

CCS-5 Helps with Hurricane Efforts

The simulation tools and expertise in the Discrete Simulation Science Group (CCS-5) are playing an important role this year in helping people who are trying to deal with a series of violent hurricanes.

In an interview on September 22—two days before Hurricane Rita struck the Texas-Louisiana coast—Stephan J. Eidenbenz said that CCS had been asked four or five days before the projected landfall of Rita to provide estimates of how telecommunication systems would be affected by the storm. Because CCS-5 had done earlier studies on Houston infrastructure, the group had in hand data that made it possible “basically to do a full-fledged simulation,” he said.

Earlier, CCS-5 had been asked to prepare a post-event study on Hurricane Katrina, providing an estimate of the impact of that storm on telecommunication infrastructure in the New Orleans area.

“We looked at the networks that existed,” Eidenbenz said. “Then we tried to figure out which network elements were damaged—based on damage estimates and power outage estimates available shortly after the storm.”

“Most infrastructure elements fail,” he said, “because there is no power. They typically have battery backup power for a few hours. The larger switches have diesel generators. But these fail or run out of fuel after a couple of days.”

He added that the Decision Applications Division (D Division) provided a power outage map that was a key tool in helping CCS-5 determine the damage.

CCS-5 was able to propose a restoration order for switches damaged by Katrina. “To come up with this,” Eidenbenz said, “we ranked telecommunication elements relative to their importance. Because of the time pressure, we were not able to do a full-scale run of our simulation, but based on the expertise we have been building up from more detailed studies, we were able to make a good estimate.”

He said members of the CCS-5 team made a few calls to get single-point samples used to validate their estimates—but they kept the number of calls to approximately 20. “We were careful NOT to overload the network,” he said.

Asked if CCS-5 worked long hours to provide the necessary information, Eidenbenz said, “We did put in quite a few night shifts.”

“It was exciting,” he said. “It’s great to do work that has the potential to directly impact people’s lives in a good way.” Much of the group’s work is more long-term, he said. And he added that the work done on the two storms is likely to result in publications on the methods used.

CCS-5 knows that some of its reports were included in briefings at the Cabinet-Secretary level. Some were even sent on to the White House.

“The team really worked great,” Eidenbenz said. He listed six people in addition to himself who were directly involved in the Katrina and Rita telecommunications response—Charles David Tallman, Sunil Thulasidasan, Matthew Nassr, CCS-5 Acting Group Leader James Smith (who

provided coordination), Feng Pan of D Division, and Phil Romero of the Computing Communications and Networking Division (CNN).

CCS-5 work was already drawing national attention even before Katrina hit. Scientists in the group did work involving both Hurricane Dennis in July and Hurricane Ophelia, the storm that went up the Eastern Seaboard in the days shortly after Katrina battered the Gulf Coast.

In a separate interview September 22, James Smith listed a number of recent accomplishments. “The National Infrastructure Simulation and Analysis Center (NISAC) Urban Infrastructure Suite Project has made some amazing progress and had a tremendous impact over the past few weeks,” he said.

He pointed out that the project—using a combined team from CCS-5 and D Division to support Department of Homeland Security (DHS) deliverables—recently completed a major improvement in its entire simulation toolset *and* an analysis of the Los Angeles metropolitan area.

“Previous studies considered only a single, carefully scripted scenario in order to demonstrate the utility of these tools for DHS,” he said. “This was the first time a contingency analysis had been used for asset-loss consequence ranking to explore the broad range of possibilities in *all* sectors, and the first time the team produced a product to contribute to the National Asset Database.” He explained, “The results were used to rank order the criticality of the infrastructure assets so that DHS can plan its protection efforts.”

To put this accomplishment into perspective: Los Angeles is more than double the size of any previous CCS-5 study area.

In addition, he said, in August, the team delivered “two quick-turnaround analyses in only two days for DHS.” One was associated with the bombings in London. The other had to do with the imminent arrival of Hurricane Dennis. Since that time, he said, the Secretary of DHS himself has submitted an additional one-day turnaround request.

The program has significantly improved the “positive visibility” of Los Alamos National Laboratory, Smith said, “because of the sustained high-quality work in solving problems that nobody else in the world can solve.”

In recent weeks, positive articles and interview requests have poured in from news organizations including the Washington Post, the Discovery Channel, Time Magazine, CNN, NBC, CBS, Investor’s Business Daily, Wired News, and Men’s Health. In addition, in the last six months, the team has produced 21 refereed publications that were either printed or accepted.