PATH Makes a Presence at 71st TRB Annual Meeting

For PATH researchers, the focus in recent months has been on the papers and presentations which highlight the latest in their transportation technology findings for the TRB Annual Meeting. In keeping with tradition, the international conference, which continues to expand in both size and scope, will be held in Washington D.C.

"TRB serves as a uniquely effective forum for presentation and discussion of the full range of transportation issues."

- Steven Shladover
PATH Technical Director

At this year's meeting, PATH is providing 14 presentations covering our statewide Intelligent Vehicle/Highway Systems (IVHS) activities. Researchers from the University of California, Berkeley, the University of California, Davis, the University of California, Irvine and California Polytechnic State University, San Luis Obispo will be presenting papers in the areas of Advanced Traveler Information Systems (ATIS), Advanced Traffic Management Systems (ATMS), Roadway-Powered Electric Vehicles (RPEVs), and Advanced Vehicle Control Systems (AVCS).

Other PATH representatives who will be chairing sessions are Technical Director Steven E. Shladover (U.C. Berkeley), Professor Ryuichi Kitamura (U.C. Davis), and Professor Paul Jovanis (U.C. Davis).

States Shladover, "TRB serves as a uniquely effective forum for presentation and discussion of the full range of transportation issues, from technology to policy. PATH researchers are able to not only showcase their recent work, but also to learn about the accomplishments of other experts in the field through both formal presentations and informal interactions."

Dorriah L. Page, a doctoral candidate in Civil Engineering and Environmental Studies at the University of California, Davis, is also presenting her PATH research. Page's presentation, co-authored by Professor Robert Johnston, is entitled, "Transportation Demand Modeling and its Effects on Advanced Technology and Transportation Policy", and will be included in the Seminar on Doctoral Student Research in Transportation Modeling.

The Transportation Research Board's 71st Annual Meeting commences January 12 and will continue through January 16, 1992.

For details on PATH papers and presentations, please refer to the TRB presentation guide on pages 4 and 5 of this newsletter.

We look forward to meeting you there.
Directors Chair

On a Positive Growth Path
A Word from Director Donald E. Orie

The recent holidays reinforced in my mind that change is truly inevitable. With my relocation from Michigan to California, old traditions were broken, and new ones are already emerging in their place. Similarly, my arrival at PATH triggered a new level of change upon an already transforming program. I would like to highlight the change surrounding the organization, and to state unequivocally that good things ahead.

This program is rapidly moving the "path" toward the expanded knowledge base necessary for solving critical transportation problems statewide. One is tempted to suggest with a smugness and complacency that PATH is an unsurpassed national program which might be in need of just a little fine tuning. Actually, it is true that permanent research staff, faculty, and graduate students at PATH's five research campuses form a significant intellectual force. It is also true that Caltrans provides unprecedented technical and financial support, as well as superior field test facilities.

Nonetheless, additional hard work is required to implement further program improvements. The "bottom line" objective is to create the best possible program to improve state and national transportation. This goal will be accomplished by effectively using all available resources.

Resources are key to a positive change process. Space precludes much elaboration but, importantly, a major organizing effort is underway. Major players in this effort include public and private universities; national laboratories; state and federal agencies; private corporations; non-profit organizations; and all-time PATH employees. Organizational elements include faculty, student and full-time researchers; a steering committee; advisory councils; research focus groups and a joint Caltrans/PATH management team. Our purpose is to establish an outstanding statewide advanced technology program with substantial test bed experimentation, slated to grow beyond the fifty or so projects currently in the program. At PATH we envision growth in both size and diversity, as well as in the available financial and skilled researcher pools.

Watchwords include cooperation, coordination, and collaboration as PATH truly takes its place as California's organization of partners for Advanced Transit and Highways.

Directors Chair is a regular column highlighting the ideas of PATH's leadership personnel.

Engineering Update

FASTCARS Driving "Game" Analyzes Driver Responses

For Jeffrey Adler, doctoral candidate in civil engineering at the University of California at Irvine, research appears to be made up of mostly fun and games. Adler has created an interactive real-time computer "game" entitled FASTCARS (Freeway and Arterial Street Traffic Conflict Awareness and Resolution Simulator) which simulates driving patterns for the purpose of analyzing human conflict awareness and response, as well as monitoring how motorists react to enroute Advanced Traveler Information Systems (ATIS).

FASTCARS provides an artificial environment that simulates the spatial and temporal situations that arouse conflict and motivation during travel. Given a fictional roadway system, a player drives a car through traffic towards a pre-ordained destination and arrival time: say, a baseball stadium with the game scheduled to start at 2:00 p.m. Players choose their route before beginning the game, but can divert to new paths at any time. Cross streets and alternative interstates are displayed on screen. The program also provides congestion warnings and commute-time alternatives. In addition, audio speakers connected to the system announce roadway advisory reports.

