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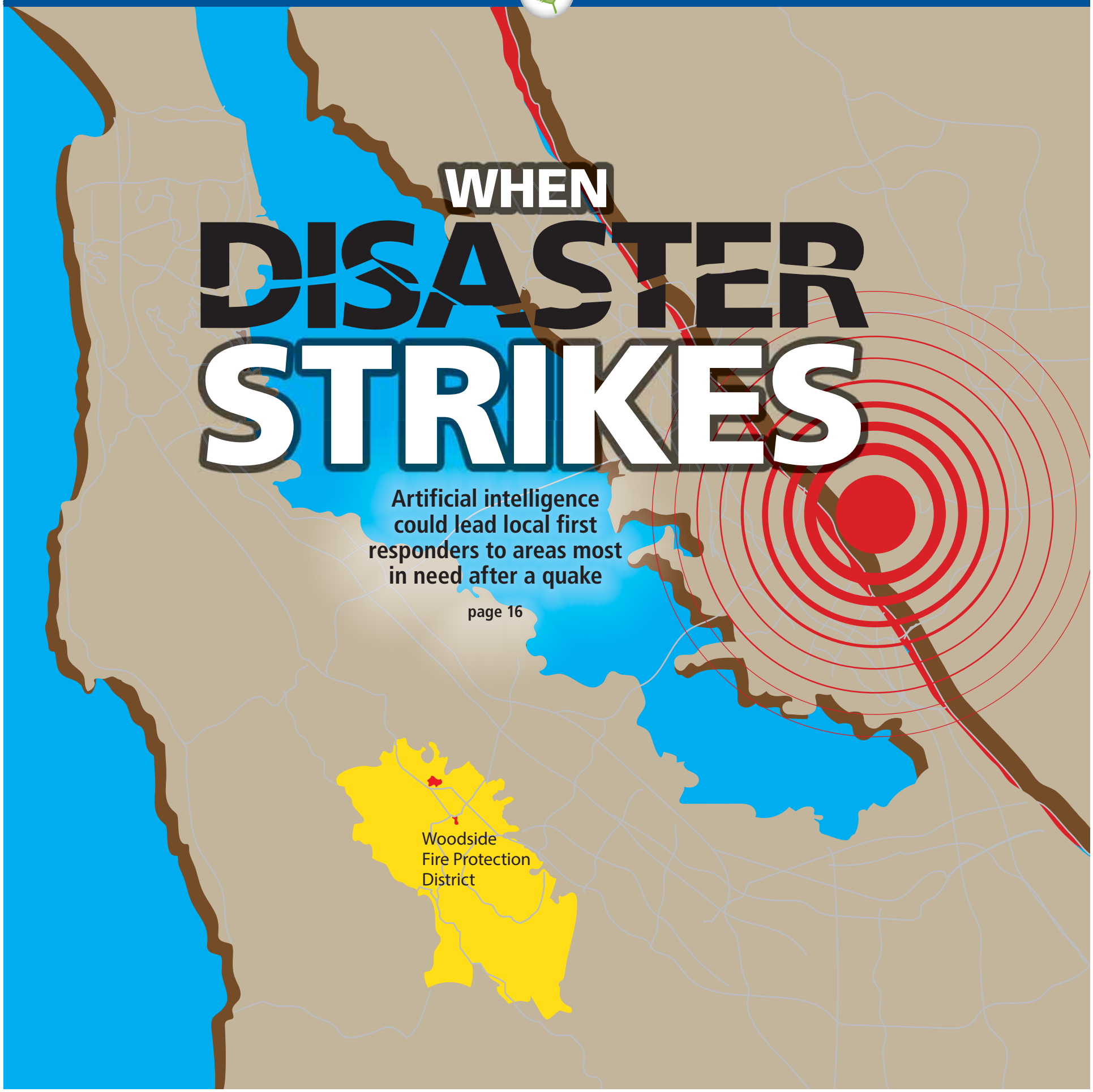

