Michigan Connected Vehicle Working Group Meeting Packet

January 30, 2012

1. **Agenda**
2. **Meeting Notes**
3. **Attendance List**
4. **Presentations**

MICHIGAN CONNECTED VEHICLE WORKING GROUP

Monday, January 30, 2012
MDOT Taylor TSC
6510 Telegraph Road,
Taylor, MI 48180

MEETING AGENDA

(1) Welcome and Introductions (9:00-9:15 AM)

(2) Briefing on policy work being conducted by the Vehicle Infrastructure Integration Consortium (Paul Eichbrecht, VII-C), 9:15 to 10 AM

(3) Briefing on V2V Driver Safety Clinics (Farid Ahmed-Zaid, Ford and CAMP, 10 to 10:45 AM
Kevin Kelly, MIS, will participate in Q&A

BREAK

(4) Lessons learned at ITS World Congress 2011 (Matt Smith, MDOT), 11 to 11:20 AM

(5) Working Task: What did you see at 2011 ITS World Congress? An informal report out from audience, 11:20 to 11:40 AM

(6) Vision for 2014 ITS World Congress (Michelle Mueller, MDOT, and Steve Kuciemba, PB), 11:40 to noon

MICHIGAN CONNECTED VEHICLE WORKING GROUP

MEETING NOTES

The January 2012 meeting of the Michigan Connected Vehicle Working Group was held at the Taylor Transportation Service Center (TSC) of the Michigan Department of Transportation (MDOT). After a brief welcome and introductions, Paul Eichbrecht from the Vehicle Infrastructure Integration Consortium (VIIC) gave a presentation on the policy work being done by VIIC. He emphasized security and privacy as crucial to deployment, discussed key policy questions and concerns regarding connected vehicle technology, and highlighted milestones in the near future for developing standards.

Following Paul, Farid Ahmed-Zaid discussed the driver acceptance clinics that have been conducted since last August as part of the Connected Vehicle Safety Pilot. These clinics were held at six different locations across the United States (starting with the Michigan International Speedway) and used 24 vehicles that were driven by 112 participants at each clinic. Farid also discussed the focus groups that were conducted at each location and consisted of 16 participants. Further deployment testing will be conducted in Ann Arbor, with the same 24 vehicles used in the clinics as well as an additional 48 vehicles (64 in total).

After a break, Matt Smith, MDOT's Statewide ITS Program Manager, discussed features of the 2011 ITS World Congress and other previous ITS World Congresses, highlighting positive and negative features. He then led discussion as other attendees discussed their experiences and suggestions for planning the 2014 ITS World Congress in Detroit. The meeting closed with Michelle Mueller of MDOT and Steve Kuciemba of Parsons Brinkerhoff presenting the vision for the 2014 ITS World Congress. They emphasized demonstrations in particular, specifically how the demonstrations can be integrated with other components of the event.

MICHIGAN CONNECTED VEHICLE WORKING GROUP

ATTENDANCE LIST

First	Last	Organization	Email
Farid	Ahmed-Zaid	Ford and CAMP	fahmedza@ford.com
Bill	Ball	Merriweather Advisors	bill.ball@comcast.net
Dick	Beaubien	Hubbell, Roth & Clark	dbeaubien@hrc-engr.com
Debby	Bezzina	UMTRI	debbybezzina@aol.com
Valerie	Brugeman	CAR	vbrugeman@cargroup.org
Frank	Carrier	Carrier & Gable	frankcarrier@carriergable.com
Kurt	Coduti	MDOT	codutik@michigan.gov
Steve	Cook	MDOT	cooks9@michigan.gov
Joshua	Cregger	CAR	jcregger@cargroup.org
Lou	Davenport	URS Corporation	lou.davenport@urs.com
Danielle	Deneau	Road Comission for Oakland County	ddeneau@rcoc.org
Dave	Dobson	Proxim Wireless	ddodson@proxim.com
Paul	Eichbrecht	VIIC	peichbrecht@yahoo.com
James	Glover	ParkingCarma	jglover@parkingcarma.com
Shari	Herman	Siemens	shari.herman@siemens.com
Qiang	Hong	CAR	qhong@cargroup.org
James	Ito	Fujitsu Ten	jito@mio.ten.fujitsu.com
Matt	Junak	HNTB	mjunak@hntb.com
Kevin	Kelly	Michigan International Speedway	kkelly@mispeedway.com
Matt	Klawon	URS Corporation	matt.klawon@urs.com
Greg	Krueger	SAIC	gregory.d.krueger@saic.com
Steve	Kuciemba	Parsons Brinckerhoff	kuciemba@pbworld.com
Marty	Lontz	MDOT	lontzm@michigan.gov
Scott	McCormick	Connected Vehicle Trade Association	sjm@connectedvehicle.org
Michele	Mueller	MDOT	muellerm2@michigan.gov
Theresa	Petko	URS Corporation	theresa.petko@urs.com
Gary	Piotrowicz	Road Comission for Oakland County	gpiotrowicz@rcoc.org
Ralph	Robinson	UMTRI	ralphrob@umich.edu
Scott	Shogan	Parsons Brinckerhoff	shogan@pbworld.com
Matt	Smith	MDOT	smithm81@michigan.gov
Jason	Stribiak	Parsons Brinckerhoff	stribiakjj@pbworld.com
Bill	Tansil	MDOT	tansilw@michigan.gov
Richard	Wallace	CAR	rwallace@cargroup.org
Rick	Warner	ParkingCarma	rwarner@parkingcarma.com
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Hongwei	Zhang	WSU - Wayne State University	hongwei@wayne.edu

MICHIGAN CONNECTED VEHICLE WORKING GROUP

PRESENTATIONS

Michigan
Connected Vehicle Working Group

MDOT Taylor TSC

January 30, 2012

Agenda for This Morning

1. Welcome and Introductions
2. Briefing on policy work being conducted by the Vehicle Infrastructure Integration Consortium, Paul Eichbrecht, VII-C
3. Briefing on V2V Driver Safety Clinics, Farid Ahmed-Zaid, Ford and CAMP
   - Kevin Kelly, MIS, will participate in the Q&A

- BREAK

4. Lessons learned at ITS World Congress 2011, Matt Smith, MDOT
5. Working Task: What did you see at ITS World Congress 2011?
6. Vision for 2014 ITS World Congress, Michelle Mueller, MDOT, and Steve Kuciemba, PB

Working Group Mission

- Cooperatively pursue projects and other activities that are best accomplished through partnerships between multiple agencies, companies, universities, and other organizations and that ultimately advance Michigan's leadership position in connected vehicle research, deployment, and operations.
  - Benefit our state and our industry (automotive and more)
  - Enhance safety and mobility in Michigan and beyond

Since Last Meeting (Sept. 2011)

- 2011 ITS World Congress in Orlando has happened
  - Attention turns to Detroit for 2014
- V2V Driver Clinics nearly completed
- V2V Safety Pilot Model Deployment making progress
- Transportation featured heavily in Gov. Snyder's State of the State
  - New bridge to Canada still being pursued
  - Possible infusion of additional infrastructure funding
- 2012 NAIAS appears to have been a great success
  - Largest crowd since 2005!
  - CES had good automotive representation, too

Upcoming Connected Vehicle Events in Michigan

- Automotive Megatrends USA 2012
  - Jan. 31-Feb. 2, The Henry, Dearborn (Safety on Jan. 31 and Connectivity on Feb. 1)
- V2X for Auto Safety & Mobility USA 2012
  - March 20-21, Baronette Renaissance, Novi
- ITS Michigan Annual Meeting and Exhibition
  - May 30, Ford Conference & Event Center, Dearborn
  - ITS American Annual Meeting, May 21-23, National Harbor, MD
- Michigan Connected Vehicle Working Group
  - Planning for April, July, and October (volunteer hosts needed)
- CAR Management Briefing Seminars
  - Aug. 6-9, Grand Traverse Resort and Spa, Acme (Connectivity on 6th)

Michigan Connected Vehicle Work Group Meeting

VIIC Policy Review

Moving from Research to Deployment

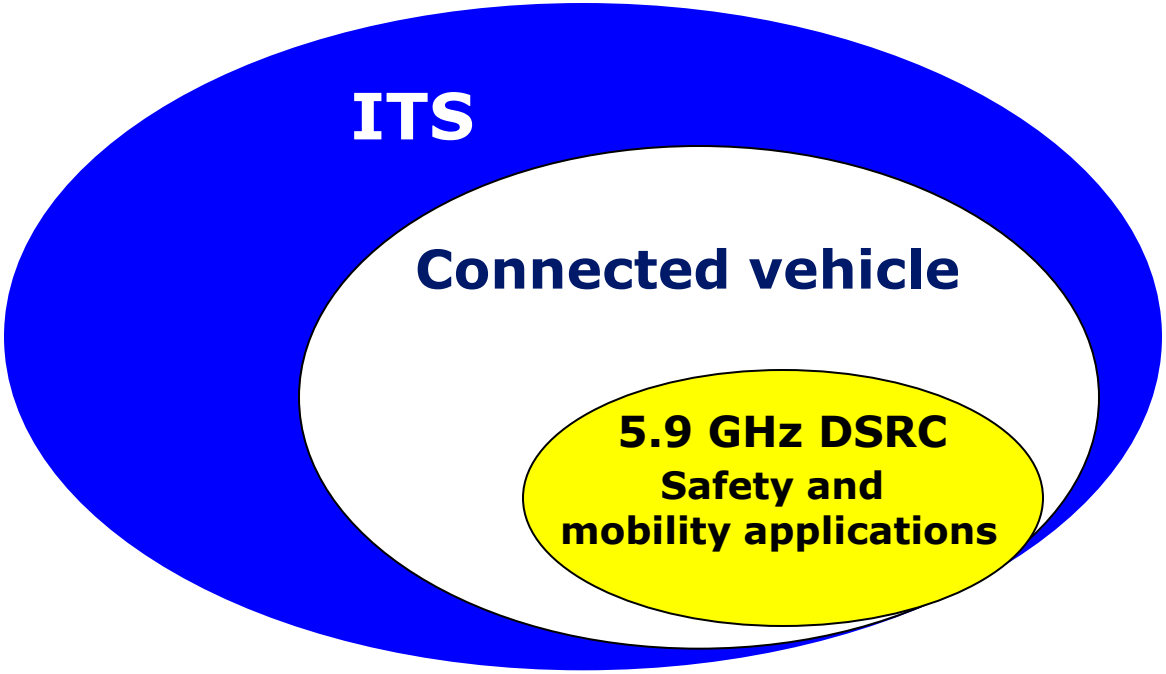
January 30, 2012

VII Consortium (VIIC) – Who We Are

Industry consortium (Michigan 501 (c6) non-profit) consists of nine light-duty vehicle manufactures.

