

Press release, 31 May 2012 at 9:00 CET

## Minimising the outcome of disasters by simulating the effects of different actions

The CRISMA project aims to improve Europeans' safety and security

**The European CRISMA project prepares for disasters by developing a decision-support tool to help the authorities, responders, communities and private parties to prioritise the most important measures for saving lives and mitigating the effects of the crisis.**

The CRISMA project, co-ordinated by VTT Technical Research Centre of Finland, is developing a planning tool for crises with immediate, extensive, and often irreversible consequences to the population and society. Crises of this type include natural disasters, toxic emissions, forest fires, and aircraft accidents.

The purpose of the CRISMA project is to improve the safety of Europeans by providing information on disasters and the effects of the various decisions and measures applied to address the crisis. The goal is to use modelling and simulation technologies for evaluating the effects of the measures taken on hypothetical scenarios. Research helps decision-makers to identify the most efficient means to prevent losses of life and damage to property.

The project develops solutions to complex crisis scenarios, which can result in massive damage and that require co-operation among various authorities and private parties, including trans-boundary cooperation. The project helps to provide crisis-management decision-makers with information on how extensive disasters should be prepared for, what measures are available during a crisis, and what their effects are.

An integrated modelling system is being designed in the project to simulate both the most likely of crisis situations and more remote scenarios, the required measures, and their effects. Domino and multi-risk effects are also to be taken into account: the integrated modelling system will give opportunities to assess impacts of natural disasters on chemical, nuclear and other industrial activities, critical infrastructures, etc. The system will be used for both short and long term planning, and training purposes.

The integrated modelling system will support comparison among alternatives and evaluation of possible effects of actions and investments, e.g.: Is the planned location for the protective structure correct? What evacuation options should be considered? Should certain areas be zoned as residential or industrial in the land-use plan – or is it best not to build there at all?

For example, the progress of an unforeseen flood can be simulated during the crisis through coupling of historical information with real-time field information. This provides a basis for decisions regarding e.g. evacuation, where the rescue resources should be targeted, and where additional flood protective structures should be constructed.

The CRISMA system helps to make complex and ambiguous issues more concrete to those that are responsible for making difficult decisions. The project helps us to understand how various accidents and crisis scenarios affect the people, society, infrastructure, the buildings, services, and the economy.

It will also be possible to use the simulation tools in planning collaboration among organisations or geographical areas. The simulation portal can be used to synthesise information provided by different parties and to create new information, including with graphical presentation. Currently, the relevant parties' individual systems are often practically standalone, with almost no co-operation.

The CRISMA project is funded from the European Community's Seventh Framework Programme FP7/2007-2013 under grant agreement no. 284552. The CRISMA project's total budget is 14.4 million euros, of which EU funding accounts for 10.1 million euros. The project ends in August 2015.

In addition to VTT, the project's research partners are Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V. (Germany), AMRA Analysis and Monitoring of Environmental Risk (Italy), AIT Austrian Institute of Technology GmbH (Austria), the Association for the Development of Industrial Aerodynamics (Portugal), Tallinn University of Technology (Estonia), and the Finnish Meteorological Institute (Finland).

The end user's perspective in the consortium is provided by the Emergency Services College (Finland), Deutsches Rotes Kreuz (Germany), Magen David Adom (Israel), the Public Safety Communication Europe Forum (Belgium).

Industrial representatives in the project are NICE Systems Ltd (Israel), EADS Deutschland GmbH – Cassidian (Germany), Insta DefSec (Finland), Spacebel S.A. (Belgium), Cismet GmbH (Germany), and ARTELIA Eau & Environnement (France).

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