Practitioner's Orientation to Emerging Connected Vehicle, Emergency Responder In-vehicle, and Wearable Technologies

Insert Presenter Name(s)

Introduction and Orientation

- Participant Welcome
- Presenter Introduction
- Webinar Application Overview

In-vehicle and Wearable Technologies for Connected Responders

- Goals and Objectives
- Synthesis of Technologies Taxonomy Framework
- Connected Vehicle, Pedestrian, Infrastructure Demonstrations
- Call to Action

Connected Vehicle Technology Overview

- Show Video - Connected Vehicles: The Future of Transportation (7:22 minutes)

http://www.its.dot.gov/communications/media/15cv_future.htm

- A shorter, edited version is available

The Basic Safety Message

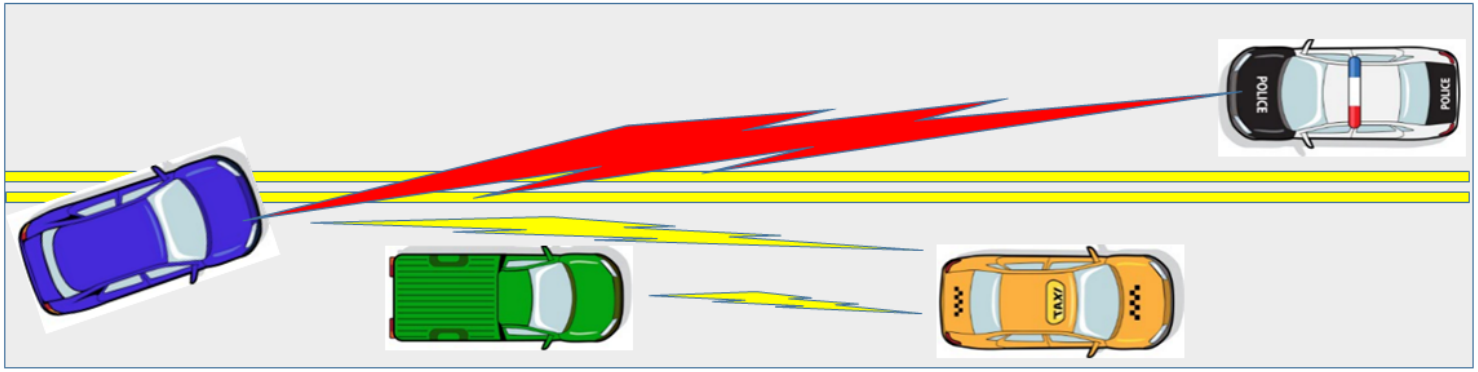
- Includes position, speed, and heading
- Normally transmitted at 10 times/sec
- Anonymous information
- Vehicles “listen” for other vehicles’ BSMs and continuously analyzes possible crash threats.
- Warnings are issued as needed

Connected Vehicles
Vehicle to Vehicle (V2V) Communications

Onboard Unit (OBU) – In-vehicle device transmits and receives Basic Safety Messages 10 times per second – determines if warning is necessary

Basic Safety Message (BSM) – Includes speed, location, and heading

Application Interface – In-cockpit device which provides warning messages to drivers



OBU from taxi transmits BSU that cab is moving slowly. OBU from blue vehicle transmits BSM that it is changing heading, potentially encroaching into pathway of police vehicle. Application Interface in police vehicle warns that blue vehicle may be encroaching into lane, while application interface in blue vehicle warns that there is an approaching vehicle (police car)

Vehicle to Vehicle (V2V) Safety Apps

Near Future

- Blind Spot Warning + Lane Change Warning
- Control Loss Warning
- Emergency Electronic Brake Light
- Emergency Vehicle Alert
- Forward Collision Warning
- Intersection Movement Assist