VIIC Focus Within the Connected Vehicle Initiative

The Connected Vehicle initiative encompasses a wide range of evolving technologies developed by many government, industry, and academic partners. The VIIC is primarily focused on policy matters associated with deployment of cooperative safety and mobility applications based on 5.9 GHz DSRC.*



*Dedicated Short Range Communication

Presentation Outline

Task 13 – General Policy Work

Task 14 – Aftermarket Safety Devices

W.O. 15 – Harmonization of Standards

Task 13

General Policy

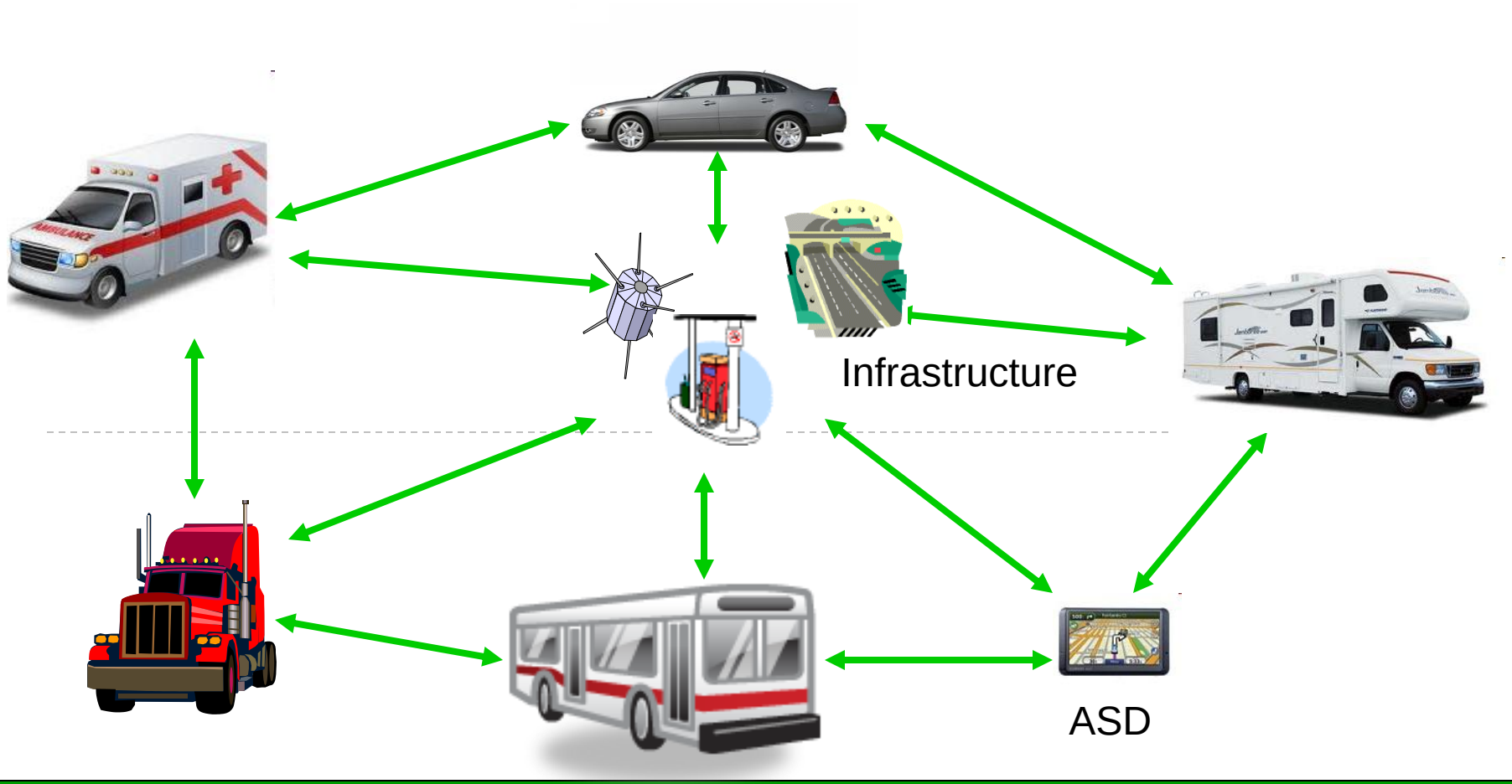
From Research to Deployment

In addition to end user acceptance, certain conditions are necessary for successful deployment:

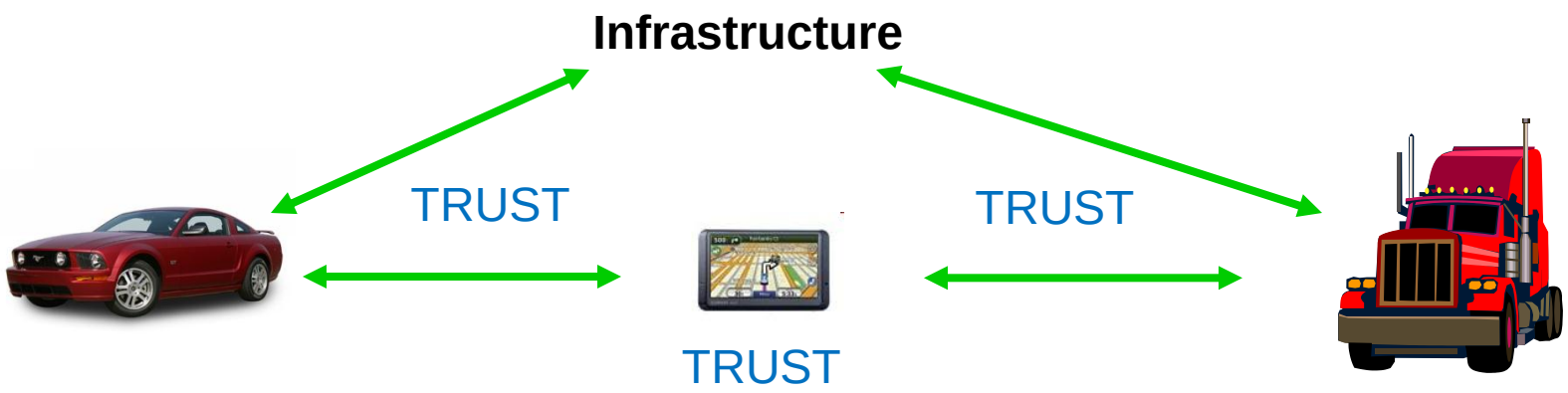
- National and coordinated roll-out of vehicles and infrastructure
- Private and secure DSRC network providing for controlled vehicle/data access
- Long-term commitment from USG for deployment
- Acceptable federal governance structure (incl. rules of use, operations, and access)
- Liability and intellectual property issues addressed through federal policy

Key Enabler - Interoperability

DSRC communications among vehicles, roadways and devices



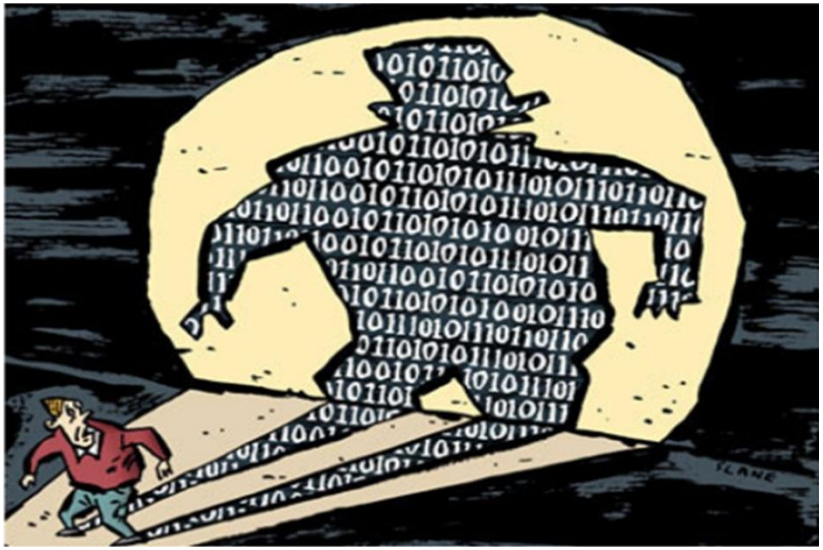
Key Enabler - Security



Messages to/from Vehicles, Devices and the Infrastructure must be trustworthy

- Autonomous vehicle safety applications depend upon sensor data from within the same vehicle
- Cooperative safety and mobility applications depend upon data from other vehicles and from the infrastructure
- This data must be trustworthy in order for a cooperative system to work

