

PREPARE Analytical Platform

Introduction

Catastrophic events are defined by the impact of natural or man-made phenomena (usually referred to as hazard) on vulnerable societal assets (human life and social conditions, economy, environment, etc.) causing potential future losses (risks). One of the objectives in research is to develop scientific methodologies or tools to reduce or mitigate risk. In recent years a research activity has emerged trying to learn from disasters in a multi-disciplinary way to better understand the event and the consequences.

Following Fukushima, many organisations in Europe have set up working groups trying to analyse the event and to predict its future development. In most cases, these working groups had no clearly defined workflow but were driven from requests from mass media, politicians and the public. Several times the working groups had different input data for their assessments leading of course to different conclusions. Decisions taken by foreign countries aiming at protecting their citizens in Japan were based on these expert assessments resulting in diverging actions e.g. in evacuation of foreign citizens in Japan, iodine prophylaxis in Japan and monitoring of their citizens returning home from Japan. This of course created confusion among the public. Europe as the array of more than 30 countries with various cultural backgrounds and differences in administrative culture needs a common information source where national experts could find information about the event and input data for their assessments.

In the framework of the European project PREPARE (“Innovative integrated tools and platforms for radiological emergency preparedness and post-accident response in Europe”, EC FP7-EURATOM-FISSION GA 323287), the work package WP2 is devoted to the development of an Analytical Platform (AP) so that it may be a focal point for collecting information, analysing any nuclear or radiological event and providing information about the consequences and its future evolution.

The use of a diverse set of methods has been envisaged:

- Automatic information extraction (crowd sourcing) using social networks, Twitter and the Internet in general to retrieve information about an event and obtain an early warning capability.
- Knowledge data bases that contain information about historic events, their propagation with time and which countermeasures have been applied successfully. This data base can be also extended with scenarios defined in exercises with experts.
- Methods that provide information about the uncertainty of incoming information describing the event.
- Case-based reasoning that comprises machine learning algorithms to find solutions for events that are not part of the existing knowledge data base.
- Communication means for the experts to analyse an on-going event (virtual meeting room).

The general idea is to provide an easy access platform for information exchange in time of nuclear or radiological crisis, allowing analytical discussion between experts on an expert-level, and a wide spread of congruent information on the current situation on a lower level to the public community.

Furthermore, crowd sourcing facilities would be used to quickly adapt to the development of the situation and to analyse and respond to the arising questions of the public.

Structure and description of the Analytical Platform Response Framework

The PREPARE Analytical Platform (AP) provides a framework as it has been designed and developed with the purpose to allow analytical discussion between experts on an expert level and to widespread congruent information on the current situation on a lower level to the public community. Furthermore crowd sourcing facilities should be used to quickly adapt to the development of the situation and to analyse and respond to the arising questions of the public.

The AP is composed of 3 types of tools (see figure 1 below):

- Tools for facilitating **expert-to-expert interactions**, including
 - A **case-based reasoning tool** that comprises machine-learning algorithms to find solutions for events that are not part of the existing knowledge database.
 - A **multi-criteria analysis tool** for evaluating the effects of potential sets of measures to be taken.
 - Communication means for experts to analyse an on-going event (**virtual meeting room**)
- A **web-crawling tool** allowing the collection and processing of information from all possible sources.
- An **“ask the expert” tool** aiming to **communicate to the public** about assessments and the future evolution of the event and answering questions from the public.

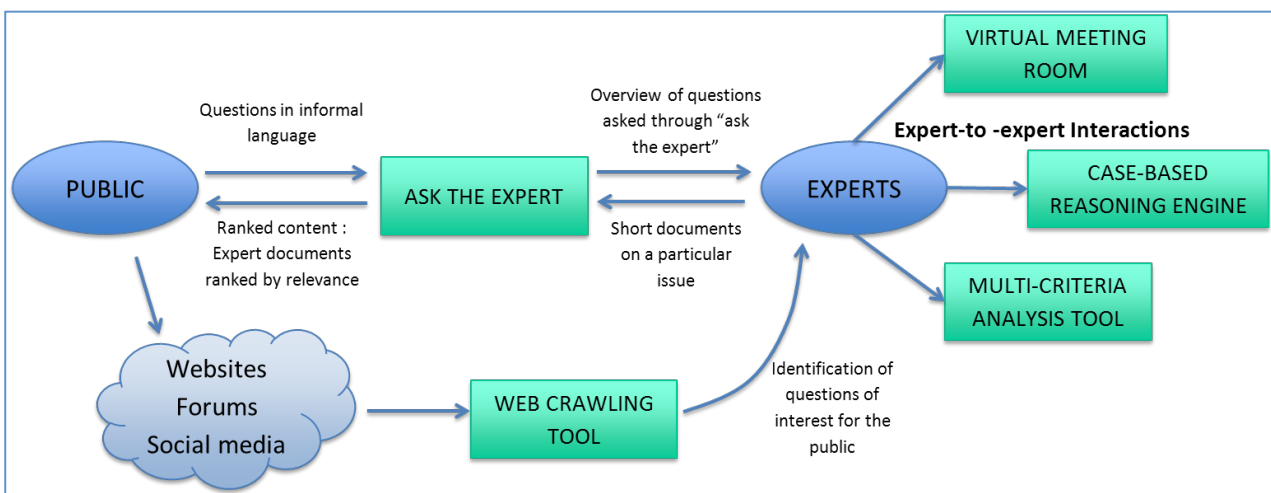


Figure 1: Interactions with the public and the experts through the PREPARE AP tools.

