



Estimation of Benefits for Automated Vehicle Systems

Session: Impact Assessment 2nd SIP-adus Workshop

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Outline

- AV Benefits Framework
- Target Crash Populations
- EU-US-JPN Subgroup on Evaluation
- Plans for 2015 - 2017



AV Multimodal Benefits Framework, Phase 1

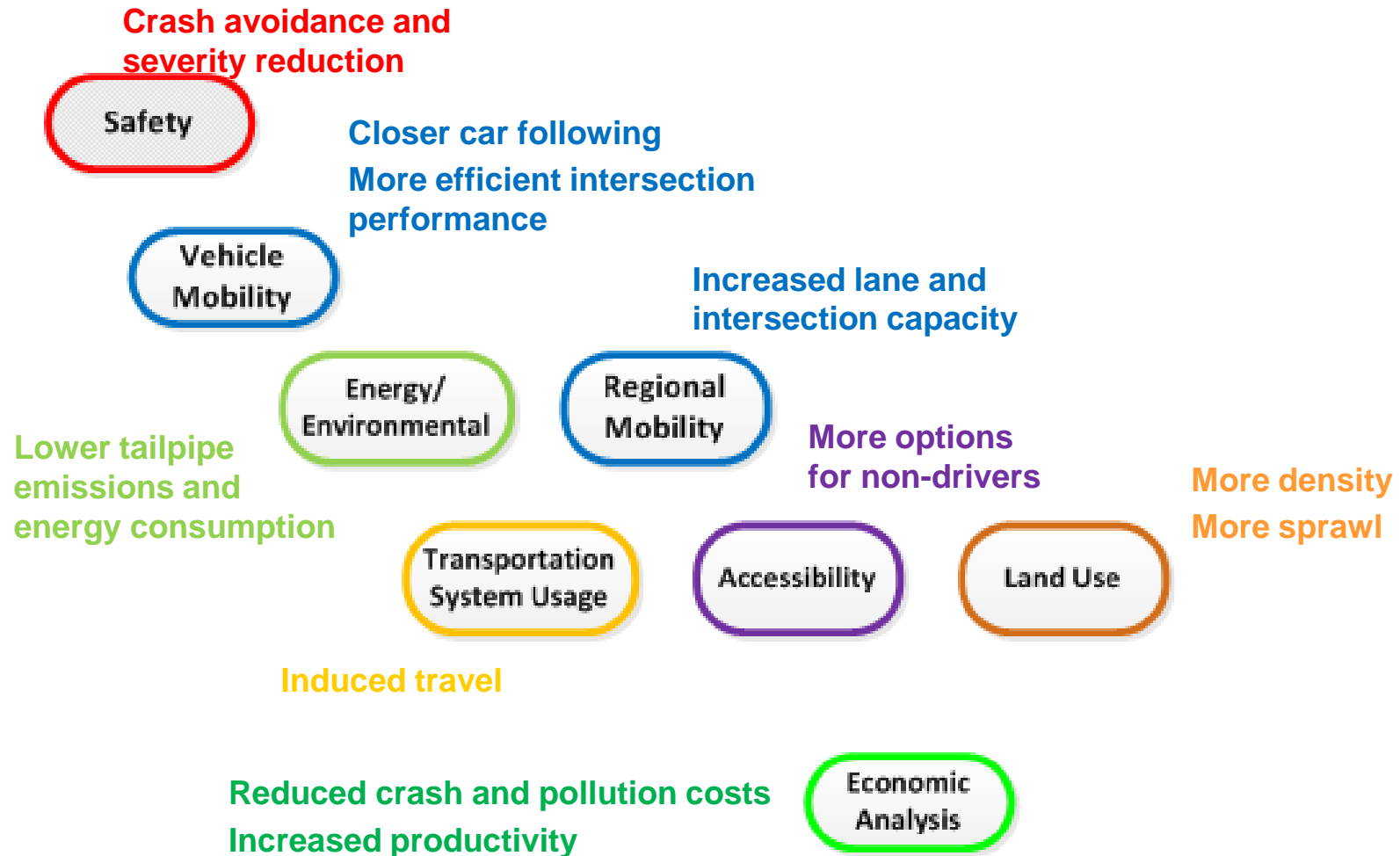
- Develop a framework to estimate the potential safety, mobility, energy and environmental benefits (including dis-benefits) of technologies contributing to the automation of the nation's surface transportation system

- Objectives
 - Identify metrics
 - Develop a framework for quantifying impacts
 - Provide a high order assessment of the state of knowledge
 - Incorporate current research by other parties.

