V2V Safety Research for Heavy Commercial Vehicles

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Washington, D.C.

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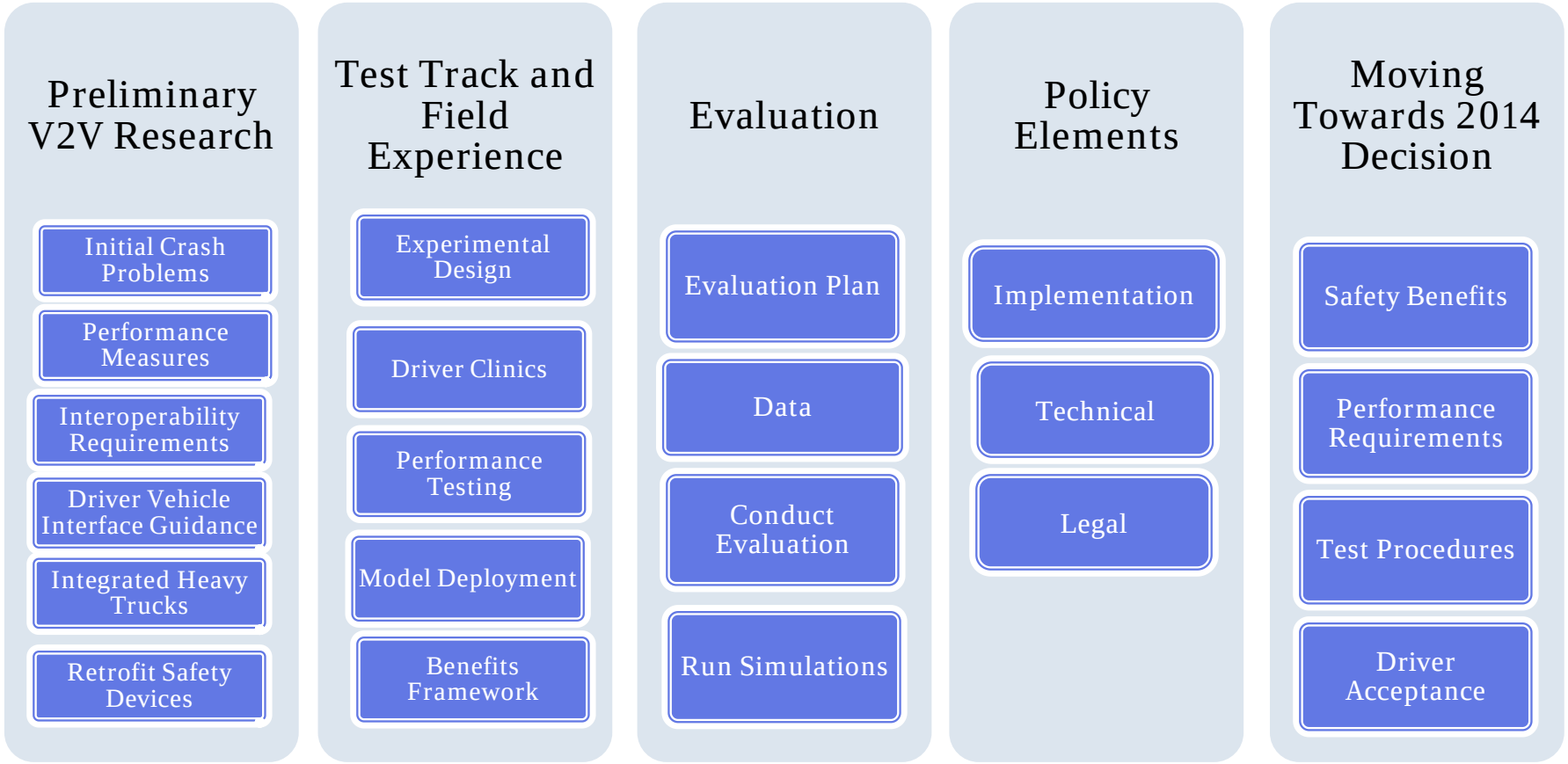
NHTSA
www.nhtsa.gov

Outline

- Analysis Framework for V2V Safety for Commercial Vehicles
- Connected Commercial Vehicle Project Team
- CV Driver Acceptance Clinics
- Heavy Trucks in Model Deployment
- Current Research Areas

Analysis Framework for V2V Safety for Commercial Vehicles



Connected Commercial Vehicle Project Team

Battelle
The Business of Innovation

Mercedes-Benz
Research & Development North America, Inc.

