# Role of ITS in Improving Efficiency in Road Transport

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# What Are Intelligent Transportation Systems (ITS)?

- Broad range or transportation system applications that are intended to address safety, congestion and sustainability.

- Crosses all transportation modes

- Range from OEM safety devices to traffic signals

- Create transactions with consumers, or end users

"Surface transportation in the United States is at a crossroads.  The mobility we prize so highly is threatened.  Many of the nation's roads are badly clogged.  Congestion continues to increase, the conventional approach of the past – building more roads – will not work in many areas of the country, for both financial and environmental reasons."

A Strategic Plan for Intelligent Vehicle-Highway Systems,

IVHS America, 1992

# Examples of Other Coming Policy Changes

- ■ Pay as you drive insurance
- ■ Mileage based user fees
- ■ Electronic tolling/freight management
- ■ New payment technologies
- ■ New sensor technology
- ■ Smart parking
- ■ Integrated corridors
- ■ Smart cities
- ■ Connections with the grid

Acknowledgment: Scott Belcher, ITS America

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# MAP-21 Where Are We Today?

**President Obama  signed the Moving Ahead for Progress in the 21st Century Act (MAP-21) into law on July 6, 2012**

- 27 Month Surface Transportation Reauthorization

- Policy took  effect October 1, 2012

- $118 billion total ($105 billion for FY13 and FY14)
  - Current funding levels indexed to inflation
  - LUST Fund, Pensions, General Fund transfers to cover $10 billion annual deficit
- Provides States and Industry with certainty to start major capital projects and create jobs

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# MAP-21: Top-Line Summary

- Consolidates or eliminates 60 federal programs
- Creates national goals and measures, statewide and metro area performance targets
- Expedites project delivery
  - Streamlines environmental review process
- Expands TIFIA and tolling, removes anti-PPP provisions
- Establishes National Freight Policy and National Freight Network
- Continues Highways/Transit split at 80/20

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# MAP-21: ITS Highlights

- **Performance Management: ITS needed to measure and improve safety, congestion, system reliability, freight movement**

- **Planning: States and metro areas must promote efficient system management and operations, incorporate performance targets**

- **Core Highway Programs: ITS eligible in all formula programs**

- **ITS Research: Restored to $100M per year**

- **Financing: TIFIA & Tolling expanded, PPP amendments out**

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# MAP-21: ITS Research, Safety and Innovation

- ITS Research and Development Program funded at <u>$100 million</u> per year
  - Senate bill had funded program at $50 million
  - Saves Connected Vehicle Program
  - Requires V2V and V2I Deployment Report in 3 Years
- Technology & Innovation Deployment Program – New $62.5 million per year program to provide competitive grants to accelerate adoption of "innovative technologies" across surface transportation system
  - ✓ Similar to but broader than the *Smart Technologies for Communities Act*
- Highway Research program includes focus on reducing congestion, improving operations and enhancing freight productivity
  - Includes active traffic and demand management, accelerated deployment of ITS, arterial management and traffic signal operations, congestion pricing, real-time information, road weather management, and other ITS strategies

# MAP-21: Freight Safety

- **Commercial Motor Vehicle Safety Enhancement Act**
  - mandates electronic logging devices to record hours of service
- **National Freight Policy**
  - Goal: "use advanced technology to improve the safety and efficiency of the national freight network"
  - Eligible expenditures: "intelligent transportation systems … truck parking systems … "
- **Highway Research and Development program (FHWA)**
  - $115 million per year for "highway safety, infrastructure integrity .."
  - Includes active traffic and demand management, accelerated deployment of ITS, arterial management and traffic signal operations, congestion pricing, real-time information, road weather management, and other ITS strategies

# Federal Highway Administration MAP-21

**National Freight  Policy**

- **Establish policy to improve the freight network**

-  **Compete in the global economy**

- **Improve economic competitiveness, efficiency, productivity, safety and security**

