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Comfort, Louise K ; Druzdel, M ; Sungu, Y ; Harrald, J.H ; Farley, J ; Cain, B ; Erdik, M ; Keles, R ; Okimura, T

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Izmit, Turkey Earthquake: A Demonstration Project for The Global Disaster Information Network Conference

by

L. K. Comfort, M. Druzdzel & Y. Sungu, University of Pittsburgh, in collaboration with J.H. Harrald, George Washington University; J. Farley, University of Arkansas; B. Cain, University of California, Berkeley; M. Erdik, Bogazici University; R. Keles, Ankara University; and T. Okimura, Kobe University

PROPOSAL

- To use the actual events, location, and characteristics of the Izmit Earthquake to develop a demonstration project for the GDIN Conference , scheduled in Ankara, Turkey in April, 2000.
- To illustrate the kinds of decision support that could be made available to local, regional, national and international organizations to facilitate their coordination in disaster response and recovery operations.
- To create an international, interdisciplinary working group to develop a demonstration model for decision support for an environment that has experienced severe seismic disruption
- To provide infrastructure and data in response to the extraordinary demands for timely field operations to meet the needs of the affected population.

Izmit, Turkey Earthquake on August 17, 1999

- M= 7.4 Richter & 10 cities are damaged.
- City, provincial, national and international public organizations, as well as private and nongovernmental organizations participated in disaster response operations
- Event provides an unwelcome but powerful case to demonstrate potential collaboration within international research community to provide timely, valid, scientific information to support disaster mitigation and response.

FRAMEWORK

- Three key (highly integrated) elements:
  –open GIS standards for the spatial database;

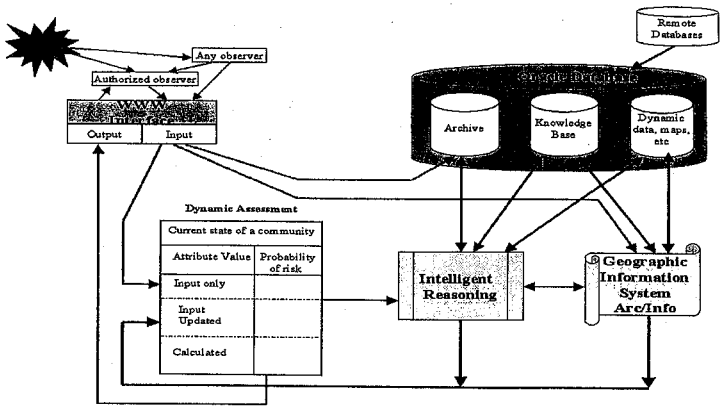
  – use of probabilistic reasoning to estimate losses as well as a rule-based decision support system based upon legal policies and practices for the region

  – an interdisciplinary, distributed knowledge base.

FRAMEWORK: IISIS

- Interactive Intelligent Spatial Information System(IISIS) prototype, under development at the University of Pittsburgh
- Three basic components of IISIS prototype:
  - interactive communication via both Internet and secure intranet networks;
  - GIS and remote sensing imagery to provide graphic representation of changes in the area;
  - intelligent reasoning by the computer to provide estimates of known losses or probabilities of likely consequences

IISIS, System Design



FRAMEWORK: OPENGIS® Technology

- To establish a mirror site for the affected region, using OPENGIS® Technology and spatial data warehousing
- To demonstrate the delivery of data from remote locations into the hands of domain experts and decision-makers on site via the Internet, using standard COTS software
- To demonstrate a fundamental portion of the infrastructure needed to support GDIN on a global basis.
- To build on ongoing work at the University of Arkansas

FRAMEWORK: Domain knowledge base.

- To illustrate the design of a knowledge base that characterizes accurately the impact of a seismic event upon the affected community and region.
- To demonstrate the technical capacity to represent this information to practicing decision makers in a form that they can readily understand and use under the constraints of actual disaster operations.
- To represent an adaptive decision support system, with new information updating changing conditions to inform a dynamic decision process

PARTICIPANTS & TASKS

- Seven universities, each representing a small network of researchers from different disciplines, would create an interdisciplinary knowledge base to provide constructive decision support for major questions confronting practicing managers in reference to the Izmit Earthquake.
- A working group of seven members, with one representative from each university, would coordinate the technical design, substantive content, and general development of the model
- Each university would invite practicing managers from their respective communities to review the selection of data and sequence of information search and exchange processes that would be involved in response to an actual seismic event.

PARTICIPANTS & TASKS (cont.).

- **George Washington University**: Design of Decision Support for Search and Rescue Operations at the Center for Crisis Management in the School of Engineering
- **Ankara University**:Design for Local Government Administration, the Department of Political Science and Public Administration
- **Bogazici University**: Scientific Description of Izmit Earthquake and Affected Region, Kandilli Observatory and School of Engineering
- **Kobe University**: Design for Interdisciplinary Model of Seismic Risk, the Research Center for Urban Safety and Security
- **University of California, Berkeley**:Design for Interjurisdictional Administration, International the Institute of Governmental Studies

PARTICIPANTS & TASKS (cont.)

- The seven universities would include:
  - **the University of Pittsburgh**: Technical Design and Implementation of the IISIS Prototype for Izmit, Turkey. with participating faculty and students from the Graduate School of Public and International Affairs, School of Information Sciences, and Department of Computer Science.
  - **University of Arkansas**: Design and Population of Spatial Data Mirror site for Izmit, Turkey at the Center for Advanced Spatial Technologies with active participation from a range of programs including Geosciences, Environmental Dynamics, the King Fahd Middle Eastern Studies Program and the School of Architecture and the Community Design Center

PRELIMINARY OUTLINE

- ***Data Collection*:**
  - Identification of the kinds of information that practicing managers seek at different time phases of disaster response, by discipline,
  - Identification of the kinds of existing knowledge sources needed for decision support
  - Identification of the major organizations involved in disaster response operations for the affected area , at local, regional, national and international levels
  - Identification of the existing information infrastructure available to support the multi-way exchange of information among participating organizations

PRELIMINARY OUTLINE

- ***Organizational Tasks***
  - Identify and check the relevant data for consistency,currency, accuracy, and validity.
  - Determine who is responsible for maintaining the data and obtain any permissions that are needed to access the data.
  - Determine what level of training or technical skill is required for access to the data from authorized locations, and establish a set of criteria for validating information as it is being submitted to the event knowledge base.
  - Develop an organizational diagram that shows the most efficient means of integrating information from separate sources into a disaster-specific knowledge base for this event.

Conclusion

- Appropriate uses of information technology can be used to support practicing managers in their efforts to increase the efficiency and effectiveness of disaster operations, as well as to reduce the vulnerability of the community to such events before they occur.

- Interoperable, scaleable geodata products and geo-processing services delivering infrastructure in support of GDIN operations are central to the successful implementation this network.

PRELIMINARY OUTLINE

- ***Technical Tasks*:**
  - Assess the network of existing hardware and software to determine the most efficient and economical means of data exchange.
  - Develop a system diagram for the information flow among the seven participating university centers for interactive data search, exchange and analysis.
  - Establish working database links among the seven centers.
  - Maintain appropriate measures of security for the transmission of data.
  - Develop a series of examples that demonstrate how the sharing of information can facilitate cumulative learning