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ACTIVATING GLOBAL MOBILITY SOLUTIONS

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10–14 October 2016



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23rd World Congress on Intelligent Transport Systems
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Scott Smith

United States Department of Transportation
Presented by Carl K. Andersen

Impact Assessment



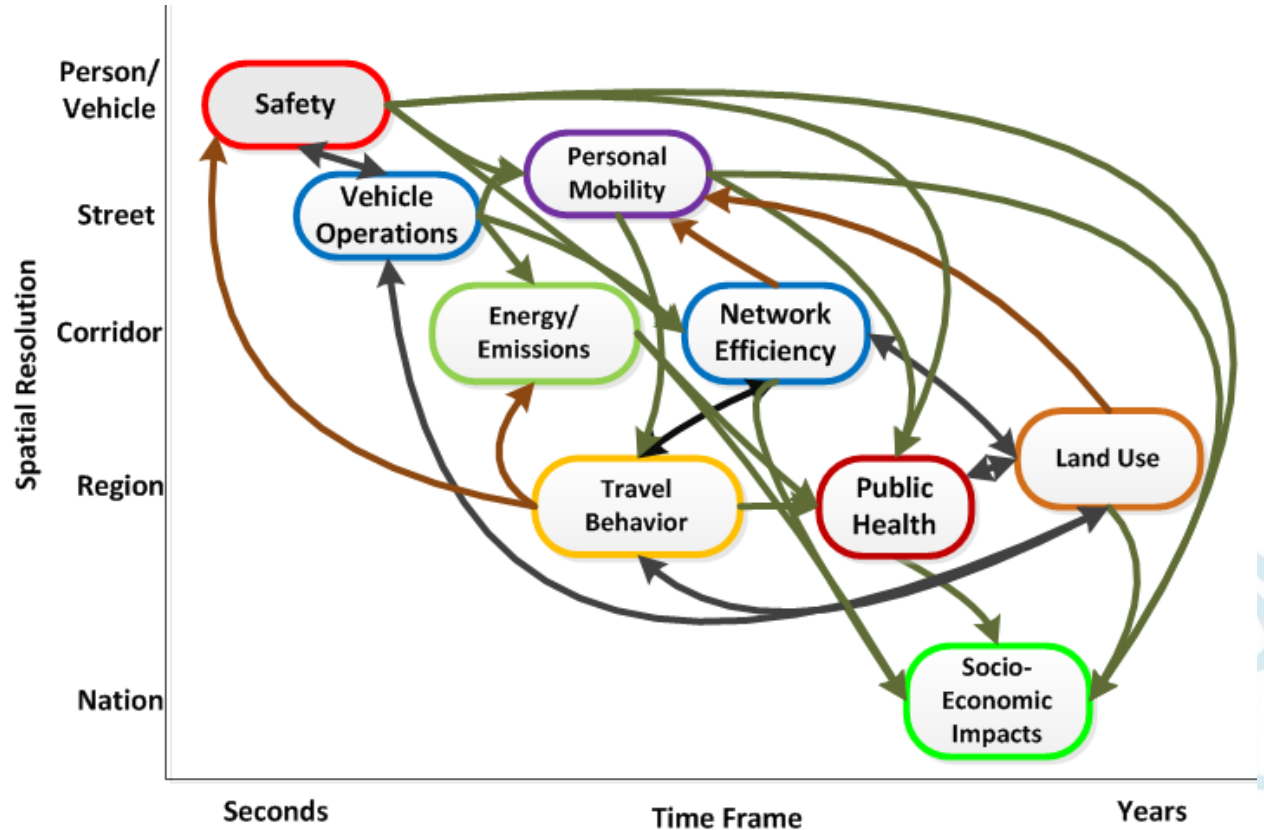
Outline

- Automated Vehicle Benefits Framework
- Research Data Exchange
- EU-US-Japan Impact Assessment Subgroup



Framework

- “Big picture” of automated vehicle impacts
- Short-term direct impacts
- Longer-term indirect impacts



Direct and Indirect Impacts

- Cost
- Infrastructure
- Safety
- Vehicle Operations
- Energy / Emissions
- Personal Mobility
 - Multi-tasking
 - Accessibility
- Asset Management
 - Lanes and lane widths
 - V2I infrastructure
 - Size and weight
- Network Efficiency
- Travel Behavior
- Public Health
- Land Use
- Socio-Economic



Direct Impacts: Cost & Infrastructure

- Capital and operating cost estimate for a production system
- Infrastructure requirements (road markings, signs, signals, mapping, V2V, V2I, V2P communications)
- Importance: supports the business case for widespread adoption



Direct Impacts: Safety

- Ultimately measured as fatalities, injuries and property damage for vehicle occupants and other road users
- Challenging to measure because crashes are rare events
- Proxy measures
 - Traffic violations (e.g., lane departure, following too closely)
 - Extreme maneuvers (e.g., sudden braking, steering, acceleration)
 - Instances where the human driver must take control
 - Exposure to near-crash situations
 - Response to near-crash situations
- Importance: human-caused crashes have a huge societal cost



