

ITS Field Operational Test Summary

Driver Information Radio using Experimental Communication Technologies (DIRECT)

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Introduction

The Driver Information Radio Experimenting with Communication Technology (DIRECT) ITS Field Operational Test is deploying and evaluating several alternative low-cost methods of communicating travel information to motorists in the Detroit, Michigan metropolitan area. The system sends travel information to a group of test vehicles and then tracks the vehicles during their commute. The tracking information will be analyzed to understand actual traveler behavior and the modifications travelers make based on improved knowledge.

The field evaluation phase of the test began in April of 1996 and concluded in December 1997.

Project Description

DIRECT is deploying and evaluating four methods of providing real-time traffic information. The test uses existing technology systems that will eventually be accessible to all drivers. The test will compare the four systems in terms of travel benefits, technical performance, projected costs, driver distraction and safety, and associated institutional issues. Recruited drivers use the systems during their normal commute and provide feedback to the evaluators. Test evaluators compare the four systems as the drivers travel along the same two corridors.

The first phase is a limited deployment that is gathering data from a small set of recruited drivers. This limited deployment will determine which methods are most feasible and cost-beneficial from the public agency and individual user perspectives. Considering the results of the initial phase, test personnel plan an expanded second phase using the most attractive technologies. The long-range goal is to promote widespread use of Advanced Traveler Information System (ATIS) in Southeast Michigan.

To achieve the project goals, the test equipped a group of vehicles with different communications methods to receive travel information. The methods include Radio Data Broadcast System (RDBS), FM subcarrier, Automatic Highway Advisory Radio (AHAR), Low-Power Highway Advisory Radio (LPHAR) and cellular phones. Initial experimental testing includes 30 equipped vehicles. The test vehicles are equipped with Automatic Vehicle Location devices (AVLs) that track their location. Analysis of the tracking data will provide further insight into traveler responses.

As part of the test, the Michigan Intelligent Transportation Systems Center (MITSC) established and maintained a traffic information messaging service. The MITSC collects traffic information from a variety of sources and composes messages about incidents, congestion, and weather conditions. The MITSC transmits these messages by one of the three broadcast technologies (LPHAR, AHAR, and RDBS) and makes them available on the cellular phone message menu. The system alerts participating drivers to available broadcast messages either via receiving equipment in the vehicle or beacons located near the transmitters. Cellular phone participants can

call an automated, menu-driven messaging service to receive updated information. The vehicle tracking system records and stores the movement (and, hence, the reaction to messages) of participating drivers. Figure 1 presents a schematic of the components and interfaces of the system.

The test also publicized the availability of the traffic information to the general public. General public travelers can access several of the technologies without special equipment. Both the LPHAR and the AHAR broadcast messages that motorists can receive on their car radios. Members of the public that have a cellular telephone can call for specific traffic information. Up to 1,000 general public users were expected to participate. Evaluators are surveying a portion of those users to help complete the evaluation.