Responding to disasters: How locals are preparing

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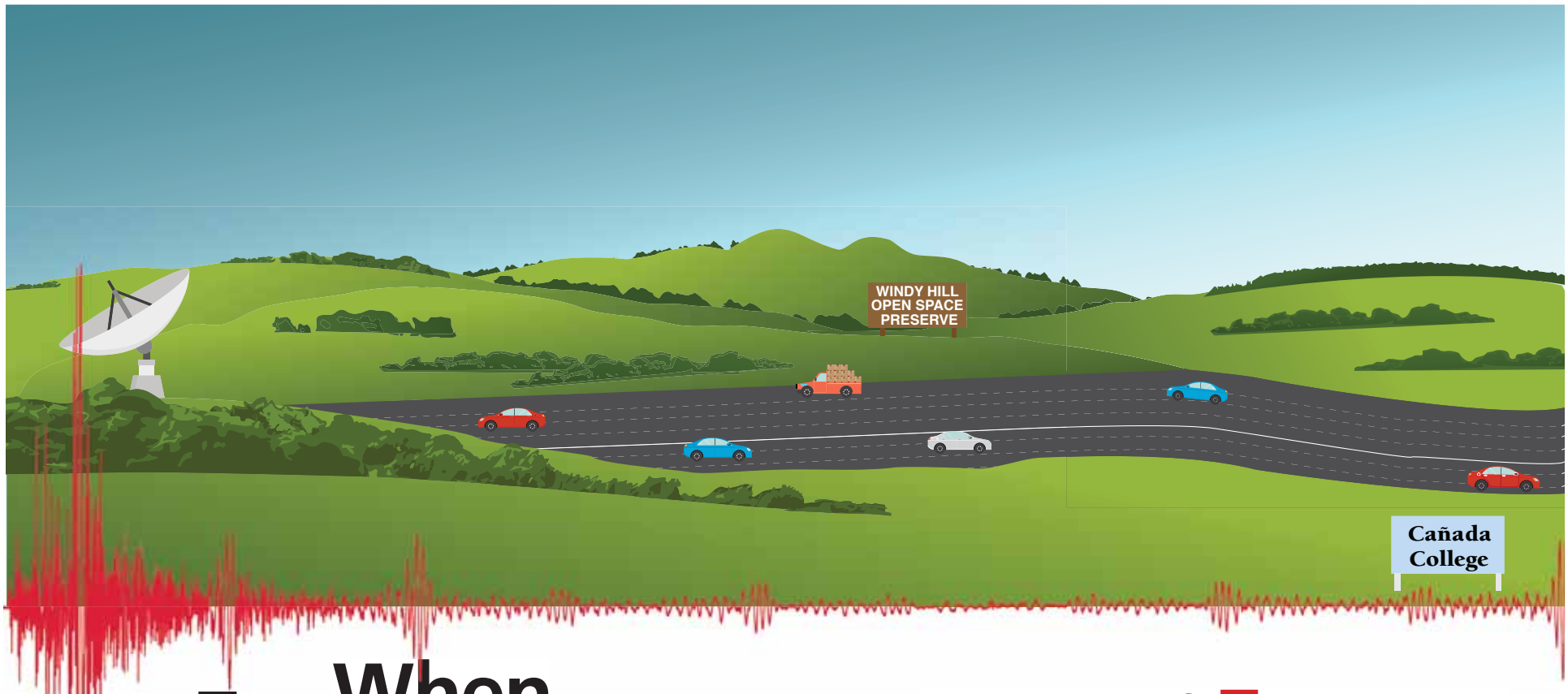


When disaster strikes

Artificial intelligence could lead local first responders to areas most in need after a quake

By Dave Boyce

For Woodside Town Manager Kevin Bryant, it was a revealing moment even though it was just a simulation.

A colored map of the Woodside Fire Protection District, in a demonstration of software that assesses damage done by earthquakes, showed Canada Community College colored red. It was one of two red spots on the map after a major quake along the Hayward fault in the East Bay.

The other area shown in red — meaning buildings potentially partially or totally collapsed, leaning or sliding off the foundation — was the corner of Woodside and Whiskey Hill roads, the location of Town Hall and the town's emergency operations center.

Most of the rest of the fire district was colored yellow, meaning moderate to extensive damage to structures such as chimneys, plaster and false ceilings, according to Digambar Ganjre of One Concern, a Palo Alto-based startup that makes these maps.

One Concern is in the business of creating damage assessment maps to direct first responders to the areas most likely in need of help after an earthquake. The software generates maps based on artificial intelligence and an algorithmic analysis of information such as building construction data, environmental and seismic data, records of past events, live sensors and typical daytime and evening populations.

Woodside, Portola Valley and the fire district are in their first year of a three-year, $50,000 license agreement with the company.

