

ADVANCE

FACT SHEET

The **Advanced Driver and Vehicle Advisory Navigation Concept (ADVANCE)** was a public and private partnership that began in 1991 as a major test of a dynamic route guidance system in the northwestern suburbs of Chicago, Illinois. The *ADVANCE* Project combined real-time two-way electronic communication, GPS positioning, CD-ROM map storage and database retrieval to provide drivers with continuously updated navigational directions. The objective was to determine if motorists supplied with real-time guidance would be given traffic information that would help them avoid congestion and improve the quality of their trip.

Simply stated, *ADVANCE* was conceived as an operational test that would involve 3,000 vehicles instrumented with in-vehicle computers and radio communications equipment. Drivers were provided with route guidance in a real-time framework using information from a variety of existing sources. These included closed-loop traffic signal systems, *999, (a cellular-based motorist call-in system), the Illinois Department of Transportation (IDOT) Traffic Systems Center (TSC) that monitors operations on Chicago area expressways, IDOT's Communications Center that communicates with the Minutemen, (the motorist aid system), and Northwest Central Dispatch (an areawide emergency dispatch system). The primary source of information, however, was the vehicles themselves acting as traffic probes. It was planned that drivers would be recruited from the public and private sectors. They would be persons who were generally familiar with the area that they traveled daily and they were expected to utilize their equipment for a period of at least 18 months.

ADVANCE was guided by five entities working cooperatively: the Federal Highway Administration, the Illinois Universities Transportation Research Consortium, Motorola Inc., the Illinois Department of Transportation and the American Automobile Association. This unique public-private cooperative effort blended public/private funds and expertise. In addition to the five participants listed above, more than 20 other industry leaders participated in *ADVANCE*. Parsons Transportation Group was retained as a consultant to the project and was responsible for overseeing the system design, system integration, and assisting IDOT in project management.

Development Phase

The *ADVANCE* system was actually five subsystems; The Traffic Information Center (TIC) which contained the central computer facility and the operator interface, etc.; the Traffic Related Functions (TRF) which included traffic algorithms; the Communications Subsystem (COM) which provided message-carrying capability between the TIC and vehicles in the field; the Mobile Navigation Assistant (MNA) which contained in-vehicle route planning and display capabilities; and the Help Center (HC) which provided for roadside vehicle assistance requests and driver inquiries.

To ensure the success of the *ADVANCE* project, an overall integration plan was developed. The integration plan detailed how each subsystem was integrated into a single working system. The document also provided guidelines on how testing would be accomplished on both system and subsystem levels. With these guidelines, detailed test plans were developed for each release, and all software and hardware components. The integration plan also detailed the roles of participants.

Integration took place at two levels: design and testing. For design activities, each component was defined in terms of purpose, input and output. Designs were formalized in documents such as the Interface Control Specification and the General Design Specification. Through the use of these documents, consistency was maintained in the design approach.

Targeted Deployment Phase

As *ADVANCE* developed, market conditions and available technology changed. When *ADVANCE* reached the important stage between project development and deployment, the partners reviewed and analyzed deployment options and possible impacts on the project goals. The partners created a more useful and efficient way to proceed with *ADVANCE*. Their agreed recommendation was that a Targeted Deployment would best serve the needs of the project.

The Targeted Deployment approach involved equipping thirty project test vehicles with in-vehicle navigation units. Project staff, paid drivers and previously recruited drivers did on-road testing. The dynamic guidance equipped vehicles sent information to and received information from the TIC. Testing occurred for a seven-month period ending December 1995.

There were several benefits to the Project under Targeted Deployment while meeting many original goals:

- There was a significant fiscal saving - approximately \$30 million.
- There was quicker turnaround on reports back to the industry, as testing and evaluation times were reduced.
- Although reduced in scope, there was testing of algorithms and safety factors, comparing probes and detector loops as sources of travel times, limited testing of dynamic route guidance, and continuation of the public/private partnership concept.
- More direct support for the TIC concepts being developed for the GCM Corridor.

Application Phase

As Targeted Deployment commenced, it became apparent the TIC was a key resource of information sharing efforts. The TIC was the data gathering and processing hub of *ADVANCE*. The Targeted Deployment tested the system. However, the wide variety of data sources that were part of *ADVANCE* continued to be available after the dynamic guidance tests were completed. With the GCM (Gary-Chicago-Milwaukee) Priority Corridor initiative solidly underway, development of the TIC as a corridor resource continued.

The *ADVANCE* Corridor Transportation Information Center (C-TIC) was expanded beyond the *ADVANCE* test area to include expressways and major arterials throughout the GCM Corridor.

The C-TIC includes electronic linkages to share information from the Surface Systems Inc. weather information station, IDOT TSC, IDOT Communications Center, Northwest Central Dispatch, and *999. Through 1996, the primary sources of information were from the Chicago area. However, this changed in 1997 when coverage was expanded to include information from the Milwaukee metropolitan area (MONITOR). Expansion also included construction and incident information from Indiana's Borman Expressway. Outreach continues to a broader set of public and private sector participants such as the Chicago Transit Authority, Regional Transportation Authority and the Illinois Tollway.

The vision for the C-TIC was to provide a system of sharing information in common formats that could be accessed by a wide variety of transportation and communication interests. Initially, travel time information on selected links, construction and maintenance lane closures and anecdotal reports of incidents is being provided. It is planned that eventually all expressway

travel times, lane closures and incident reports will all be handled electronically. The practical architecture is now being demonstrated and a full deployment scenario was being developed under the Gateway Traveler Information System effort.

The Gateway Traveler Information System is being developed in accordance with the national architecture recommendations. The prime data providers into the system are the transportation and enforcement agencies who have responsibility for the GCM area systems. The prime beneficiaries would be the aforementioned providers plus the public who will then have access to the improved traffic and transit information. Radio and TV would also be given access. The information would be available to ITS developers and users to support not only in-vehicle guidance, but also a wide range of information concepts including personalized trip planning, or transportation advisories through personal communication devices.

The *ADVANCE* homepage is <http://ais.its-program.anl.gov>.