Key Enabler - Privacy



Drivers must also find the system acceptable

- Goal 1: Protect vehicle/data integrity while preserving vehicle and occupant anonymity for all mandatory services. It must be possible for people to travel in their private vehicles without being tracked, therefore mandatory services must be rendered anonymously

- Goal 2: Protect personally-identifiable information exchanged as part of opt-in services Opt-in services that collect personally-identifiable information must adhere to use limits and fair information practices

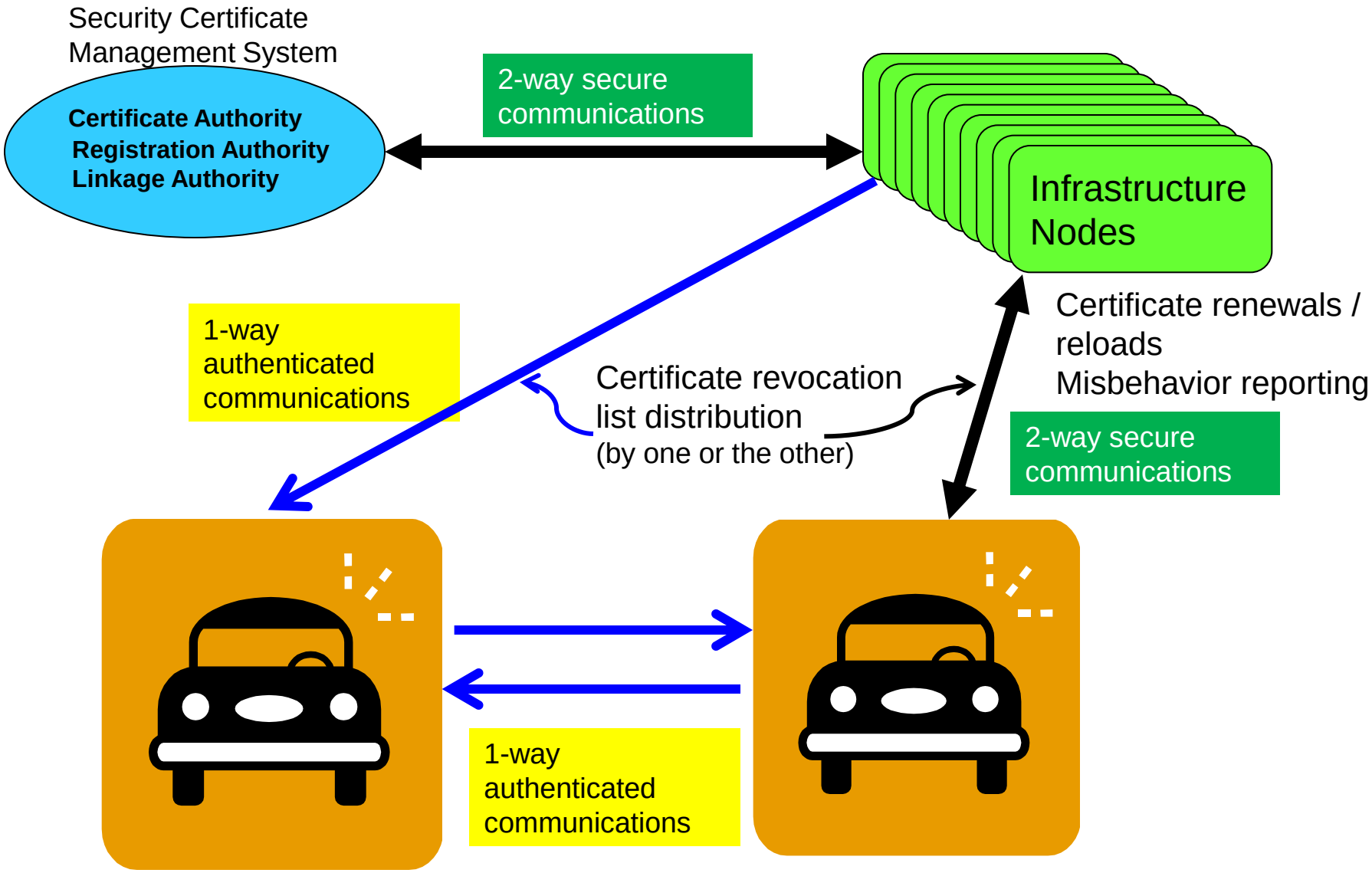
Security Design Balance

Safety

Privacy

Security

Recommended Basic Security Configuration



Security System: Privacy by Design and Policy

Included in CAMP Prototype Security System

- **Anonymity** for mandatory services
  - Data collected, disclosed, or used does not identify or relate to an individual
- **Non-Trackability** for mandatory services
- **Protection from Attacks** on System Integrity
  - Prevent system administrators and/or system hackers from mis-using, manipulating or de-constructing the security certificate management system in ways that could undermine anonymity and/or enable vehicle tracking
- **Prevention of Unauthorized Access** to Personally Identifiable Information (PII)

Will need to be implemented in deployed Security System

- **No User Fees** for mandatory services
- **Stable, Long-term** Policy and Technology with backward compatibility (decades rather than years)

VIIC Member Key Policy Issues

Security and Privacy

Risk/Liability/Intellectual Property (IP)

Harmonization – global standards

Vehicle, Device, and Data Access issues

DSRC Device Validation/Authentication

Governance and Funding

Spectrum Analysis

Other Key Task 13 Policy Issues

Risk Management: How will liability be addressed, given that safety outcomes depend on multiple actors in the public and private sectors? How can patent issues (IP) that are embedded in standards be resolved if/when they are included in a future regulation?

Data Access: How will vehicles be protected from unmediated third-party access? Can we avoid the issue of "ownership" for certain classes of data (e.g., anonymous probe data)? How to address data access issues throughout the chain of custody: from source to end user?

Device Certification: Who will develop and implement DSRC crash avoidance safety device and equipment certification procedures? Who will develop and implement DSRC non-safety device and equipment authentication procedures in the absence of government regulation?

Governance and Funding: Who will authorize, finance and implement the DSRC infrastructure and network?

Spectrum Analysis: Is a Spectrum Manager required to coordinate and enforce use of the channel? What actions are needed to protect the spectrum from reallocation or unlicensed use?

Task 14

Aftermarket Safety Devices

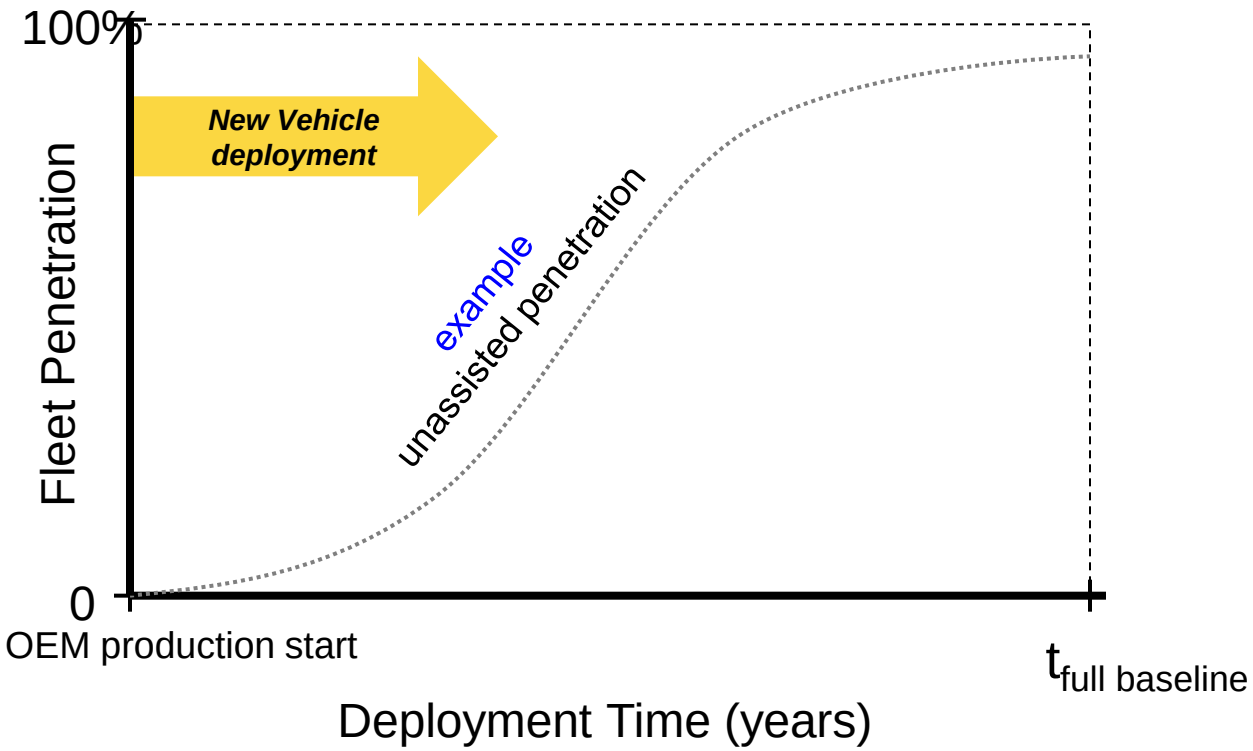
Task 14 Program of Work

The purpose of the Task 14 Aftermarket Device Research is to explore the deployment and policy implications of introducing 'aftermarket devices' to further accelerate the realization of potential V2V and V2I benefits.