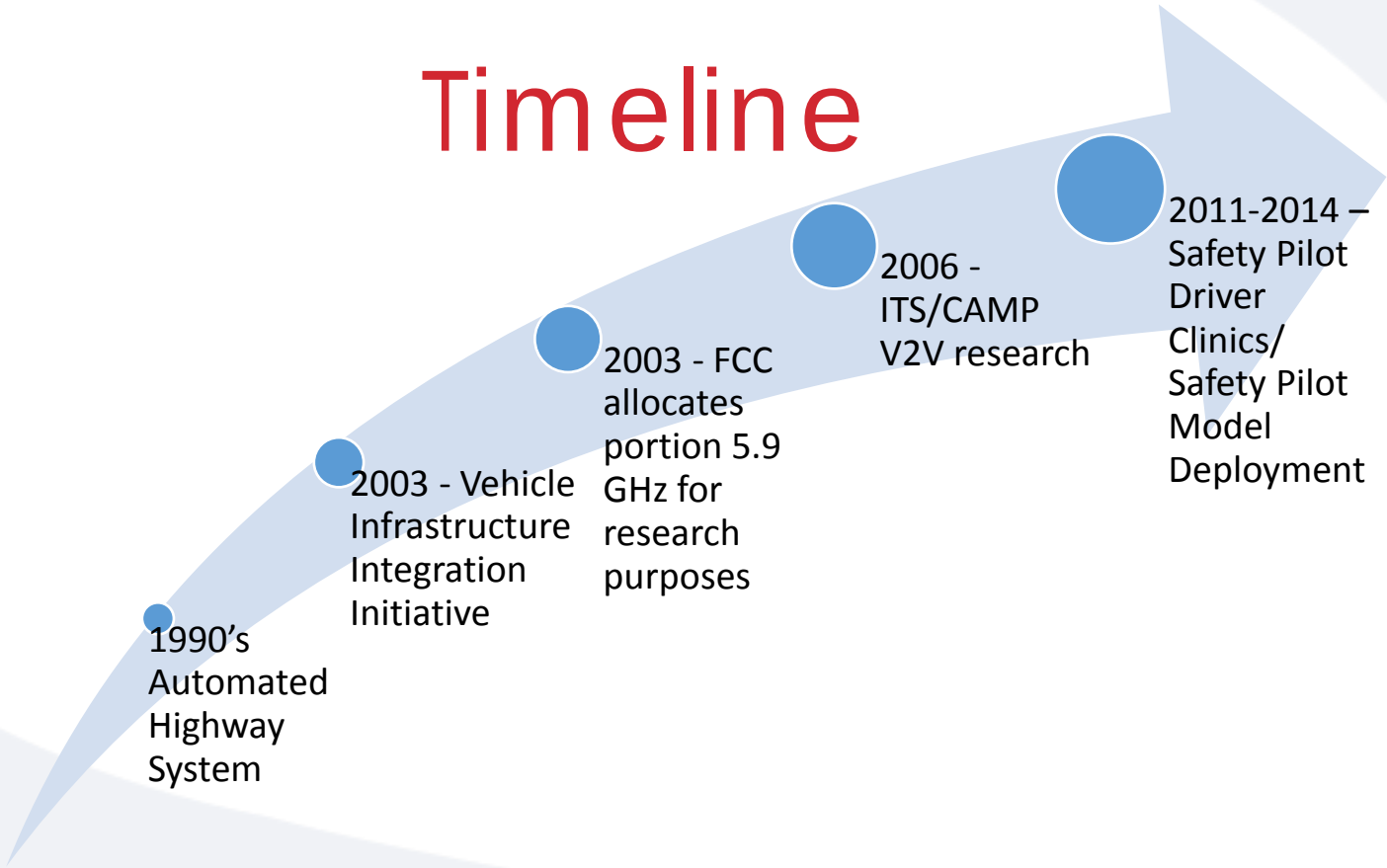
Mid to Far Future

- Do Not Pass Warning
- Motorcycle Approaching Indication International Icon
- Pre-Crash Actions
- Situational Awareness
- Slow Vehicle Warning International Icon
- Stationary Vehicle Warning International Icon
- Tailgating Advisory
- Vehicle Emergency Response

