Alert4All – civil warning system for emergencies

15 October 2013

Natural catastrophes and other disasters have little concern for the differences in how emergency services are organised across European borders, and rarely give heed to administrative procedure. But what is the best way for those responsible to offer a rapid, effective and comprehensive response? With this in mind, researchers at the German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt; DLR) have developed a unique civil warning system. 'Alert4All' emerged from a cooperation between 11 European partners and 'Euralarm', a network within the continent's security industry. The system uses a variety of communication channels to connect government agencies and institutions with their citizens, whether on the road, in the office or at home, providing standardised alerts. The Alert4All system was demonstrated in a test on 15 October 2013.

Support for decision makers

Alert4All is designed as a secure web portal for registered users. In the event of a crisis, government agencies, security officers and relief forces can access the latest information on the alert status wherever they are situated in Europe, using this data to streamline responses: Which catastrophe has occurred where? What information has the population received?

For the first time, the civilian population can be alerted on emerging situations within an internationally coordinated structure, for instance during the catastrophic spread of floods. The user platform creates common interfaces for decision makers throughout Europe – as they reach decisions and also during alerts.

Multilingual and multimedia

One of the aspects that make Alert4All special is that warnings need only be created once in the system for them to be automatically disseminated across all communication channels. The notifications reach recipients directly without requiring any further action – in the required language and in a text or audio form. Depending on the situation, they inform the population of how the threat has developed, how reliable the assessment is and which precautionary measures are advisable.

Notifications can be issued as text messages on mobile telephones or navigation devices. They may also interrupt TV programmes and appear in the form of text banners across the screen, on LED displays in railway stations or airports, and can even be issued as audio alerts via public address systems in buildings and public spaces.

The creation of highly efficient communication protocols enables this form of multimedia dissemination; even extensive information is converted into very small data packets and transmitted to the different receivers in this form. The communication system was developed at the DLR Institute of Communications and Navigation in Oberpfaffenhofen, in cooperation with the Broadcast Technology Institute (Institut für Rundfunktechnik; IRT), Eutelsat and Avanti Communications.

Satellites join terrestrial connections in transmitting the data; alerts can be broadcast via satellite television and to satellite-assisted cell phones. "Often, the infrastructure of terrestrial systems is damaged or destroyed during catastrophes, rendering them useless. Usually, though, satellite systems remain available," says Cristina Párraga Niebla, Project Manager at the DLR Institute of Communications and Navigation. Communication satellites in Europe also have a certain S-band frequency range that is reserved specifically to transmit data in emergencies. The Alert4All protocols are optimised for this data channel.

Feedback and forecasts

The communication is not just one-way; the new alert system also provides a feedback channel to capture the mood of the general public. Once an alert has been broadcast, linguistic algorithms are applied to filter comments on the crisis situation in social networks, classifying them according to certain emotional responses. The authors and contents remain entirely anonymous; the user interface only presents the emotions conveyed. This provides public agencies with a real-time appreciation of the public mood and permits targeted responses if those affected have clearly erroneous or inadequate information.

Alert4All can also be deployed in the planning phase. A simulation protocol enables the system to calculate and predict the dissemination of alert messages and the expected responses among the public.

Future options

While developing Alert4All, Párraga Niebla and her colleagues kept their sights firmly trained on the principle of system interoperability. So the alert system is compatible with more than just the usual channels. Its modular design will permit the integration of other, as yet undeveloped methodologies. When necessary it can be upgraded – for instance to incorporate the security systems in large facilities such as company buildings, schools or shopping centres. Cooperation with the Euralarm project 'PEARS' (Public Emergency Alert & Response Systems in Buildings) enabled a successful demonstration of this system upgrade capacity. It can also be integrated within existing alert systems that use channels made available within Alert4All that they would otherwise be unable to access. Cooperating with the German Federal Office of Civil Protection and Disaster Assistance (Bundesamt für Bevölkerungsschutz und Katastrophenhilfe; BBK), Alert4All was also successfully integrated with MoWaS (Modulares WarnSystem or Modular Alert System), the German system used in civil alert scenarios.

DLR plans to continue this work in 2014, when the current project is complete. A comprehensive disaster protection system will be established as part of the research project 'PHAROS' – monitoring risks, providing alerts via the Alert4All communication system and even coordinating the deployment of emergency services.