- Subtask 1 – Literature Review
- Subtask 2 - Impact Assessment on Deployment and Policy Factors
- Subtask 3 – Potential Benefits Analysis

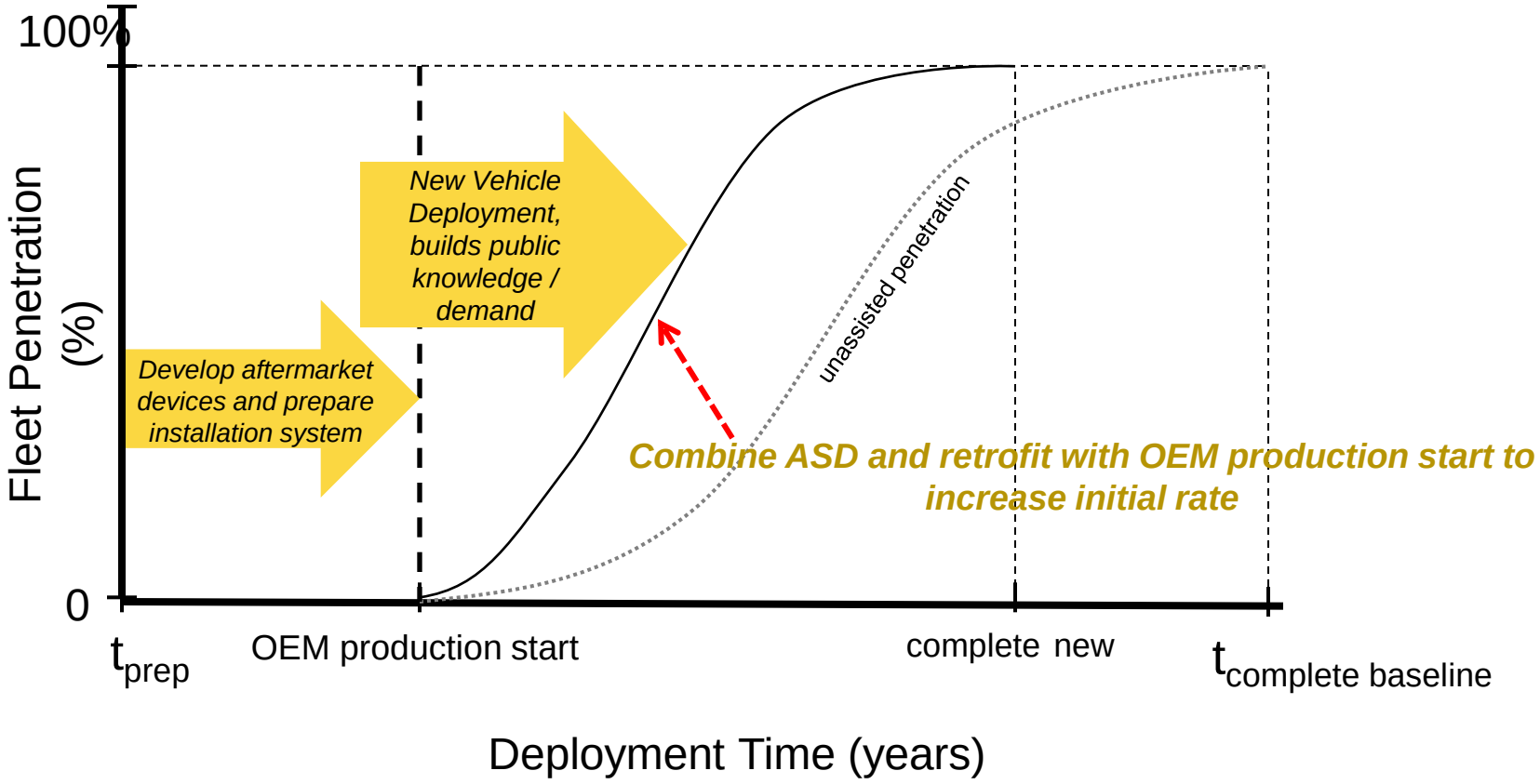
Standard Fleet Deployment

VIIC is examining how different retrofit or aftermarket device deployment strategies might increase penetration rate and the resulting system benefits.



Accelerating Deployment

Potential for retrofit or aftermarket device deployment to increase penetration rate and the resulting system benefits.



Impact of ASD Key Policy Issues

The Key ASD Policy Issues were identified and restated as questions which should be addressed and mapped into the current USDOT Safety Policy Research Tracks

USDOT Safety Policy Research Tracks

ASD Key Issues

	Communication Security & Infrastructure	Certification	Spectrum Analysis	Risk Allocation & Liability	Governance
Cost / Benefit Allocation	✓	✓	✓	✓	✓
Product Development & Validation	✓	✓	X	✓	✓
Vehicle Network Access	✓	✓	X	✓	✓
Installation & Maintenance	✓	✓	X	✓	✓
Liability & Immunity	X	✓	X	✓	✓
Certification & Trust	✓	✓	✓	✓	✓

ASD Benefit Analysis Interaction Matrix

Number of core safety functions available

What I Meet / Who I Am	VAD	INT	INT-S	ASD-U	ASD-C	OEM
VAD	0	0	0	0	0	0
ASD-U	7	2	5	7	8	8
ASD-C	8	2	5	8	9	9
OEM	8	2	5	8	9	9

Note: the number in each cell represents a count of the core safety functions expected to be available to the driver of the 'who I am' vehicle for a given encounter, not the relative benefit since each of these functions do not address equal safety benefit opportunities.

V2X Core Safety Application Relevance

Decisions regarding the specific high priority applications for ASDs cannot be made until the relative safety benefit (applicability, effectiveness, etc.) of each function is estimated

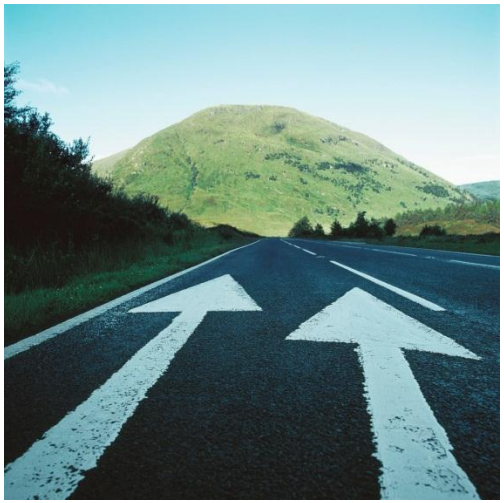
Crash Frequency from USDOT HS 811-381 Table D2	*V2X Application Relevance (X = may apply, blank = no relevance)*											
PRE CRASH SCENARIO	BSW	LCW	FCW	CLW	EEBL	IMA / SSM	DNPW	SSVW	TSVW	BMW	HMA	***Application Relevance to Host Vehicle equipped with an Unconnected ASD receiving a Well Formed Basic Safety Message***
Control loss/vehicle action				X								This means an unconnected ASD receives a signal from an integrated system
Control loss/no vehicle action												
Running red light									X			
Running stop sign								X				
Road Edge Departure/maneuver												
Road Edge Departure/no maneuver												IMO, This is drifting out of the lane/road and V2X does not help here
Pedestrian / maneuver												
Pedestrian / no maneuver												
Backing into vehicle												
Parking/same direction												
Turning/same direction	X	X										
Changing lanes/same direction	X	X								X	X	
Drifting/same lane												
Opposite direction/maneuver							X					
Opposite direction/no maneuver												
Rear-end/striking maneuver			X									
Rear-end/LVA			X									
Rear-end/LVM			X									
Rear-end/LVD			X		X							
Rear-end/LVS			X									
LTAP/OD @ signal						X						This means an expansion of the currently limited IMA application, but that is ok
LTAP/OD @ non signal						X						This means an expansion of the currently limited IMA application, but that is ok
Turn right @ signal						X						This means an expansion of the currently limited IMA application, but that is ok
SCP @ non signal						X						This means an expansion of the currently limited IMA application, but that is ok
Turn @ non signal						X						This means an expansion of the currently limited IMA application, but that is ok
Rollover												For unconnected ASD, this will be difficult. Also, does this address roll-over due to road depa
Object Contacted / maneuver												
Object Contacted / no maneuver												
Other - Rear-end												
Other - Sideswipe												
Other - Turn Across Path												
Other - Turn Into Path												

Work Order 15

Connected Vehicle Technical Standards Harmonization

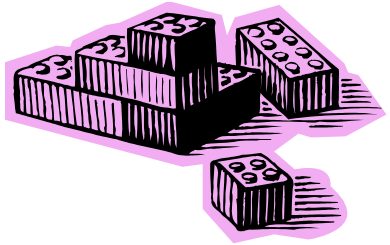
Road to Harmonization Success

- Clearly stated objectives – not everything can or needs to be harmonized
- Reach global industry consensus on reasonable objectives
- Identify and define *minimum* necessary standards work to enable harmonization objectives
- Build *political and policy* support for those objectives
- Assess likelihood for global acceptance of harmonized standards



