Operating Future Transportation Systems

Session SS24: Establishing a Proactive, Integrated, and Reliable Transportation System

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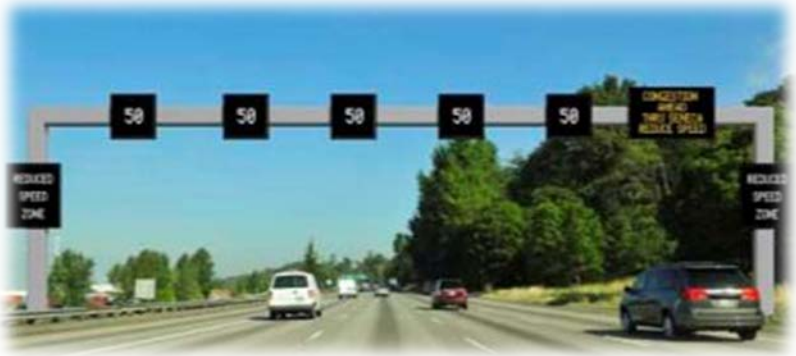
Overview

- State of operations today
- Where operations is headed
- On-going research

Operations Today



Data Analysis

- Real Time Data Management
- Regional TMCs
- Fixed Traffic Surveillance and Sensor Technologies

Technology

- ITS Technology
- Advanced Speed Algorithms
- Information Sharing Technologies (Variable Message Signs, 511)

Photos Courtesy of WSDOT (http://www.wsdot.wa.gov/Projects/I5/ActiveTrafficManagement/gantries.htm) and MnDOT (http://www.dot.state.mn.us/rtmc/)

Where is the Future of Operations Headed?

1

Connected Vehicles

- Vehicle-to-Vehicle (V2V)
- Vehicle-to-Infrastructure (V2I)
- Vehicle-to-Environment (V2X)