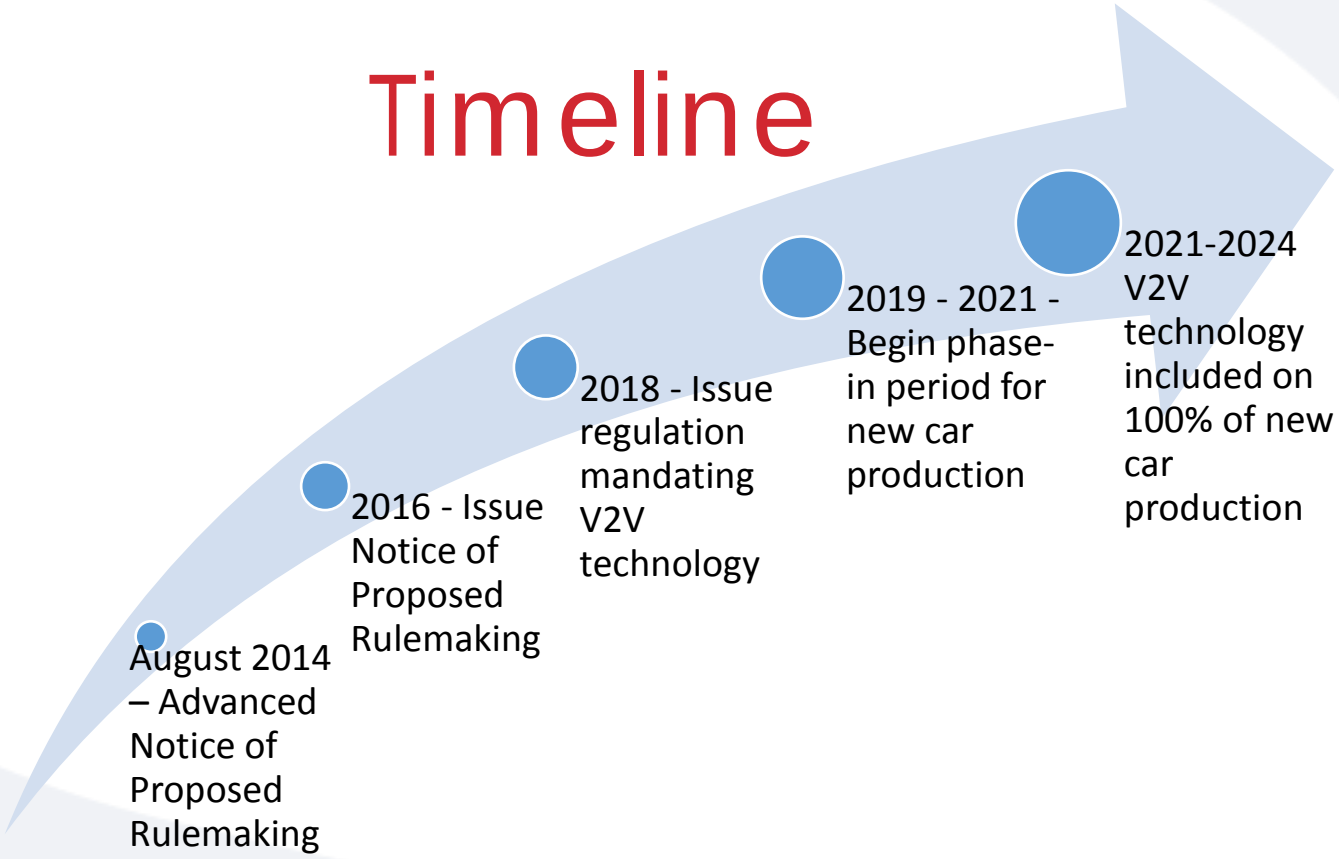
Vehicle to Infrastructure (V2I) Safety Apps

- Curve Speed Warning
- In-Vehicle Signage
- Oversize Vehicle Warning
- Pedestrian in Signalized Crosswalk Warning
- Railroad Crossing Violation Warning
- Red Light Violation Warning
- Reduced Speed Zone Warning / Lane Closure
- Restricted Lane Warnings
- Signal Preemption/Priority
- Spot Weather Impact Warning
- Stop Sign Gap Assist
- Stop Sign Violation Warning
- Warnings about Hazards in a Work Zone
- Warnings about Upcoming Work Zone

Timeline


1990's Automated Highway System
2003 - Vehicle Infrastructure Integration Initiative
2003 - FCC allocates portion 5.9 GHz for research purposes
2006 - ITS/CAMP V2V research
2011-2014 – Safety Pilot Driver Clinics/ Safety Pilot Model Deployment

Timeline


August 2014 – Advanced Notice of Proposed Rulemaking
2016 - Issue Notice of Proposed Rulemaking
2018 - Issue regulation mandating V2V technology
2019 - 2021 - Begin phase-in period for new car production
2021-2024 V2V technology included on 100% of new car production

Proposed Rulemaking

Will require vehicle-to-vehicle (V2V) communication capability for light vehicles (passenger cars and light truck vehicles (LTVs)) and create minimum performance requirements for V2V devices and messages.