Daimler Trucks North America

UMTRI

MERITOR WABCO

TRC
TRANSPORTATION
RESEARCH CENTER INC.

DENSO North America

AUTOMOTIVE EVENTS

Vehicle Builds and Application Development

- **Connected Commercial Vehicle - Integrated Trucks Project (CCV-IT)**
  - Heavy truck tractors were developed with Connected Vehicle safety applications in December 2011

Retrofit Safety Devices (Battelle-RSD)

- Complete hardware and software retrofit kits for commercial vehicles
  - Denso Mini-WSU Platform used for ASDs
  - Applications:
    - FCW, IMA, EEBL, BSW/LCW, CSW, BHI
  - RSDs are designed to be used in various brands and models of heavy trucks

Retrofit Safety Devices (Cambridge/SWRI-RSD)

- Complete hardware and software retrofit kits for commercial vehicles
- Team: Cambridge Systematics, Southwest Research Institute, and Volvo Technology North America
  - Cohda Platform similar to ASDs
  - Applications:

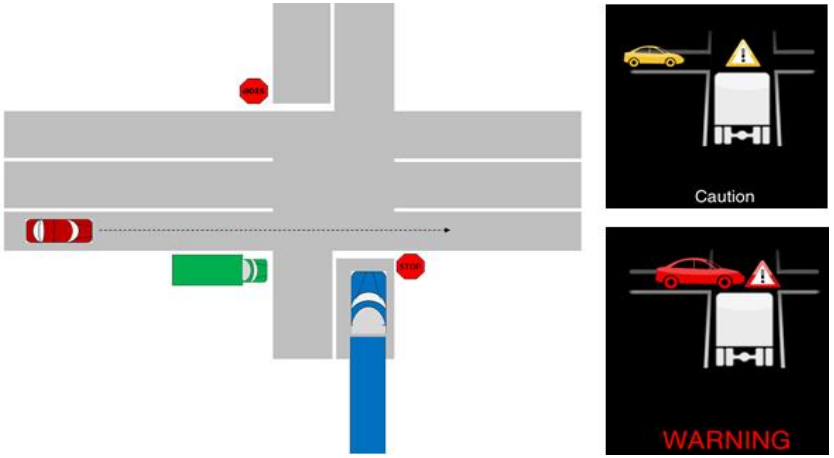
FCW, EEBL, Curve Speed Warning (CSW)

Application Development

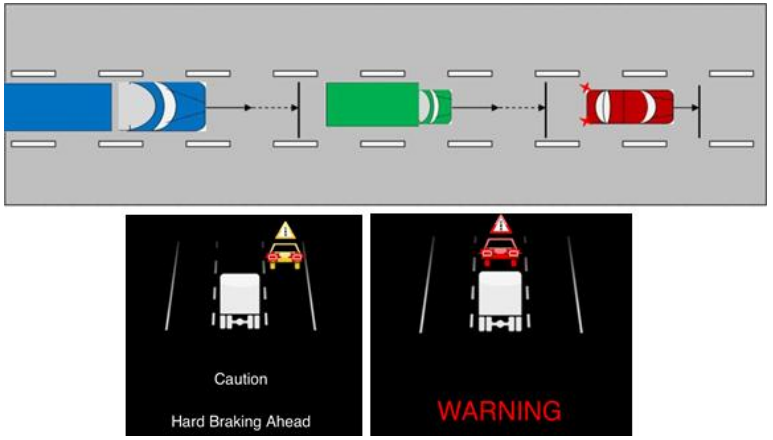
V2V and V2I Application development for heavy truck platforms:

- Forward Collision Warning (FCW)
- Blind Spot/Lane Change Warning (BSW/LCW)
- Intersection Movement Assist (IMA)
- Emergency Electronic Brake Lights (EEBL)
- V2I – Curve Speed Warning (CSW)
- V2I – Bridge Height Inform (BHI)

