



Project Summary Report 1985-5

Project 7-1985: Houston Smart Commuter ITS Operational Test:
Project Management Assistance and Study Design, Data Collection,
Monitoring, and Local Evaluation Program

Authors: Katherine F. Turnbull, Stephen P. Farnsworth, and Darryl D. Puckett

Lessons Learned: Houston Smart Commuter Operational Test

Traffic congestion continues to be a significant problem in Houston and other large metropolitan areas, especially during the morning and afternoon peak periods. Enhancing the mobility of residents and visitors, managing the increasing demands on the transportation system, and addressing traffic-related air quality issues continue to be priorities for the Texas Department of Transportation (TxDOT), the Metropolitan Transit Authority of Harris

County (METRO), other agencies, and local jurisdictions. These groups are using innovative and coordinated approaches to better manage all elements of the transportation system in the Houston area.

Advanced technologies, including those commonly referred to as intelligent transportation systems (ITS), are among the techniques being developed and deployed in the Houston area. The Houston Smart Commuter ITS Operational Test provides one example of an

innovative multi-agency approach. TxDOT and Houston METRO co-sponsored and funded the project, with additional financing from the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA).

The Houston Smart Commuter project examined the influence of providing real-time traffic and current bus information to commuters in the I-45 North Freeway corridor. A group of individuals living in the Spring and Kuykendahl park-and-ride lot market areas, and working in downtown Houston and other areas served by regular route buses, were recruited to participate in the test. These individuals were provided with access to real-time traffic and current transit information through a hand-held device and a telephone system. Use of these methods was monitored, and changes in travel behavior were examined. The travel behavior of a control group, comprised of commuters in the corridor not participating in the project, was also monitored.



Figure 1. Magic Link™ handheld personal information device



What We Did . . .

Two communication devices — an enhanced Sony Magic Link™ Personal Intelligent Communication (PIC) - 1000 device and an interactive touch-tone telephone system — were used in the test. These systems were developed by a team headed by TRW, Inc., which was selected by METRO and TxDOT through a two-step competitive procurement process.

The Sony Magic Link™ is shown in Figure 1 (page 1). The standard features of the Magic Link™ include a date book, notebook, calculator, spreadsheet, dictionary, and games. Additional information and programs were added as part of the test. Participants could obtain real-time traffic information on the I-45 North Freeway general purpose lanes and HOV lane, as well as the Hardy Toll Road. As illustrated in Figures 2 and 3, current information on transit schedules, road construction, and accidents was also provided. The real-time traffic information was sent through an FM subcarrier to an activated Magic Link™ device.

Two groups of participants were recruited for the test. The first group of 275 individuals started in the fall of 1996, and 226 people joined in the fall of 1997. The test ended in December 1999. Participants in both groups completed travel surveys and travel diaries before the test started, travel diaries at six-month intervals, and surveys and diaries at the end of the project. Members of the control group completed surveys and diaries at the same time periods.

What We Found . . .

The results from the Houston *Smart Commuter* project provide a wealth of information concerning commuters' travel behavior. These behaviors include travelers' interest in and use of current traffic and transit information, methods for obtaining this information, and changes in travel behavior resulting from the provision of this information. The project also provides additional insights into the difficulty of developing user-friendly and reliable systems for providing traffic and transit information,

especially with the rapid evolution of technology. The major conclusions from the test related to these items are highlighted next.

- The project successfully developed and tested the provisions of real-time traffic and static transit information through a hand-held device and a telephone system. The Magic Link™ and the telephone system were tested over a two-year period with participants commuting in the I-45 north corridor.
- Technical problems with the FM radio subcarrier limited the reliability of the Magic Link™ system during portions of the test in some areas. These problems resulted in some participants dropping out of the test and in others not using the devices to their fullest capabilities.
- The results from the travel surveys, trip diaries, and the discussion group all indicate that drivers do seek information on traffic conditions on a regular basis. Commercial radio stations are the primary sources of information for most drivers, followed by television, the newspaper, and the Internet. Radio is the most frequently used method on trips to work in the morning and home in the afternoon. Television is used more in the morning, while Internet use is higher at work in preparation for the trip home.
- Use of the Magic Link™ varied among participants. Approximately 20 percent of the participants responding to the final survey reported daily use of the devices, 25 percent indicated periodic use once or twice a week to once or twice a month, and 55 percent were infrequent users. The Magic Link™ logs show 19 percent of the participants were

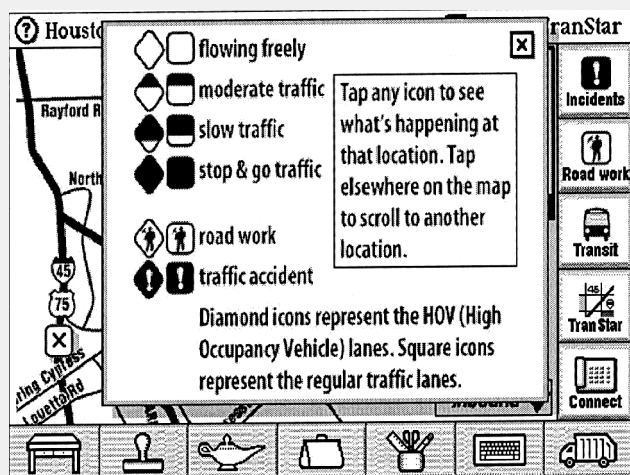


Figure 2. Example of graphic icons.



daily users, 20 percent used it once or twice a week to once or twice a month, and 61 percent were infrequent users.

