

**VIIC Cooperative Research
Toward Deployment of 5.9 GHz DSRC Safety
Technologies**

2011 National Rural ITS Conference

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VII Consortium (VIIC) – Who we are

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



TOYOTA



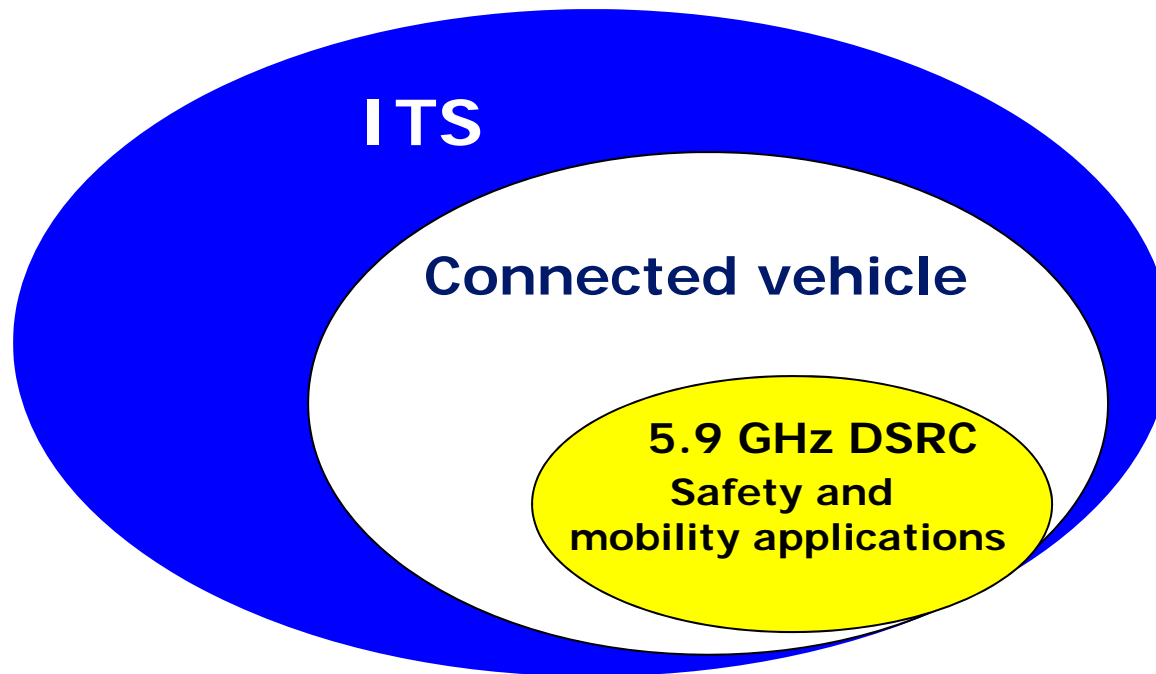
HONDA



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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 deployment of cooperative safety and mobility applications based on 5.9 GHz DSRC .



Safety Benefits



▶ OPPORTUNITY

- **35-40,000** deaths+**3,000,000** injuries/year (US)
- **6,000,000** crashes/year (US)
- Direct economic cost of **\$230 Billion**
- Leading cause of death for **ages 4 to 34**
- ▶ **Cooperative active safety could potentially address 82% of the vehicle crash scenarios involving unimpaired drivers.** (Volpe crash analysis)

REAR-END

- Forward Crash Warning
- Adaptive Cruise Control
- Brake Assist
- Automatic Braking

OFF ROADWAY

- Lane Departure Warning
- Lane Keeping
- Curve Speed Warning
- Stability Control