Initial Political Foundation

- European Commission standardization mandate with European community – Brussels, 6th October 2009
- European Union (EU)-U.S. Joint Declaration of Intent on Research Cooperation in Cooperative Systems – Washington, D.C, 13th November 2009
- U.S.-Japan MLIT agreement signed in 2010 to promote collaboration in the field of Intelligent Transport Systems
- EU-Japan MLIT Memorandum of Cooperation Concerning Cooperative Systems in ITS



High-level Harmonization Objectives

- Ultimate goal: “Tested once, accepted everywhere”
- Ideal objective: Allow a manufacturer to efficiently design, engineer, test and build a single design or product which can be marketed internationally
- Practical objectives
  - Base voluntary technical standards and core policies for DSRC on low-latency, crash-avoidance safety applications
  - Systems deployed in different regions to be designed so that they could support the requirements for such applications (even if not initially configured for these applications)

Consistent Industry Position

Sufficient technical standards compatibility to enable individual vehicle and device manufacturers to use common hardware

- Over-the-air data elements* with minimum performance specifications for cooperative crash avoidance applications
- Common strategy for message security
- Common strategy for message congestion management
- Harmonized test procedures for device/component level validation of devices used for safety applications
- Joint inventory of other message sets

* Basic Safety Message (BSM)

Roadmap for the EU-US OEM (Böblingen) Group

Subject	Activity	Milestone
Spectrum /channels	Analyzed	Finalized
Common Hardware	Dependent on security	Spring 2012
Safety message sets	BSM-CAM/DENM finalized Performance requirements	June 2012
Congestion control	Exchange information on on-going testing and analyses and discuss recommended approach.	June 2012
Certification	Exchange of information Possible common test procedures	June 2012
Security	Analyses and evaluation Further activities towards harmonisation	End 2012
Other message sets	Comparison of SAE and European message sets to achieve a joint inventory of messages.	Sept 2012
Information	Ongoing contacts and info exchange	Ongoing

Policy Engagement in Harmonization

- Strategic policy foundation and engagement support acceptance/use of harmonized standards

- Recognize that policies among jurisdictions often will remain different
  - Minimize unnecessary burdens/complexity in implementation schemes by various jurisdictions
  - Jointly assess technical/institutional implications of policy approaches
  - Raise recognition of potential negative impact on free trade and loss of potential consumer benefits if no harmonization

Concluding Thoughts

- General Policy Work
  - Security/privacy crucial for DSRC deployment
  - Substantial work remains to build policy foundation in additional key areas as well: risk/liability/IP, harmonization, data access, device validation, governance and funding, and spectrum analysis
- Aftermarket Safety Devices
  - Could help accelerate benefits achievement
  - Decisions regarding the specific high priority applications for ASDs cannot be made until the relative safety benefit (applicability, effectiveness, etc.) of each function is estimated
- Technical Standards Harmonization
  - "Tested once, accepted everywhere" / One design that a vehicle OEM can market internationally would be the ideal outcome
  - OEM harmonization priorities and practical objectives/goals identified and standards harmonization efforts underway
  - Both technical and strategic policy foundation/engagement are necessary for harmonization success

Thank You

CAMP

Vehicle Safety Communications 3

Mercedes-Benz Research & Development North America, Inc.

GM

TOYOTA

HONDA Honda R&D Americas

Ford

NISSAN

HYUNDAI·KIA MOTORS Hyundai·Kia America Technical Center, Inc.

VOLKSWAGEN GROUP OF AMERICA

Intelligent Transportation Systems

V2V Driver Acceptance Clinics

MICHIGAN CONNECTED VEHICLE WORKING GROUP

January 30, 2012

Farid Ahmed-Zaid – Ford Motor Company

V2V Light Vehicle Driver Acceptance Clinics (DAC) Project

- Obtain feedback on connected vehicle technology and safety applications from a representative sample of drivers
- Assess V2V safety system performance and reliability (especially 5.9 GHz DSRC & GPS) across a wide variety of environments and diverse geographic locations, and…

- Promote V2V-based safety technology and its potential safety benefits

V2V DAC Project Team

CAMP

Vehicle Safety Communications 3

Mercedes-Benz Research & Development North America, Inc.

GM

TOYOTA

HONDA Honda R&D Americas

Ford

NISSAN

HYUNDAI·KIA MOTORS Hyundai·Kia America Technical Center, Inc.

VOLKSWAGEN GROUP OF AMERICA

Intelligent Transportation Systems

DEPARTMENT OF TRANSPORTATION UNITED STATES OF AMERICA

NHTSA www.nhtsa.gov

U.S. Department of Transportation Federal Highway Administration

DENSO North America

RITA Research and Innovative Technology Administration Volpe National Transportation Systems Center

VirginiaTech Transportation Institute

AUTOMOTIVE EVENTS

DAC Project: Two Main Components

Driver Acceptance Clinics

- 2 dry runs (MIS) and 6 clinics
  - Naïve drivers in controlled environment
  - 112 subjects per clinic evenly divided across three age brackets

System Performance Testing

- DSRC performance and system reliability testing near each location
  - Trained drivers on public roads
  - Diverse geographic locations
  - Approximately 20,000 miles of test data

Driver Acceptance Clinics Location Map

Driver Acceptance Clinics – Vehicles

- 24 total / 3 vehicles per OEM
  - 16 DAC vehicles
  - 8 OEM template vehicles

Driver Vehicle Interface (DVI) Examples

- **DVIs: visual cues, audible tones and haptic seats**
- **Based on unique OEM designs**

DAC V2V Safety Applications - per OEM

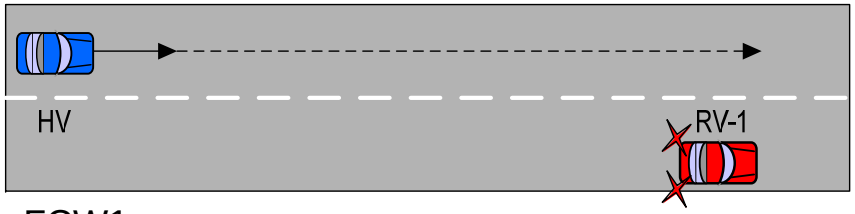
Application \ OEM	Ford	GM	Honda	Mercedes	Toyota	Hyundai - Kia	Nissan	VW-Audi
EEBL	X	X	X	X	X			X
FCW	X	X	X	X		X	X	X
BSW / LCW	X	X	X	X	X	X	X (BSW)	
DNPW	X	X	X					
IMA	X	X	X	X	X			X
LTA							X	

EEBL: Emergency Electronic Brake Lights
FCW: Forward Collision Warning
BSW/LCW: Blind Spot Warning/Lane Change Warning
DNPW: Do Not Pass Warning
IMA: Intersection Movement Assist
LTA: Left Turn Assist

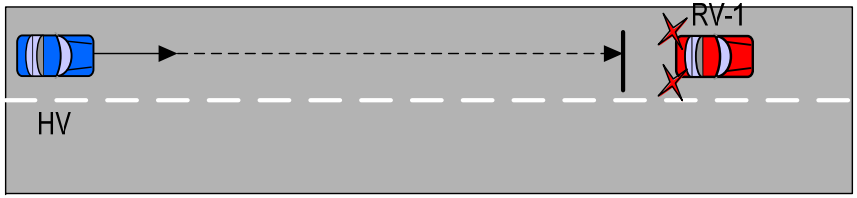
V2V Safety Applications Scenarios – (1/3)

FCW

HV: Host Vehicle (driven by participant)
RV: Remote Vehicle (threat vehicle)



FCW1



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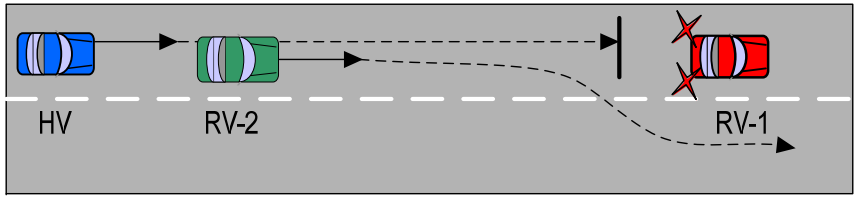

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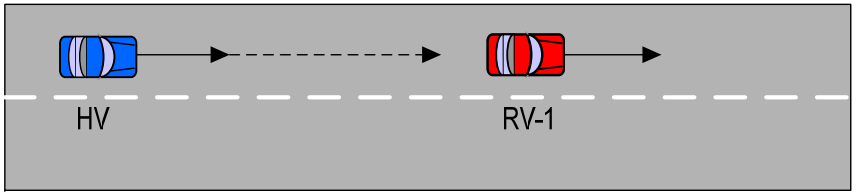