One Concern makes available to its customers a color-coded damage-assessment map within 15 minutes of a quake, and provides simulations as well, Mr. Ganjre said. Among the company's clients: the city and county of San Francisco and the city of Los Angeles, he said, adding that they have a memorandum of understanding with the California Office of Emergency Services.

The company's goal is to serve the entire state, and "hopefully, the United States," Mr. Ganjre said. The company's slogan: "Every life matters, every second counts."

Photo by Michelle Le/The Almanac

Dan Ghiorso, fire chief of the Woodside Fire Protection District, considers a map — on his laptop and on the screen on the opposite wall — simulating the impact on the fire district of an earthquake along the Hayward fault in the East Bay.

Rethinking plans

For Mr. Bryant, the simulation of a 7.0 quake on the Hayward fault "forced us to think about" Canada College which, conditions permitting, would be a staging area and shelter. Running simulations is a kind of "sensitivity analysis ... to find areas with issues" that may or may not line up with what town and fire district officials suspect or already know, he said.

In stressful situations, humans "have a tendency to just revert to what we know and what we think we know and react accordingly," he said. "This is a tool that would cause us to stop and question that. That's one of the things it does."

Fire Chief Dan Ghiorso of the Woodside fire district said that if a real-time map were to show Canada College colored red after a quake, "whoever is available is going to be out there."

While these analyses are not the last word in damage assessment, they are tools for the first responders' toolbox, the chief said. In concert with district volunteers in the Citizens Emergency Response Preparedness Program, "we're in real good shape," he said. "I'm very happy with this (software). I can't look at 32 square miles of district. I think this is the real deal."

Asked about relying on a computer to direct first responders rather than, say, using on-the-ground familiarity, Chief Ghiorso said the company claims its predictions have an accuracy of 85 percent, and reiterated that the software is just one of the district's many tools.

Asked about that 85 percent claim, Mr. Ganjre, the company's "director of customer success," said the number is backed up by two principal advisers to the company: Gregory Deierlein, a civil and environmental engineering professor at Stanford University, and Roger Borcherdt, an emeritus research seismologist at the United States Geological Survey.

Traditional forecasts of quake damage assessment have an accuracy of 15 percent to 20 percent, Mr. Ganjre said. One Concern's accuracy is "exponentially better than that," he said. "We help (first responders) prioritize and really focus on where it's going to matter in saving more lives."

The company draws from sources that include public, private and paid-for data, Mr. Ganjre said. "It's part of our secret sauce," he said, "bringing all of these things together to deliver value to our clients."

'A modest investment'

Mr. Bryant said he was "confident" that information from One Concern will be valuable. "It's intelligent software," he said. "As it gets new information, it's able to incorporate that and provide more accurate information. If a (census) block came up with 70 percent damaged

came up with 70 percent damaged buildings, we're going to take that information seriously. ... It's absolutely worth some investigation."

Portola Valley Town Manager Jeremy Dennis was not available for comment, but at a recent Town Council meeting that included a demo of the software, he called One Concern software "a modest investment" in return for quality data. The two towns and the fire district "get together on a regular basis and run simulations and see what we find," he said.

The town's deputy building inspector, Keith Weiner, noted during the demo that the software can be updated to include information such as locations of emergency shelters.

Like most online maps, the display can shift between map and satellite views, giving first responders a view of a site under normal circumstances. One Concern "gives a hyper-realistic representation of what could happen," Mr. Weiner told the council. "I find this to be an amazing tool," he added. "The realism that we're getting out of it just makes it that much more valuable."

Wildfires and floods

Both the simulations and real-time analysis involve the use of big data, but the data processing is done by web service computers in the cloud. The two towns and the fire district already have satellite phones in case phone service is cut off, and the towns are reportedly looking into satellite web service as well.

The maps as viewed remotely in real time would not make high demands on bandwidth, Mr. Ganjre said, since they are simply images based on data compiled elsewhere.