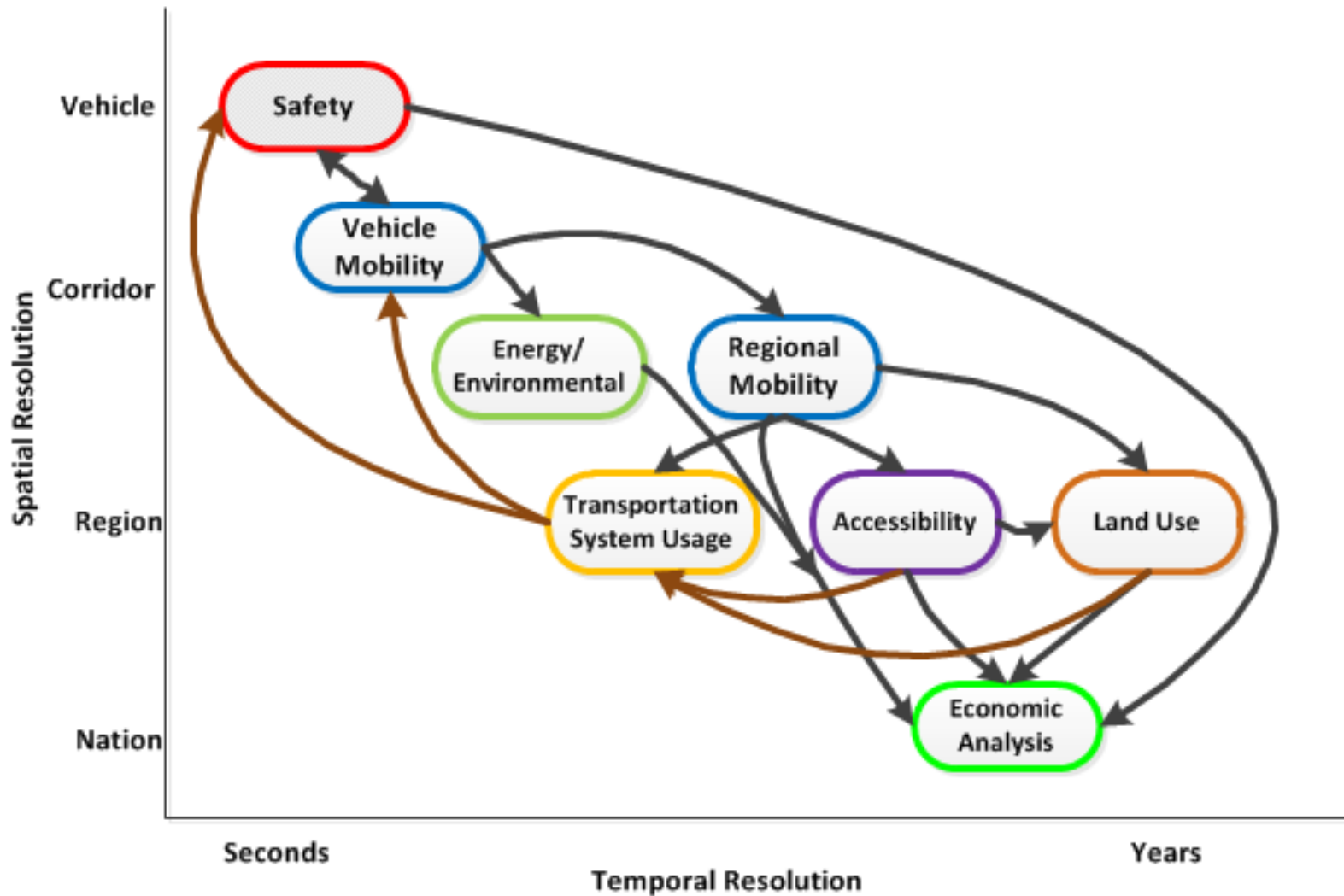
The goal during 2014-2015 was to build a framework. Quantitative analysis of expected benefits will come later.



