ATIS/CVO System

European ATIS Projects/Systems

Europe has several large-scale programs in progress under the umbrella of Road Transport Informantics (RTI), which is the equivalent of the U.S. ITS. Their main programs are dedicated road infrastructures for vehicle safety in Europe (DRIVE) and the program for European traffic with highest efficiency and unprecedented safety (PROMETHEUS). These two programs are separated by the organizations that formed them, but their goals are largely the same. DRIVE is under the control of the Commission of European Communities (CEC), while PROMETHEUS is part of the European Research Coordination Agency (EUREKA) platform, an industrial research initiative involving 19 countries and European vehicle manufacturers. While the projects are separate, close cooperation between the two is needed to reach a common goal. Actual system development is the primary goal of the PROMETHEUS project, while DRIVE tends to focus on human behavior issues and implementation of systems into the entire European community. Detailed program material can be found in: McQueen and Catling (1991), Kemeny (1990), Hellaker (1990), and Transport Canada (1992).

DRIVE

The intention of DRIVE is to move Europe towards an Integrated Road Transport Environment (IRTE) by improving traffic efficiency and safety and reducing the adverse environmental effects of the motor vehicle. It focuses on the infrastructure requirements, traffic operations, and technologies of interest to public agencies responsible for the European road transport systems. DRIVE also focuses on the human user and related issues that will be addressed in the implementation of in-vehicle systems.

DRIVE I was the first phase of the project and was started in 1989. It was funded for 3 years with an operating budget of $150 million. The pre-competitive research program consisted of 60 individual projects undertaken by members from the private sector, government agencies, and research institutions. The goal was to establish the overall work plan from which a European IRTE could be developed. The program has been highly successful and is now moving on to the demonstration phase.

The DRIVE program was seen only as a feasibility study in the beginning. However, as DRIVE progressed, it became apparent that there was a realistic opportunity for system development. This resulted in DRIVE II, which emphasized the implementation of pilot projects that had been developed as a result of DRIVE I. Funding was increased to about $250 million in order to construct and test hardware. DRIVE II is scheduled to end in 1995, and the release of products into the marketplace is expected at that time. The DRIVE II work plan identifies seven pilot project areas:

- Demand management.
- Traffic and travel information.
- Integrated urban traffic management.
- Integrated interurban traffic management.
- Driver assistance and cooperative driving.
- Truck fleet management.
- Public transit management.

For detailed individual project descriptions, see Keen and Murphy (1992).

PROMETHEUS

PROMETHEUS was started in 1986 and was initiated as part of the EUREKA program, a pan-European initiative aimed at improving the competitive strength of Europe by stimulating development in such areas as information technology, telecommunications, robotics, and transport technology. The project is led by 18 European automobile companies, state authorities, and over 40 research institutions. The budget for the project is over $800 million and the project is scheduled to last 7 years. PROMETHEUS is a pre-competitive research project, with the output being a common technological platform to be used by the participating companies once the product development phase begins. The overall goals of PROMETHEUS fall into four categories:

- Improved driver information - providing the driver with information from new sources of technology that were not previously available. Currently, the lack of information or the inability to assess a hazard is often the primary cause of accidents.
- Active driver support - when the driver fails in some way at the driving task, the system may aid the driver in an informative way or by active intervention.
- Cooperative driving - establishing a network of communication between vehicles in order to provide drivers with relevant information for areas en route to their destination.
- Traffic and fleet management - systems for the efficient use of the road network, ranging from highway flow control to fleet operations.

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The emphasis of PROMETHEUS, however, is on systems having a large in-vehicle component to their design. The ultimate aim is for every vehicle to have an on-board computer to monitor vehicle operation, provide the driver with information, and assist with the actual driving task. A centralized communications network will also be a component of the system in order to provide two-way communication between each vehicle and a control center.

Within the PROMETHEUS program, there are seven subprograms; three are carried out by the motor industry, and four are carried out by the research community.

The industry subprograms cover the following:

- In-vehicle systems for vehicle monitoring and driver assistance.
- Vehicle-to-vehicle communications networks.
- Road-vehicle communications for traffic control.

