

May 19, 2015

*Getting There in the Digital Age:
How to Craft a 21st Century
Surface Transportation Bill*

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Why Intelligent Transportation Systems?

- IT is transforming every sector; it's time for transportation
- The 21st century, digital equivalent of the Interstate Highway System.



From Concrete to Chips: Bringing the Surface Transportation Reauthorization Act Into the Digital Age

BY STEPHEN J. EZELL AND ROBERT D. ATKINSON | MAY 2015

The future of surface transportation lies not simply in pouring more concrete, but in leveraging information and communications technologies to bring intelligence to every asset in the U.S. transportation network, thus making transportation safer, more accessible, and more efficient.

Next-generation information and communications technologies (IT) are set to revolutionize America's transportation system. Whether it is the emergence of innovative connected vehicles or intelligent infrastructure, the future of transportation lies not just in building new roads but in bringing intelligence to every asset in the U.S. transportation network—from roadways and private vehicles to commercial truck fleets and public transit systems—thereby making transportation safer, more accessible, and more efficient. Accordingly, it is time for U.S. transportation policy—principally enshrined through the Surface Transportation Reauthorization Act—to reflect this shift from “concrete” to “chips”: in other words, to comprehensively integrate IT into America's surface transportation system.

INTRODUCTION

This report examines the promise of IT-enabled smart transportation systems and vehicles and proposes a number of policy principles and recommendations for how Congress can leverage the 2015 Surface Transportation Reauthorization bill to advance the development and deployment of intelligent transportation systems (ITS) and automated vehicle technologies. By bringing efficiencies to existing transportation assets and systems, ITS solutions deliver the most “bang for the buck” on each dollar the federal government invests in transportation. Put simply, it is time for policymakers to view ITS as the 21st-century, digital equivalent of the Interstate Highway System, with the federal government again taking the lead in declaring a vision, investing in research and development (R&D), developing standards and technologies, shifting incentives to favor the deployment of

What Are Intelligent Transportation Systems?

ITS Category	Specific ITS Applications
Advanced Traveler Information Systems (ATIS)	Real-time Traffic Information Provision Route Guidance/Navigation Systems
Advanced Transportation Management Systems (ATMS)	Traffic Operations Centers (TOCs) Adaptive Traffic Signal Control Dynamic (or “Variable”) Message Signs Ramp Metering
ITS-Enabled Transportation Pricing Systems	Electronic Toll Collection (ETC) Electronic Road Pricing (ERP) Fee-Based Express (HOT) Lanes Vehicle-Miles Traveled (VMT) Usage Fees Variable Parking Fees
Advanced Public Transportation Systems	Real-time Status Information for Public Transit Automatic Vehicle Location (AVL) Electronic Fare Payment
Vehicle-to-Infrastructure (V2I) and Vehicle-to-Vehicle (V2V) Communication	Cooperative Intersection Collision Avoidance Systems (CICAS) Intelligent Speed Adaptation (ISA)
Driver Assistance Technologies	Advanced Accident Avoidance (e.g., lane departure warnings, collision warnings, etc.)
Vehicle Automation	Autonomous (i.e., driverless) vehicles

ITS Deliver Five Key Classes of Benefits By:

1. Increasing driver and pedestrian safety;
2. Improving performance of the transportation network;
3. Enhancing personal mobility and convenience;
4. Delivering environmental benefits;
5. Boosting productivity and regional economic growth.

Chips Are Better Than Cement

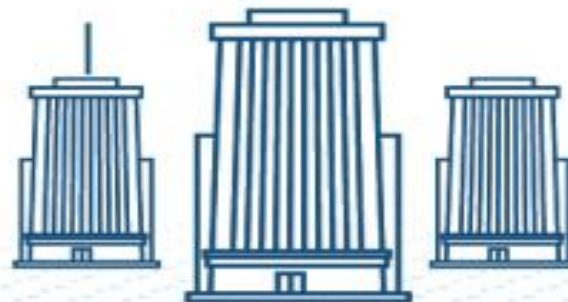
- The benefit-cost ratio of ITS-enabled systems-operations measures is 9 to 1; far above the addition of highway capacity, which has a benefit-cost ratio of 2.7 to 1.
- Benefits of traffic signal optimization alone outweigh costs 38 to 1.

ITS is Ready, the System is Not

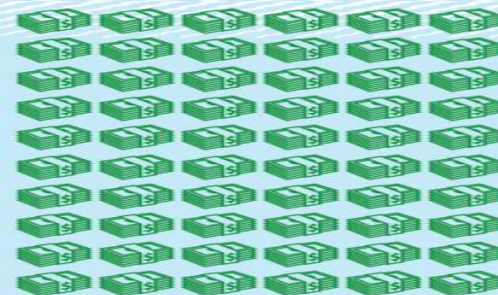
As a share of investment, business invests 60 times more in IT than the U.S. Department of Transportation



(Transportation Investment)



(Total Capital Expenditures)



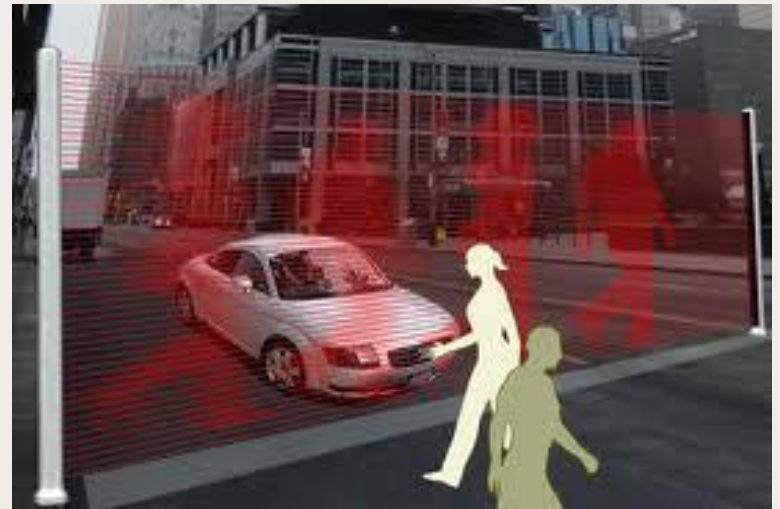
Why So Little ITS Investment?

- Federal programs focus on cement, not chips;
- State DOTs lack IT skills;
- Big flashy “concrete” projects are more politically compelling.



Policy Principles for the Surface Transportation Reauthorization Act

- Shift from “Concrete” to “Chips”;
- Focus on ITS deployment and scaling existing solutions, while ensuring nationwide systems interoperability.



Reauthorization Recommendations

I. Funding ITS Deployment and Incentivizing States

1. A “Cement & Chips” funding approach that directs no less than 5 percent (@\$2.5B) of the HTF to ITS-related projects;
2. A “Race to the Digital Top” that funds awards for six regions to launch a comprehensive “smart communities” initiative;
3. Tie share of federal surface transportation funding to states’ documented improvements in transportation performance;
4. Lower share of federal funding for non-toll projects to 60%.

Reauthorization Recommendations

II. Enhance Institutional and Strategic Support

1. Charge DOT with developing an innovation strategy/convening an inter-state dialogue on ITS deployment;
2. Launch two-transportation related NNMI:
 - An intelligent vehicles and infrastructure consortium;
 - Innovative materials.



Reauthorization Recommendations

III. Leverage Open Data Solutions for Transportation Innovation

1. Promote greater availability of traffic data in machine-readable form and support creation of more APIs;
2. Identify innovative local solutions (e.g., *StreetBump*; *SFpark*) and provide resources to scale them nationally.

Thank You

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