CROSSING PATHS

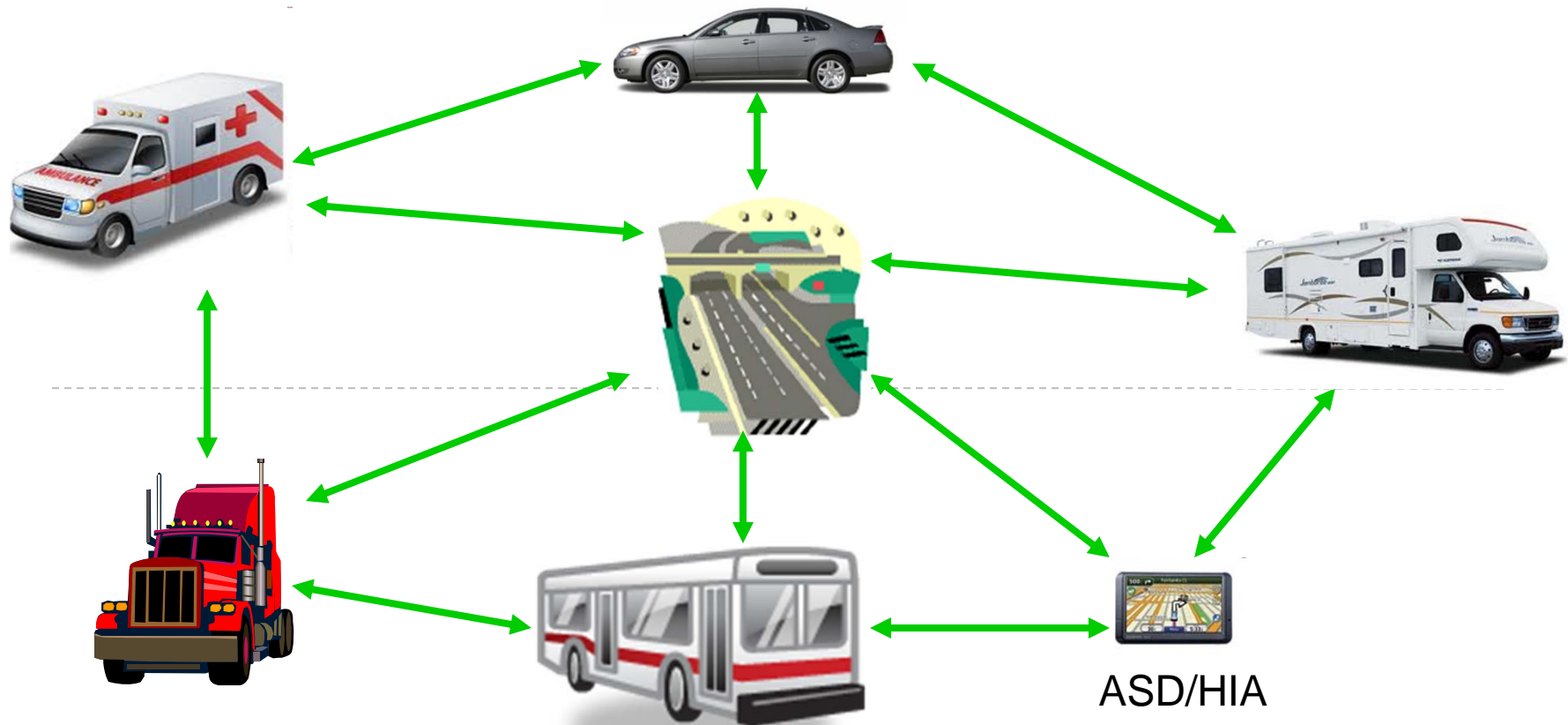
- Intersection Movement Assist
- Stop Sign & Signal Violation Warnings