Direct Impacts: Vehicle Operations, Energy, Emissions

- Vehicle operations: acceleration, deceleration, lane keeping, car following, lane changing, gap acceptance
- Energy and emissions: affected by changes in the driving cycle
- Importance: societal cost of congestion, air pollution and GHG emissions



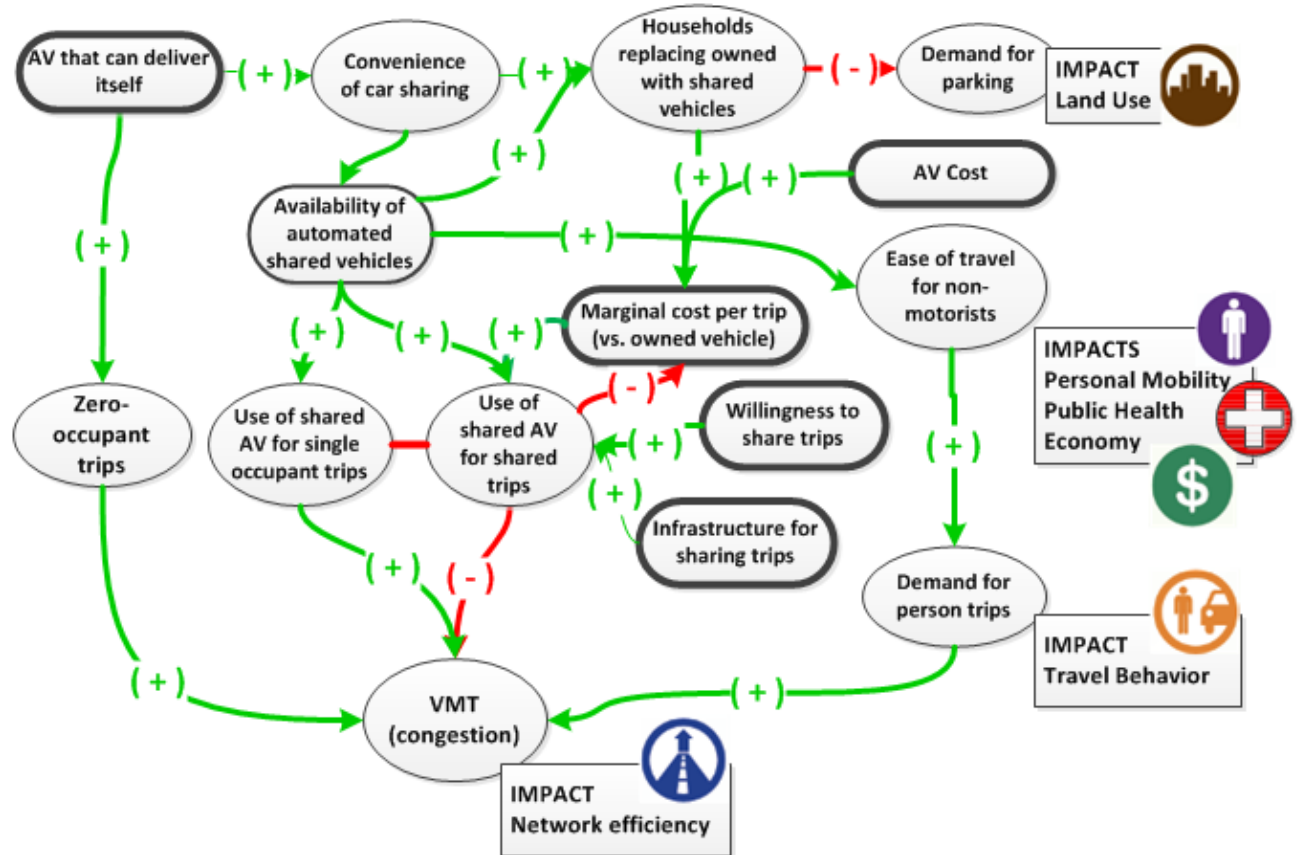
Direct Impacts: Personal Mobility

- Is a travel option available to someone (e.g., a non-motorist)
- Journey quality (comfort), travel time, out of pocket cost
- Ability to engage in other activities while en-route
- Different effects on different sub-populations (e.g., non-motorists)
- Fleet (truck or bus) driver productivity
- Importance: higher levels of automation may significantly improve personal mobility, particular for populations that are not well-served today.



Going from Direct to Indirect Impacts, an example

Example of an AV that can deliver itself to a user



Framework: Lessons learned and next steps

- **Need for a clearinghouse on research, to facilitate sharing**
 - What data are collected?
 - What methods (models) are used?
 - What results are reported?
- **Understand the big picture, to ensure the right data are collected**
 - For example, a mobility project may affect safety and vice versa
- **Next steps**
 - Identify data sources and automation applications for initial modeling
 - Examine linkages between micro and regional mobility models
 - Develop AV impact models
 - Start with Safety, Mobility and Environment
 - Continue to other areas
 - Coordinate with U.S. and international evaluation efforts