About the project

The DLR-coordinated research project Alert4All has been in operation since March 2011 and is set to run until December 2013. A further 11 partners from six different countries hold a stake in the project – German Red Cross, British APCO, Avanti Communications, Tecnosylva, Edisoft, University of Stuttgart, Tecnalia Research and Innovation, Swedish Defence Research Agency, the German Federal Office of Civil Protection and Disaster Assistance, Eutelsat and the Broadcast Technology Institute. The European Union's 7th Research Framework Programme contributes to project financing.

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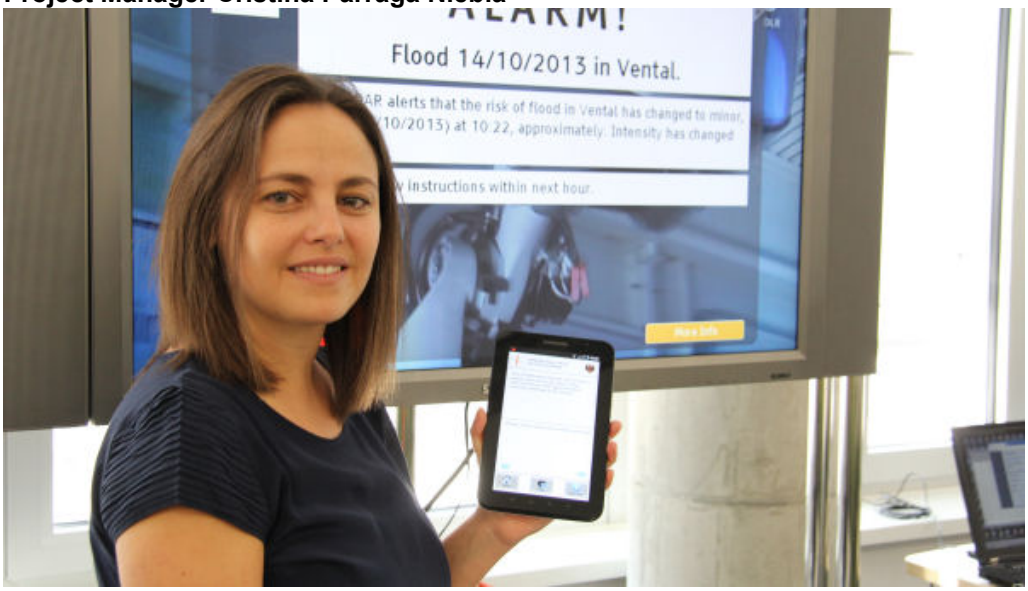

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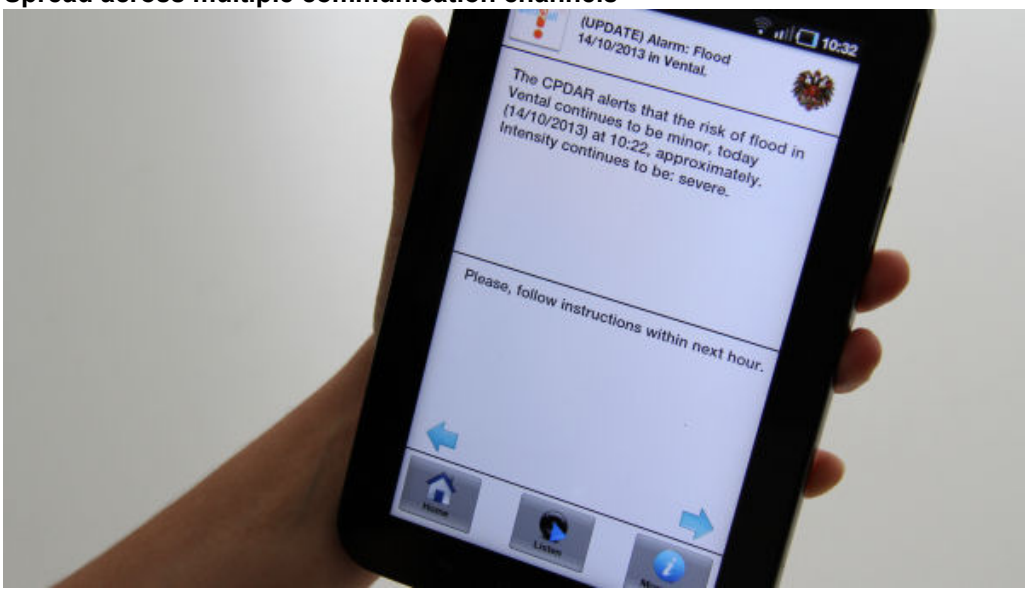
Spread across multiple communication channels



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Project logo

Logo of the 'Alert4All' project, a collaboration between 11 European partners and 'Euralarm', a network within the continent's security industry.

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