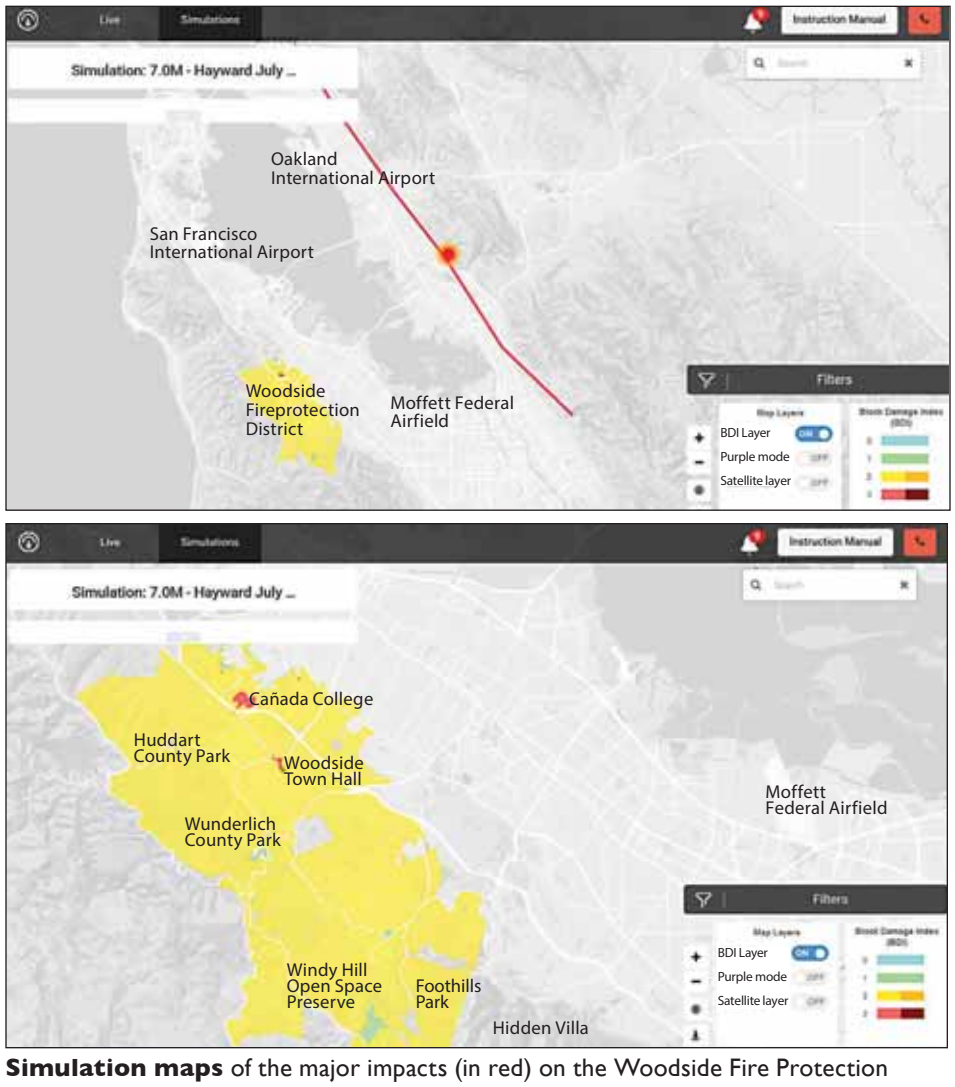
Chief Ghiorso said he has asked the company to look into providing similar predictive services for wildfires and floods. Mr. Ganjre would not comment on these topics.

The company came about through the efforts of Stanford engineering student Ahmad Wani, who was marooned for a week with his family in 2014 during a flood in Kashmir, India. "He spent seven days wondering whether he would live or die before they were rescued," the company's website says.

That experience led to a mission to create a "next-generation disaster response platform," which involved "figuring out how to apply data science and machine learning to aid (in) disaster response." His co-founders were Nicole Hu and Timothy Frank.

Notable people advising the company, Mr. Ganjre said, include David Petraeus, former general and CIA director, and two former Obama administration officials: John Roos, U.S. ambassador to Japan during the Fukushima earthquake and tsunami, and Richard Serino, former deputy administrator in the Federal Emergency Management Agency.

About the cover: The yellow area shows the Woodside Fire Protection District. The yellow color indicates moderate to extensive damage from a simulated 7.0 East Bay earthquake; the two red spots in the yellow area — Cañada College and Woodside Town Hall — indicate potential for collapsed buildings.



Simulation maps of the major impacts (in red) on the Woodside Fire Protection District (in yellow) of a 7.0 magnitude earthquake centered in the East Bay, using artificial intelligence to estimate damage to buildings and inhabitants.