

Intellimotion

Keeping up with California PATH Research in Intelligent Transportation Systems

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Smart Parking Project Launches at BART's Rockridge Station

Susan Shaheen and Amanda Eaken

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When you think about parking, do the words, dynamic, intelligent, or efficient come to mind? More likely it's frustration, shortage, or lack of space.

A new research effort, launched on December 8, 2004, is seeking to change this parking paradigm. Working with several project partners, California Partners for Advanced Transit and Highways (PATH) researchers are conducting a field trial to test a new service that permits dynamic management of parking spaces at the Rockridge Bay Area Rapid Transit (BART) District station. The project's broader goal is to provide real-time transit parking information on the highway and advanced reservations to increase transit ridership.

The program, called "Smart Parking," is a project partnership of the California Department of Transportation (Caltrans); the BART District; California PATH, University of California, Berkeley; Parking Carma; Quixote Corporation; Intel; and Microsoft.

BART has dedicated 50 spaces at the far-east end of the Rockridge reserve lot to the Smart Parking project. Underground sensors located at the entrance and exit to this lot frequently transmit their data to a central computer, so that at any given point, research-

ers know exactly how many cars are in the lot, and by extension, how many spaces are available. This technology allows researchers to communicate with potential BART riders in two ways.

First, researchers have created a reservation system that the public can access by phone, PDA, or Internet at any time of the day to check on availability. Patrons can use this system to reserve a space up to two weeks in advance, or as little as a few minutes before they need a space. Researchers are also attempting to capture the attention of motorists on Highway 24 with two changeable message signs (CMS) that display the number of available spaces in the lot.

Signs instruct motorists to use the College Avenue exit to access the Rockridge BART station parking lot. Motorists can reserve a space upon reading the CMS sign or once they've parked in the lot. Researchers will assess changes in driver behavior through analysis of systematic observations, reservation data, questionnaires, and focus groups.

"We'd like to know whether putting real-time information about the availability of BART parking along a congested freeway will help move people off the roads and into public transit," said Susan Shaheen, the project's principal investigator and program leader

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California PATH—Partners for Advanced Transit and Highways—is a collaboration between the California Department of Transportation (Caltrans), the University of California, other public and private academic institutions, and private industry.

PATH's mission: applying advanced technology to increase highway capacity and safety, and to reduce traffic congestion, air pollution and energy consumption.





*Pictured from Left to Right:
 Bob Franklin, Director BART District 3
 Randell H. Iwasaki, Chief Deputy Director, Caltrans
 Susan Shaheen, Program Leader, California PATH*

for Policy and Behavioral Research at California PATH. “Many drivers do not drive to a BART station because they assume the parking lot is full. Our research question is whether individuals will now use transit if they know that they will find an open spot at the station or can reserve one in advance.”

In addition to furthering an understanding of driver behavior, another aim of the research is to test a new technology for potential use at other transit stations around the Bay Area. Since this unique smart parking system has never

been implemented, it is critical to monitor its performance in the field before expansion to other stations.

“It’s important to point out that this is simply a demonstration project,” said Linton Johnson, BART’s chief spokesman. “However, once it’s been proven to work, we look forward to implementing it at other BART stations to make parking at BART much more convenient for everyone.”

Caltrans is providing the funding for the \$500,000 research effort and has provided instrumental guidance in the early phases of the research project. Caltrans Director Will Kempton spoke to the importance of this project to his agency. “This project reflects the leadership role that Caltrans is playing in implementing Intelligent Transportation Systems in California. This program will help reduce congestion by making transit a more practical and convenient travel option and getting vehicles off the road. We are always on the lookout for successful innovative ideas and smart parking technology is certainly one of those.”

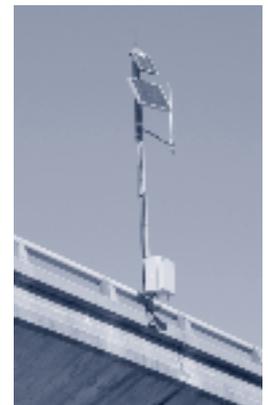
While parking shortage problems are well recognized, the cost of providing additional capacity is frequently prohibitive. Smart parking may provide a sensible means to effectively increase parking capacity by dynamically managing spaces for high efficiency. The results of the before and after evaluation of the smart parking field test at the Rockridge BART station will contribute further insights into the potential benefits of transit-based smart parking.

