties of modelling	Capability for using the forecasting system and solve problems.
	Adequacy of the implementation of the model (parameters, performance, 3D/2D,…)
	Team's knowledge regarding the limits of applicability of the modelling configuration
	Asses the accurate of the forecast
	Capability to explain the discrepancies of the forecast and modify criteria with new data

OBJECTIVE

Adequacy of "equipment" and its deployment
To evaluate the capability of the system to give a quick response

SUB-OBJECTIVE	EVALUATION CRITERIA KEYS
To asses the readiness of the system to produce a quick forecast	Readiness of the system to work
	Capability of ingest data with minor changes (coordinates systems, formats)
To asses the adequacy of the system to ingest and output information	Adequacy of used forcements for that problem
	Capablility to produce several model outputs

OBJECTIVE

Management and dissemination of the information
To evaluate the capability of receive right notifications and send a clear answer

SUB-OBJECTIVE	EVALUATION CRITERIA KEYS
	Capability of receive clear notifications with all necessary information.
To evaluate the capabilities to receive clear information to set up the forecasting system	User-friendly and clear distributed documents
	Capability of merging forecast maps with other data and maps
	Knowledge who is the people that must received the information and how to send this information
To evaluate the capability to send a clear forecast to the right responsible	Established and fulfilled a level of security of this information
	Existence of a spokesman in order to clarify any doubt
	Right use of the forecast without misleading information by the management team

OBJECTIVE	
Management of complains and claims	
SUB-OBJECTIVES	**EVALUATION CRITERIA KEYS**
To deal with complaints.	Existence of a spokesman in order to deal with complaints and justify the criteria of action.
To evaluate the capability to justify the decisions (not only regarding the model)	Existence of a register of actions and decisions.

OBJECTIVE

Relationship with other teams of Contingency plan and with external agencies

SUB-OBJECTIVE	EVALUATION CRITERIA KEYS
To evaluate the adequacy of the modelling team in the response team	Modelling team's knowledge of contingency plan
	Integration level of the modelling team in the response team
	Capability to share information with other teams and agencies.

OBJECTIVE	Relationship with general public
SUB-OBJECTIVE	**EVALUATION CRITERIA KEYS**
To evaluate the capability of the modelling team to be consulted by general public	Capability of sharing results with general public when permitted
	Designated Spokesperson to talk with media when needed
	The team is proactive to provide information, documents, etc

To facilitate the work of evaluation next file card box may be used:

EVALUATION CRITERIA KEY	ACTIONS	DELAYS	ASSESMENT		SUGGESTIONS FOR IMPROVEMENT
			STRONG POINTS	WEAK POINTS	

Table 1. File card to asses the actions of the forecasting team by evaluation criteria key.

EVALUATION CRITERIA KEY	ACTIONS	DELAYS	ASSESMENT		SUGGESTIONS FOR IMPROVEMENT
			STRONG POINTS	WEAK POINTS	
Capability to receive clear notifications with all necessary information.	- Phone call with a spill notification with location, time and spill characteristics. - No new notifications were received but new slicks were observed	- A new phone call was necessary to ask about if time is Local Time or in UTC - Spill location coordinates were transformed to another coordinate system to be ingested by the model	Information was received Fast and Communications were fluent. All the necessary data were collected by the responsible of the notification.	- Used time system is not unique or is not well established - Coordinate system is not unique or model system cannot ingest data in other coordinate systems. - There isn't a procedure to claim for data of new observations or procedures are not established	- Use an unique time system - Modify numerical model to ingest location data in several coordinates systems - Establish procedures to claim or receive new observations data.

Table 2. Example of filled file card with one evaluation criteria key.

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8. ACKNOWLEDGEMENTS

We would like to thank to Javier Menéndez (SASEMAR), Eric Comerma (ASA) and Vincent Gouriou (Cedre) for their valuable comments and help. Many thanks also to Gardacostas de Galicia staff who provide logistic support and very helpful comments during the development of this guide.

