




CONNECTED VEHICLES FOR A CONNECTED WORLD



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A REVOLUTION IN TRANSPORTATION IS NEAR

What if your car could warn you that a car traveling on a cross street was about to run a red light and T-bone you? Or what if it could warn you that you were going too fast to navigate a dangerous curve or that there was a stopped queue of vehicles ahead or ice on the road? What if your car could tell you that another car is in your blind spot when merging? These may sound like minor conveniences, but they could potentially save your life. In fact, experts estimate that active safety features like these could save thousands of lives per year on our nation's roadways.

What if you were able to download any information you want directly into your vehicle during your drive? Imagine being able to download maps, information about traffic and services ahead, and entertainment. What if your car could tell you about traffic and

roadway conditions a quarter mile, or even 50 miles ahead, and suggest other routes or modes of travel that would save you time? What if your car could automatically pay tolls or find and reserve a parking spot for you in busy downtown areas? What if traffic managers could see traffic everywhere on the roadway, giving them the ability to adjust traffic signals, clear hazards and incidents, and take other actions to smooth traffic and get you where you're going faster?

Many of these capabilities are possible today, and, thanks to an innovative initiative known as Vehicle Infrastructure Integration (VII), these capabilities could become commonly available in the next few years. VII is a partnership among the US Department of Transportation, State and local governments, universities, and industry, focused on creating an information backbone for the transportation network – enabling instantaneous communications with and among vehicles. VII could revolutionize the way we drive, just as the Internet revolutionized the way we work, shop, and live.

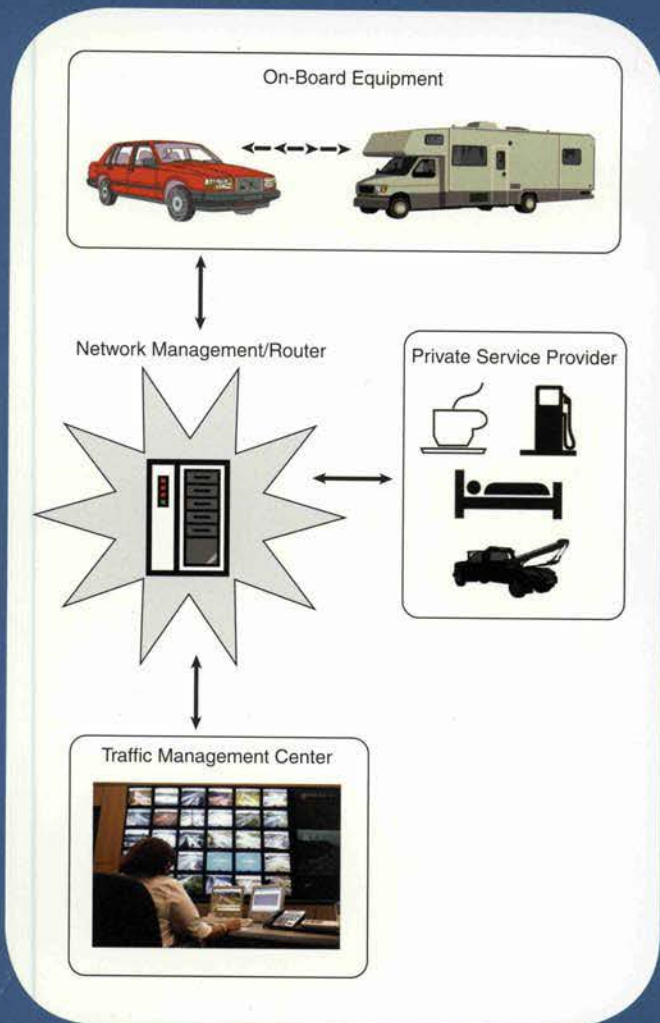
THE POTENTIAL

VII can make America's roads safer. Instantaneous communications with vehicles would reduce fatalities and injuries by alerting drivers and their vehicles of impending danger so that crashes can be avoided or minimized. While helpful to all drivers, such alerts will be particularly beneficial for older drivers. Information collected by VII-equipped



Innovations made possible through VII

- Ubiquitous information on travel times and incidents
- Real-time re-routing to avoid traffic problems
- Urban parking place locator
- In-vehicle signage, such as next exits and school zones
- Imminent crash notification and avoidance systems
- Electronic toll payment systems extended to non-toll uses such as parking
- Real-time traffic signal optimization
- Real-time road-weather conditions response



vehicles about roadway surface and traffic conditions would be continuously reported to transportation agencies. Possessing such comprehensive information, traffic managers could smooth traffic flow and respond to problems as soon as they occur, such as when an obstacle is blocking the road or a slick roadway surface needs attention.

Americans would have greater mobility options via the ubiquitous transportation data made possible through VII. Traveler information provided either by public agencies or through customized private services would take the guesswork out of what routes best meet travelers' needs. VII could facilitate commercial transactions, such as e-payment for tolling, parking, fueling up, or other commercial uses. By enabling better traffic management and optimizing travel choices, VII could help reduce environmental impacts and fuel consumption,

stop-and-go traffic. Studies in Europe and Asia have also shown that when given information about the environmental impacts of their mode choices and routes, travelers frequently make choices that reduce this impact.

