



Safer, More Efficient Travel with Intelligent Transportation Systems

As evening rush hour draws to a close, you breathe a sigh of relief. An overturned truck on a toll road this afternoon could have spelled disaster, bringing rush hour traffic to a standstill and causing delays in deliveries to the big electronics plant at the edge of town. The truck was hauling canisters of hazardous waste. The crash happened just as school was let out for the day and only 2 hours before the start of the evening rush hour. A few years ago, an incident of this type would have likely had horrendous consequences. Today, however, a system of advanced, integrated technology, operated by a team of State and local transportation officials, led to a very different outcome.

Video cameras and traffic sensors installed along the toll road immediately alerted the staff in the Traffic Operations Control Center to the incident. The Control Center staff then notified the regional hazardous materials team, which arrived on the scene to discover that one of the canisters was leaking. A transponder, or electronic tag, on the truck and a bar code on the canister made it possible to quickly identify and notify the trucking company and the shipping company and to get information from them that would be helpful in the cleanup.

The public was alerted within minutes of the incident, thanks to the regional traveler information system. The system uses cable television channels, highway advisory radio, a network of variable message signs along roadways, and other communication outlets to pass important information to travelers and bus and truck fleet managers. In this case, the traveler information system provided a fast, accurate means of informing commuters, school and public transit bus drivers, and truckers of the accident. Transit riders were quickly made aware of the delay and the options available to them. Motorists in cars outfitted with in-vehicle navigation systems were able to get detailed information about alternative routes.

By the end of rush hour, the clean up had been completed and traffic was back to normal. As a result of the well-organized and coordinated re-

sponse and the guidance provided by the regional traveler information system, traffic delays had been kept to a minimum—with commute times averaging just 7 minutes longer than normal.

Sound too good to be true? Well it's not. Thanks to intelligent transportation systems (ITS), State and local governments are doing a better job of keeping traffic flowing and goods moving, even when disaster strikes.

What Is ITS?

For most of this century, we, as a Nation, have responded to traffic congestion by building new highways and transit systems and by widening existing roads. But we're running out of land for highways, and massive road projects are too expensive. As travel volumes continue to increase, traffic congestion worsens, producing longer commute times, pervasive delays, more fender-benders, increased energy consumption, and air pollution. Our transportation woes are beginning to erode our quality of life.

By making the most of the Nation's existing highways, streets, and transit systems, ITS technologies help solve these transportation problems. Using sophisticated sensors and computers, advanced communication networks, and innovative management strategies, ITS enables people and goods to be moved more quickly, safely, and efficiently—and with less harm to the environment.

For ITS to be effective, systems must share information so that local jurisdictions and transit providers can coordinate their responses, not only to incidents like the one described above, but to routine traffic conditions. By standardizing common elements of these systems and establishing physical links between traditionally distinct systems, all components can benefit from each other's information. For instance, a system that monitors traffic conditions can transmit its data to a system that controls traffic signals, so that signals can be programmed to optimize traffic flow and give priority to transit and emergency vehicles.



The need for coordination and communication extends to the staffs of many organizations (e.g., police, fire and emergency services, and transit). These organizations must be able to share information, establish partnerships, and define the chain-of-command for incident management.

ITS also provides for a link to be established and maintained with consumers, or users, of our highways and transit systems. These consumers include commuters, as well as businesses, governments, trucking companies, shippers, and travelers that need access to up-to-date, reliable information on travel conditions.

What Does ITS Encompass?

ITS embraces a range of components:

- Multimodal travel management, including traffic and signal control, public transportation management, incident and emergency management, and traveler information systems.
- Commercial vehicle operations, including credential check, safety inspection, onboard monitoring, freight mobility, and hazardous materials incident management systems.
- Advanced vehicle control and safety systems, including intelligent cruise-control and collision avoidance systems.

Some ITS initiatives, such as collision avoidance systems, are still in the research phase and may be 10 or more years away from ready use. Other initiatives, such as electronic toll systems and variable message signs, are already being used today.

Technologies and methodologies that make transportation more efficient are all part of ITS, even when they are not necessarily considered “advanced” technologies.

For more information...

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For instance, when a local transportation department programs its traffic signals so that motorists don't have to stop at every intersection along a roadway, this is a component of ITS that benefits passengers of automobiles, trucks, and buses. Similarly, when State agencies exchange information about a truck's weight and safety record so that a commercial truck driver doesn't have to stop at weigh stations in every State, this too is ITS.

For ITS to be successful, the many partners in the transportation system—including highway and transit officials in Federal, State, and local governments—must coordinate their efforts and work as a team. Public-private partnerships and participation by urban and rural organizations are also necessary, as is the support of the public.

The Building Blocks of ITS

The first components of ITS to be deployed will serve as the cornerstone, or building blocks, for all future services. The ITS building blocks include these nine key elements:

- Traffic signal control
- Freeway management
- Transit management
- Incident management
- Electronic toll collection
- Emergency management
- Electronic fare payment
- Railroad grade crossing control
- Traveler information

A current focus of ITS is on standardizing and integrating these building blocks in metropolitan and rural areas. Many urban areas have already implemented portions of these components, and more than 400 ITS projects have been completed or are under way across the United States.

Additional information about these individual ITS components is provided in other fact sheets in this ITS Sheet series.

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