



2012 National Awards in Excellence Nomination Form

Presented at the National Earthquake Conference

Memphis, Tennessee

April 10-14, 2012

Award Category (check all that apply)

- ✓ Mitigation
- ✓ Response & Recovery
- ✓ Plans/Materials
- ✓ Use of New Technology
- ✓ Innovations (i.e. Private/Public Partnership)
 - Research
 - Non-Profit Agency Efforts
 - Multi-Jurisdictional Planning
- ✓ Outreach

Nominated Program, Project, or Product

Nominated Program, Project or Product: Suite of products developed by the U.S. Geological Survey under the direction of Dr. David Wald to include ShakeMap, ShakeCast, PAGER and the Community Internet Intensity Map

Nominated Administering Organization: United States Geological Survey, National Earthquake Information Center

Contact Name/Title: Dr. David Wald, Supervising Research Geophysicist

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Nomination Made By *(must be nominated by someone outside the nominated organization)*

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1. Please write a **one-page** summary describing the program, product, or project that details the issue addressed, the nature of the work, and any resulting materials/products. (Please submit such materials electronically.) The summary will be posted on the conference website at www.earthquakeconference.org and www.wsspc.org.

Additional details are requested in the following questions.

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ShakeMap, ShakeCast, the Prompt Assessment of Global Earthquakes for Response (PAGER) and the Community Internet Intensity Map (“Did you feel it?”) are being nominated for a WSSPC Award in Excellence in the categories of Innovation though the contributions of this suite of seismic information products have proven highly significant in the areas of Response Planning/Materials, Mitigation Efforts and the Use of New Technologies. These products, developed by Dr David Wald and his team at the US Geological Survey’s National Earthquake Information Center have greatly enhanced the capacity of emergency management agencies, worldwide, to rapidly assess the scope of possible impacts of earthquakes in terms of damage and population exposure, mitigate earthquake hazards and test response plans with valid scientifically-grounded earthquake scenarios. The innovative uses of new scientific developments, mapping techniques and loss estimation technologies have made these products the most important improvements in earthquake emergency response and management capability in the last 30 years.

In March of 1997, the first ShakeMap was produced for a small southern California earthquake. Based on ground motion parameters captured by the Southern California Seismic Network, the map revealed the distribution of ground motion as acceleration, velocity and most important to emergency managers, intensity. The map displays ground motion as color-coded areas with red and orange indicating strong and potentially damaging motion and green and blue for relatively minor non-damaging motion. From this modest beginning, the ShakeMap technology was extended to the nation as a whole and ultimately, the occurrence of global earthquakes. The Shakemap is automatically produced and posted on the Internet within a few minutes of an earthquake occurrence, then reviewed, verified and updated by a seismologist. It is utilized by emergency managers to determine the overall scope of impact, identify the areas of probable damage and direct response activities. These activities include search and rescue, medical emergency services, damage assessment and the location of staging areas for resource allocation and deployment. ShakeMaps have also been developed for scenario earthquakes that may occur or have occurred historically. These scenarios have facilitated the mitigation of hazards in communities with known earthquake risks and have been the basis for conducting exercises to test emergency response plans.

ShakeCast is an application of ShakeMap that allows specific users (e.g. utility and lifeline operators) to receive notification of shaking levels at user-selected facilities. Using the velocity and spectral acceleration parameters in ShakeMap, ShakeCast is used by the California Department of Transportation (Caltrans) to prioritize inspection of highway bridges and corridors following the occurrence of a significant earthquake. For events greater than magnitude 4.0, ShakeCast automatically determines the shaking value at the locations of more than 12,700 bridges and facilities, compares the values with the damage threshold pre-established for each facility, and distributes emails to designated responders within 15 minutes of the event.