Research Data Exchange

- **Purpose**
 - Provide data-related services that support development, testing and demonstration of mobility, weather and environmental applications.
- **Objectives**
 - Enable systematic data capture from vehicles, mobile devices, and infrastructure
 - Perform data quality checks and provide clean, well-documented data sets
 - Integrate data from multiple sources into data environments

www.ite-rde.net



EXPLORE DATA

Data Environments

All ▾

All
BSM Data Emulator
FDOT Orlando ITS World Congress
Integrated Dynamic Transit Operati
Intelligent Network Flow Optimizati
ITS World Congress Connected Vehicl
Leesburg VA Vehicle Awareness Devi
Minnesota DOT Mobile Observation d
Multi-Modal Intelligent Traffic Signal
NCAR 2009
NCAR 2010
Next Generation Simulation (NGSIM)
Pasadena
Portland
Response, Emergency Staging, Comn
Road Weather Demonstration
Safety Pilot Model Deployment - One
Safety Pilot Model Deployment Data
San Diego
Seattle

Open Source Application Development Portal



- **Purpose of OSADP**
 - Promote reuse of software
 - Transparent application development
 - Provide complete application package
 - Collaborative development
- **Features**
 - Resources to use & download applications
 - Forums for discussions on applications
 - Platform to test (GitHub) applications before posting
 - Developer instructions to support submitting applications

<http://www.itsforge.net>

Latest Application Releases

[DIRECTView-AMS-v1.0](#)

[Dynamic Intermodal Routing Environment for Control and Telematics - Analysis, Modeling and Simulation](#)

[P-ODE-v2.0.3](#)

[Prototype Operational Data Environment](#)

[SEMI-ODE v1.0](#)

[Southeast Michigan Operational Data Environment \(SEMI-ODE\)](#)

[TCSPT-v1.0](#)

[Traffic Congestion State Predictor Tool](#)

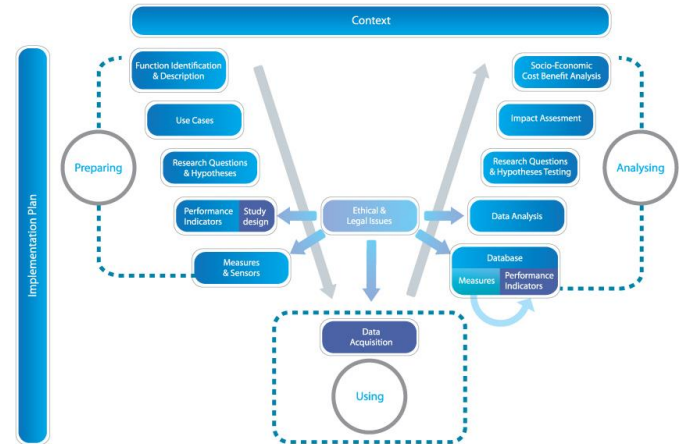
[INFLO-AMS-v1.0](#)

[Intelligent Network Flow Optimization Analysis Modeling and Simulation](#)

International coordination

Impact Assessment subgroup of the EU-US-JAPAN trilateral road automation in road transportation working group

- **Collection of impact assessment approaches on projects**
 - http://wiki.fot-net.eu/index.php/Trilateral_Collection_of_Impact_Assessment_Methods
- **Planned activities (first priority)**
 - Define which impact areas we recommend to cover
 - Define what we mean by each impact area (common vocabulary)
 - Define KPIs with which we recommend the impact to be expressed
 - Provide recommendation for baseline
 - Provide examples of anticipated impact mechanisms



For More Information

www.its.dot.gov

Project Manager: Scott Smith
US DOT / Volpe Center
Scott.Smith@dot.gov
617-494-2588

Program Manager: Kevin Dopart
US DOT / ITS JPO
Kevin.Dopart@dot.gov
202-366-5004

The screenshot shows the homepage of the United States Department of Transportation Intelligent Transportation Systems Joint Program Office. The page features a navigation menu with categories like About, Research, Tech Transfer, Library, Press Room, ITS PCB Program, and Contact Us. A prominent banner advertises the '2014-2016 ITS STRATEGIC PLAN'. Below this, there are sections for 'Current Research' with a list of topics such as Safety, Mobility, and Environment, and a 'Spotlight' section highlighting recent news items from December 2014 and August 2014. The page also includes a 'FREE ITS TRAINING' offer and a 'Connected Vehicle TEST BED' section. At the bottom, there is contact information for the Office of the Assistant Secretary for Research and Technology (OST-R) and various accessibility and utility links.

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- Mobility
- Environment
- Road Weather
- Policy
- Connected Vehicle Technology
- Short-Term, Intermodal Research
- Exploratory
- ITS Cross-Cutting Support
- Success Stories

Spotlight

December 10, 2014
The U.S. Department of Transportation Plans for the Future of Intelligent Transportation Systems (ITS) ...
Read more

December 10, 2014
The Connected Vehicle Reference Implementation Architecture (CVRIA) Training Course is Now Available ...
Read more

August 12, 2014
The USDOT Connected Vehicles Pilot Deployment Program Webinar Series Part 1: Concept, Phases, Waves, and Partnerships with Kate Hesterman ...
Read more

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1200 New Jersey Avenue, SE • Washington, DC 20590 • 800.853.1351 • E-mail OST-R

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