For more information, visit www.bart.gov/parking and www.innovativemobility.org.

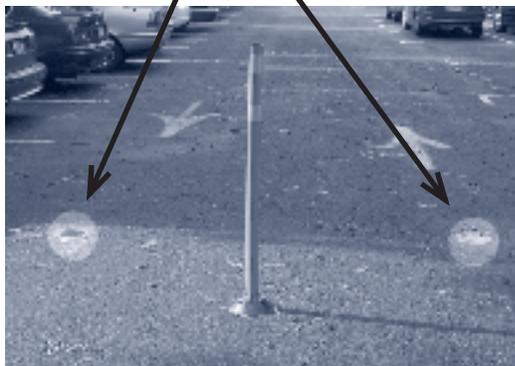


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Signals from buried sensors (1) located at the entrance and exit of the BART station (2) are sent by wireless transmitters (3) to a central computer that determines how many spaces are available and sends this to a changeable message sign (4) located before the freeway exit.



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Accelerating ITS Deployment: California's Innovative Corridors Initiative

Susan Shaheen, Rachel Finson, and Cynthia McCormick



Intelligent Transportation Systems (ITS) show great potential to improve safety; transportation system management; and individual choice of mode, route, and time of travel. However, there are still many challenges to ITS deployment. Several of these challenges include: unclear roles and responsibilities among jurisdictions in ITS policy development and operations; competing priorities for scarce resources; limited private investment in ITS; limited ITS expertise among transportation agencies; lack of understanding of ITS benefits; and poor visibility of ITS projects (for instance, in comparison to highway construction).¹

California's Innovative Corridors Initiative (ICI) is developing a unique partnership between government and private industry that is designed to break through some of the challenges to ITS deployment. The collaboration among the California Department of Transportation (Caltrans), the Metropolitan Transportation Commission (MTC) in the San Francisco Bay Area, the Los Angeles Metropolitan Transportation Authority (MTA), and the California Center for Innovative Transportation (CCIT) offers a new business/policy model for public-private partnerships. The ICI is the incorporation of innovative transportation pilot projects developed and implemented by private industry, with oversight from Caltrans, MTC, and MTA staff. The goal of the ICI is to test existing technologies, systems, and ideas on a pilot basis and to develop better government-industry business strategies. The ICI is a multi-year effort, which began in 2003 and will continue through 2006.

The Intelligent Transportation Society of America (ITSA), which will host the 12th annual ITS World Congress in San Francisco in November 2005, is also a partner in the ICI—providing industry participants with an opportunity to showcase their projects during this high visibility event that is expected to draw an international audience of nearly

10,000 transportation professionals, decision makers, business leaders, media, and interested public.

The Call for Submissions (CFS) is the key ICI mechanism developed to offer private sector companies an opportunity to exchange/propose innovative ideas for improving safety and mobility in California with the public sector.

Caltrans and its partners released the CFS to the public on October 15, 2003, with a final date for proposal submission of January 2, 2004. The CFS resulted in 28 proposed project ideas from private industry to test self-financed pilot projects in Northern and Southern California. Unlike traditional bid contracts between the public and private sector, no Federal or State funding will be awarded as a result of the CFS.

While no public funds will be awarded, Caltrans intends to offer limited access to the State's rights-of-way. Furthermore, Caltrans and its partners will lessen risk to the private sector by streamlining processes to facilitate the development and deployment of selected projects. In return, Caltrans and its CFS partners will receive information and technology, which will improve choice for individual travelers and aid them in making informed decisions. Access to enhanced information and technology will also assist transportation managers in planning and operating the system and in reducing collisions and incident severity. The result should be a more efficient and safer transportation system in California.

