

IntelliDrive Commercial Vehicle V2V Safety Program

IntelliDrive Safety Workshop July 20, 2010

Alrik L. Svenson **US** Department of Transportation National Highway Traffic Safety Administration





IntelliDrive for Commercial Vehicles

Vehicle to Vehicle (V2V)

- Forward Collision Warning
- Blind spot Detection
- Emergency Brake Light
- Lane Change Warning
- Do Not Pass Warning
- Other Safety Applications

Vehicle to Infrastructure (V2I)

- Intersection Safety
- Run-off Road Prevention
- Smart Roadside
 - USDOT Truck Parking Programs
 - SmartPark
 - Automated Enforcement
 - Wireless Roadside Inspections
- Other Safety Applications



Track 7 - Commercial Vehicles

Objective - Resolve the technical and policy issues impeding the accelerated deployment of V2V systems for commercial vehicles.

Key Tasks

- Identify priority CV crash scenarios.
- Select priority safety applications and determine performance requirements.
- Identify CV specific interoperability issues.
- Identify CV specific human factors / DVI issues.
- Build prototype vehicles and develop objective test procedures
- Vehicle testing for performance and DVI driver acceptance.
- Estimate safety benefits for CV applications.
- Identify CV policy issues and coordinate with overall program
- Support NHTSA regulatory decisions

Commercial Vehicle V2V Safety Application Research Plan CY 2009 CY 2010 CY 2011 CY 2012 CY 2013 CY 2014 20 30 40 20 30 40 30 40 30 30 10 20 30 40 10 10 10 20 10 20 40 10 20 40 TRACK 7a Identify Priority CV Crash Scenarios Crash Scenario Select Critical Safety Applications Framework Develop Performance Estimate Safety Benefits Requirements Develop Objective Test Consumer Information Objective Test Procedures TRACK 7b Procedures for Fleets Application Development /Benefits Develop and Build Testing Develop Final Prototype Safety Assessment •Performance Performance Application Vehides Interoperability Specifications & Driver Acceptance Test Procedures Identify Priority CV TRACK 7c Interoperability Issues Interoperability Coordination with IntelliDriveSM Interoperability Identify Priority CV TRACK 7d Develop CV DVI Guidelines CV DVI Guidelines Human Factors Issues Human Factors/ Driver Coordination with LV HF Research Issues Webinar CV Research Plan CV Stakeholder Workshop OCV Stakeholder Workshop CV Stakeholder Workshop TRACK 7e Identify Primary Safety Performance Testing Safety Benefits/Implementation Planning Applications/Interoperability & Outreach CV Stakeholder CV Stakeholder CV Stakeholder **Coordination Meeting Coordination Meeting Coordination Meeting NHTSA CV Regulatory Decision** TRACK 7f

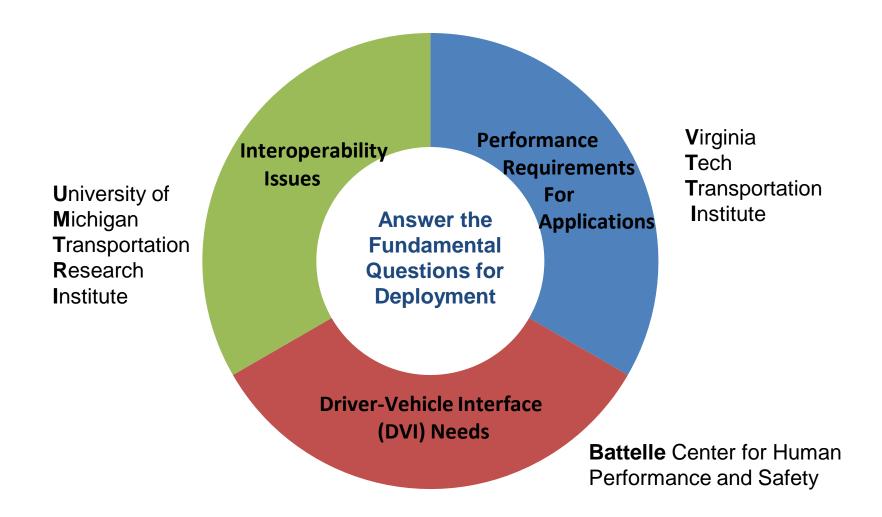
Coordination with CVV2I

Coordination with IntelliDriveSM Policy Issues - Security, Retrofit & Aftermarket, Enforcement, Governance

Policy



2010 Commercial Vehicle V2V Research





CV Interoperability Issues

- Consider root causes and platform context to identify CV interoperability issues
 - Root cause antenna placement limitations, multipath, density of vehicles, CAN bus performance, others?
 - Platform context anticipated application requirement, vehicle factors, usage factors, operational patterns.
- CV Issues of concern to LV
- Issues considered by LV, but not of priority concern, where root causes or platform context differs in significant ways
 - e.g., Trailer configurations
- Issues arising from unique CV context
 - e.g., Effect of commercial vehicle's limited & loaddependent maneuvering levels



Performance Requirements

Minimum Performance

What is needed to ensure proper system function?

Sensors Warning Reliability



Functional Requirements

Lead Vehicle:

Position

Speed

Engine Brake

Trailing Vehicle:

Position

Speed

Range

Closing Distance



Crash Type: Rear End Collisions

Emergency Brake Light*



*Example application



Driver Vehicle Interface (DVI) Specifications

- Develop DVI guidelines to address:
 - Message presentation characteristics
 - Auditory, visual, and haptic displays
 - Integration and prioritization of messages
 - Message conflicts
 - Arbitration of concurrent warnings
 - Nuisance / false warning mitigation
 - Driver overload and distraction
 - Minimize errors, workload, and confusion
 - Minimize eyes-off-road time
 - Specific strategies to identify and address distraction in real-time



CV Research Timeline

- Project kickoff meetings were held June 2010.
- Project durations are 7-8 months each.
- Final reports submitted at the end of 2010.
- Looking ahead to 2011:
 - CV Test Vehicle Builds
 - Safety Pilot
 - Driver Clinics
 - Model Deployment