Benefits of CV Technology

- Reduction of agency involved crashes
- Reduction of citizen vehicle crashes
- Reduction of secondary incidents

"NHTSA estimates that safety applications enabled by V2V and V2I could eliminate or mitigate the severity of up to 80 percent of non-impaired crashes, including crashes at intersections or while changing lanes"

The Emergency Responder In-Vehicle Technology Environment

- Safety systems
- Data collection, recording, and dissemination systems
- Limited interoperability with each other vehicle
- Benefits of integration

The Wearable Technology Environment

- Long used within emergency responder community
- Growth of body worn camera use
- New wearable technology emerging
- Integration with other technologies

ITS AMERICA

TSAG
TRANSPORTATION SAFETY ADVANCEMENT GROUP
Promoting Technology for Public Safety

What is a Taxonomy Framework?

Identify New Vehicle or Wearable Technology

Assess the Relevance and Determine the Priority for Stakeholders

Determine Feasibility and Integration Requirements

Taxonomy Framework Example

Intersection Collision Avoidance System

"Shiny Object"

Who (stakeholders), What (capabilities), and Why (operational benefit)

Structured Assessment

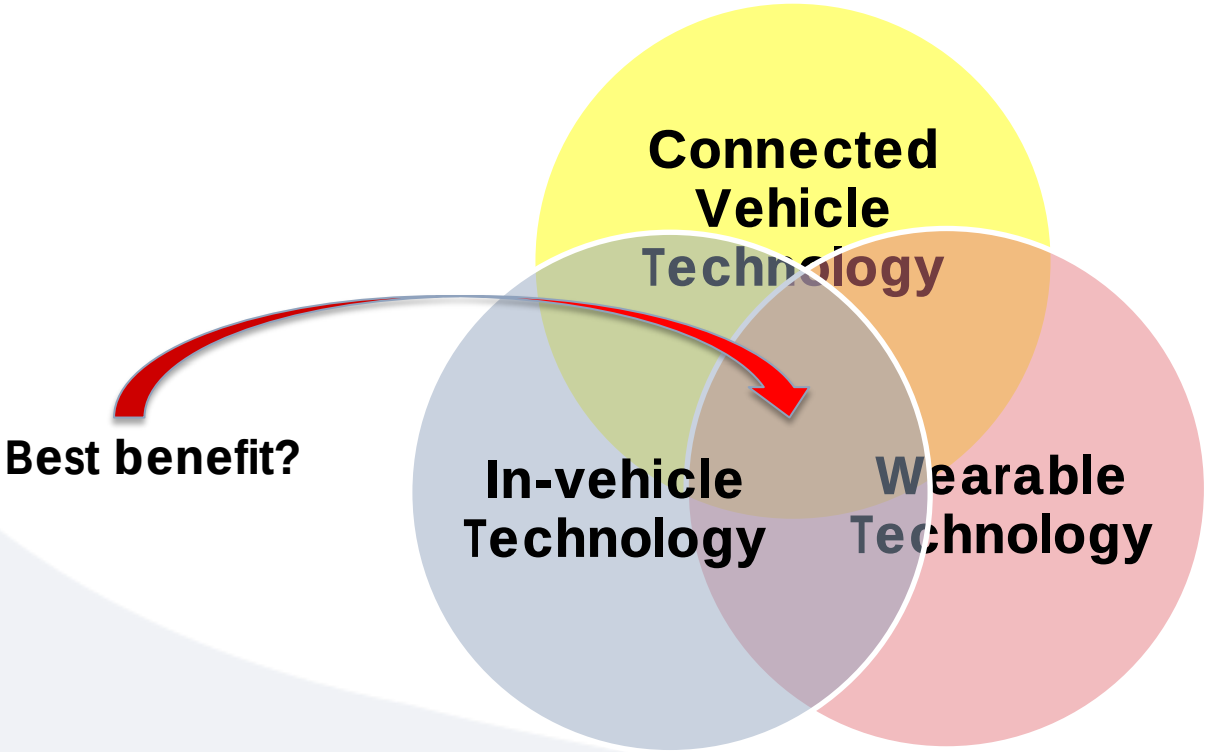
When (technology maturity) and How (dependent and integrated technologies)

