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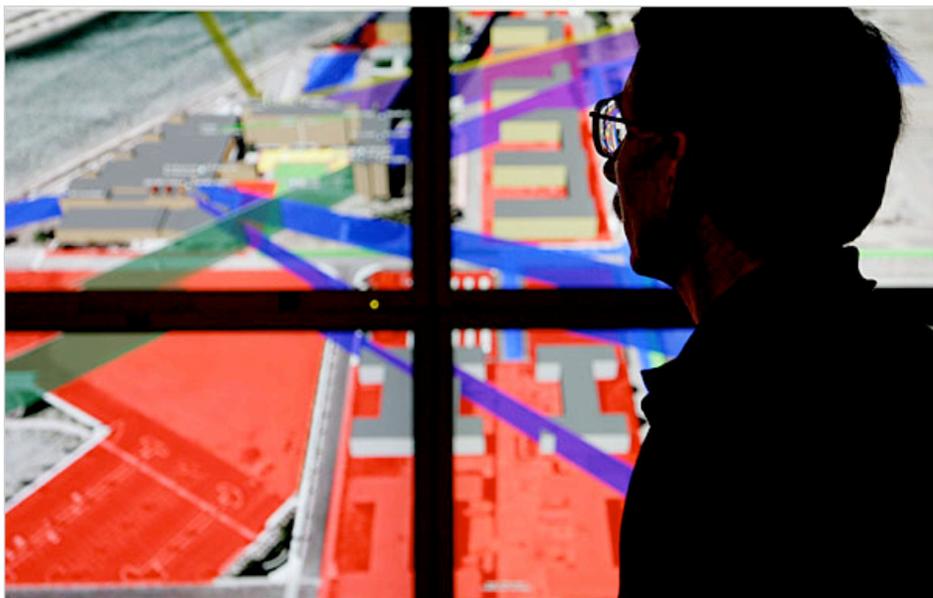
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## This Is Only a Drill: In California, Testing Technology in a Disaster Response



Sandy Huffaker for The New York Times

Eric Frost, of San Diego State University, checking a maplike visual.

By JOHN MARKOFF  
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SAN DIEGO, Aug. 26 — It began with a worldwide virus outbreak that had cities under quarantine, emergency workers overwhelmed and government agencies unable to cope. It was compounded by a wave of cyberterror attacks that cut off power, phones and Internet access.

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Sandy Huffaker for The New York Times  
A temporary shelter called a Hexayurt

Such was the crisis that teams from the Pentagon, nongovernmental agencies and several dozen technology companies set out to resolve in a five-day simulation meant to showcase and test a new set of digital tools in responding to disaster.

The limitations of even the latest technology were in evidence when an effort to restore communications by setting up ad hoc wireless networks resulted in a three-day data traffic jam.

Yet the problems encountered in the training effort,

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and a communications antenna within an inflatable sphere were deployed in the exercise.

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Sandy Huffaker for The New York Times

David Headley took simulated readings from a dummy that served as a trauma victim.

named Strong Angel III, did little to dampen the enthusiasm of the participants, a diverse group of more than 800 “first responders,” military officers and software and wireless network experts — some from rivals like [Microsoft](#) and [Google](#), working side by side.

“My view is that the value of Strong Angel is 70 percent in the social networks that will be created,” said the organizer, Eric Rasmussen, a Navy surgeon and veteran of relief efforts on several continents. “What we do is try to bring people with disparate backgrounds together and ensure that they are forced to enter into a conversation.”

More than \$35 million in equipment was assembled here as part of the event, aimed at preparing for natural disasters, epidemics, terrorist attacks or the aftermath of war.

Last Monday, the group began to assemble a makeshift command center at an abandoned building near the San Diego airport. But a state-of-the-art wireless network, intended to route video images, satellite map coordinates and other data — from an impressive array of mobile computers, software analysis tools and command programs — failed to come to life.

“Finally I said, ‘Lights out! Everyone turn everything off and let’s start over,’” said Brian D. Steckler, a computer scientist at the Naval Postgraduate School in Monterey, Calif., who was in charge of more than a dozen interlocking networks at the heart of the command center.

Hundreds of computers and even cellphones were shut down, and then the network was slowly turned back on, segment by segment. Too many high-bandwidth applications had clogged the network, including a powerful video camera and “rogue” transmitters set up by participants intent on creating their own mini-networks.

Computer researchers call wireless networks of this type “hastily formed networks.” But Mr. Steckler said his experience in the training session and in real disasters had led him to refer to them as “fragilely formed networks” instead.