- **Achieve resilience of freight movement**

- **Improve infrastructure condition**

- **Foster innovation, technology, accountability in operation and reduce environmental impacts**

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# National Freight Network

- **Requires US DOT to establish a freight network to assist States to improve movement of freight on highways**
- **Consists of:**
    - □ **primary freight network (PFN)**
    - □ **Portions of the Interstate System not part of PFN**
    - □ **Critical freight corridors (MAP-21 [ § 1115; 23 USC 167])**
- **DOT must designate PFN within 1 year**
- **PFN limited to 27,000 miles critical to freight**
- **States will designate critical rural freight corridors**

# National Freight Strategic plan

**Develop a national freight strategic plan within 3 years & update every 5 years**

- ☐ **Assess the condition and performance**
- ☐ **Identify freight congestion bottlenecks**
- ☐ **Forecast freight volumes**
- ☐ **Identify major trade gateways & freight corridors**
- ☐ **Assess barriers to performance**
- ☐ **Identify routes to energy areas**
- ☐ **Identify best practices (for network & impact mitigation)**
- ☐ **Improve freight intermodal connectivity**

# Other Highlighted Topics

- **Planning & reporting – data and tools, biennial performance report**

- **Improvement projects – 95% Fed share for projects that improve freight efficiency**

- **State freight advisory committees**

- **Truck size and weight – major study**

- **Truck idle reduction technology**

- **Special permits during National Emergency**

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# Current Projects Under Development

- **Platooning of heavy trucks**
- **Economics of truck-only lanes**

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**The mission and objectives of the CAR 2 CAR Communication Consortium are**

• to develop

    ...an open European standard for C-ITS

    ...an associated validation process focusing on V2V Systems

    ...realistic deployment strategies and business models to speed-up the market penetration

    ...a roadmap for deployment of C-ITS (for V2V and V2I)

• to contribute

    ...to the development of European standards for V2I Communication being interoperable with the specified V2V standard

    ...to an associated validation process

    ...its specifications to the standardisation organisations, in particular ETSI TC ITS, in order to achieve common European standards for ITS
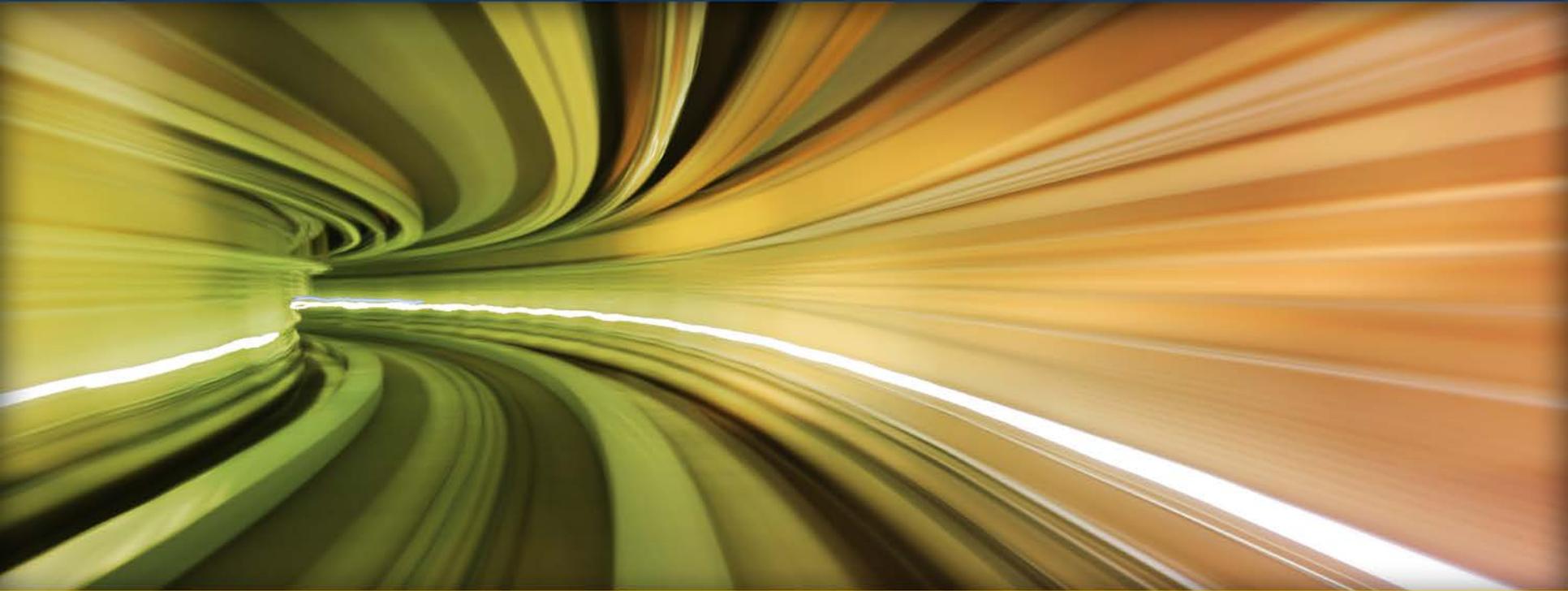
# Michigan leading the convergence of connected and automated mobility systems