9. ANNEX I

During ARCOPOLplus project INTECMAR carried out 7 exercises in order to train the four aspects (detection, monitoring, forecasting, and information dissemination) of a spill crisis as part of a single system. Special emphasis on training the modelling team to assure the usefulness and integration of forecasting tools in response operations was placed.

These exercises were conducted in the framework of Plan CAMGAL (Galician Regional Contingency Plan) in coordination with Galician Coast Guard. At time of this design and planning IMO/IPIECA guidelines were tacked into account.

Thanks to the development of those exercises problems regarding to the accuracy of the model inputs, bottlenecks during the transmissions of the information, or difficulties for synthesize several different outputs in a simple figure that helps to the decision table board to deal with the accident, were revealed.

This annex reports a description of the conclusions and recommendations obtained during these exercises. All the information generated during the exercises both lacks and strengths were tacked into account for the development of this guideline.

Fig. 4. Drifter buoys deployed during an exercise

9.1 First Exercise

GENERAL INFORMATION

Name: Marín 2012 **Data**: 04/06/2012 **Type**: Equipment deployment

Scenery: An oil spill in the Pontevedra estuary is reported. Regional Contingency Plan is activated. INTECMAR must do the drift and forecast of the slick

OBJECTIVES

- Test the tools developed in ARCOPOL project to follow the movement of the slick and test the capability to forecast the drift of pollutant over time.
- Test the use of ARCOPOL viewer as management system. Several kinds of data as static data (coastline, ESI line, special protected areas, etc), model results (winds, currents, spills) and observations (drifter tracks, pictures, spill observations, etc.) will be disseminated using this tool.

LESSON LEARNT

- The simulations performed have been made with sufficient time to be useful.
- The forecasting team provided useful, short and effective information. Management system through the web viewer has proven as an effective and versatile monitoring tool. The dissemination of results was safety and optimal.
- Aerial photographs, although in this case more processing time is needed, were disseminated in an acceptable time.
- A lack in automaticity of the processes of transmission and publication of information especially in the drifter data was detected.
- A lack of memory resources is denoted when serving the page viewer so it is recommended to increase this type of computational resources.

