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Cutting-Edge Wireless Traffic Technology Wins Support from Feds

Twelve-million-dollar partnership pushes instant travel information one step closer to California drivers

Today the Bay Area became a national center for the development of intelligent, real-time traffic and transit information, according to an announcement from Paul Brubaker, Research and Innovative Technology Administrator at the U.S. Department of Transportation (DOT).

The U.S. DOT awarded \$2.9 Million to the California Connected Traveler Project, a public-private partnership that, together with monies pledged by Caltrans, Nokia, Navteq, the Metropolitan Transportation Commission (MTC), and vehicle donations from Nissan, represents a research investment worth \$12.4 Million. The University of California, Berkeley is the sole academic partner in the project, which will significantly advance research already underway here.

Inaugural Award Supports Two ITS Berkeley Research Groups

The award to the Caltrans-led consortium was the first in the nation under the new Safe Trip-21 initiative (Safe and Efficient Travel Through Innovation and Partnerships for the 21st Century), a competitive solicitation run by the U.S. DOT's Research and Innovative Technology Administration (RITA). Safe Trip-21 offers federal funding to encourage innovative partnerships that use technology to address transportation problems.

The California Connected Traveler Project will establish a national "test bed" in the South Bay, building on an existing network of sensors and other infrastructure to support systems that will empower travelers with safety and traffic information. The project comprises two research groups, California Partners for Advanced Highways and Transit (PATH) and the California Center for Innovative Transportation (CCIT), both part of UC Berkeley's Institute of Transportation Studies.

The teams are each working on a "cyber-physical system," a cutting-edge moniker describing technology that integrates cyberspace, the physical world, and people. Together, the projects tap the potential of existing cell phone networks and the ubiquity of personal mobile devices to generate and share real-time traffic, transit, and road-safety information. With alerts sent directly to drivers as road conditions change, motorists will be able to choose the quickest and safest routes, integrate with public transit, and adjust their routes to avoid developing hazards and congestion.

The Mobile Millennium Project

"This award will lead to the development of a pioneering cyber-physical system that uses cell phones to improve human mobility" said Alexandre Bayen, assistant professor of systems engineering and principal investigator on Mobile Millennium, the project administered by CCIT.

Bayen, together with Quinn Jacobson, research leader at Nokia Research Center, led the Mobile Century project, Mobile Millennium's previous research stage in which a cell-phone-based, real-time monitoring system for highway traffic was developed. In February, the capabilities of the system were demonstrated with the first large-scale coordinated experiment of its kind, in which 100 cars drove a 10-mile loop, the drivers all carrying GPS-equipped mobile phones that transmitted data.



Randell Iwasaki, Chief Deputy Director, Caltrans (L) and Paul Brubaker, Administrator of the U.S. Department of Transportation's Research and Innovative Technology Administration (RITA).

The California Connected Traveler Program supports research and logistics leading to an unprecedented field test of 10,000 cars transmitting data over highway and arterials in a 200 mile radius. "Cyber-physical systems such as the one we are constructing in this project are emerging as an important new way for people to interact with the environment," says Bayen. "They will change our lives by integrating sensing and communication with the physical world."

The GEMS Project

A few miles north of campus, at UC Berkeley's Richmond Field Station, another ambitious technology has been under rigorous study since 2005, and the California Connected Partners Project aims to build on that investment. PATH researchers have been developing Vehicle Infrastructure Integration (VII), a high-tech road-to-car hotline that utilizes dedicated wireless frequency to allow roads to "talk" to cars, instantly alerting drivers to road hazards, intersection problems, and traffic and transit information.

PATH, in partnership with Caltrans, MTC, and private partners, built the South Bay-based VII California testbed, which will be expanded to serve as the national testbed under the Safe-Trip 21 award. "The safety benefits of VII are enormous," said Jim Misener, program lead for PATH's Transportation Safety Research Program, who cites research showing that 70 percent of all traffic fatalities take place in intersections.

Ultimately, VII's infrastructure may prove too costly. But, Misener said, the research and its critical "safety of life" applications are invaluable. Thus, the next iteration, dubbed Group Enabled Mobility and Safety (GEMS), was born. "The question became, 'How do you marry Mobile Millennium's leveraging of the cell phone network with VII's enormous potential to save lives?'" said Misener, who is collaborating with associate professor of civil and environmental engineering Raja Sengupta. "The California Connected Traveler funds will allow us to investigate that question by expanding the scope of our GEMS work," Misener said.

Working Towards the World Congress

Along with the hefty financial backing, researchers have been handed a challenging first deadline for the two-year project. Progress on the new technology will be demonstrated at the World Congress on Intelligent Transport Systems, an international meeting to be held in New York City this November. PATH director Alex Skabardonis says UC Berkeley will be ready.

"This technology has the potential for enormous benefit to travelers, not just in California, but across the globe," said Skabardonis. "At Berkeley we have a group of faculty, students, and researchers of the highest quality, dedication, and enthusiasm who will be working long hours to make it a reality."

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Jim Misener (L), program lead for California PATH's Transportation Safety Research Program, shares greetings with (L-R) Ravi Puvala, Principal of Savari Networks, Administrator Brubaker, and Randell Iwassaki.



Raja Segupta (R), associate professor of civil and environmental engineering and GEMS principal investigator, with Jeremy Wolstan, (Center) of Naveteq, field questions from the media.