**Peter F. Sweatman**

**Director, UMTRI**

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# THE UNIVERSITY OF MICHIGAN IS INVESTING IN MOBILITY

# MOBILITY IS RIPE FOR TRANSFORMATION

**Connected Vehicles**

**+**

**Automated Vehicles**

**+**

**Shared Vehicles**

**+**

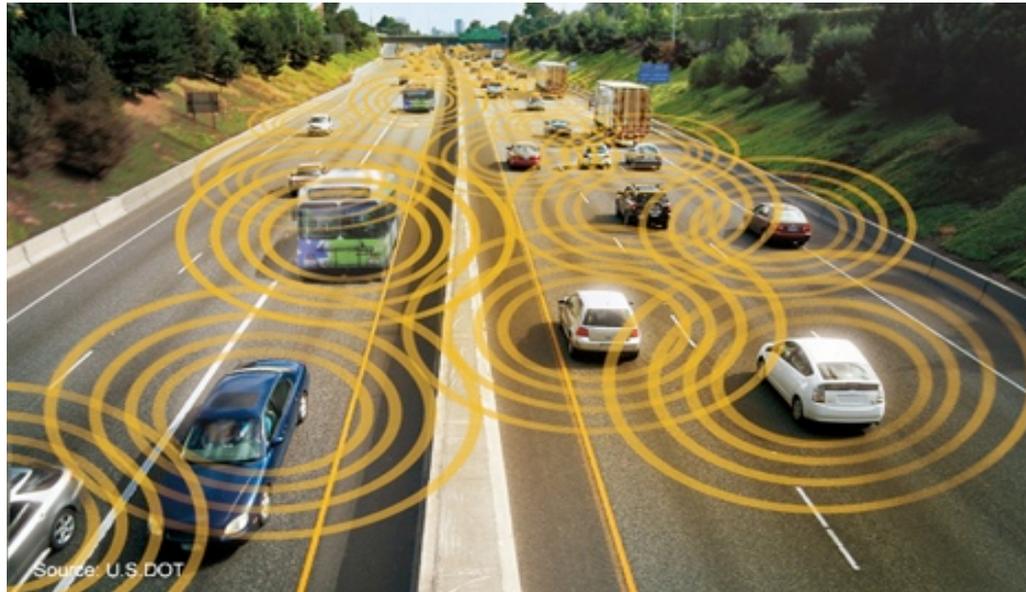**Specific Purpose Vehicles**

**+**

**Advanced Propulsion Systems**

**+**

**Operating System**

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# TRANSFORMATIONAL GOALS

**We will demonstrate a mobility system which addresses order-of-magnitude advancements in multiple metrics**



4 + 4 years

# TRANSFORMATIONAL GOALS

- Motor vehicle fatalities and injuries
- Energy consumption moving people and goods
- Carbon emissions from the transportation system
- New transportation economy start-ups