At the same time, the technology roadblocks were balanced by notable successes, like the work of Google, Microsoft, ESRI, [Intergraph](#) and other companies to allow sharing a single set of digital satellite maps seamlessly and to overlay event data relayed from emergency workers throughout the San Diego area.

The new software capability relies on a Microsoft-designed system called Simple Sharing Extensions. It has been built on industry standards, like the Web protocol known as Really Simple Syndication, or R.S.S., which was designed to enable one-way data streams.

Such tools are valuable for disaster-response coordinators who require real-time data feeds from a variety of locations. The Microsoft extensions will make it possible for the feeds to display constantly changing or even conflicting data streams from multiple sources.

Moreover, the achievement demonstrated that industry rivals like Microsoft and Google could cooperatively generate useful technologies. Small teams of programmers from the two companies sat before laptops at adjacent tables to make sure that the Microsoft

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software connection system would transfer information to Google Earth, Google's visual mapping tool.

"I've been talking to Google all week," said Robert Kirkpatrick, lead architect of Microsoft's humanitarian systems group.

That is the kind of teamwork that Dr. Rasmussen had in mind in organizing the Strong Angel event, the third held since 2000. Dr. Rasmussen has become a leading figure in high-tech emergency preparedness in the United States and internationally. His expertise has been honed by experience in Bosnia and Baghdad, in African refugee camps, in Indonesia after the tsunami and in New Orleans after Hurricane Katrina.

Working a decade ago in the Defense Advanced Research Projects Agency at the Pentagon, he began exploring the use of high-tech systems to support the emergency missions that he would serve as a doctor.

"People are dying in really ugly ways, and it's avoidable," he said.

That led him to organize Strong Angel, which he said was not a formal disaster exercise, but rather a laboratory to experiment with technology that might prove useful in disaster settings. He likened the event to a group of musicians playing casual jazz rather than a rigorous symphony.

That unstructured approach led to some frustrations among participants, who complained at times that they were uncertain of their duties. But Dr. Rasmussen said the situation was meant to force them to organize themselves in a leadership vacuum.

Significantly, Dr. Rasmussen's effort has the support of Linton Wells II, principal deputy assistant secretary of defense for networks and information integration. Mr. Wells, a military strategist, was a driving force behind a Pentagon directive last November that put "stability operations" — defined as "military and civilian activities conducted across the spectrum from peace to conflict to establish or maintain order" — on an equal footing with waging war as a primary mission for the military.

Recognizing the shortcomings of reconstruction efforts after the invasion of Iraq, the directive acknowledges that much of this work is best performed by "indigenous, foreign or U.S. civilian professionals."

"We want to be able to create a space outside of the Pentagon's network firewalls to offer assistance," Mr. Wells said. Such a shift in mission will make it easier, for example, to provide Pentagon imagery from satellites and unmanned Predator aircraft to disaster relief organizations, he said.

It took 300 e-mail messages and ultimately the intervention of a high-ranking fleet admiral to get Dr. Rasmussen and two colleagues to Banda Aceh, Indonesia, in the days immediately after the tsunami in December 2004. Such missions need to be on the military's checklist, Mr. Wells said.

In addition to large technology firms like [Cisco Systems](#), Mitre and [Bell Canada](#), smaller companies demonstrated a range of initiatives last week, tucked amid a phalanx of big trucks that had brought communications equipment and other rescue gear to the command site.

VSee Lab, a Silicon Valley start-up, brought a videoconferencing software system made to transmit video over today's cellular telephone data networks at good quality.

GATR Technologies, a two-person company in Huntsville, Ala., brought a satellite

communications antenna tucked inside a 10-foot inflatable beach ball made of ultralight racing sail cloth. The system, designed by Paul Gierow, a former aerospace engineer, weighs just over 70 pounds and makes it possible to deploy a two-megabit Internet connection — faster than many digital phone lines — virtually anywhere.

Looking around at the satellite dishes that had been trucked to the command site, Mr. Gierow said, “We were the only ones who walked here carrying our gear.”

Also on display was a novel low-cost refugee shelter designed by Vinay Gupta, a software engineer in Chicago. Called Hexayurts, the buildings are fabricated from four-by-eight sheets of foam or hexacomb cardboard and duct tape and can be built for about \$1,000 apiece. Mr. Gupta set up several of the buildings in a plaza and showed how they could be equipped with a high-efficiency wood stove for cooking, a composting toilet and a small fluorescent light.

Although there has been no mass production of the buildings, which are large enough to shelter a family, Mr. Gupta has put design instructions on the Internet and placed them in the public domain. He thinks they are sure to find users.

“A [FEMA](#) trailer costs \$30,000,” he said. “I’m waiting for the next hurricane season.”

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