In addition to enhancing traveler safety and convenience, the ICI encourages private investment in ITS and creates a better understanding of when and how to maximize public investments. One of the major barriers to ITS implementation is a lack of available resources. More traditional approaches to system improvement (e.g., construction) typically take priority for limited funding. Public-private partnerships offer an alternative funding mechanism

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¹ Benouar, Hamed. "Deploying the ITS Infrastructure in California." *Intellimotion*. 10.1 (2002): 4.

where risks, costs, and benefits are understood and shared between the public and private sectors. Such public-private partnerships are being increasingly examined as a means to finance needed transportation system improvements. For example, the Florida Department of Transportation will select a private contractor to build and operate a broadband wireless Internet testbed along portions of Orlando's rights-of-way. In California, State Route (SR) 91 electronic toll road was fully funded by a private firm that was selected by Caltrans through a process similar to the CFS. SR 91 was completely funded through private investments and was the first project born from Assembly Bill 680 legislation.



California State Route 91 (SR 91)
electronic toll road

ICI Project Implementation

The implementation and management of the ICI includes partnership development, public outreach, the draft and release of the CFS, proposal review, contract negotiation, and coordination with the 2005 ITS World Congress. CCIT is managing the implementation of the ICI project in close coordination with Caltrans' Divisions of Traffic Operations and Research and Innovation.

ICI Partnership Development:

The development of a strong partnership was crucial to the long-term success of the ICI, especially because the unique nature of the CFS requires participants to test new processes and develop new relationships. In an effort to define the roles and responsibilities of those involved in delivering the 2005 ITS World Congress, Caltrans and ITSA developed a Memorandum of Understanding (MOU) in July 2003. Additionally, two advisory groups were also created: an ICI/World Congress 2005 Working Group and a Caltrans Technical Working Group.

CFS Development:

Caltrans, MTC, and MTA collaborated in the CFS development, with Caltrans' contracts and legal divisions playing a

leading role. The goal of the CFS was to gather necessary information about possible projects, while encouraging innovative ideas. The CFS asked respondents to indicate: the type and extent of improvements and services offered to the traveling public or public agency; the proposed roles of Caltrans, MTC, MTA, or other public partners in the development and operation of the project; and to include a plan for the deployment, operation, maintenance, and subsequent removal of the pilot project (as needed).

Public Outreach:

ITSA, the Silicon Valley Manufacturers Group, TechNet, the Bay Area Council, and the California State Chamber of Commerce all published announcements about the ICI project, the CFS, and the Northern and Southern California CFS Review Sessions in their newsletters. The two public CFS Review Sessions were designed to inform the public of the project and gain industry and public agency (e.g., transit providers) feedback. Drafts of the CFS were distributed for review, comment, and questions during the review sessions to gain input prior to the final CFS release. Attendees of the two sessions included representatives from the auto industry, transportation sector, business community, trade consultants, engineering firms, the information technology sector, the communications sector, State and local government, university researchers, and not-for-profit organizations. Approximately 150 people attended both sessions.

CFS Release:

The CFS was released to the public on October 15, 2003. The CFS was posted on the California State Department of General Services web page (CFS Number 0587a33, entitled "Pilot Projects for Demonstration in Conjunction with the 2005 ITS World Congress"). The CFS also included a formal process for submitting questions, which were answered as Addendum 3 to the CFS. A total of 39 questions were received from industry and answered by Caltrans, MTC, and MTA.

Examples of the types of questions and responses included:

- Question One:** Will there be funds available and what other types of resources or assistance can the proposers expect from the public agencies?
- Response One:** No funds would be available and staff assistance and possible access to rights-of-way could be available depending on the proposed project.
- Question Two:** Will the commitment to work with industry from the highest levels of the public agencies translate into a real difference at the working level?
- Response Two:** Every effort is being made to engage all departments and divisions in the agencies as early as possible to gain full participation and cooperation.

Question Three: Will requests for clarification about the CFS submittal and evaluation process.

Response Three: Every effort will be made to make the CFS process transparent to industry.