# KEY INDICATORS OF CHANGE

- **System user time**
- **Freight cost**
- **Utilization of infrastructure capacity**
- **Need for parking**
- **Physical proximity to services**
- **Land use for mobility**

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# RESEARCH INFRASTRUCTURE
# +
# DEMONSTRATION of 21$^{st}$ Century Mobility Operating System

# A KERNEL OF DEMONSTRATION



OFF-ROAD TEST TRACK

V2X TEST ENVIRONMENT (SAFETY PILOT)

RESEARCH

TEACHING

ANN ARBOR USA DEMONSTRATION

DATA

STANDARDS

**21ST CENTURY MOBILITY OPERATING SYSTEM**

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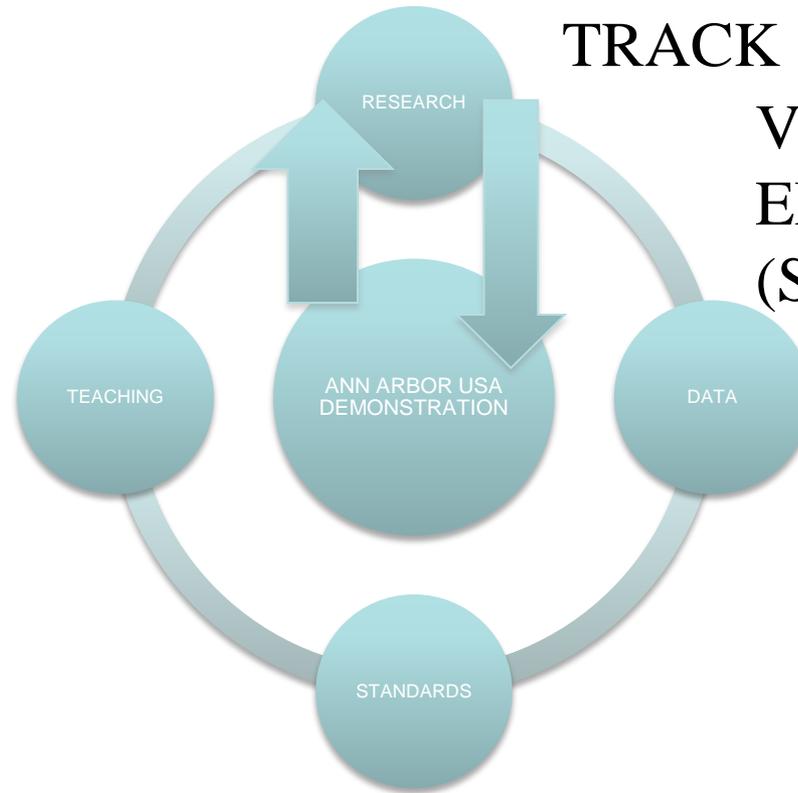
# Our research infrastructure includes off-road and on-road test facilities

# SAFE, AFFORDABLE AND EFFICIENT AUTOMATED MOVEMENT OF PEOPLE AND GOODS ANYWHERE AND ANYTIME

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# CUSTOMER VALUE AND ECONOMIC VITALITY

- **Compelling to consumers**
- **Offer profitable business on a large scale**
- **Safe, environmentally sustainable and socially progressive in advancing accessibility**

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Wall Street Journal
September 24, 2012
**Who's Behind the Wheel? Nobody.**
**The driverless car is coming. And we all should be glad it is.**