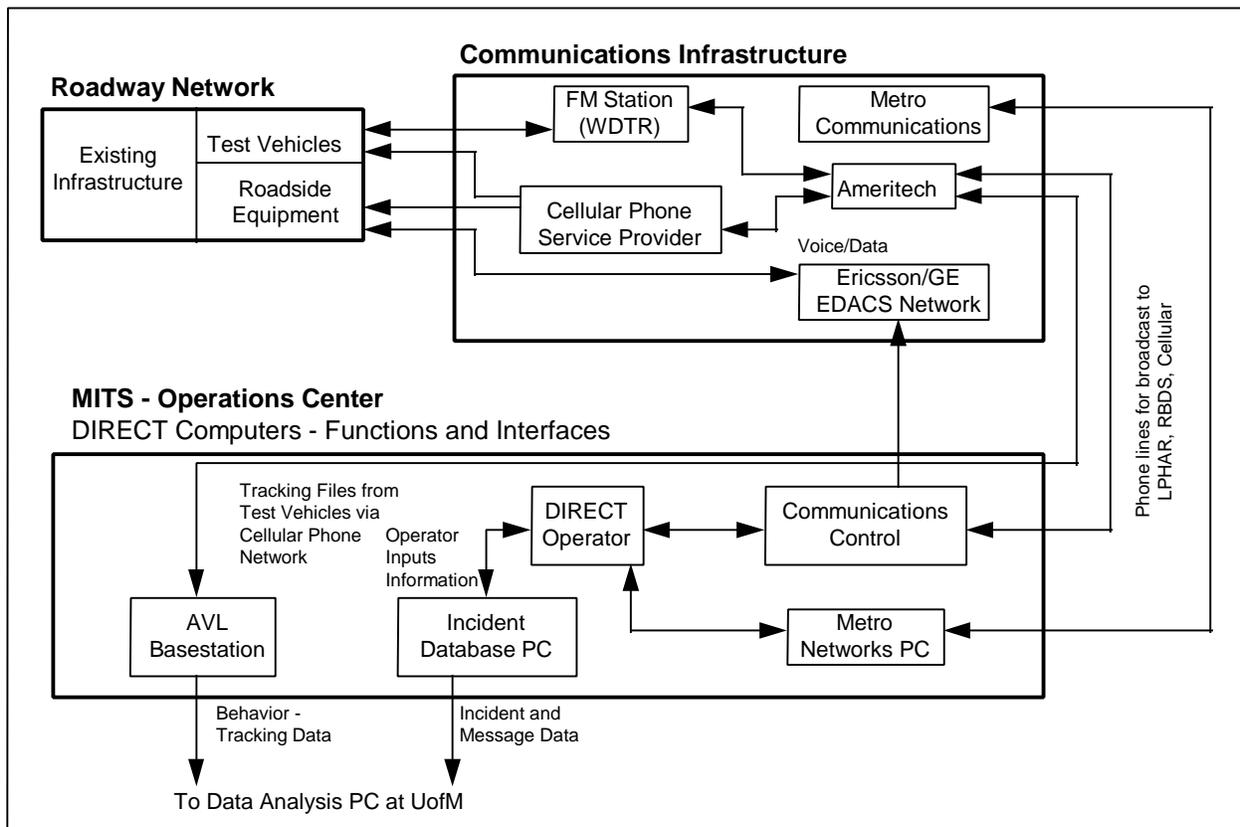


Figure 1: DIRECT System Components and Interfaces

The evaluation focuses on five functional areas:

- Natural Use (user behavior changes, attitudes, and opinions after using the system)
- Simulation and Modeling (forecast impacts and benefits of higher levels of market penetration)
- Human Factors (driver attention, ease of use, and safety of alternative presentation methods)
- Technical Performance and Cost (performance and reliability, likely production cost of systems)

- Institutional Issues (institutional problems encountered, solutions, and lessons learned).

The evaluation focuses on user attitudes, preferences and projected system-level effects. In addition to the four tested systems, the evaluation will compare benefits from a conventional AM-FM broadcast reporting system to baseline measurements. The test area includes some changeable message signs as part of the baseline.

Test Status

Data collection concluded in December 1997. The Final Evaluation Report for Phase I is anticipated in April 1998 but interim results are available. Although the reader must use caution interpreting them because the study is incomplete, interim results (as of July 1997) indicate that:

- Drivers want specific types of traffic information such as unexpected delays, location of incidents, length of present delay, expected time for incident to clear, location of construction activity, advice on whether to divert, and alternate routes. Drivers prefer information specific to the area in which they plan to travel (as opposed to information for the entire metro area).
- Drivers found all four technologies easy to use.
- The technologies involving extensive field components (LPHAR, AHAR, RDBS), were difficult to maintain and, therefore, less reliable.
- Drivers did not feel that the DIRECT system they used was a significant improvement over commercial radio traffic information. They did think, however, that DIRECT systems were an improvement over television traffic information and changeable message signs.
- Those drivers surveyed reported, on average, having changed their route only one time in the eight week test period due to information they received from the DIRECT systems.

Test Partners

AAA of Michigan

Capstone/Ameritech

Delco

Ericsson/GE

ERIM

Federal Highway Administration

Ford Motor Company

General Motors

Metro Networks

Michigan Emergency Patrol

Michigan State Police

WDTR FM Radio

References

DIRECT Interim Results (7/30/97), University of Michigan Intelligent Transportation Systems
Research Lab, July, 1997