The research subprograms cover the following:

- Development of required microelectronic components, including sensors and on-board computer systems by the PRO-CHIP researchers.
- Use of artificial intelligence in the vehicular system and software development by the PRO-ART research group.
- Communication within the system vehicle and driver, vehicle and vehicle, plus vehicle communications to the overall road network by the PRO-COM group.
- Vehicle change effects on the traffic environment will be studied by traffic engineers in the PRO-GEN group.

The research phase, covering the past 4 years, has largely been completed. The current move is toward the definition phase, where the emphasis has shifted to field tests and demonstrations. Ten common European demonstrations have been identified to evaluate systems in each of the following areas:

- Vision enhancement.
- Emergency systems.
- Proper vehicle operation.
- Commercial fleet management.
- Collision avoidance.
- Test sites for traffic management.
- Cooperative driving.
- Dual-mode route guidance.
- Autonomous intelligent systems.
- Travel information systems.
- Cruise control.

These demonstrations are scheduled to be completed by 1994; however, it is likely that PROMETHEUS will continue beyond that date. The second phase will be somewhat modified to reflect the near-market status of products under development, and will move away from the program's non-competitive origins.

In order to bring products to market more quickly in Europe, European Road Transport Telematics Implementation Coordination Organization (ERTICO) was created in November 1991. Its objectives are to pool the information from the many individual projects and identify strategies in order to exploit the results of DRIVE, PROMETHEUS, and other individual programs. ERTICO's goal is to create a climate for market-driven investment in order to ensure European dominance in advanced-vehicle technologies.

Individual system descriptions

Many individual RTI/ITS systems are now being tested throughout Europe. A short description of some individual systems is presented below to enhance the reader's understanding of developments taking place in Europe. System descriptions will be limited to the driver interface, as opposed to actual system hardware and communications network information.

Autoguide and the Ali-Scout are dynamic in-vehicle route guidance systems; that is, the system gives routing recommendations to drivers who are dependent upon real-time traffic conditions. The display unit is mounted on the dashboard of the car and controlled with a hand-held remote control (similar to a television remote). At the start of a journey, the driver can enter a grid reference or a preprogrammed destination. The system uses dead reckoning and roadside infrared-transmitter/receiver beacons to guide the driver to the selected destination. The beacons serve the system by correcting cumulative errors and updating traffic information. The navigation information presents directions to the driver through the use of icons and arrows. There is also a digitized speech unit that supplements visual directions. The Autoguide system has undergone extensive testing in London, while the Ali-Scout system has over 700 units being tested in Berlin. For more information, refer to one of the following articles: Catling and Belcher (1989), Jeffery, Russam, and Robertson (1987), Jurgen (1991), or Morans, Kamal, and Okamoto (1991).

TrafficMaster from the United Kingdom (U.K.) was the first commercially available in-vehicle system to provide dynamic traffic

information to the driver. It is a map-based system that only provides traffic flow information; it does not actively suggest routes. The display screen is a 101-mm by 82-mm (3.9-in by 3.2-in) in-liquid crystal display that provides the map information. "Hard" push buttons for control of guidance functions are mounted next to the display (Jurgen, 1991).

TRAVELPILOT is a German autonomous navigation system based on the American ETAK Navigator sold by Blaupunkt Bosch Telecom. This system displays vehicle location on a dashboard-mounted CRT map that is stored on CD-ROM. The maps move relative to the vehicle's position, which is determined through the use of dead reckoning and map matching. A small CRT can display maps with highlighted routes or driving instructions that have intersection maps and street names. Hard buttons mounted on either side of the CRT are changeable function controls. The system has reportedly sold over 1000 units in its first year on the market and will be available soon in the United States for certain areas. For more information, refer to the following references: Suchowerskyj (1990), and Morans, Kamal, and Okamoto (1991).

Many other individual systems already exist or are in the prototype testing phase. Systems on the market currently tend to be navigation systems, but other driver information systems, such as collision warning systems, are nearing completion. These will most likely be marketed by the automobile manufactures and not by after-market suppliers.

Previous

Next