LANE CHANGE

- Blind Spot Detection
- Side Radar

Goal: DSRC Interoperability

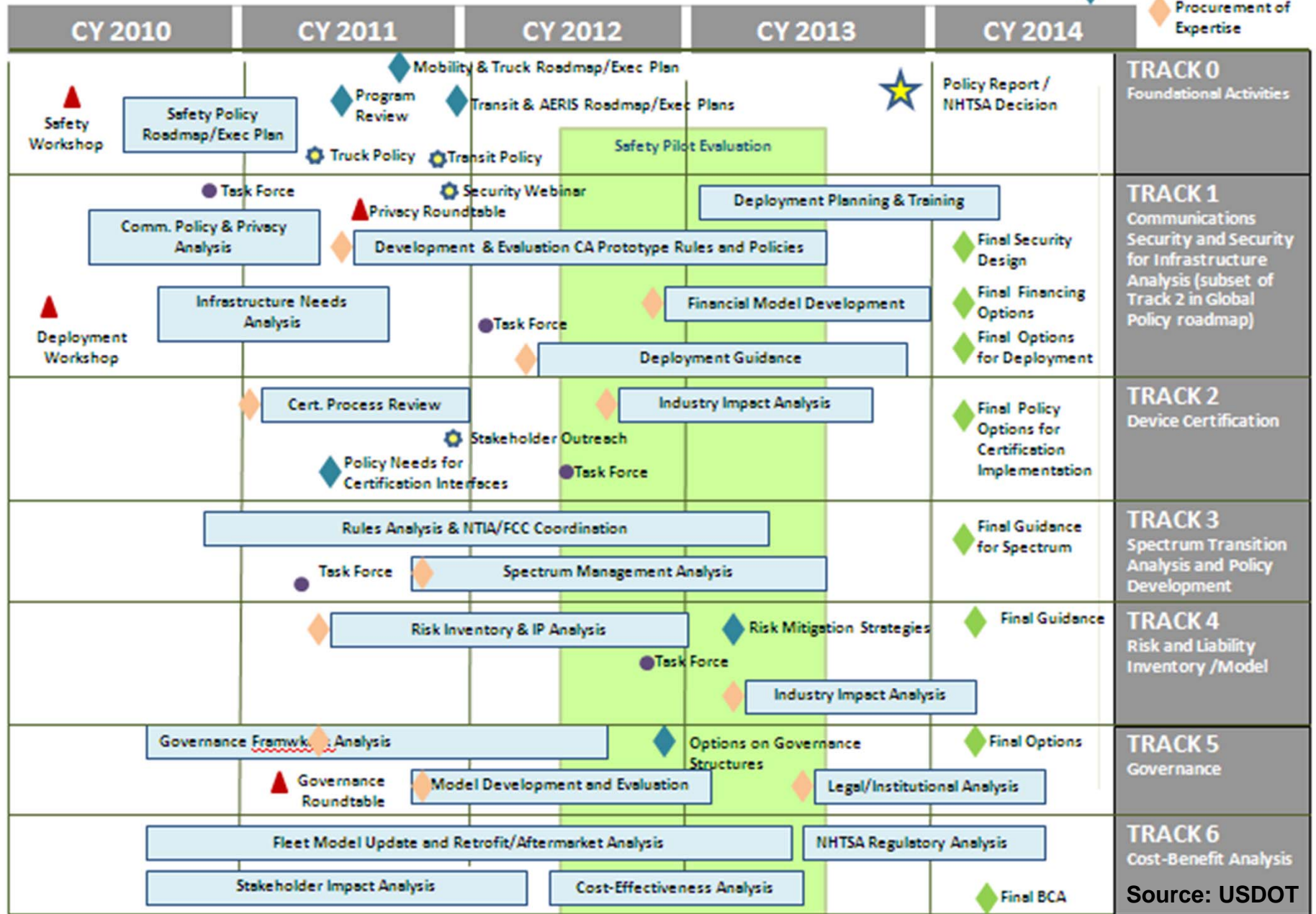
DSRC communications among vehicles and roadways