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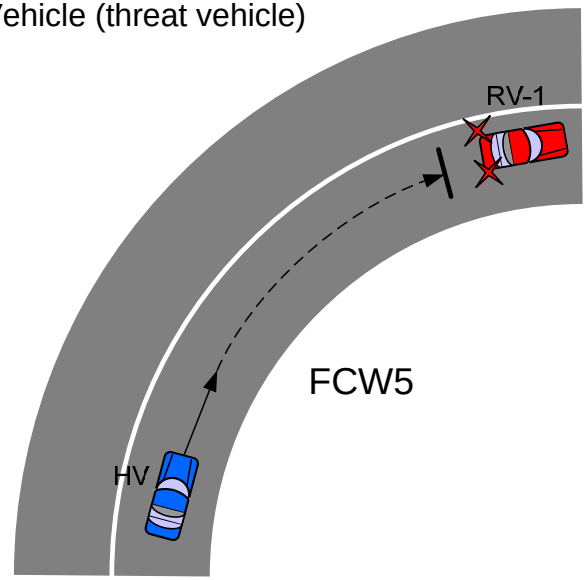
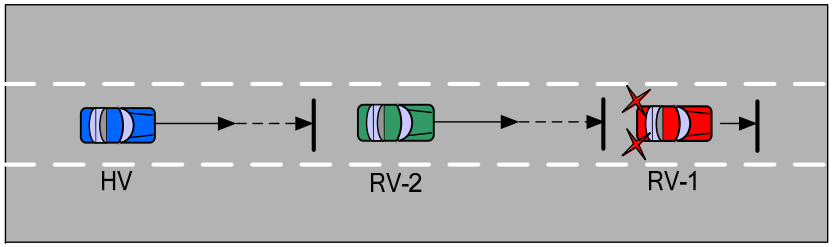


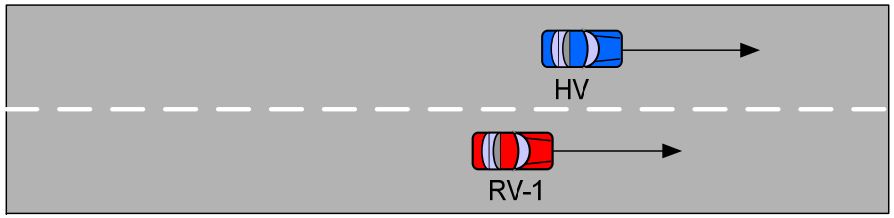
FCW5

EEBL

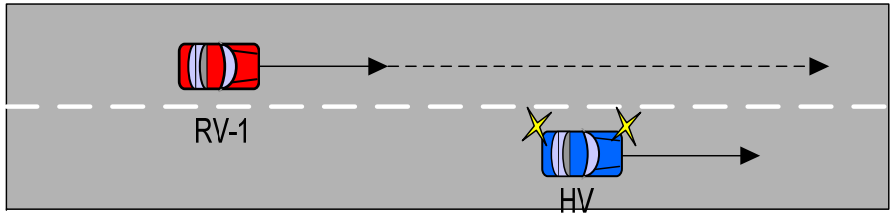


V2V Safety Applications Scenarios – (2/3)

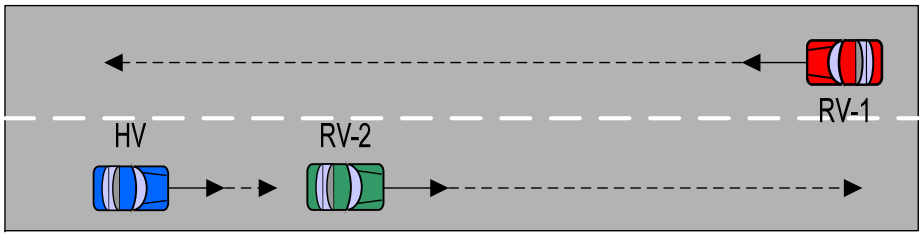
BSW



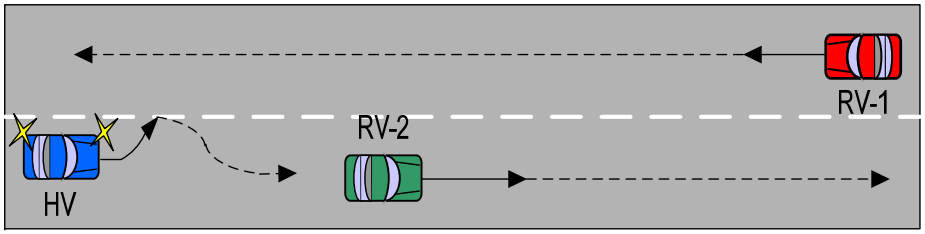
LCW



DNPW



DNPW1

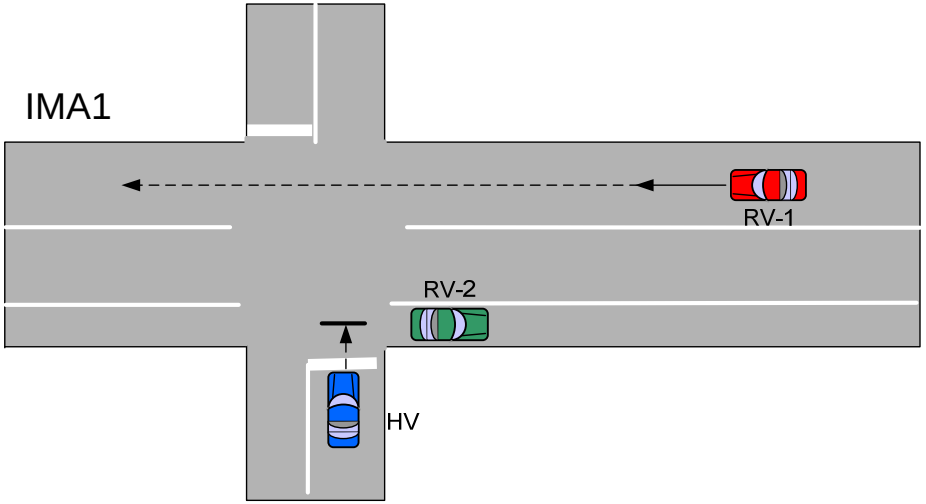


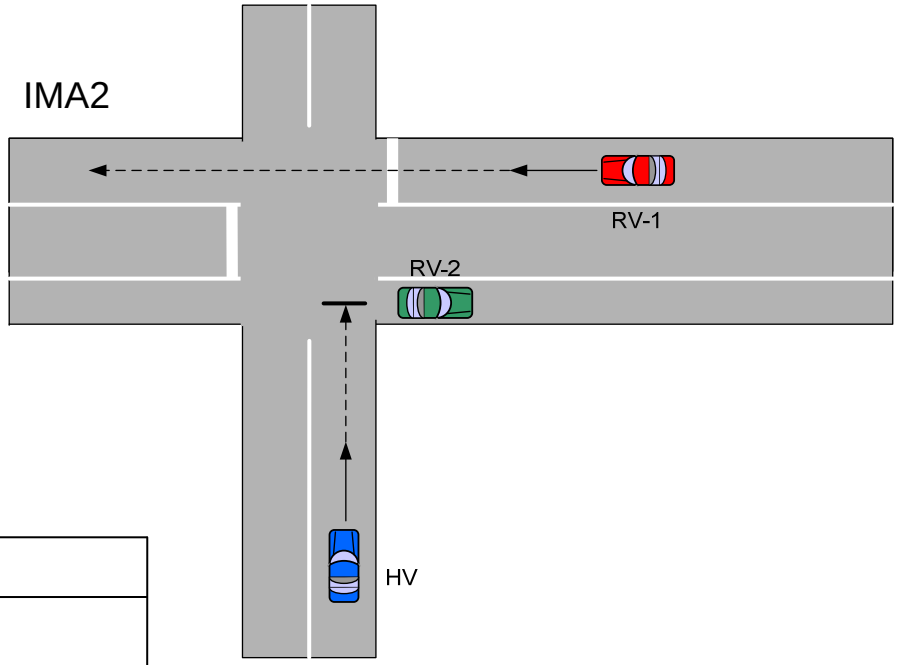
DNPW2

HV: Host Vehicle (driven by participant)
RV: Remote Vehicle (threat vehicle)

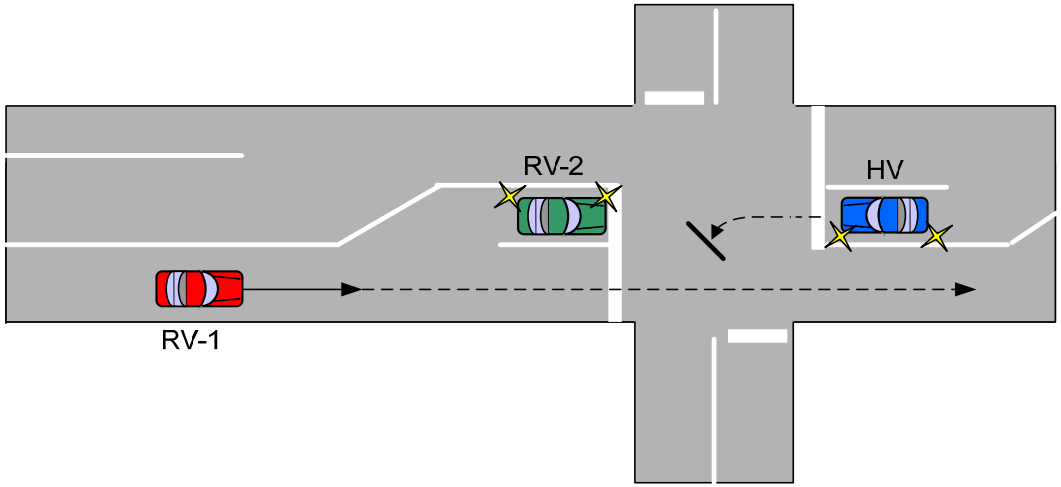
V2V Safety Applications Scenarios – (3/3)

