Framework for Developing a Real-Time Broad-Area Disaster Management System

Olufemi A. Omitaomu[1,2]
[1]Computational Sciences and Engineering Division
Oak Ridge National Laboratory, Oak Ridge, TN 37831.
[2]Department of Industrial and Systems Engineering
University of Tennessee, Knoxville, TN 37996.
Phone: (865) 241-4310, **E-mail:** omitaomuoa@ornl.gov

ABSTRACT

When disaster strikes, effective incident management and response coordination is essential to ensuring the resilience of critical infrastructure. This, in turn, depends on the availability of critical infrastructure data, as well as geospatial modeling and simulation capabilities, that can complement the decision making process at various stages of the disaster. Hence, disaster consequence management organizations should have access to the best available geospatial technical expertise, global and regional datasets, and modeling and analytical tools. However, an optimal combination of data assets and modeling expertise are often beyond the resources available internally within a single agency/county/state, but can be accessed by leveraging existing investments by the federal, state, and county governments as well as community-based NGOs. This collaboration provides an opportunity to develop a unified framework for emergency response. Such a framework would become a platform for sharing data and model outputs. For such a framework to be successful, though, there are at least three necessary conditions that must be fulfilled:

1. Allow the sharing of data and information among subscribers without any proprietary restrictions. This condition may necessitate the re-definition of partners to include NGOs, utility companies, and other organizations. With the promise of better informatics for disaster management, these new partners can justify their involvement and be more willing to share data and knowledge. Such a community-based network can change the calculus of partners' engagement.
2. Support the need for real-time updates of data and models as the disaster evolves. The unified framework will focus on all the stages (before, during, and after) of a disaster as well as everything in-between. With advances in geospatial technology, the barrier to disaster management is not the technology or lack of data or models, but connecting the dots between data, models, and decision making in real-time.
3. Promote the development of a new kind of expertise for a truly all-hazards framework. The ability to have all data and models within a single unified framework would promote the integration of new expertise in order to understand correlations between events; and thus, create an all-hazards framework.

If successful, the framework will allow the delivery of real-time solutions and in-depth analysis of disasters to help emergency workers and government decision makers better understand and manage their responses at different stages of major disasters. To achieve such a framework in the State of Texas, the design, implementation, and application of a real-time all-hazards situational awareness decision support system called the Energy Awareness and Resiliency Standardized Services (EARSS) is presented. The EARSS system is developed at the Oak Ridge National Laboratory as a global real-time disaster informatics for federal emergency workers and decision

makers. Even though the EARSS system is a federal emergency management product, its application to disasters in the State of Texas will also be presented.

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