Rational Analysis

Taxonomy Framework Components for Analysis and Justification

- In-Vehicle or Wearable Technology
- Priority for Responders
- Response Phase
- Stakeholders
- Technology Maturity
- Associated Technologies

The Integration of Technologies



Operational and Technical Use Case: Intersection Collision Avoidance

Dangerous Operations

During 2011, public safety related motor vehicle crashes resulted in 34 fatalities involving ambulances, 14 fatalities involving fire equipment, and 83 fatalities involving law enforcement vehicles.

Operational and Technical Use Case: Intersection Collision Avoidance

- **Purpose:** Detect and warn drivers of approaching traffic at intersections
- **Benefits:** Life safety, economic, and operational readiness improvements for the responder community and general public by reducing common intersection collisions
- **Use Case:** Routine Non-Emergency Vehicle Operations Collision Avoidance Alert

Operational and Technical Use Case: Road Weather Alerts and Warnings

Dangerous Conditions

Almost **19%** of law enforcement motor vehicle crash related **fatalities** from 1980 to 2008 occurred on **wet, snowy, slushy, or ice** covered roadways

Operational and Technical Use Case: Road Weather Alerts and Warnings

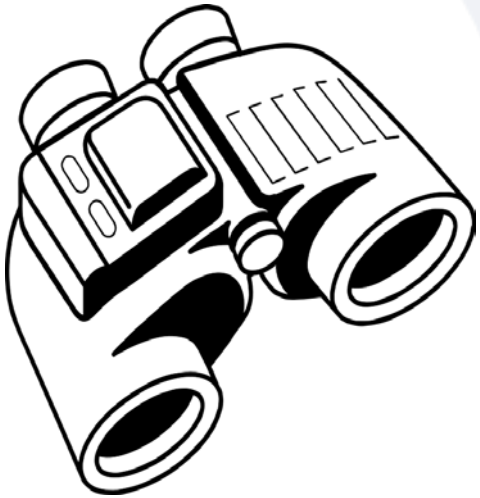
- **Purpose:** Notify drivers about unsafe conditions and roadway closures due to weather-related events through Vehicle to Vehicle (V2V) and Vehicle to Infrastructure (V2I) transmitted messages.
- **Benefits:** Life safety, economic, and operational readiness improvements for the responder community and general public by reducing the risk of collisions due to vehicles losing control or operating in impeded/inhibited sight situations due to weather will result in
- **Use Case:** Routine Non-Emergency Vehicle Operations Collision Avoidance Alert

Wearable Technologies for Connected Responders

- **Purpose:** Provides a platform for communicating alerts, warnings, and operational data to the emergency responder within the vehicle and while outside the vehicle.
- **Benefits:** Allows emergency responders to receive mission-related information while working in a hands-free environment. Data can be collected and transmitted in real time to other responders and command centers or be viewed forensically at a future date.
- **Use Case:** Secondary collision audible and sensory alert to responders working a multi-vehicle interstate crash. Alerted responders take rapid protective measures.

Call to Action

- Opportunities for application are limitless
- Consider the immediate environment, but focus on the future
- You, the practitioner, can influence the future direction of these technologies



Emerging In-vehicle and Wearable Technologies for Responders

Discussion

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Questions

Resources & References

For more detailed information on Connected Vehicle technology:

The Connected Responder – A Business Case for the Emergency Responder Agency and a Business Plan for Engaging the Responder Community

Published by the Transportation Safety Advancement Group

Insert hyperlink to document

Resources & References

- Intelligent Transportation Systems - Joint Program Office
- ITS America Connected Vehicle Task Force
- Transportation Safety Advancement Group (TSAG)
- Connected Vehicle Reference Implementation Architecture (CVRIA)

Presenter Contact Info

- Insert Presenter Name and E-mail
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Thank You