

*With calls to emergency services each year across Europe totalling over 200 million, interaction, coordination and information exchange between agencies and departments can be hectic. New systems can make big improvements, as Uberto Delprato of the REACT project, explains.*

## Reacting to emergencies through enhanced data distribution



*Effective emergency response requires a coordinated network of information exchange*

Speed, coordination and transference of knowledge are key to emergency services in Europe and all over the world in providing an effective reaction and response to an emergency. Further, with increasing pressure put upon them through natural disasters – Hurricane Katrina being a recent and noteworthy example – and the current zeitgeist of Public Safety Answering Points (PSAPs) serving increasingly large areas, an accumulating importance is being given to emergency response systems that assist call takers and dispatchers in formulating a fast overview of the incident. The REACT (Reaction to Emergency Alerts using voice and Clustering Technologies) project, led by IES Solutions CEO, Uberto Delprato, wished to address this need for fast, efficient and – most importantly – standardised knowledge throughout emergency service agencies and departments – no matter whether they are local or foreign.

“The REACT project aimed at creating a seamless way to allow command and control centres of different agencies (or of the same agency in different locations) to share data in electronic format,” explains Delprato. “Currently the situation in Europe shows a large number of emergency services using different command and control systems and are – despite some improvement in this area – not sharing information in electronic format yet. This produces negative effects both in the response time and in the possibility that the right recipient of the piece of information is actually addressed and informed about an event.

“A good example of this,” continues Delprato, can be seen “during the deadly 1998 Sarno mudflow (137 casualties) in Italy. Here, several notification calls of minor precursory flows were addressed from on-spot citizens to police stations or municipalities: however, such precious and precise information was not addressed to the right decision maker. Despite the inherent local geological conditions and extreme rainfall, there is evidence that the high number of casualties was partly due to a lack of a unified information repository, available to emergency crews as well as emergency ‘intelligence’ managers.”

The REACT project – which was funded by the European Commission under the Sixth Framework Programme – has been addressing this problem by the design and implementation of working prototypes that allow:

- A seamless sharing of information between different agencies in electronic format
- A reliable voice (and language) recognition for capturing more information from caller/call takers’ conversations
- An intelligent ‘clustering’ of apparently non-related incidents into a dynamic scenario, therefore creating a decision support tool based on a large/larger group of calls

Currently the REACT project’s system for call clustering, call prioritisation and interoperability is being utilised by the Corpo Nazionale dei Vigili del Fuoco (Italy), ACPO – Sussex Police Authority (United Kingdom) and Feuerwehr Aachen (Germany) emergency services. In these cases each emergency service has set the target for a system that will increase both efficiency and efficacy of work, particularly when a lot of calls are received for the same event (potentially using different emergency numbers) and where small incidents may go underestimated and escalate in scale.

### **The REACT architecture**

The REACT system itself is based on a distribution model that supports efficient and performance optimised data exchange, coupled with platform independence. “This type of architecture,” notes Delprato, “was chosen to satisfy requirements for deployment and assist integration with components from many different partners, which is key for us. The communications backbone of the project is provided by XML-based Web Services, these facilitate the interconnection of components using clearly defined APIs. Web Services were chosen because they are an industry standard way for disparate components to interoperate, independently from the used operating system or programming language. In addition, security is of paramount importance in REACT to protect the information transmitted between components or between our systems. Encryption is applied to the messages passed through Web Services for integrity and protection. Because of the existing limitations in the modifications that can be brought to existing legacy infrastructure at each user site, a customised interface is then employed to plug their current command and control software into the REACT system.”