MAKING IT POSSIBLE

To advance the promise of VII, USDOT's Research and Innovative Technology Administration is spearheading a robust program of collaborative VII research and development (R&D) in partnership with State and local departments of transportation, automotive manufacturers and suppliers, universities, and others. Many of these partners are also investing their own R&D funds to advance VII.

USDOT's VII program is divided into three phases:

- Phase I - Operational testing including *SafeTrip-21*
- Phase II - Research in the areas of enabling technology, institutional issues, and application to support deployment
- Phase III - Technology scanning to determine potential new technology horizons for VII

In December 2007, USDOT announced *SafeTrip-21*—Safe and Efficient Travel through Innovation and Partnerships in the 21st Century.



Phase I, the multi-application field test of safety and congestion-reducing technologies, will be launched at the Intelligent Transportation Systems World Congress in New York City from November 16-18, 2008 and then integrated into other test locations. *SafeTrip-21* builds upon research into the use of information, navigation, and communications technologies to prevent accidents and alleviate congestion by providing drivers with real-time safety warnings, traffic and transit information, and advanced navigational tools. *SafeTrip-21* will accelerate testing and deployment of these capabilities.

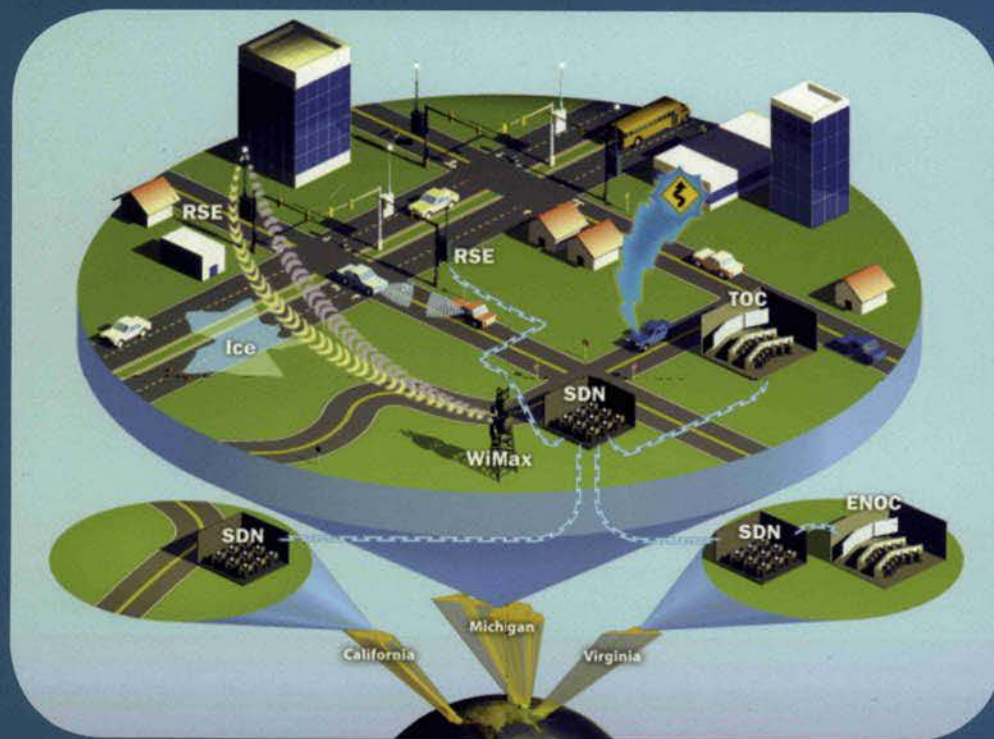
Phase II continues the foundational research necessary to determine the viability of a nationwide VII deployment decision. Significant work has been done in partnership with automakers, equipment suppliers, and State and local governments in assessing potential technologies and applications. Concept testing is being conducted in Michigan, California,

Virginia, Arizona, Florida, Minnesota, and New York. Privacy principles and related technical requirements have been developed. Study of other legal and institutional issues is underway, and work has begun to explore potential deployment scenarios and business models.

Phase III will be an ongoing scanning activity to make sure that the Vehicle Infrastructure Integration Initiative continues to plan for and use the best available technology over time.

FROM RESEARCH TO REALITY

As with any information technology network, VII technology will be deployed in stages and evolve over time, enabling increasingly greater capabilities and geographic coverage. VII will likely be deployed through a public private partnership. The future of VII is potentially revolutionary, but relies on a continued commitment from all the partners involved, and a recognized value by the traveling public in their everyday lives.



VII Network Concept

Data is transmitted wirelessly from vehicles to roadside equipment, then routed through service delivery nodes to an enterprise network operations center where it can be processed and sent to public and private users.

KEY: ENOC – Enterprise Network Operations Center; RSE – Road Side Equipment; SDN – Service Delivery Node; TOC –