The Prompt Assessment of Global Earthquakes for Response (PAGER) is also an extension of ShakeMap to provide fatality and economic loss impact estimates for earthquakes worldwide. Fatality and economic loss estimates are scaled as alerts ranging from Green (zero or minimal loss of life and property damage) to Red indicating that fatalities could exceed one thousand and losses could reach or exceed one billion dollars. Yellow and Orange alerts are intermediate categories. PAGER was an important factor in notifying local and international response and relief agencies of the catastrophic earthquakes in Haiti and Chile in 2010, and New Zealand and Japan in 2011.

Taking advantage of the vast numbers of Internet users, the Community Internet Intensity Map invites those who feel an earthquake to complete a brief questionnaire on the “Did you feel it?” web site, responses are aggregated by Zip or Postal Codes and arrayed on a map, color coded by intensity. This

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map not only provides an opportunity for the public to participate in analyzing an earthquake and promoting a better understanding of earthquakes, it also provides scientists and emergency managers with valuable information about impacts, particularly in areas that are sparsely instrumented or have no seismic network coverage at all.

In developing these products, David Wald and his team have given the emergency management community vital tools that have provided early detection of earthquakes which require immediate response and have provided rapid information on what the impacts of these events are likely to be. Before ShakeMap and its derivative products, emergency managers relied on “windshield surveys” and the media for information about earthquake impacts, an inefficient, time consuming and error prone method. ShakeMap scenarios have provided accurate scientifically-grounded events that have been the basis for mitigation plans and driven exercises to test emergency response plans for public and private sector organizations. For catastrophic international earthquake disasters, particularly in underdeveloped nations, PAGER now alerts international aid agencies of the need for immediate assistance avoiding days or weeks of delays. These products have also increased public understanding of earthquakes and allowed non-scientists to participate in the analysis of an earthquake. These products are a major accomplishment and merit a WSSPC Award in Excellence.

2. How long has the program been operational? Since: Month March Year 1997
(Note: In order to be considered for a 2012 National Award in Excellence the program must have been operational since at least December 2010.)

3. What are the major purposes of the program? What problem(s) or issue(s) was it designed to address?

All products are emergency management oriented with application to response, mitigation and the application of new technologies. Please see one page narrative for details.

4. Describe the specific activities and operations of the program.

Please see one-page narrative for details.

5. Does it take a new and creative approach or method? If yes, please describe.

The products utilize scientific research, mapping, loss estimation methodologies and rapid communications to produce real-time information products for mitigation and emergency response.

6. What were the start-up costs and source(s) of funding?

Budget: \$ Unknown Source: USGS

What are the annual operational costs and source(s) of funding?

Budget: \$ Unknown Source: USGS

7. How many employees (full-time equivalent) work(ed) with the program? 3-5

8. To the best of your knowledge, did the program originate with you? Yes No

Are you aware of similar programs elsewhere? Yes No

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9. Has the program been fully implemented? Yes No
If no, what actions remain to be taken?

10. Is there evidence that the program has been effective in achieving its stated purpose(s)?
Briefly summarize evaluations (pro and con) of how well it has addressed the defined problem(s) or issue(s).

Since its introduction in 1997, the ShakeMap and its derivative products have been successfully implemented by emergency management agencies worldwide. These products are often the first indication that a large damaging earthquake has occurred and provides the earliest details of what has, or is likely to have, happened in terms of the distribution of strong (and weak) motion, damage and impacts on local and regional populations. If there exists a downside, it is that the quality of the data vary tremendously from one global area to another and local source data is sometimes inadequate to produce a reliable ShakeMap.

11. How has the program changed since its inception? What limitations or obstacles might others expect to encounter if they attempt to adopt it?

The main changes have been in the proliferation of useful products based on the original ShakeMap concept. These products include ShakeCast and PAGER. In addition, what began as a California product was generalized to the nation and ultimately to the entire world.

12. Additional comments:

Deadline: All nominations and supporting materials must be completed and received by WSSPC by **Friday, December 30, 2011**, to be considered for the *2012 National Awards in Excellence*.

Email completed application and supporting materials to Amy Lewis: alewis@wsspc.org.



2012 National Awards in Excellence
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