When Adler convinces one of his colleagues to partake in a game of FASTCARS, he is not judging the "The role of a good simulator is to recreate real-world scenarios and elicit responses that are similar to those expected under real-world conditions."

Aider's FASTCARS program in action.

As a basis for interpreting the data compiled by FASTCARS, Adler relies on psychological models of conflict and resolution theories, applied to patterns of individual consumer behavior. He operates under the assumption that "enroute assessment and adjustment is a reactionary process influenced by increased conflict arousal and motivation to change. When conflict rises to a level where a personal threshold of tolerance is exceeded, a driver is likely to alter enroute behavior through other route diversion or goal revision."

The development of Adler's simulator is recognized by colleagues and faculty advisor Wilfred Becker as a valuable research tool in the area of Advanced Traveler Information Systems (ATIS). ATIS provides motorists with real-time traffic information to improve their awareness of current roadway network conditions and aid in their evaluation of alternative routes, thereby stimulating changes in driving behavior that result in a more efficient use of existing road systems. ATIS not only assists drivers in adjusting trip patterns en route, but also makes travel choices before embarking.

However, developing ATIS is only half the battle—the remaining challenge is determining if ATIS can be successfully utilized by drivers in real-world applications. The usefulness of ATIS technologies is dependent upon driver response to information. Unfortunately, limited implementation of these systems makes it difficult to evaluate how the acquisition of real-time traffic information would influence driver behavior.
## Presentations of PATH Research Results at TRB 1992

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<tr>
<th>DATE</th>
<th>TIME</th>
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<td>109</td>
<td>Hilton</td>
<td>Jeffrey L. Adler, Wilfred W. Recker, Michael G. McNally</td>
<td>University of California, Irvine</td>
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<td>Mark A. Miller, Victor Dato, T. Chira-Chavala</td>
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<td>Wei-Bin Zhang, Hsei Peng, Alin Anai, IMRA America, Peter Dedin, Yo Lin, Thomas Hessburg, Steven E. Shladover, M. Tomizuka</td>
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<td>Youmbin Yim, Adib Kanaan, Jean-Luc Ygnace</td>
<td>INRET, France</td>
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## PATH Researchers Host TRB IVHS Sessions

The following sessions will be chaired by PATH Researchers:

### Session # 109
**Title:** Traveler Decisions with ADIS
**Session Chair:** Ryushich Kitamura, University of California, Davis
**Date:** Tuesday, January 14, 1992
**Time:** 8:00 a.m.
**Location:** Hilton
(Sponsored by Committee on Traveler Behavior and Values, and Committee on Transportation Supply Analysis)

### Session # 208
**Title:** IVHS Safety Assessments from Existing Accident Data
**Session Chair:** Paul Jovenis, University of California, Davis
**Date:** Wednesday, January 15, 1992
**Time:** 2:30 p.m.
**Location:** Sheraton
(Sponsored by Committee on Traffic Records and Accident Analysis)

### Session # 215
**Title:** Advanced Control Systems for IVHS
**Session Chair:** Steven Shladover, University of California, Berkeley
**Date:** Wednesday, January 15, 1992
**Time:** 2:30 p.m.
**Location:** Shoreham
(Sponsored by Task Force on Advanced Vehicle and Highway Technologies)

**"Transportation Demand Modeling and its Effects on Advanced Technology and Transportation Policy"**

Seminars on Doctoral Student Research in Transportation Modeling
**Presenter:** Darrah Page, doctoral candidate in Civil Engineering/Environmental Studies at the University of California, Davis
**Date:** Sunday, January 12, 1992
**Time:** 4:00 p.m.
**Location:** Shoreham
Human Factors Report: Understanding Interface Issues between People and Technology

Monique Vernet, a psychologist at the Institut National de la Recherche sur les Transports et leur Sécurité (INRETS) in Lyon, France, joined PATH one year ago to study some of the human factors issues surrounding Advanced Vehicle Control Systems (AVCS). Specifically, Vernet examined how drivers respond to collision avoidance via different types of warning systems.

There are many ways in which a warning signal can be given to a driver: devices can be audible or visual, and they can provide detailed information on the exact distance or time between the vehicle and another object. Regardless of which type of warning device is used, human factor requirements dictate that: the following criteria apply: shor: learning curve; useful, efficient, non-supersitious processing of information; satisfied and non-stressful reaction of driver to information received; and user acceptance.

Vernet designed a set of specified scenarios for use in an in-lab driving simulator, exposing drivers to various hazardous conditions to compare the effectiveness of alternative safety warning systems. Vernet's scenarios were modeled after a two-lane rural road setting in the U.S. which would be used as a backdrop for simulated conflicts between the test vehicle and other vehicles and objects within the same lane. Traffic in the opposing lane will be simulated in order to provide the test driver with the visual occupation of on-coming traffic and, in some situations, to prevent the driver from overtaking a vehicle. The total time required for action necessary to avoid collisions consists of two critical components: the driver response time and the vehicle response time. Vernet's scenarios assume response times that should be within the capabilities of most drivers.

