

UC San Diego's High-tech Tools Helped Combat Wildfires

Emergency advancements can aid disaster response worldwide

November 5, 2007

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Hi-tech cameras showed fire's progress

Some of those fighting rampaging California wildfires in late October didn't wield shovels or hoses -- they worked with high-tech tools developed at the University of California, San Diego.

UC San Diego's response to the nearby wildfires included innovative technologies that not only helped the local region respond and recover, but that also can save lives during emergencies elsewhere in the world.

One of the most urgent needs in any emergency is accurate and timely information. This is especially true for wildfires, whose unpredictable paths and intensity leave the populace vulnerable and responders asking where to turn next.

As the fires raced westward toward populated areas, Larry Smarr, director of the California Institute for Telecommunications and Information Technology (Calit2), created a collaborative effort with NASA and San Diego State University to provide satellite imagery of wildfires linked to maps used by firefighters battling the blazes and emergency officials evacuating the citizenry ahead of the flames.

Calit2 also used other advanced technological tools in emergency response. Ramesh Rao, director of the UC San Diego division of Calit2, led efforts to provide an overlay on a Google map of 18 remote cameras throughout San Diego County during the fires. Users could click on a camera, see high-quality video feeds, and observe the wildfires in real time.

Fifteen of those cameras belong to the High Performance Wireless Research and Education Network (HPWREN), a project of the San Diego Supercomputer Center at UC San Diego and the National Science Foundation. An HPWREN camera on Lyons Peak in a remote part of the county captured some of the most dramatic video of the firestorm, showing how an original wisp of smoke blew up into a major conflagration. Hans-Werner Braun, director of HPWREN, whose own family was forced to evacuate, monitored the network's cameras.

"The HPWREN real-time cameras tell us what is happening before engines or chiefs can get there," said CAL FIRE Emergency Command Center Chief Tom Gardner. "They tell us clearly where to go when we are getting swamped with locals calling it in."

Chris Hinshaw, manager of the San Diego County Sheriff's Department wireless communications office, further described the cameras' contributions as "especially helpful as they are set up with a 360-degree view from each site in small thumbnails so you can browse quickly. We were also able to estimate potential damage to our radio site by observing remedial actions such as fuel deliveries for our generators using the cameras. They are a force multiplier for us."

The San Diego Supercomputer Center (SDSC) also used its advanced data technologies to help some of the quarter-million people evacuated throughout Southern California. Chaitan Baru, a supercomputer center scientist and expert in data technologies, led the development of the "Safe and Well" website for the American Red Cross.

The collaboration between SDSC and American Red Cross began during the Hurricane Katrina disaster to help families and friends find each other in widespread displacements and evacuations. The website was quickly launched during the wildfires so that people could log on and register to let others know of their well-being and whereabouts.

Information on dangerous air quality can be critically important to firefighters and other responders in disaster areas. Kim Prather, professor of chemistry and biochemistry and an atmospheric chemist at UC San Diego, and her laboratory monitored the chemical make-up and health impacts of the soot and ash falling on San Diego County during the wildfires. She developed an instrument, the Aerosol Time-of-Flight Mass Spectrometer, that can measure these minute particles and analyze their chemical constituents in real time, and provide the data to firefighters and medical personnel immediately.

Prather is one of several Scripps Institution of Oceanography researchers who observed the fires' effects from the ground, at sea, and from space. Jens Mühle, a colleague of Prather's at Scripps, said that data from the wildfires that swept through Southern California in 2003 suggest that this year's fires will significantly contribute to the state's yearly greenhouse gas emissions. Mühle and Prather recently published a study on emissions from the 2003 wildfires which found that emissions of carbon dioxide and methane, both major greenhouse gases, represented between 3 and 7 percent of the entire state's emissions that year.

UC San Diego's innovative research provided direct and immediate benefits for the people of San Diego County during the wildfires. Equally important is the proof-in-action that technology can provide real-time emergency information, advanced computer approaches to reuniting displaced people, and immediate data on health - among other benefits -- wherever the next disaster strikes.

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