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Safety Policy Research Plan

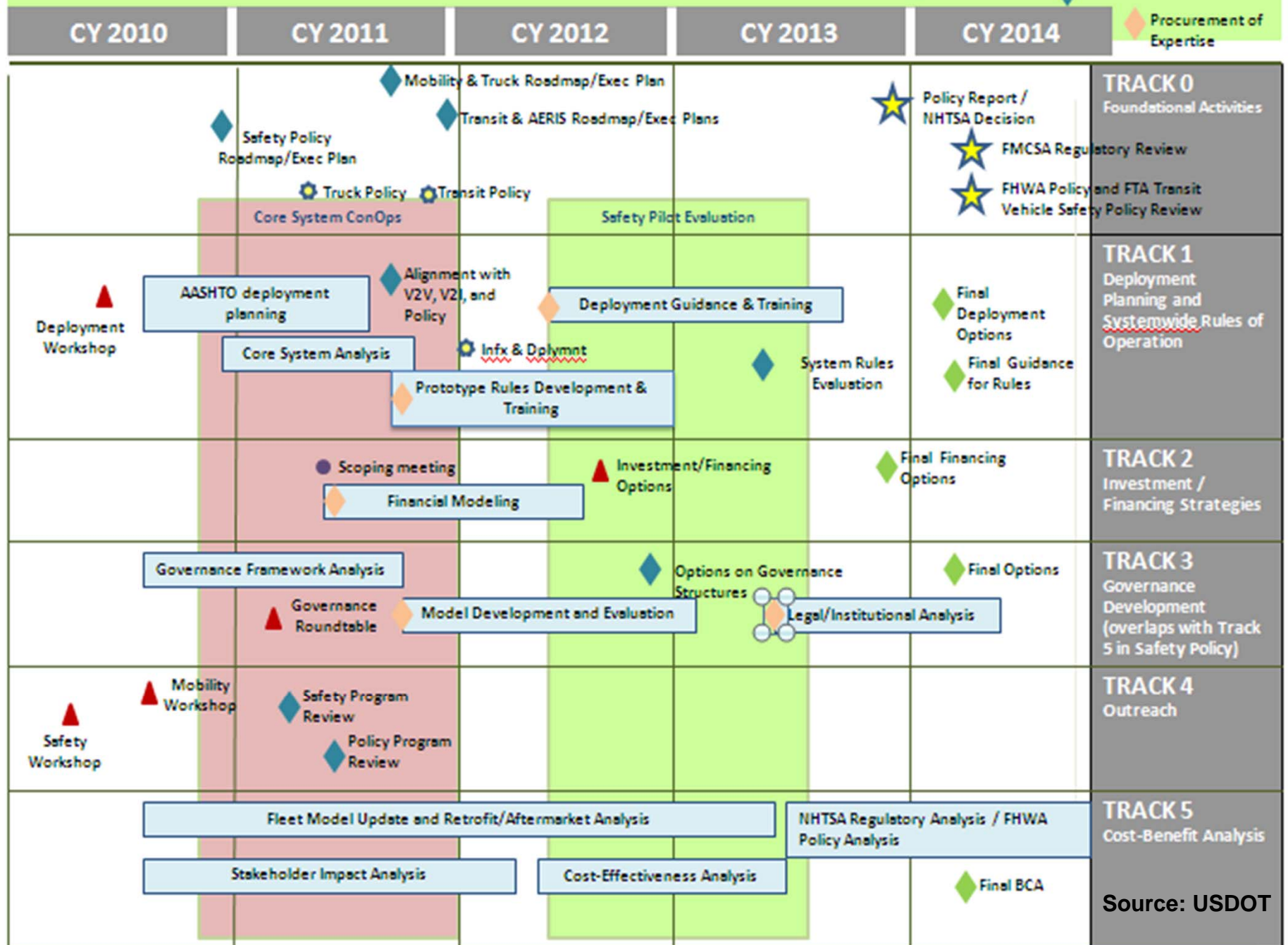
Webinar
 Workshop
 Policy DOT Task Force
 Milestone
 Procurement of Expertise