### **An important breakthrough**

Since the project’s conception excellent progress has been made, culminating with a decision by the Italian government introducing information sharing between emergency services and fire fighting authorities; and announcing the implementation of a communications platform developed by European researchers. Delprato explains: “The Italian Ministry of the Interior has issued a formal decree concerning the sharing of data between the fire department and other emergency



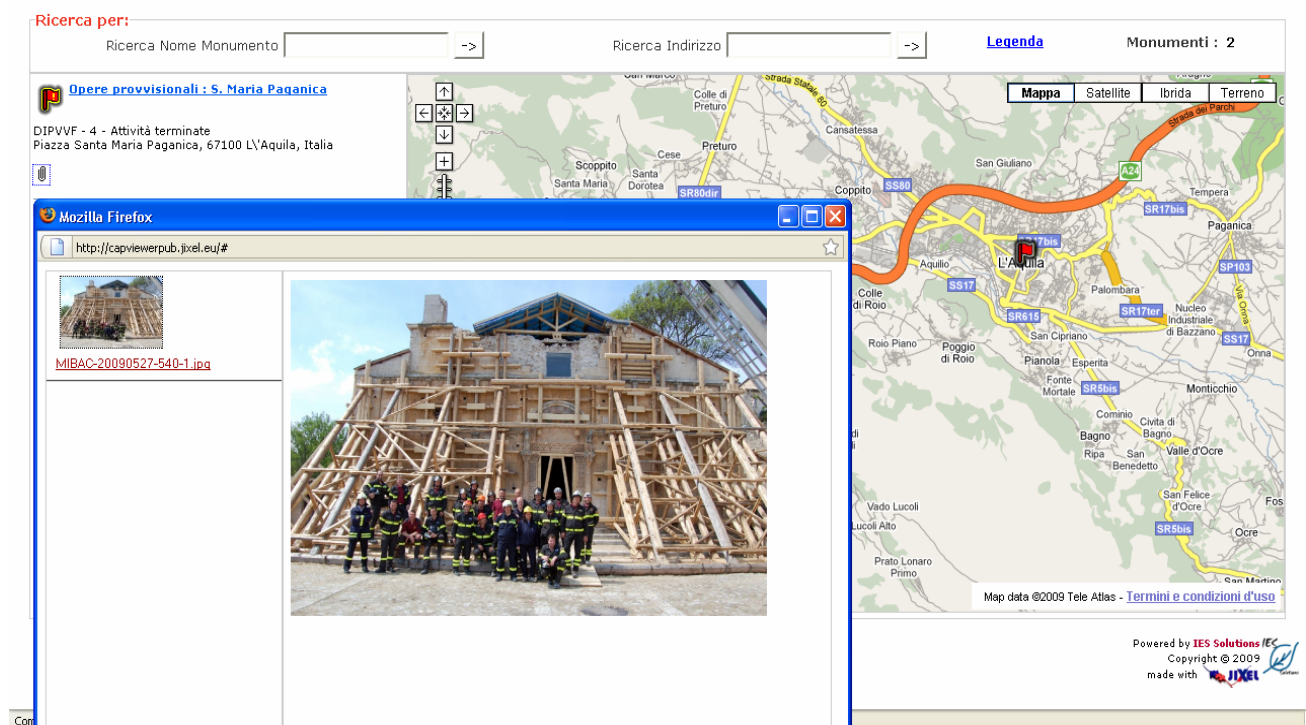
organisations, such as the ambulance service. The decree – published in the government’s Official Journal – defines the communication protocols for exchanging data and information between emergency service command and control rooms. This is excellent news as it is the first time in Italy that an emergency organisation will open its databases to other similar organisations, providing they adopt the communication protocol which has been defined and developed within the REACT project. The work refining and combining two established communications protocols – the CAP (Common Alerting Protocol), a de facto standard and TSO (Tactical Situation Object) data dictionaries – by REACT is to be implemented in Italy. And, following the trials in Germany and the UK, talks are underway with the respective authorities to implement REACT’s platform there as well.”

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**REACT adopted for the L’Aquila earthquake**

Further to the terrible earthquake that stroke in Central Italy on 6<sup>th</sup> April 2009, the Italian Ministry of the Interior decide to adopt the REACT set-up for the coordination of the several teams deployed on site. Each team was able to access, update and share vital information on the conditions of the buildings, their accessibility and keep track of the immediate consolidation tasks.