The Sunday Times (London)
September 16, 2012
**56MPH - I THINK I'LL HAVE A NAP;  Ken Gibson gets a taste of the future in a 'road train' convoy of cars controlled by a single driver**

telegraph.co.uk
May 18, 2012
**Self-driving cars 'not far off'; General Motors reckons most of the building blocks are already in place for a semi-autonomous self driving car, but that full autonomy is a way off.**

New Scientist
March 31, 2012
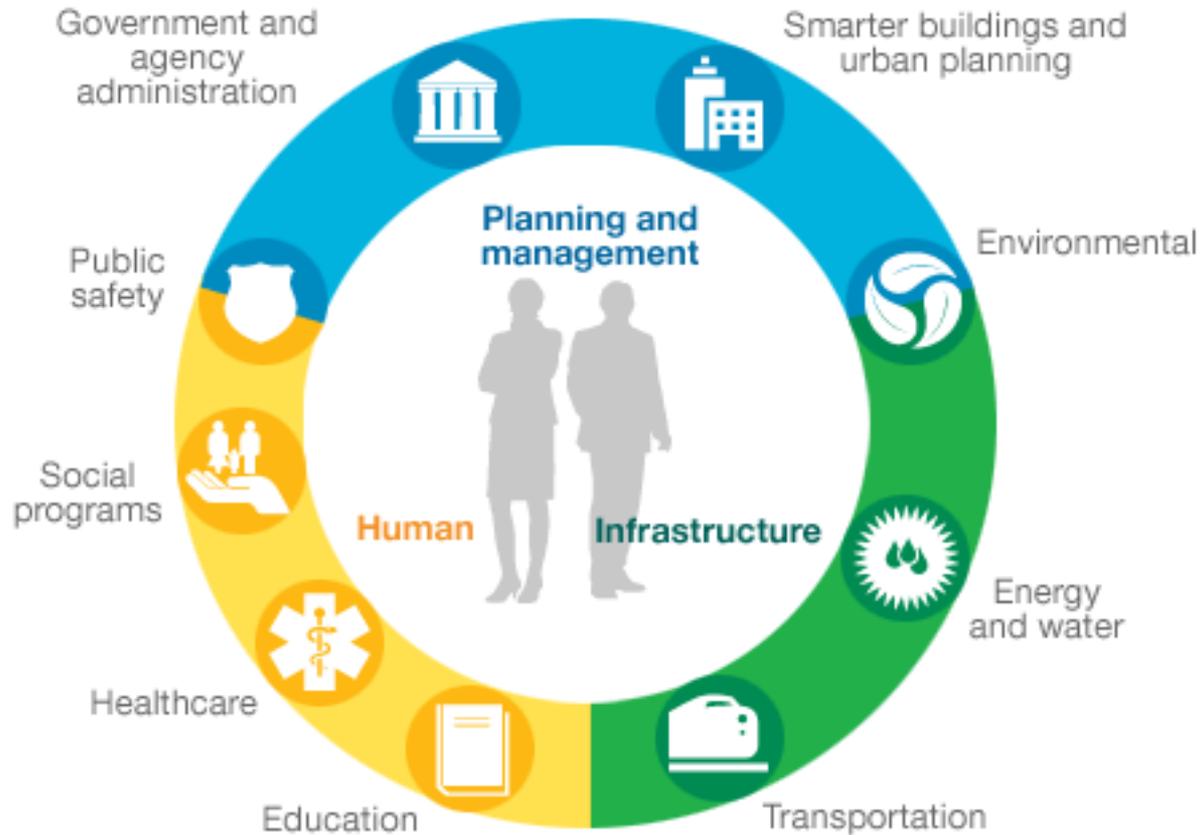**Hands off the wheel. If the going's tough, the car gets cover**

# Clean, safe and it drives itself

Cars have already changed the way we live. They are likely to do so again

Raising the I.Q. of City Services - NYTimes

**SIEMENS**

Sustainable cities
Intelligent traffic solutions, green buildings, wastewater management, and smart grid infrastructure are just a few of the technologies helping to steer today's urbanization toward sustainability.

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