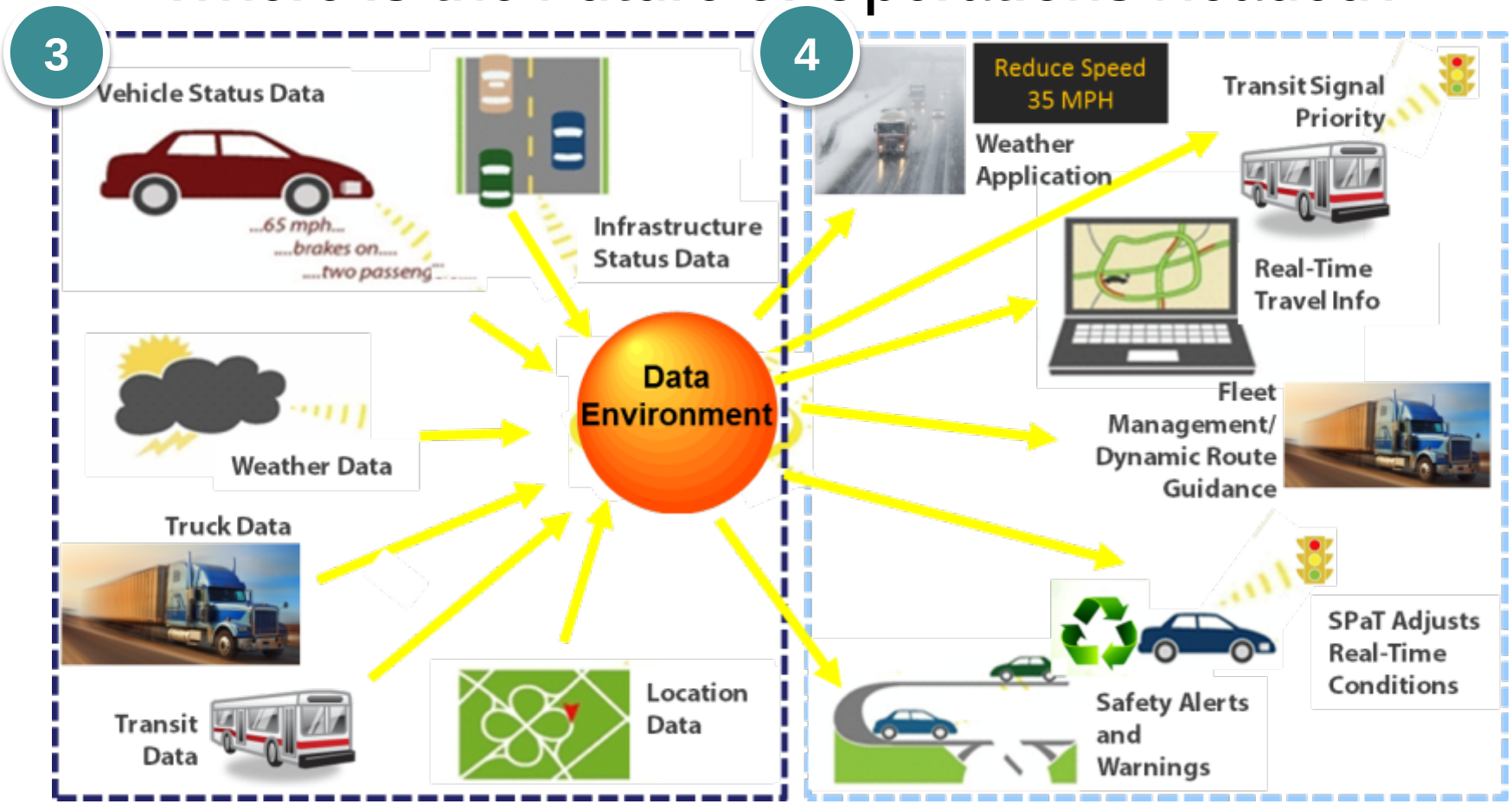
2

Cooperative Systems/Automation

- Speed Harmonization
- Platooning
- Automated Vehicles

Photos Courtesy of Spirent (http://www.spirent.com/Blogs/Wireless/2011/September/2011-9-1_Autonomous_Vehicles_Science_Fiction_or_Reality) and http://blogs.itb.ac.id/ditto/2012/07/10/teknologi-platooning-mobil-akan-bisa-berjalan-sendiri-woow/

Where is the Future of Operations Headed?



Multiple Data Sources

Multiple Applications

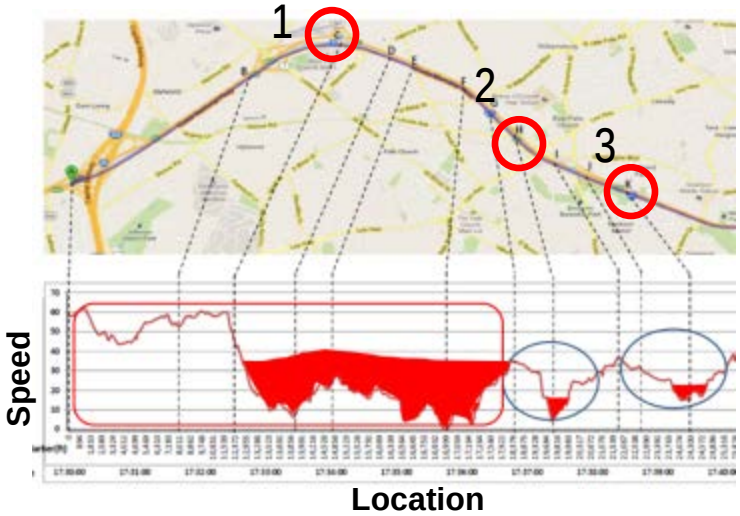
Current Connected Vehicle Research

- Connected Vehicle Test Beds, e.g.,
  - Michigan, Virginia, Saxton Laboratory
- Dynamic Mobility Applications Program
  - Connected Transportation Systems Pooled Fund Study
- National Connected Vehicle Field Infrastructure Footprint Analysis
  - AASHTO involvement
  - What is needed nationally to implement connected vehicles

Enabling Automation Technologies

- Speed Harmonization I-66
- Signal Coordination US-29/US-50
- Simulations and Experiments
  - Feasibility
  - Benefits
  - Testing and Demonstrations
    - Acquiring 5 test vehicles

Photo Courtesy of http://www.drive-c2x.eu/use-12



Managing Multi-Source Data

- Research Data Exchange
  www.ITS-RDE.net
  - Leesburg Vehicle Awareness Devices
  - Pasadena network data
  - Multiple Other Sources
  - Safety Pilot - Coming Soon

- High quality, well documented data

Integrating Future Technologies to Advance Today's Operations Solutions

- Go Beyond the Gantry
  - Incorporating connected vehicle (V2I) technology into existing transportation management system
  - Utilize wireless technology to broadcast speeds and messages to traffic
  - Near-future solution: TMCs broadcast advisory information via in-vehicle signage
- Take Away Delay Through Automation
  - Longer term solution: TMCs broadcast information direct to vehicle control systems