Past, Present, and Future: HPWREN and First Responders

Since 2001, the High Performance Wireless Research Network (HPWREN) team has been working with San Diego County first responders to better understand how high-speed wireless ad-hoc networking can assist with public safety in hard-to-reach areas. HPWREN-connected cameras, meteorological sensors, and alert systems located on several mountaintop towers provide first responders and rural community members with real-time images, environmental conditions, and public safety alerts throughout San Diego County. For instance, the 2007 Harris Fire was closely monitored by the California Department of Forestry and Fire Protection (CAL FIRE) and the San Diego County Sheriff's Department via HPWREN-connected cameras atop Lyons Peak while the 2007 Rice Canyon Fire, Witch Fire, and Poomacha Fire were also monitored via HPWREN-connected cameras at Mount Woodson, Santa Margarita Ecological Reserve and Palomar Mountain.

The NSF-funded HPWREN team also deployed high-speed network communication capabilities at six major CAL FIRE Incident Command Posts: Coyote Fire (July 2003), Eagle Fire (May 2004), Mataguay Fire (July 2004), Volcan Fire (Sept 2005), Border 50 Fire (October 2005), and Horse Fire (July 2006). Permanent CAL FIRE sites currently connected to HPWREN include the following: Red Mountain Fire Station, La Cima Fire Camp, Ramona Air Attack Base, Gillespie Helitack Base, and Puerta La Cruz Conservation Camp.

2007

May

The Regional Command and Control Communications (3Cs) project conducted a series of tests to connect with and pass traffic across the HPWREN network, in conjunction with the local Wildland Fire Drill hosted by the Barona Fire Department.

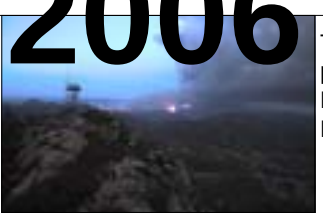
October

HPWREN-connected real-time cameras, meteorological stations, and alert systems were used by public safety and rural communities to monitor the Harris Fire (90,440 acres), the Witch Fire (197,990), the Rice Fire (9472 acres), and the Poomacha Fire (49,410 acres).

(l-r): Several Palomar Observatory employees serve on Palomar Mountain's Volunteer Fire Department; they used HPWREN connectivity for communications during the Poomacha Fire, which came within a few miles of their site. Meanwhile, first responders used HPWREN-connected cameras to monitor the Harris Fire.

"The HPWREN real-time cameras tell us what is happening before engines or chiefs can get there; they tell us clearly where to go when we are getting swamped with locals calling it in."
- CAL FIRE Emergency Command Center Chief Tom Gardner (October 2007)

2006



May

The HPWREN team participated in the San Diego County Wildland Fire Drill.

July

HPWREN provided network connectivity and Voice over Internet Protocol (VoIP) to the Horse Fire Incident Command Post.

August

HPWREN participated in the annual Ramona Air Show via a public display at the CAL FIRE Ramona Air Attack Base.

HPWREN continues collaboration with NOAA's National Weather Service in obtaining valuable real-time meteorological data.

November

Several public safety agencies began work on an HPWREN-like system for southern California; the Regional Command and Control Communications (3Cs) will allow multiple agencies to communicate with one another - rather than each agency having its own system.

Above: Real-time image collected via HPWREN-connected camera during Horse Fire.

"Our efforts to enable cyberinfrastructure have the potential to draw together various people and agencies to address research, education and public safety issues, and we certainly see this during emergency situations such as wildfires."
- Hans-Werner Braun, HPWREN principal investigator (July 2006)

2005

HPWREN worked with CAL FIRE and San Diego Sheriff's Dept for airdrop-based network relay demo at Lake Hodges fire exercise.

May

July

The San Diego County Sheriff's Department and the California Department of Forestry and Fire Protection airlift replacement sensors for HPWREN real-time weather alerts.

August

CAL FIRE's Gillespie Field Helitack Base was connected to HPWREN.

September

HPWREN establishes high-speed connectivity at the Volcan Fire ICP.

October

CAL FIRE's Incident Command Post for the Border 50 Wildfire was connected to HPWREN.

December

CAL FIRE's Puerta La Cruz Fire Camp and designated Incident Command Post was connected to HPWREN in collaboration with SDSU and TDVNet. This enabled first responders at Puerta La Cruz to have access and high speed connectivity via the network.