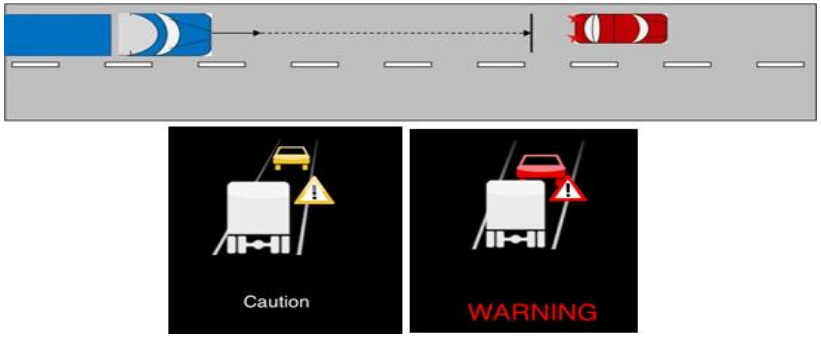
V2V Safety Applications



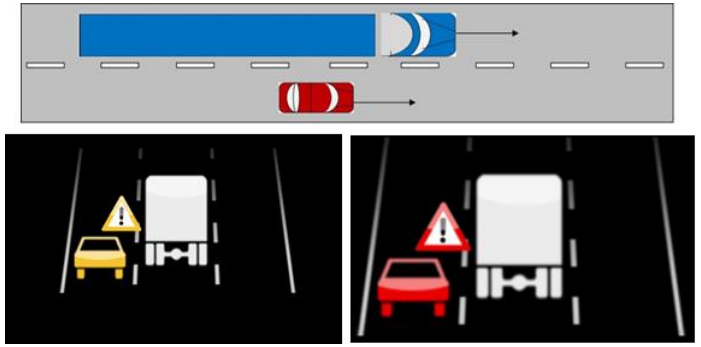
Intersection Movement Assist (IMA)



Emergency Electronic Brake Lights (EEBL)



Forward Collision Warning (FCW)



Blind Spot/Lane Change Warning (BSW/LCW))

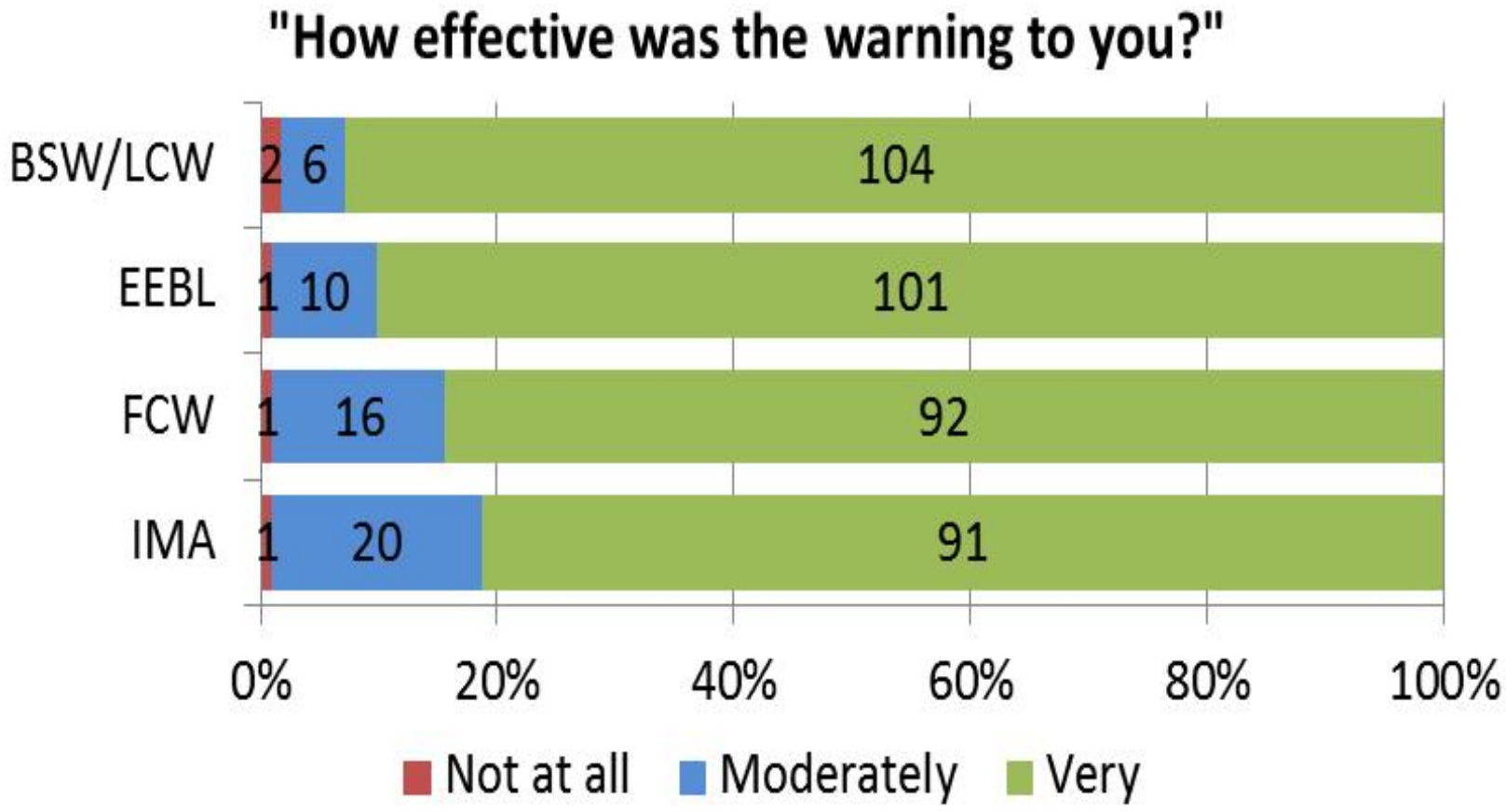
CV Driver Acceptance Clinics (CV DAC)