The AP will provide information management by collecting, analysing and disseminating event/incident or related information at the level of the AP. Through their analyses, the AP will provide a variety of specific products and information to the experts, authorities or other internal and external specialists and stakeholders including public.

The AP will have the necessary means to process requests for information; manage records; develop reports, briefings within meeting rooms and presentation products; collect and gather information; perform information analysis using the knowledge database; develop and integrate geospatial and technical information; and develop material to support public messages.

The experts taking part in the AP will be grouped according a general Response Framework as shown in the figure 2.

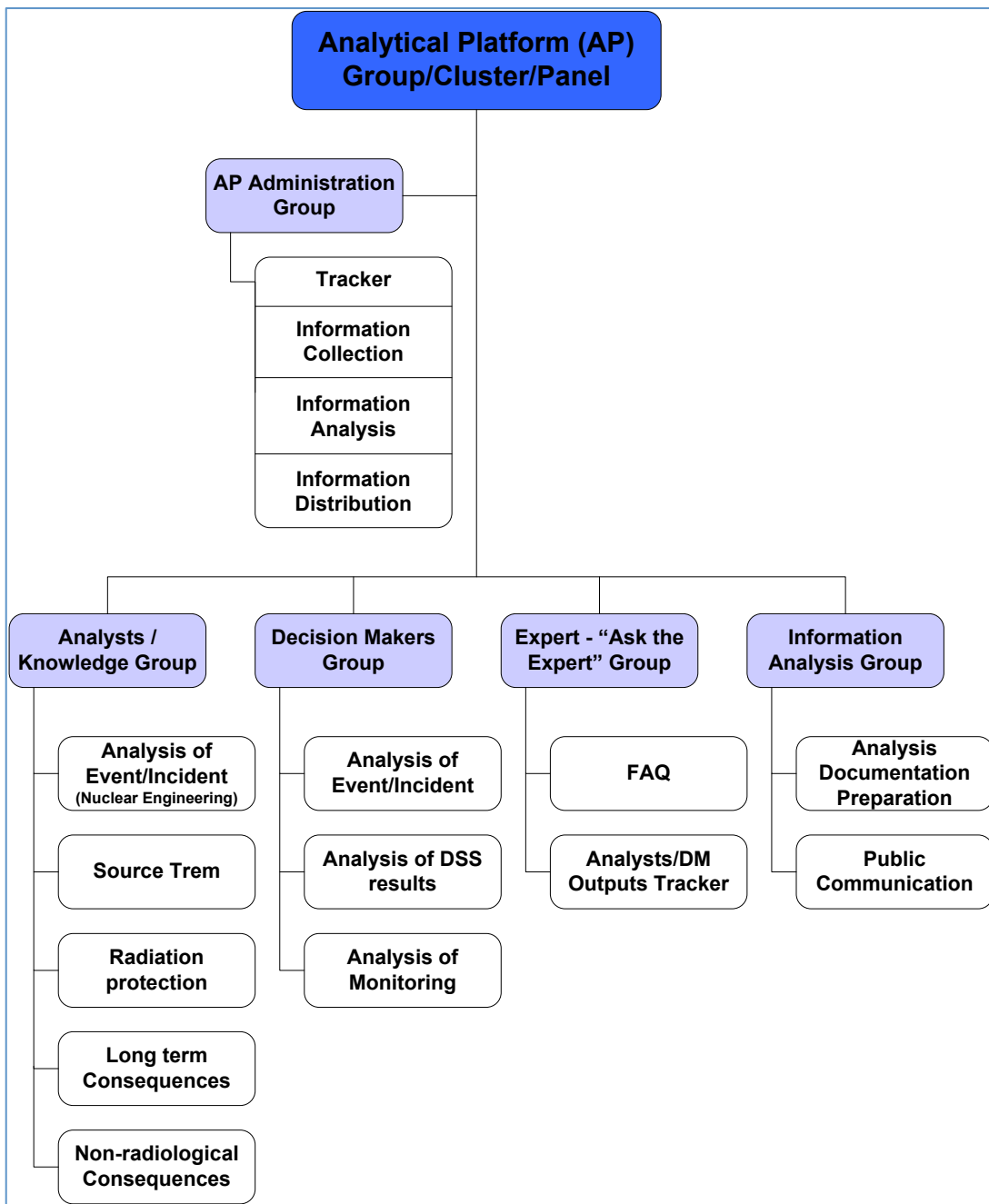


Figure 2: Analytical Platform Response Framework



Under this framework the information will be compiled and analysed and data will be collected through each designed specific function and will produce relevant products from which the experts, authorities and other stakeholders (internal or external) can make decisions affecting their specific support to an event/incident, including information provided to the general public. The sources of this information may include knowledge in terms of previous cases and vocabulary stored in a knowledge database, public social media sources (e.g. Twitter or newspaper web presences, locally available sub components like sources from the concerned administration), geoinformation and modelling, weather forecasts, specialized or technical information.

AP will support informed decision-making through the development and maintaining the common picture of the event and will serve as the single point of reference for event/incident information management.

About the functioning and governance of the Analytical Platform

The use of the AP by experts will be organised on the basis of a registration of the interested experts and a set of rules of good use to be determined after the analysis of the questionnaire.

The added value of the AP does not only lie in its technical aspects but in the trustworthiness of the information it provides. The information will be owned by the expert that provides it. Only after agreement it will be shared with others and opened to the public.

The management, operation and maintenance of the AP along the time are open questions: advantages and disadvantages of possible options (as an own capability offered by the EC, by an international or private organization or as another tool / capability of the NERIS Platform) will be object of consensus among the potential contributor users.