"I just wanted to let you know how invaluable the Internet connectivity was at the Incident Command Post. It amazed the personnel in the Planning section that we were able to have such a great internet service, while we had little to no phone and FAX service. The data connection allowed us to send digital maps of the incident all the way to Sacramento with ease. During the demob phase, the internet connection was a lifesaver. Without reliable phone or FAX communication with expanded dispatch, we were able to set up a live MIRPS terminal to communicate the resources that were being released from the Incident."
- Firefighter with Incident Command Team 10, Volcan Fire (Sept 2005)

2004

May

Four HPWREN video cameras were installed to improve firefighters' with a 360-degree-view from Lyons Peak to observe wildland fuel areas along the US/Mexico border area. Another HPWREN camera was installed at Red Mountain, which views Palomar Mountain, Valley Center and the northern Santa Margarita River area.

Above: CAL FIRE's Eagle Fire ICP in Riverside was connected to HPWREN via the Santa Margarita Ecological Reserve.

July

The HPWREN team provided ad-hoc connectivity for the Mataguay Fire Incident Command Post. This marked HPWREN's first experience with incident response deployment at night-time.

October

Scripps Institution of Oceanography Visualization Center produced a DVD from HPWREN Cedar Fire images - as narrated by Retired CAL FIRE Fire Captain Ron Serabia.

November

New software was developed by HPWREN, in collaboration with the CAL FIRE, atop Mount Laguna and Lyons Peak that allows first responders to be paged by real-time data when humidity and fuel moisture levels as well as wind speed and direction reach alarming levels.

December

CAL FIRE's Dos Picos pre-designated Incident Command Post site received a pre-installed wireless communications setup for easy access as needed.

2003

July

- For research and prototyping, a central San Diego Sheriff's Department location is connected at 45Mbps to HPWREN's backbone.

- Firefighters at the remote Coyote Fire operations site were provided with HPWREN connectivity for the week-long incident so that they could update wildfire status reports, images, and weather information in real-time.

- In addition to a 45 Mbps link, HPWREN installed high-resolution remote-control cameras for the San Diego County Fair wireless demo.

September

Real-time wildfire images are now collected via motion-detect HPWREN-connected cameras atop Laguna Mountains and the Ramona CAL FIRE Air Attack base.

October

HPWREN cameras captured about 150,000 still images of the Cedar and Paradise Fires. Many were turned into DVD-quality MPEG2 time lapse animations.

December

The CAL FIRE La Cima Fire Camp's comms were restored with voice (VoIP), fax, and Internet access via HPWREN after the Cedar Fire devastated their phone lines.

- The CAL FIRE's Ramona Air Attack Base is connected to HPWREN *(shown here during the Cedar Fire of October 2003)*.

2002

May

HPWREN participated in a UCSD activity that demonstrated an ad-hoc and temporary multimedia installation of seismic and visual instrumentation at the Coronado Bridge.

June

The HPWREN team transitioned its Mount Laguna backbone site to a County facility, which also enabled the creation of a new link to Toro Peak.

July

A feasibility check was conducted for the CAL FIRE's Red Mountain fire station link.

September

"The Mt. Laguna HPWREN backbone site was instrumented with several real-time meteorological sensors, with the data being made available to various parties and via public web sites.

"Administrators of the Sheriff's Department managed Regional Communications System believe that the HPWREN sensor project may eventually lead to the development of more widespread wireless technology in mountainous East County areas that will assist in general public safety tasks such as search and rescue missions and the prevention and containment of wildland fires."
- Curt Munro, manager of the San Diego Sheriff's Department's Wireless Services Unit and Regional Communications System. (Sept 2002)

2001

The HPWREN team worked with CAL FIRE firefighters to demonstrate an ad-hoc rapid response mobile wireless access point at Dos Picos Park, a pre-designated Incident Command Post.

February

August

- Along with several governmental agencies, the HPWREN team tested the feasibility of using real-time images and maps during a pre-simulated incident management situation.

"This exercise allowed us to evaluate an Internet-based data sharing scheme, where multiple agencies could view tailored perspectives of the same incident in real-time."
- Dr. Steve Murray, SSC San Diego (Aug 2001)

- Three HPWREN antennae were also mounted on CAL FIRE's tower near Fallbrook.