Potential Impacts of Automation

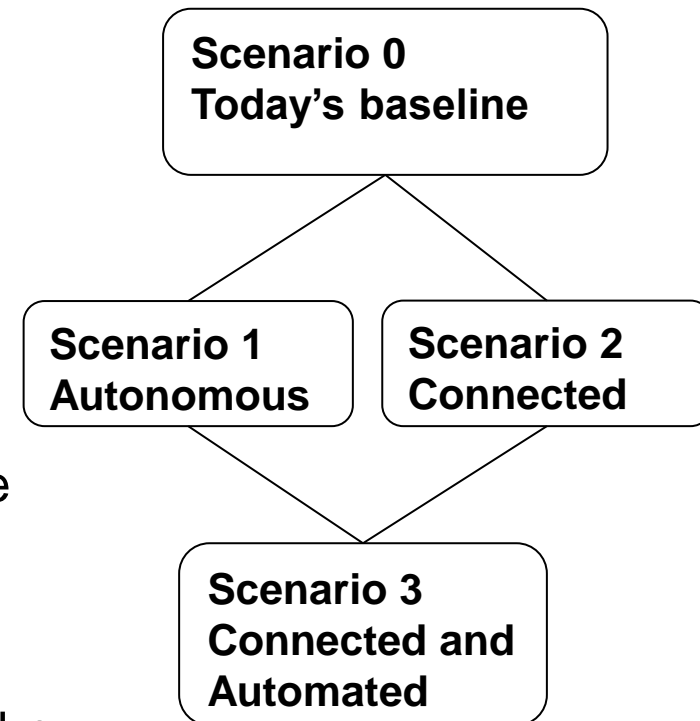


Framework Elements



Framework Approach

- Divide and conquer
 - Several models
 - Several levels of spatial and temporal resolution
 - Well-defined scenarios, for example,
 - Forward collision avoidance with lead vehicle stopped
 - Car following (lane capacity) on a freeway
- Feedback loops are important
- Consistent methods for modeling the baseline and automation
- Use existing tools and methods as appropriate
 - Safety impact methodology
 - Car-following and traffic microsimulation
 - Emissions / energy estimation (MOVES)
- Flexibility to accommodate several visions of the future world (e.g., state of infrastructure, amount of ride sharing)



Framework: Lessons Learned thus Far

- Substantial interest in the framework
- 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



Phase I: Status of Current Models

- Safety
 - Safety Impact Methodology provides a reasonable starting point
 - Now need to consider changes in exposure and multiple vehicles (no longer a simple host and target)
- Vehicle mobility
 - An active area of research.
 - Look at recent modeling and simulation research
- Regional mobility and transportation system usage
 - Areas of research include
 - Travel model improvements (not related to automation)
 - User attitudes (stated preference research)
 - Needs
 - Link regional and vehicle models
 - Develop reasonable scenarios on user responses to automation



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Target Crash Population Project

■ Goal

Estimate potential safety benefits that could be gained from automated vehicle concept functions at NHTSA automation levels 2-4

■ Objectives

- Map known automated vehicle functions and operations to crash information
- Query national crash databases to estimate the target crash population that could benefit from automated vehicles

■ Focus

- Light vehicles (Gross vehicle weight rating \leq 10,000 pounds)



TCP - Approach

1. Describe automated vehicle functions
2. Identify/map target crash characteristics and determine:
 - Target crashes that could be addressed by automated vehicles (L2-L4) in general
 - Incremental target crashes that could not be addressed by crash-imminent avoidance systems (L0-L1)
3. Query and analyze crash data
4. Publish final report in 2015



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US-EU-JPN Automation in Road Transportation Working Group: Evaluation Subgroup

- Formed at La Rochelle meeting 30 March 2015
- Objective: *harmonization of the high-level evaluation framework for assessing the impact of automation in road transportation*
- Co-Chairs
 - Satu Innamaa – VTT
 - Scott Smith – US DOT
- Next meeting: January 2016 (TRB in Washington)



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Plans for 2015 - 2017

- Review related research
- Small Business Innovation Research (SBIR) project 15.1 FH4, with CLR Analytics
 - Evaluating System Impacts of Automated Vehicles: A Multi-Resolution Modeling Approach
 - Phases
 - Phase 1, 6 months, a white paper and limited modeling
 - Phase 2, 2 years, model development
- International evaluation coordination
- Benefits model development
 - Proof-of-concept model in 2016
- Outreach
 - Trilateral working group
 - TRB 2016



For More Information

The screenshot shows the homepage of the United States Department of Transportation. At the top left is the DOT logo and the text "United States Department of Transportation". To the right is a search bar. Below the header are navigation links: "About DOT", "Our Activities", and "Areas of Focus". The main content area features a large carousel of images related to transportation, including a train, a bridge, a carpooling lane, and a cyclist. A text overlay on the carousel reads: "DOT's GROW AMERICA offers long-term transportation certainty. Legislative proposal sent to Congress would boost public and private investment, create jobs, provide certainty for future growth." Below the carousel are three resource boxes: "RESOURCES FOR INDIVIDUALS" (Services, alerts, frequently requested information and more for citizens), "RESOURCES FOR PARTNERS" (Services and information for businesses, institutions and organizations), and "RESOURCES FOR GOVERNMENT" (Information and services for state, local and federal government agencies). To the right of these boxes is "THE BRIEFING ROOM" section, which includes "NEWS, VIDEOS, & PHOTOS" and "CONNECT WITH US" with social media icons for Facebook, Twitter, and YouTube.

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