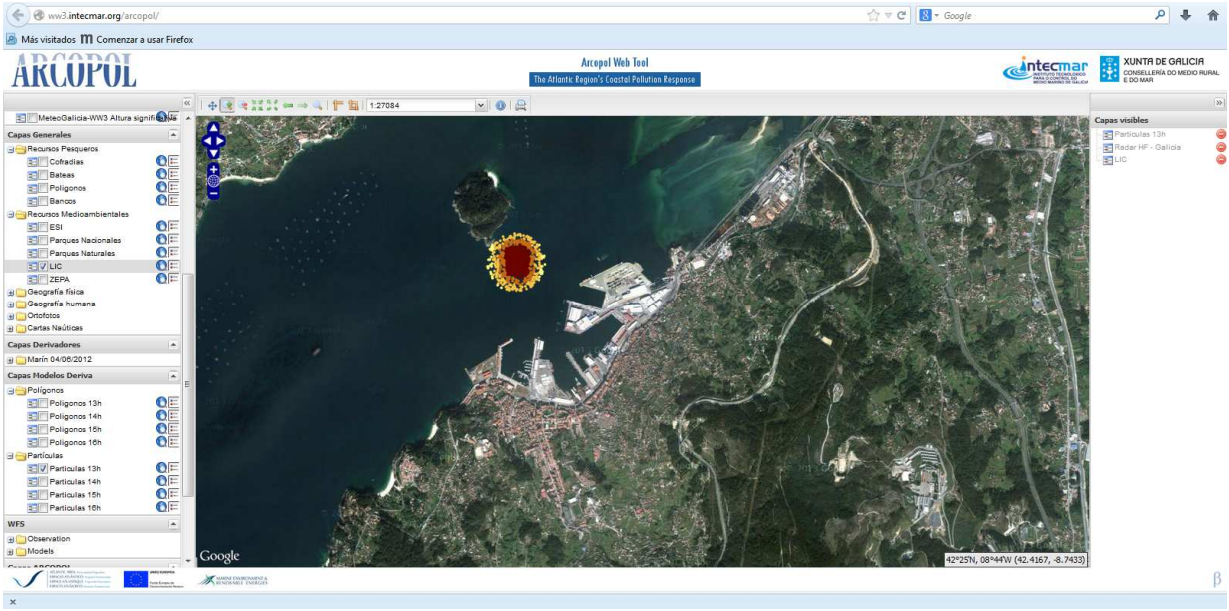

Fig. 5. ARCOPOL viewer

Spill forecasted during the Marín 2012 exercise.

9.2 Second Exercise

GENERAL INFORMATION

Name: Exercicio CAMGAL **Data**: 17/10/2012 **Type**: Notification

Scenery: The merchant vessel TORM Almene with Singapore flag, suffers a mechanical failure being adrift without rudder or razor in the N 43 ° 46.525 '-8 ° 48,914' W. The vessel carries, among other cargo, 20,000 tons of Toluene. It will be monitored until the problem is fixed.

OBJECTIVES

- To train the procedure to activate and to deactivate the Regional Contingency Plan (Plan CAMGAL)
- Strengthen coordination between stakeholders.

LESSON LEARNT

- First of all is important to know the information regarding the chemical pollutant.
- Until you know which is the exclusion zone don't send the staff.
- Improve the knowledge about the intervention teams for HNS is needed..
- Install the chemical disperse in water software in INTECMAR is recommended.

9.3 Third Exercise

GENERAL INFORMATION

Name: Monte ENXA **Data**: 17/10/2012 **Type**: Tabletop exercise

Scenery: The merchant vessel TORM Almene with Singapore flag, suffers a mechanical failure being adrift without rudder or razor in the N 43 ° 46.525 '-8 ° 48,914' W. The vessel carries, among other cargo, 20,000 tons of Toluene. It will be monitored until the problem is fixed.

OBJECTIVES

- Strengthen coordination and operational cooperation for combating marine pollution between involved partners.
- Train the information exchange between SASEMAR UOP and Galician Coastguard

LESSON LEARNT

- The protocols for exchange the data during an emergency between the institutions are not established.
- The main actors for the exchange of information were identified. This information will be included into the communication protocols of the Regional Contingency Plan (Plan CAMGAL).
- First model simulation should focus on determining a exclusion area to work around the plume

9.4 Fourth Exercise

GENERAL INFORMATION

Name: CAMGAL2 Exercise **Data**: 17/02/20123 **Type**: tabletop exercise

Scenery: An oil spill in the Arousa estuary is reported. The position of the spill is not available at the beginning of the exercise

OBJECTIVES

- To train the procedure to activate and to deactivate the Regional Contingency Plan (Plan CAMGAL)
- Strengthen coordination between stakeholders

LESSON LEARNT

- Spill notification protocols should be established
- People who the simulation will distribute to should be define previously.

9.5 Fifth exercise

GENERAL INFORMATION

Name: Escarabote 2013 **Data**: 23/05/2013 **Type**: Equipment deployment

Scenery: An oil spill from land to sea is reported. The movement of the slick is threatening industrial and touristic activities on the coastline. Close to oil spill are floating mussel farms, a small marina and the mouth of a major river.

OBJECTIVES

- To train the procedure to activate and to deactivate the Regional Contingency Plan (Plan CAMGAL)
- Test the modeling team knowledge of contingency Plan.
- Test the integration level of the modelling team in the response team

LESSON LEARNT

- Modelling team was capable to receive clear notifications with all necessary information.
- Establish procedures to claim or receive new observations and data
- Use a Unique time system

Fig. 6. Escarabote exercise. Debriefing

Fig. 7. Barra exercise. Track used as coordination and meeting room.