CFS Submissions and Proposal Review:

The CFS submission deadline was January 2, 2004. Technical experts from many of Caltrans divisions and districts, as well as MTC and MTA specialists, were involved in various phases of the proposal review. As announced in the CFS, all persons reviewing the proposals were asked to sign a non-disclosure agreement, including a statement that they had no conflict of interest with the project they were reviewing. The evaluation criteria included an assessment of the proposal's benefit to the partner agencies and the traveling public; the degree to which the proposal assists with data collection, processing, and dissemination; technical and environmental feasibility; company/agency qualifications; project innovation; and timeframe. (Projects should be deployed by September 1, 2005, and continue operating through the ITS World Congress in November 2005.)

Current Status and Expectations:

Initial proposal evaluations and meetings with CFS proposers have been completed. Nine of the initial project proposals are moving to an agreement negotiation phase. At present, detailed discussions about agreements, plans, specifications, approvals, and installation are in progress. For projects that are advancing, the partner agencies are implementing a multi-phased process, including:

- 1) Negotiation and agreement on project plan, roles and responsibilities, and pilot timeframe and requested agency resources that will result in an agreement on the plan and project design;
- 2) Environmental/encroachment permitting and agreement to deploy, operate, maintain, and dismantle the project;
- 3) Project implementation by the proposer;
- 4) Operation and demonstration of the project during the 2005 ITS World Congress;
- 5) Dismantling and project removal (as needed); and
- 6) Comprehensive, independent evaluation of the ICI project including key outcomes and lessons learned.

After project agreements are finalized CCIT will continue to provide ICI planning support and detailed project implementation oversight will shift to the appropriate public agency (i.e. Caltrans and MTC).

ICI Planning Process

An assessment of the ICI policy/planning process is being conducted by California PATH staff. The final report will include a literature review and background report, a chronology of the CFS process, and lessons learned from a series of interviews and surveys. Interviews with agency participants and CFS participants are the primary means by which researchers are examining the effectiveness of the

ICI policy/planning process as a mechanism to accelerate the deployment and commercialization of ITS technologies. Lessons learned will influence future policy and practices among Caltrans and other public agencies.



Summer 2004 meeting of the ICI/World Congress 2005 Working Group held at Caltrans' District 4.

Lessons Learned

Although the ICI project will not be completed until the end of 2006, staff and researchers participating in the project are taking a phased approach to documenting the knowledge gained from the ICI and have identified the following early lessons learned through interviews with public agency partners:

- This type of project requires dedicated staff from the beginning to ensure that tasks are completed, ideas are communicated, all of the necessary departments are involved, staff is not pulled away from their compulsory assignments, and the agency achieves a successful business/policy model.
- Early partnership building and key player involvement in projects is important for successful collaboration.
- Concurrence on the vision and goals at all levels within the public agencies is critical.
- It is important to define project proposer and public agency responsibilities early, as it is difficult to anticipate what expertise will be necessary.
- Recurrent meetings have allowed agencies to realize common needs and goals, build trust, improve personal relations, share information, and witness cooperation on both sides of the table.
- High-level management support of the ICI within all partner agencies has been critical to the project's success to date.
- Overall the process of developing the CFS, evaluating proposals, and negotiating with industry respondents was more time consuming than anticipated (in part because of the large number of proposal received).
- Allowing adequate time for public outreach and for questions and answers is essential for gaining participant involvement.
- To encourage innovation, the CFS did not specify a location, technology, or desired outcome. However, without a specific problem to solve, several respondents submitted vague proposals. More CFS specificity may have resulted in stronger proposals, but the

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UCB-ITS-PWP-2004-7

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challenge of requiring enough proposal details for proper evaluation, while still encouraging innovation, is a necessary corollary of CFS style solicitations.

- The process of providing confidentiality (i.e., all evaluators were required to sign non-disclosure agreements (NDA) and non-conflict of interest statements) was time consuming and impacted the review process.
- The CFS process has been successful in identifying numerous ITS innovations that could benefit the traveling public.
- The CFS appears to have opened a process of creating stronger linkages between government and industry that should allow the exchange of information and sharing of resources and expertise in a manner that will improve transportation management.

Additional lessons learned are expected to be amassed and documented throughout the Innovative Corridors Initiative.

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