

Addressing cascading crises in Europe

Olivia Cahuzac describes a European project that seeks to improve how EU member states – especially their first responder communities – understand and mitigate cascading effects in a crisis

The triple disaster of earthquake, tsunami and nuclear reactor failure that Japan faced on March 11, 2011, illustrated that a: "Country's vulnerability to disaster can go beyond natural hazards, to incorporate (and combine with) risks caused by 'man-made innovations' in industrialised nations" (United Nations University – *Lessons for Japan from the World Risk Report 2011*). Japanese disaster managers had not planned for such a catastrophic scenario, so the country's infrastructure – and the Fukushima nuclear power plant in particular – was not equipped to resist the events of that day.

This case illustrates the potentially devastating consequences of cascading effects in a crisis. Cascading – or domino – effects, can be defined as an 'unforeseen chain of events owing to an incident, deliberate act or

natural disaster that can lead to major damage to infrastructure and risk to human lives'.

As today's crisis situations become more complex, it is vital for crisis managers to take such cascading effects into account. Indeed, more and more crises cross borders and affect many different actors. Large-scale disasters can easily disrupt the proper functioning of critical societal services, including health, supply chain, safety, security or economy. This is mainly the result of increasing dependencies between different sectors of society, industry and nations.

And the European Union has not been exempt from such disasters. Flooding across Europe in 2002, and recently in Central Europe in 2013 and 2014 (p42), have shown that a natural crisis can trigger further disasters. For example, much of Europe's critical infrastructure is located close to rivers. So far, civil protection

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authorities have managed to prevent any domino effects, but the risk remains.

These examples show that research is required to analyse cascading effects and to map and understand dependencies between critical infrastructure at the European level. There is also a need to develop solutions that will improve the preparedness of first responders and decision-makers in crisis management. Indeed, better training for these groups will contribute to more efficient crisis management and will help to limit damage and spill-over effects.

The Predict project – Preparing for the Domino effect in Crisis Situations – was launched in April 2014 with these objectives in mind. Predict is a three-year research project co-funded in the framework of the European FP7 programme. Its consortium,



led by the French Commissariat à l'Énergie Atomique et aux Énergies Renouvelables (CEA) is composed of four research and technology organisations (RTO), two small to medium size enterprises (SMEs), two industrial market players and three end-users. The consortium represents six European countries.

The aim is to provide a comprehensive solution for dealing with cascading effects in crisis situations. It will deliver a solution composed of: Methodologies; models; and software tools.

The methodologies developed in the project will be derived from an in-depth study of cascading effects and an assessment of their probability in various crisis situation scenarios. It will then propose methodologies for building scenarios and measuring threats.

Simplified models will be developed to enable assessment of the resilience, robustness, functionality and interconnectivity of complex systems in crisis situations. Finally, the Predict partners will develop two software tools. The first of these will be a foresight and prediction tool to support crisis managers in simulating the evolution of cascading effects and their impact in a given crisis involving various actors and sectors. The second is a decision-support tool to help crisis managers determine the best course of action and to calculate the risks associated with it.

The tools will be tested by crisis response organisations to develop a solution that improves their training and response capabilities. The methodologies can also support policymakers and authorities in the field of civil security in their decision-making processes.

Throughout the project, the partners will present their findings to the identified end-users, gathering their requirements and needs for developing the tools. This will ensure that the outcome of the project corresponds to identified needs and that the developed solutions can readily be implemented by the end-user organisations.

This strong focus on end-users is one of the core values of the project, reinforced by the fact that three end-users are part of the consortium itself: International Union of Railways, the Finnish Environment Institute (SYKE and South-Holland-South Safety Region (VRZHZ).

With their support, three different case studies will be developed within the project:

■ **Case 1:** Flooding in densely populated areas (Netherlands);

■ **Case 2:** International Railway Emergency (incident at the German-Dutch-Belgian border); and

■ **Case 3:** International maritime incident (Finland)

Through a series of engagements with end-users around these scenarios, the Predict partners will assess their understanding of cascading effects in crisis management and seek their ideas and requirements with respect to information and decision support systems for their operations. End-users will also provide feedback on the functionalities of the tools being developed. At the end of the project, three table-top exercises will be organised to test the final versions of the tools.

Engagement

In addition to engaging with end-users through these three scenarios, workshops will be organised for a wider network of external end-users. The Compagnie Européenne d'Intelligence Stratégique (CEIS) is in charge of reaching out to end-users and of managing these workshops. CEIS has a strong experience in connecting various communities of end-users and of facilitating the dialogue and exchange of best practices between these various stakeholders. The chosen format of gathering end-users in a working session has proven very successful in previous

European projects. It has also contributed to creating a community of trust between end-users from different Member States.

The first Predict workshop was organised in Paris on October 2, 2014. The event attracted 13 end-users, representing 10 European Member States and was useful in introducing participants to the concept of cascading effects.

The first results of the project were presented and discussed, and participants were interviewed about their experience of managing crises and using tools.

All in all, the user-centric dimension in a European-funded project is crucial. It is, however, not without challenges. If it is important that European funding serves to solve concrete issues that practitioners face, translating models and technical knowhow into real solutions is not always easy. Projects such as Predict must find a compromise between the end-users' needs and what the research can actually develop, bearing in mind budgetary and financial constraints.

In addition, European projects address transnational issues and therefore must develop solutions that can be implemented in different Member States, although this can be complicated by the fact that these states might have different organisational processes in place.

Despite these challenges, projects like this are a good opportunity for end-users to build a network of contacts and exchange best practice with their colleagues from other countries. As crises in Europe are often cross border and therefore managed by several Member States, processes and tools need to be interoperable and the Predict project can contribute to this effort.

Finally, in line with the FP7 objectives, projects such as this also contribute to strengthening the scientific and technological base of European industry, and encourage its international competitiveness, while promoting research that supports EU policies. The Predict project is still at an early stage. However there is no doubt that its findings, complementing those of hundreds of projects funded within the EU's research programmes, will improve the way the European Member States and – the first responder community – understand and mitigate cascading effects during crises. CRJ

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European Office, one of the partners within the Predict project consortium. More information from: www.predict-project.eu

Research and Technological Development in the EU

FP7 is the Seventh Framework Programme for Research and Technological Development, the EU's main instrument for funding research in Europe between 2007 and 2013. Its objectives are grouped as follows: Co-operation; ideas; people; and capacities. Following the end of the FP7 programme, the EC launched Horizon 2020, allocating around €80 (\$99) million to this programme, which runs from 2014 to 2020.