IMA





LTA

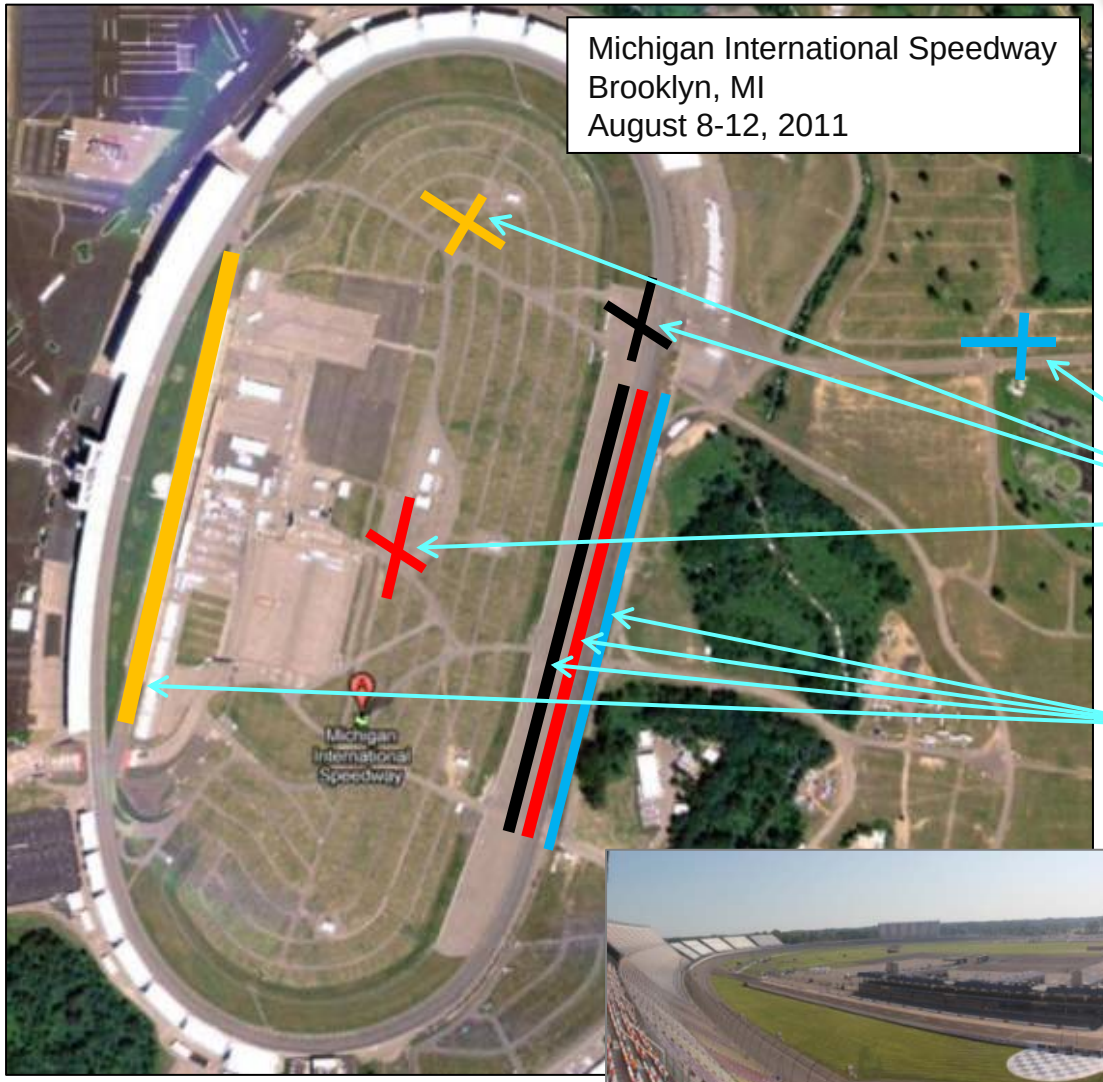


HV: Host Vehicle (driven by participant)
RV: Remote Vehicle (threat vehicle)

Safety Feature Exposure

- 112 participants over a 4 day period
- Typically, 4 sessions per day at 8 participants each
- Participants are:
  - Equally split by gender
  - Equally split into three age categories (20-30, 40-50, 60-70)
- Participants experience each V2V safety feature
- After each exposure the experimenter asks a series of questions
  - Captures their immediate impressions
  - Safety Application Effectiveness
  - Relevance of Driver Vehicle Interface (DVI)
- Focus Groups

Example Station Layout
DAC 1 - MIS



Station 1 – GM & Ford
Station 2 – Honda & M-B
Station 3 – VW & Nissan
Station 4 – Hyundai & Toyota

Intersection Scenario Locations

Straightaway Scenario Locations

Example Stations - DAC 1 @ MIS

Example Stations - DAC 1 @ MIS

System Performance Testing - Overview

Purpose

Assess system performance and reliability in diverse geographic regions of the country under real-world conditions in both rural and urban locations

Approach

- Collected 8+ hours of V2V and GPS data per vehicle at each DAC location
- Used 8 similarly-equipped OEM engineering template vehicles, equipped with Data Acquisition system (including forward video scene)
- Split vehicle fleet into two groups of 4 vehicles, driving same of similar routes
- Driving routes were designed to capture a representative set of roads used by an average driver over a lifetime

Performance Metrics

- GPS solution availability and quality
- Relative GPS positioning error
- Communications Performance
- Application Level Performance

Open Road Testing - Environment Selection

Freeway Open Sky

Major Throughway

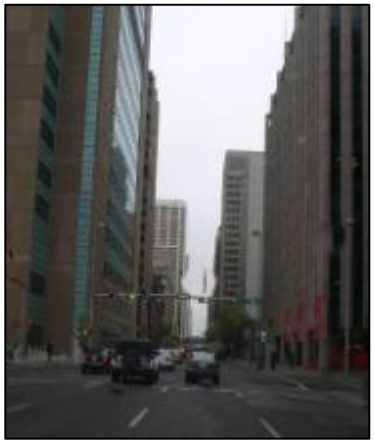
Local Roads – Tree Cover

Mountains

Table 7-1: Data Collection Summary

Category	Time collected	%
Deep Urban	1:39:54	3.7%
Major Urban Thruway	9:50:03	21.8%
Major Rural Thruway	8:40:09	19.2%
Major Road	8:10:40	18.1%
Local Road	6:30:48	14.4%
Interstate/Freeway	9:04:51	20.1%
Mountains	1:08:32	2.5%
Total	45:04:57	

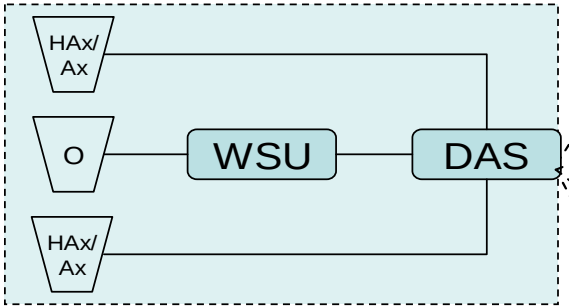
Urban Canyon



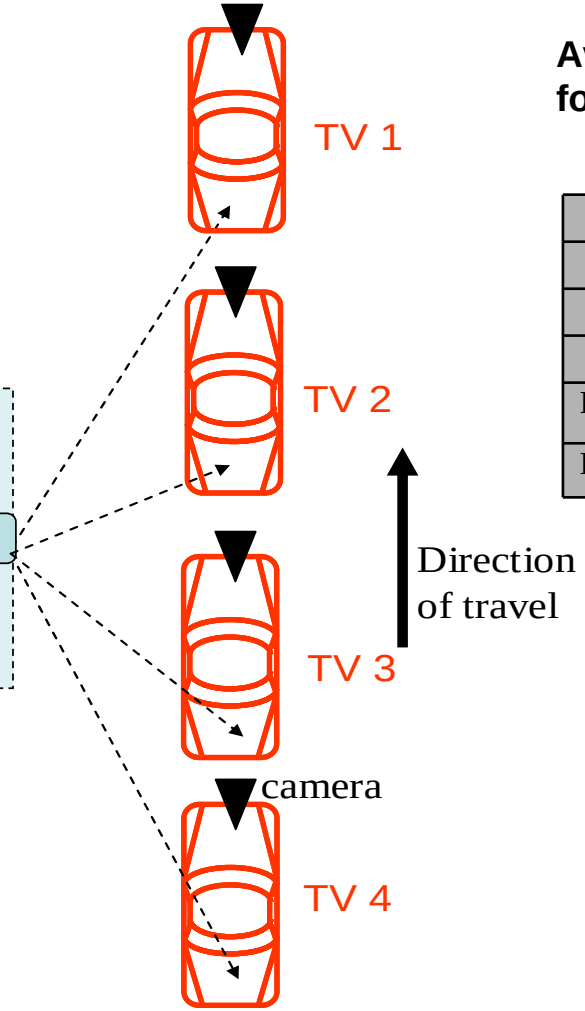
Note: Roadway environment distribution used in VSC-A relative positioning availability/accuracy study. Represents road usage of average driver [*Our Nation's Highways*, FHWA 2008].