- Evaluate Driver Acceptance of V2V applications on Heavy Trucks
  - Surveys and direct observation of driver responses to warnings
  - Recruited 112 drivers with valid CDL from local fleets and independents (109 male, 3 female)
  - 61 In-depth interviews of drivers
  - Age range similar to drivers in U.S. fleet (20s-60s)
- Coordinated with the Light Vehicle Clinics and Independent Evaluator (Volpe)

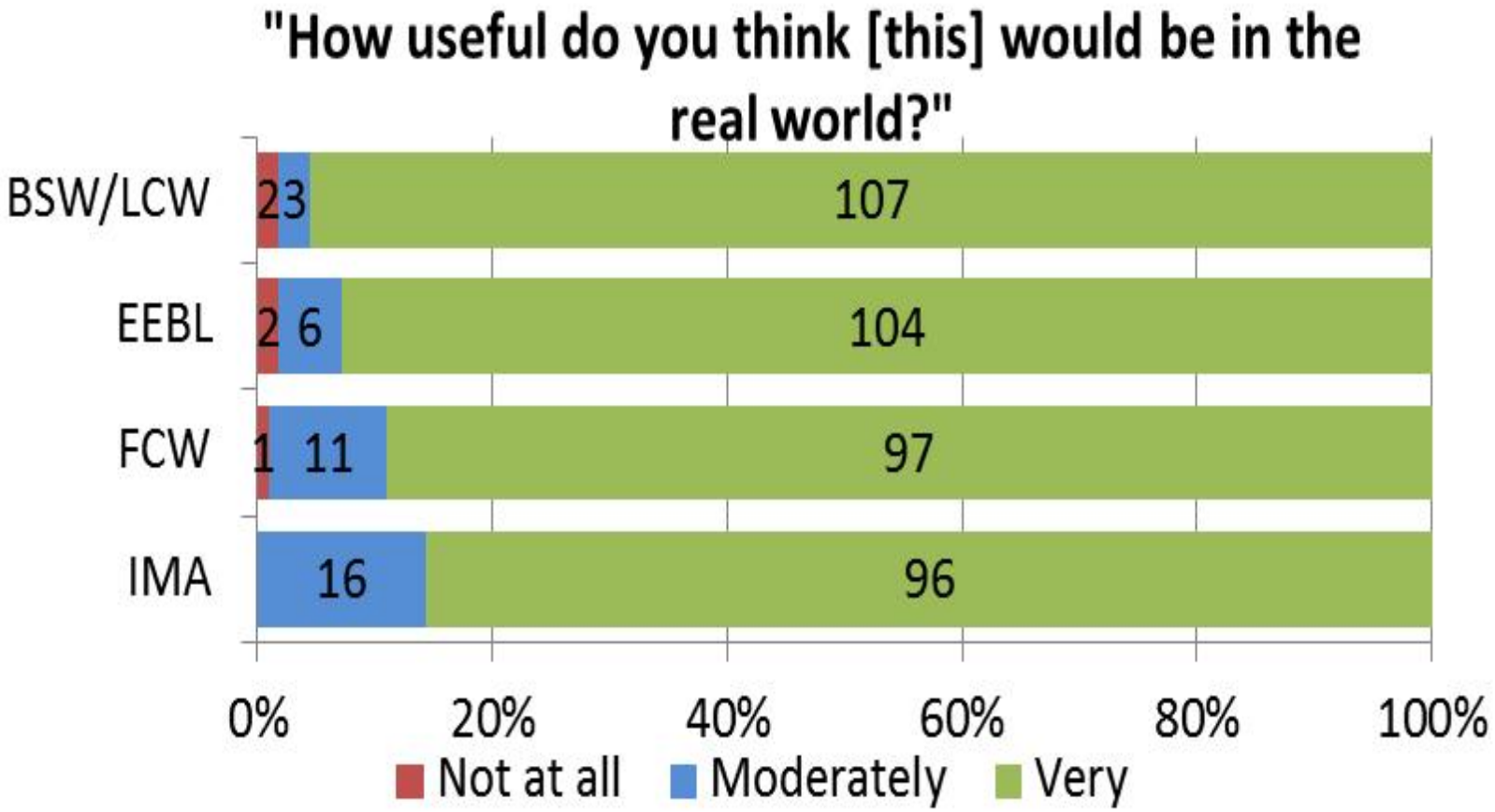
Ohio - July 10-26, 2012
Transportation Research Center, Inc.
East Liberty, Ohio

California - August 22-23, 2012
Former Alameda Naval Air Station

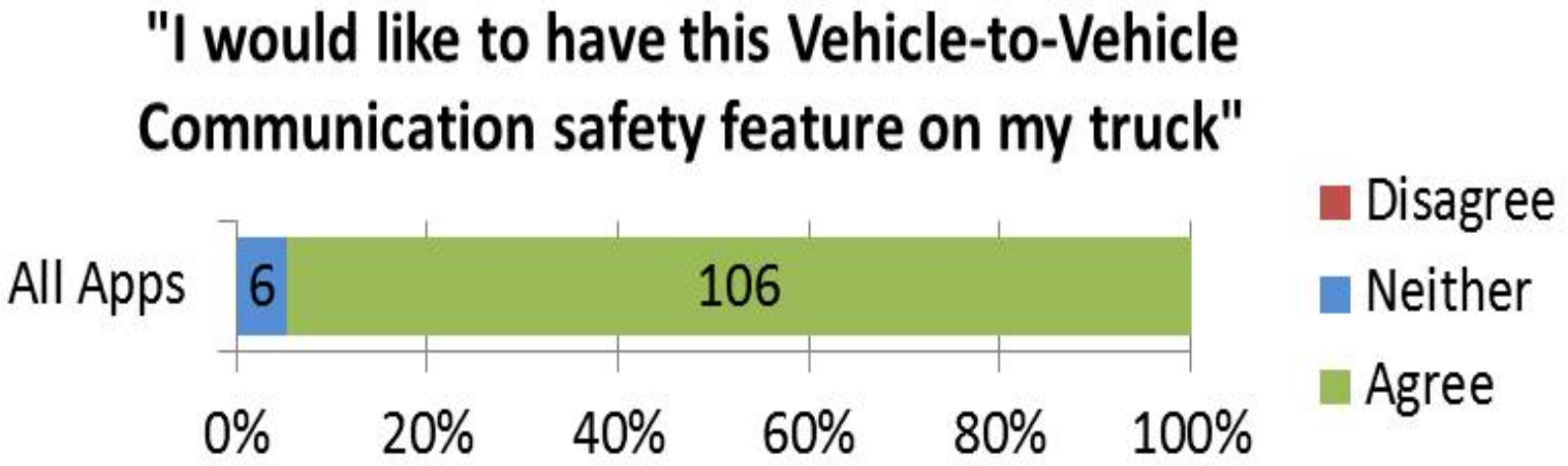
CV DAC Results



CV DAC Results (cont.)