PATH looks forward to continuing progress in this and other important research projects.

Driving FASTCARS

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behavior. In developing FASTCARS, Adler recognized that laboratory experimentation with interactive driver choice simulators provides both a substitute for real-world ATE applications, and an alternate approach for data collection and driver behavior analysis.

Adler believes that the advantage of using FASTCARS over other data collection methods is to study driver behavior in the context of the task environment, thereby increasing the validity of the data. In addition, the entire driving process from pre-trip planning through arrival at the destination.

ENGINEERING FOUNDATION

International Conference on Artificial Intelligence Applications in Transportation Engineering
June 20-24, 1992
San Buenaventura, California, USA

Chair: Stephen Ritchie, U.C. Irvine
Co-Chair: Chris Hendrickson, Carnegie Mellon University

This conference is co-sponsored in part by Caltrans and PATH. For information please call the Engineering Foundation at 212-765-7635.

Conference Announcements


Presentations

Jeffrey L. Adler - Research Specialist, Institute of Transportation Studies (ITS), U.C. Irvine. "Predicting Drivers' Response to Real-Time Traffic Condition Information".

Paul P. Jovannis - Professor, Department of Civil Engineering, ITS, U.C. Davis. "Assessing Safety Implications of In-Vehicle Route Guidance Systems Using an Advanced Driving Simulator".

Adolf D. May, Research Engineer and Professor Emeritus of Civil Engineering, ITS, U.C. Berkeley. "Potential Benefits of In-Vehicle Information Systems in a Smart Freeway Corridor".

1991 Report Titles

Second Annual Symposium on Advanced Traffic Management Systems (ATMS) and Advanced Traveler Information Systems (ATIS) UCB-ITS-PTR-91-1; pp. 24; $3.00

Studies of the Adoption and Use of Location and Communication Technologies by the Trucking Industry UCB-ITS-PTR-91-2; pp. 78; $2.50

Sketch of an IVHS Systems Architecture UCB-ITS-PTR-91-3; pp. 88; $3.50


Evaluation of Potential Hybrid Electric Vehicle Applications: Volume II Appendices UCB-ITS-PTR-91-5; pp. 54; $6.00

The Design of Platinum Manner Prototype for IVHS UCB-ITS-PTR-91-6; pp. 175; $18.00

Restructuring the Automobile/Highway System for Less Vehicles: The Scaled Presence Activity Network (SPAN) Approach UCB-ITS-PTR-91-7; pp. 175; $18.00

Use of NASS Data for Evaluation of AVCS Decisions UCB-ITS-PTR-91-8; pp. 10; $1.50

ITS (Version 1.0) - Bluetooth Traffic Simulator User's Manual UCB-ITS-PWP-91-1; pp. 40; $3.00

User Perceived Benefits with Navigation Systems UCB-ITS-PWP-91-2; pp. 48; $4.50

Notes from a Talk on IVHS Safety UCB-ITS-PWP-91-3; pp. 9; $1.50

Time Benefits of New Transportation Technologies: The Case of Highway Automation UCB-ITS-PWP-91-4; pp. 45; $5.00

Incident Management with Advanced Traveler Information Systems UCB-ITS-PWP-91-5; pp. 36; $3.00


Attention PATH Researchers

Intelligence would like to feature your research activities to help keep everyone up-to-date on PATH's IVHS projects. If you are interested in submitting your work for publication, contact Anna Marie Bozzini at 510/231-9495.
Bobby Satyedev Yerramilli-Rao (a.k.a. Bobby Rao) began his two-year appointment as a Post-Doctoral Researcher at PATH in October 1991. While at PATH, he will concentrate his efforts on information distribution with regard to traffic control and sensing issues. Dr. Rao attained his degree at Oxford University, where he specialized in robotics.

PATH bids au revoir to Monique Vernet, a visiting researcher from the Institut National de la Recherche sur les Transports et leur Sécurité (INRETS) of Lyon, France. While at PATH, Vernet concentrated on Human Factors Issues surrounding Advanced Vehicle Control Systems (AVCS). Her background in psychology complemented her research in the area of human factors. PATH wishes Monique continued success in her valuable research.

Congratulations to Haitham Al-Deek on the completion of his U.C. Berkeley Doctoral Dissertation entitled The Role of Advanced Traveller Information Systems in Incident Management. Currently, Dr. Al-Deek is conducting full-time research with PATH, specializing in Advanced Traveler Information Systems (ATIS).

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Information and specifications within this newsletter are subject to change without notice.