In addition to this, REACT was also adopted for the important task of planning and monitoring the restoring activities on relevant buildings. Personnel from the Ministry of the Interior and of the Ministry of Cultural Assets and Activities were empowered with the sharing of data about valuable buildings, on the results of the first assessment on the building conditions and on the progress in the restoring activities. Such large amount of data (more than 500 buildings are being monitored) include pictures of the building before and after the earthquake, as well of the results of the deployed restoring solutions. A part of this information has been made available to the general public ([http://www.vigilfuoco.it/opereprovvisionali\\_eng.asp](http://www.vigilfuoco.it/opereprovvisionali_eng.asp)) using a specific functionality of REACT and the CAP protocol.





## **REACT adopted for the Fire Season in Calabria Region**

Building on the good results in L'Aquila, another important initiative was started by the Italian Ministry of the Interior (Dept. of Fire and Rescue) in Calabria Region. During the so-called "Fire Season", alerts from citizens and surveying systems (manned or automatic) can be received by several actors: Civil Protection, Forest Guards, Fire Brigades and Local Volunteers. So far, they were able to share alerts and updates only via telephone or fax, but the adoption of REACT made them able to instantly share such information. Moreover, this allowed a more efficient deployment of resources (including helicopters) and gave the Regional Control Room a vital tool to have an updated and complete picture of the situation.

The screenshot displays the REACT web interface. At the top, a blue header bar contains the text "REVENGE - Dipartimento dei Vigili del Fuoco - Campagna AIB 2009 Regione Calabria" and a "Legenda - Logout" link. Below the header, a search and filter section includes a dropdown for "COP: Tutti", a "Selezioni Multiple" button, a date selector set to "01/09/2009", a search address field with "orsomaro", and a "Ricerca Avanzata" button. A sidebar on the left lists three incidents from the "Centro Operativo Provinciale Vibo Valentia":

- SQUADRA ASSEGNATA**: Incendio Sterpi, 89043 Filogaso VV, Italia, Incendio Sterpi.
- SQUADRA SUL POSTO**: Incendio Sterpi, Pizzoni VV, Italia, Incendio Sterpi.
- ASSEGNATO A INTERVENTO**: Risorse Partenza Vibo Valentia, VV-VVF-001.

The main area features a satellite map of a mountainous region with several red and green markers. A "Mappe" control bar at the top right of the map area includes "Mappa", "Satellite", "Ibrida", and "Terreno" options. A yellow warning box in the bottom right corner reads "Attenzione: Ci sono informazioni non lette. Leggi".

*The first successful deployments of REACT-based systems in Italy show the high potentials of the solution and pave the way for a larger adoption by different organisations in several emergency situations*

## **REACT supporting the deployment of emergency services to people with disabilities**

The architecture developed in REACT is also being adopted in another EC-funded project, REACH112 (Responding to all citizens needing help). The European emergency number 112, which is used to contact emergency services free of charge all over the EU, is currently not accessible to the majority of disabled people. However this is set to change with the start of REACH112, a new five-country initiative in France, the Netherlands, Sweden, Spain and the UK, which will introduce improved communication solutions for disabled people, allowing them direct access to emergency services, a potentially life saving feature. Users will also be able to call each other in video, voice and text via the Internet, across national boundaries.

REACT will provide the basic architecture allowing PSAPs to share the information eventually generated by the Total Conversation Solutions implemented in REACH112.



## **At a glance**

### *Full Project Title*

Reaction To Emergency Alerts Using Voice And Clustering Technologies (REACT)

W: [www.react-ist.net](http://www.react-ist.net)

### *Project Aims*

REACT aims at reducing risks to citizens and the environment by enhancing the interactivity of citizens with Emergency Services and by providing added value to integrated information coming from disparate sources.

### *Contact Details*

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### **Uberto Delprato (Project coordinator)**

Uberto Delprato holds a degree in Nuclear Engineering and currently is CEO of 'IES Solutions', an SME based in Rome, Italy and active in the domain of ICT Solutions for Environment and Security (Earth Observation, sensor technologies, (wireless) Internet technologies and GIS application). Since the first stages of his professional career in companies of the Finmeccanica Group, he worked on international R&D projects, co-ordinating several project teams and typically representing the interface between the scientific and academic world and the industrial environment.