9.6 Sixth exercise

GENERAL INFORMATION

Name: EMSA 2013 **Data**: 26/07/2013 **Type**: Equipment deployment

Scenery: An oil spill in the Vigo estuary is reported.

OBJECTIVES

- Test the use of Aquasafe Oil Spill Simulator OSS
- Test the use of ARCOPOL viewer as management system. Several kinds of data as static data (coastline, ESI line, special protected areas, etc), model results (winds, currents, spills) and observations (drifter tracks, pictures, spill observations, etc.) will be disseminated using this tool.
- Check the effectiveness of forecasting system during the holiday period.

LESSON LEARNT

- In terms of forecasting is very important to know the type of fuel. Have a table with the different types of fuel is recommended.
- Aquasafe Oil Spill Simulator OSS must work without the INTERNET connexion because this connexion not always is available.
- Expand the training with Aquasafe Oil Spill Simulator to people from modelling team who do not normally work with it is recommended in order to avoid problems during the holiday period

Fig. 8. Observer team using a movile phone to transmit the information during the EMSA 2013 exercise

Fig. 9. Authorities receiving the information through tablet and phone devices.

9.7 Seventh Exercise

GENERAL INFORMATION

Name: Domaio 2013 **Data**: 06/11/2013 **Type**: Equipment deployment

Scenery: A vessel docked at the pier is doing bunkering operations when the overflow of one tank causes a spill of IFO 180. The fuel spilled causes compact slick that threatens to reach to the nearest mussels rafts. Moreover, various fragmented slicks are scattered in the central channel of the estuary.

OBJECTIVES

- To test several tools developed in the frame of ARCOPOLplus, ARCOPOL viewer and data manager, drifting models, the SCAT app, and the camera for taking georeferenced photos from helicopter.

LESSON LEARNT

- Tablet application to report a POLREP was tested. Some bugs and connection problems was detected.
- Multipurpose table application was not very useful to look for drifters. A new app should be developed specific for this objective.
- It is very important to explain the outputs of the models (accuracy, discrepancies,…)

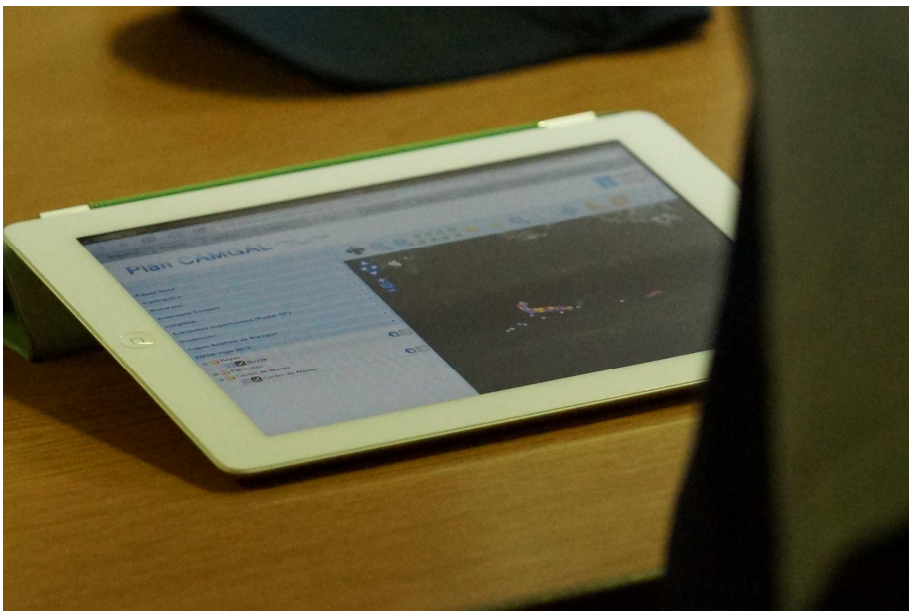

Fig. 10. Arcopol Viewer over a Tablet showing model outputs.

Fig. 11. During the exercise, Arcopol Plus Apps for tablets and smart-phones were tested