Open Road Testing - Vehicle Configuration

Vehicles
TV = Template Vehicle



GPS Receivers
A = Automotive Grade
HA = High Accuracy



Available combinations receivers for relative error measurements

	O	A1	A2	A3	HA1	HA2
O	✓	✓	✓	✓	✓	✓
A1	✓	✓	✓	✓	✓	✓
A2	✓	✓	✓	✓	✓	✓
A3	✓	✓	✓	✓	✓	✓
HA1	✓	✓	✓	✓	✓	✓
HA2	✓	✓	✓	✓	✓	✓

Application of DAC Results

Driver Acceptance Data

- Provides data on drivers' initial impression of V2V safety applications
- Supplements the Safety Pilot Model Deployment driver acceptance data for seasoned drivers
- Required for 2013 NHTSA decision
- Does not feed into V2V Track 3 benefits estimation

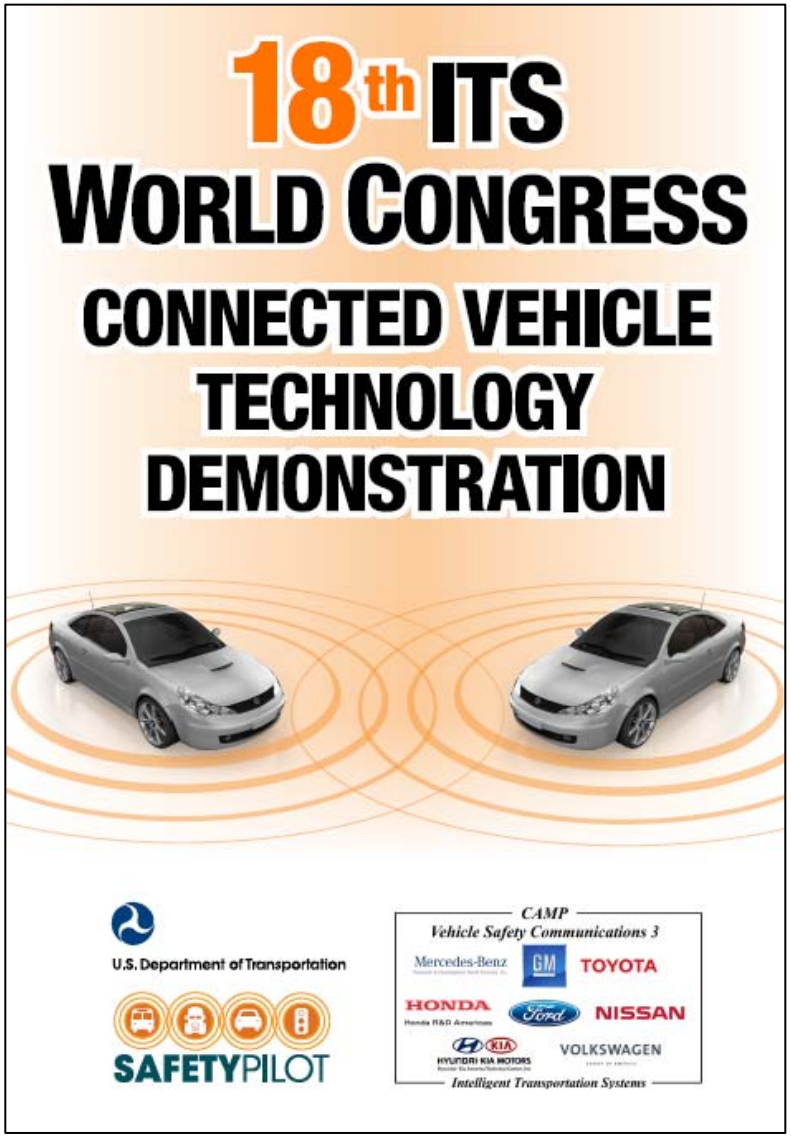
System Performance Data

- Characterizes system availability in diverse geographic locations
- Feeds into Track 3 benefits simulation

Other Key Project Elements

Connected Vehicle Technology Demonstrations

- 2011 ITS World Congress Showcase Connected Vehicle Technology Demonstration (October 17th - 20th)
  - Over 750 participants
- Industry demonstration days in DC, California and Texas



Next: Model Deployment (Ann Arbor, MI)

- Tests V2V safety systems in real-world environment on public roads
- Up to 3000 devices will be installed in participants vehicles
- Timeline: August 2012 – August 2013
- Will include cars, trucks, transit vehicles with both integrated and aftermarket devices
- Results will be used by NHTSA for 2013 light vehicle and 2014 heavy vehicle agency decision

CAMP VSC 3 Consortium Contributions to Model Deployment

- Equip a total of sixty-four (64) Light Vehicles with V2V Safety Systems (includes 16 upgraded DAC vehicles)
- Install Data Acquisition System (DAS) for data collection during Model Deployment
- Support OBE certification testing, perform safety application verification on Light Vehicles
- Support device interoperability and minimum performance testing
- Coordinate delivery of vehicles to USDOT Model Deployment Test Conductor (UMTRI) and provide engineering support

Thank-you!

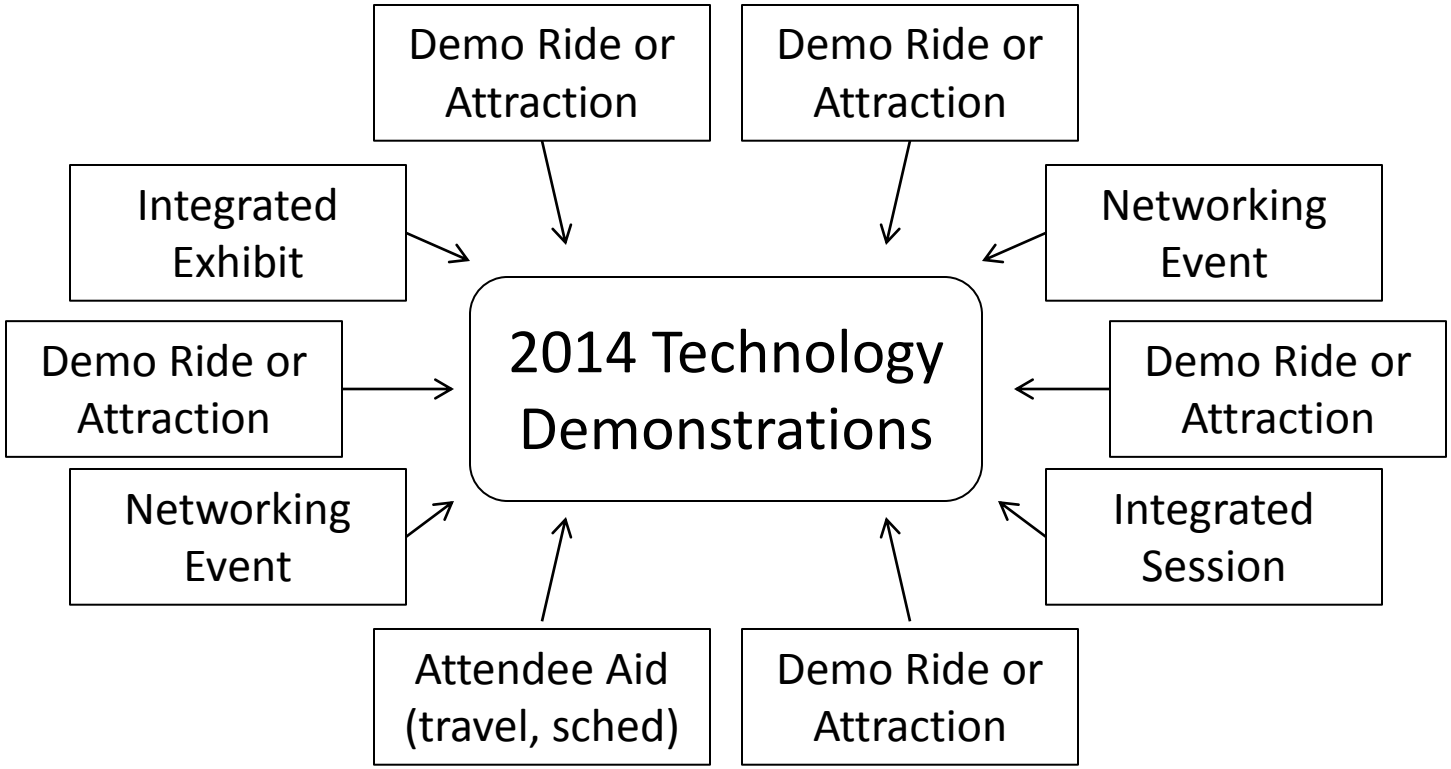
The Vision…

- Demonstrations will be…
  - Interactive, “hands-on” experiences integrated into the participant’s schedule.
    - Participant to gain more control, could be integrated with networking or program event, easy to fit into schedule
  - Experiences based not on “what can be done”, but rather “what can be effectively demonstrated”.
  - Fewer in number but more comprehensive
    - More groupings around multiple vendors/agencies, less stand-alone
  - Based on “live” data using locally deployed systems.
  - Inclusive and beneficial to a broad set of participants. Answers the question: How does this affect me?

Where are we headed?

- More refined Vision based on your needs/desires/inputs
- Action Plan
- Map out stakeholder involvement process
  - Expand reach beyond dedicated group
  - Targeted, small group interviews
- Align needs with business model
- Define distinct themes for demos
  - To reduce redundancy/overlap
  - Capture broader participant base

The 2014 ITS World Congress…



…Not Just Demos, but a *Complete Experience*