- Factors that appeared to limit the use of the Magic Link™ devices included the time to set it up, the inability to obtain information due to the problems with the FM subcarrier, and the fact that it was not intended to be used in a moving vehicle.
- Factors that appear to be important to travelers in obtaining traffic information are ease of use, reliability, and accuracy. The Magic Link™ was rated by participants below other methods, except the newspaper, on most of these attributes. Commercial radio reports were rated the highest by both participants and control group members on five attributes — ease of use, reliability, accuracy, timeliness, and usefulness of information.
- While the results indicate that people seek traffic information, most do not

appear interested in paying for it. The majority of participants and control group members responding to this survey question were not interested in subscribing to a system requiring payment.

- Other potential methods for obtaining traffic information of interest to some members of the test and the control groups included cellular telephones, pagers, e-mail, and hand-held or laptop computers.
- Test and control group members reported changing their travel behavior based on traffic information. Most individuals appear to modify their behavior on an infrequent basis, although some reported making frequent changes. Altering travel route is by far the most common type of change, followed by time of travel. Only a small percentage reported changing mode or not making the trip. A few participants did change from driving alone to taking the bus on a regular basis over the course of the project.

- Individuals in most groups reported mostly positive experiences when they did make a change. A less stressful trip was the most frequently cited benefit, followed by saving time, and a more comfortable trip. As a result, most individuals noted they would make the same change in the future.
- The survey results indicate that individuals are more likely to change their behavior on work commute trips, rather than work-related, personal business, or social/recreational travel.

Researchers Recommend ...

The results of the Houston Smart Commuter Operational Test indicate that commuters do value real-time traffic information. Based on the rapid evolution of technologies and the apparent small market for fee-based services, the private sector is best suited to provide value added real-time transportation information systems. TxDOT and its public agency partners can continue to make traffic and transit information available to travelers, private sector vendors, and other groups through more traditional methods. Additional techniques for providing this information that warrant testing include:

- pagers,
- e-mail,
- Highway Advisory Radio (HAR), and
- Dynamic Message Signs (DMS).

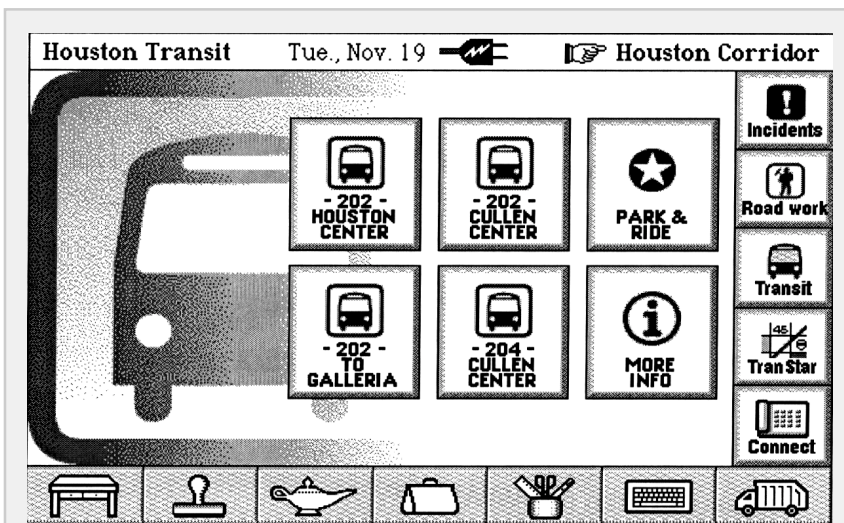


Figure 3. Example of transit information

- Route 202 serves the Kuykendahl Park-and-Ride (with midday service to Spring Park-and-Ride) and has three possible destinations
- Route 204 serves only the Spring Park-and-Ride and Cullen Center (Downtown)
- More Info will link you to information on HOV lane policies, bus fares, transfers, etc.



For More Details...

The research is documented in a series of reports published between 1995 and 1999. Report 1985-5: *Houston Smart Commuter ITS Operational Test — FY 99 Status Report* provides an overview of the project and summarizes the test results from the operational test.

Research Supervisor: Katherine Turnbull, TTI, (409) 845-6005

Researchers: Darryl Puckett, TTI, (713) 686-2971; and Stephen Farnsworth, TTI, (409) 862-2673

TxDOT Project Director: John Gaynor, HOU, (713) 881-3060

To obtain copies of the report, contact Dolores Hott at the Information & Technology Exchange Center, (979) 845-4853, or e-mail d-hott@tamu.edu.

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By Dr. Khali Persad, P.E., CSTR Research Engineer
Phone: (512) 465-7908 or e-mail kpersad@mailgw.dot.state.tx.us

This study examined the feasibility of providing real-time traffic and bus information to commuters via a handheld device. It found that commuters want traffic information live, that is, immediately before and during their trip. Television and radio appear to fulfill the “before” need on mornings, radio is by far the preferred source during trips, and the Internet is becoming more popular in planning evening trips. There is very little demand for handheld traffic information devices, especially ones not designed to be used in moving vehicles.

Because of the limitations of current technology, and the probability of having to charge users for a service that is available free elsewhere, no implementation of this research is planned. The researchers have identified additional techniques for testing, but without justifiable demand for the service, there is no need for further investigation.

YOUR INVOLVEMENT IS WELCOME

This research was performed in cooperation with the Texas Department of Transportation. The contents of this report reflect the views of the authors, who are responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official view or policies of TxDOT. This report does not constitute a standard, specification, or regulation, nor is it intended for construction, bidding, or permit purposes. Trade names were used solely for information and not for product endorsement. The researcher in charge was Katherine F. Turnbull.