

# A Semantic GIS Emergency Planning Interface Based on Google Maps\*

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**Abstract.** We outline a generic graphical user interface for a Semantic Geographical Information System handling heterogeneous data sources through Semantic Web Services. This application aims to provide a goal oriented tool for emergency planners and decision makers of the Essex County Council. It uses Google Maps API, Firefox's implementation of JavaScript with E4X for XML handling, as well as AJAX techniques to access IRS-III Semantic Web Services execution platform. It allows access to resources relevant to the emergency context, as defined in an OCML ontology, and to communicate with relevant agents through BuddySpace's Instant Messaging services.

## 1 Application Description

In an emergency planning situation different agencies have to collaborate by sharing data as well as information. However, many emergency resources are not available online and interactions among agencies usually occur on a personal/phone/fax basis. The resulting system is therefore limited in scope and slow in response-time, contrary to the nature of the need for information access in an emergency situation.

To help alleviating this problem for the Essex County Council (ECC) emergency planning officers (EPO), we applied concepts based on the Semantic Geographical Information System (GIS) framework introduced in [4] to develop a prototype application. In the resulting system functionalities and relevant data sources are exposed by means of Web Services (WS), semantically described by OCML ontologies, and accessible to the user through a web interface using Google Maps. At the heart of the system stands IRS-III, a Semantic Web Services (SWS) execution platform described in [2]. For the time being it handles *accommodation* and *presence* related goal invocations, discovers and selects SWS that satisfy these goals, manages SWS orchestration and mediation, before executing WS provided by British Telecom. The mediated results are returned in a custom XML format, parsed by Firefox's implementation of JavaScript using the E4X idiom, and displayed on Google Maps.

BuddySpace [3] is used as a Jabber Instant Messaging protocol client to handle spatial presence; each user specifies in his context a longitude and latitude,

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possibly in a FOAF/RDF file, will appear on the map if relevant to the situation, as described in the emergency planning ontology.

## 2 Usage Example

A user defines a *snow hazard* or a *snow storm* (each offering different goals), before trying to contact relevant agents. The procedure is as follows:

1. Based on external emergency information the EPO draws a polygon on the map, then assigns a type of emergency to the region. Here, a *snow storm*.
2. Described in an ontology, the new instance has attached *features* and *goals*. Here three goals, one *gets shelters* at distance from the area, two others *connect* to BuddySpace and *get relevant presences*.
3. First, the user requests all *rest centres* inside the region, they are retrieved with their features and attached goals.
4. With that information the EPO *logs* into BuddySpace, then *contacts* the relevant persons to requests action or information.

A video of the interaction is available<sup>1</sup> as well as a live website<sup>2</sup> for testing with the last version of the Firefox browser. JavaScript code for the interface is available online, in '\*.js' files.<sup>3</sup>

## 3 Conclusion and Future Work

This is work in progress. In the following versions, we plan to add meteorological information resources, which introduce other GIS concepts such as *fields*. Eventually our system should reach a level of functionality satisfying for the EPO as well as a test bed for further experiments in Semantic GIS.

## References

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2. Domingue, J. et al.: IRS-III: A Platform and Infrastructure for Creating WSMO-based Semantic Web Services. Workshop on WSMO Implementations (WIW 2004), 2004.
3. Eisenstadt, M., Komzak, J. and Dzbor, M.: Instant messaging + maps = powerful collaboration tools for distance learning. Proc. TelEduc03, May 19-21, 2003.
4. Tanasescu, V. and Domingue, J., Toward User Oriented Semantic Geographical Information Systems, 2nd AKT Doctoral Symposium, 2006.

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<sup>1</sup> <http://irs-test.open.ac.uk/sgis-dev/vlad/sgis.htm>

<sup>2</sup> <http://irs-test.open.ac.uk/sgis-dev/>

<sup>3</sup> e.g. <http://irs-test.open.ac.uk/sgis-dev/spatial.js>