CV DAC Results (cont.)



Heavy Trucks in Model Deployment

- 3 - Integrated CVs – driven by participating fleets
- 16 - Retrofit of existing fleet vehicles
- 76 – CVs with Vehicle Awareness Devices

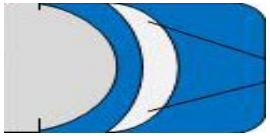
	Integrated V2V Systems	Retrofit Safety Devices	Vehicle Awareness Devices
Broadcasts Basic Safety Message (BSM – SAE J2735)	Yes	Yes	Yes
Receives BSMs, Assess Threats, Issue Alerts to Drivers	Yes	Yes	No
Integrated with vehicle data bus & systems for BSM & alert decisions	Yes	Yes	No
Data Logging	Full data acquisition system (DAS)	DAS for 12 vehicles, Device log files	Device log files only

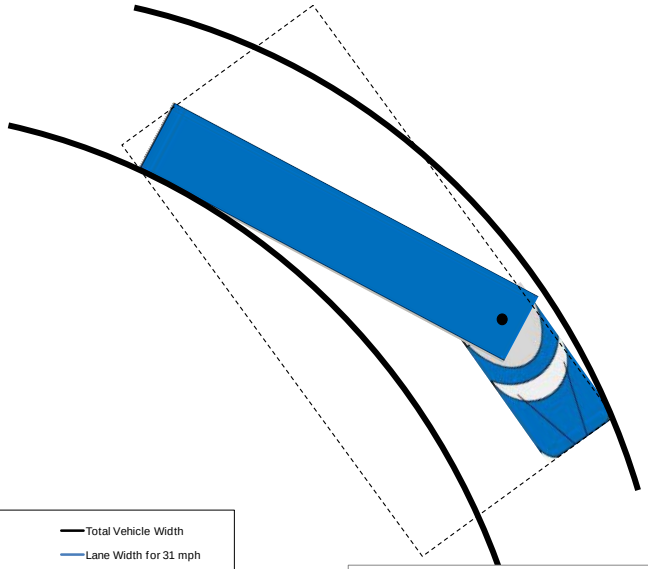
Current Research: V2V Objective Test Development

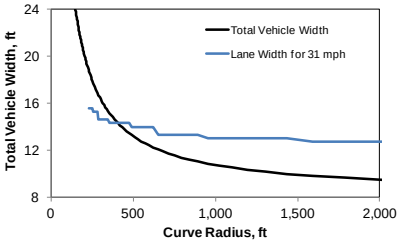
- Develop Test procedures and performance criteria for heavy trucks with V2V safety applications
- NHTSA Vehicle Research and Test Center in East Liberty, Ohio.
- Supports Compliance test procedures for possible future rulemaking in this area.

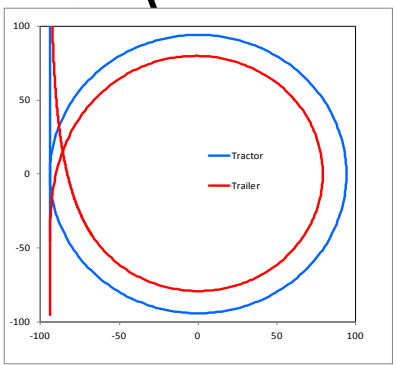
Basic Safety Message (BSM) Development for Truck Trailers

- On a straight path a single, simple BSM adequately describes the vehicle.
- On a highway curve or ramp at low to moderate speed, the trailer tracks inside the tractor.
- CAMP/MBRDNA is studying modifications to BSM to more accurately represent trailers
- Demonstrate in mid 2014 on tractor-trailer.
- Recommendations for SAE J2735 and J2945









Contact Information

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For more information on the U.S. DOT Connected Vehicles Program, visit the website:

http://www.its.dot.gov

Thank you!