Source: USDOT

Global Policy Research Plan

-  Webinar
-  Workshop
-  Policy DOT Task Force
-  Milestone



Source: USDOT

VIIC Member Key Policy Issues

Security and Privacy

Governance and Funding

Risk/Liability/Intellectual Property

Vehicle, Device, and Data Access issues

DSRC Device Certification /Authentication

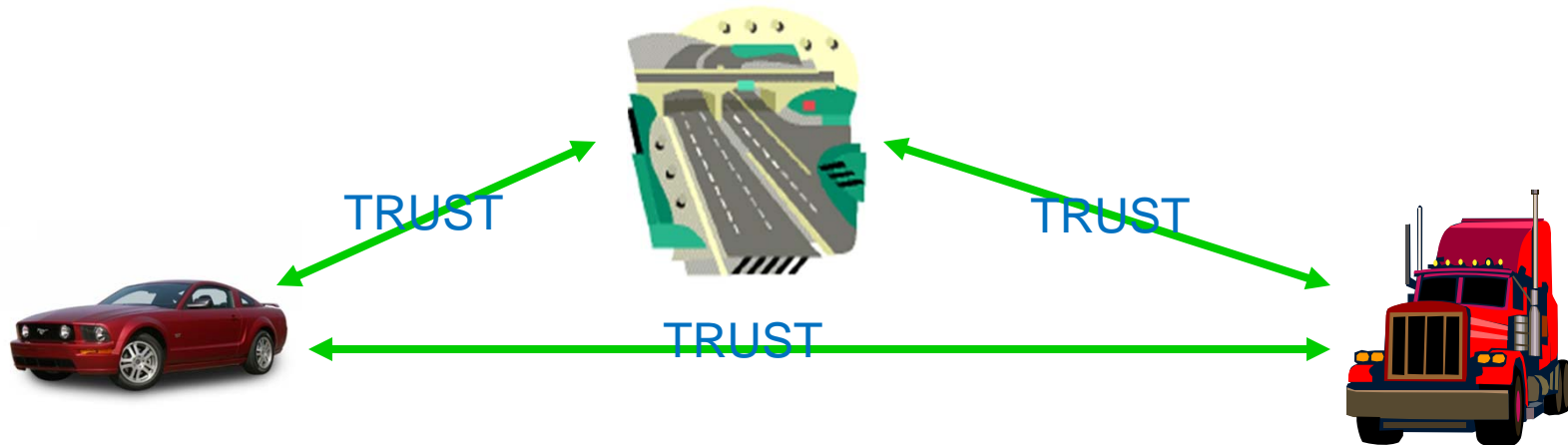
Spectrum Analysis

Harmonization

Security Design Balance



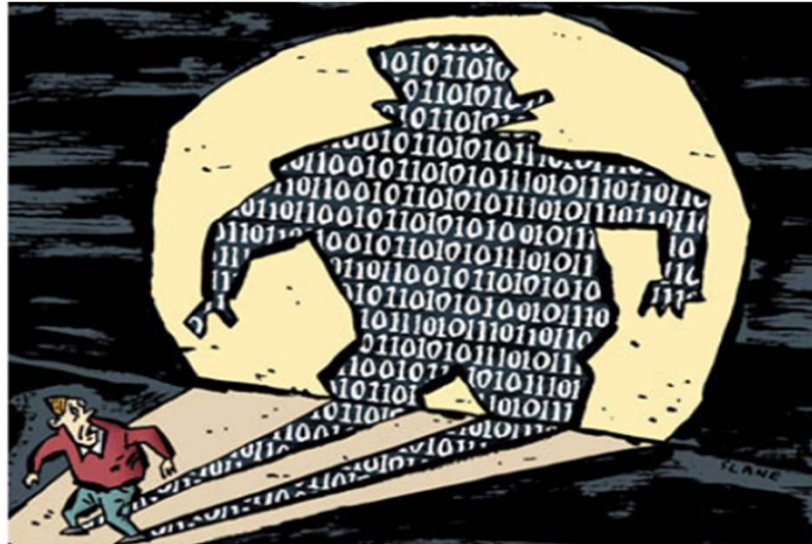
Key Enabler – Security



Messages to/from other Vehicles 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
- It must be possible for people to travel in their private vehicles without being tracked, therefore mandatory services must be rendered anonymously
- Opt-in services that collect personally-identifiable information must adhere to use limits and fair information practices

DSRC Privacy Limits

▶ Limits on DSRC Use

- **Public-Sector Transportation**
 - anonymous, only
- **Public-Sector Commerce and Toll Collection**
 - with consent, only & protection of PII
- **Public-Sector Regulation and Commercial Vehicle Permitting**
 - with consent where possible, otherwise limited use and protection on PII
- **Law Enforcement/Investigation**
 - prohibited
- **Public Security Surveillance**
 - prohibited
- **Private-Sector Commerce**
 - with consent, only & protection of PII
- **Private-Sector Transportation**
 - anonymous, only

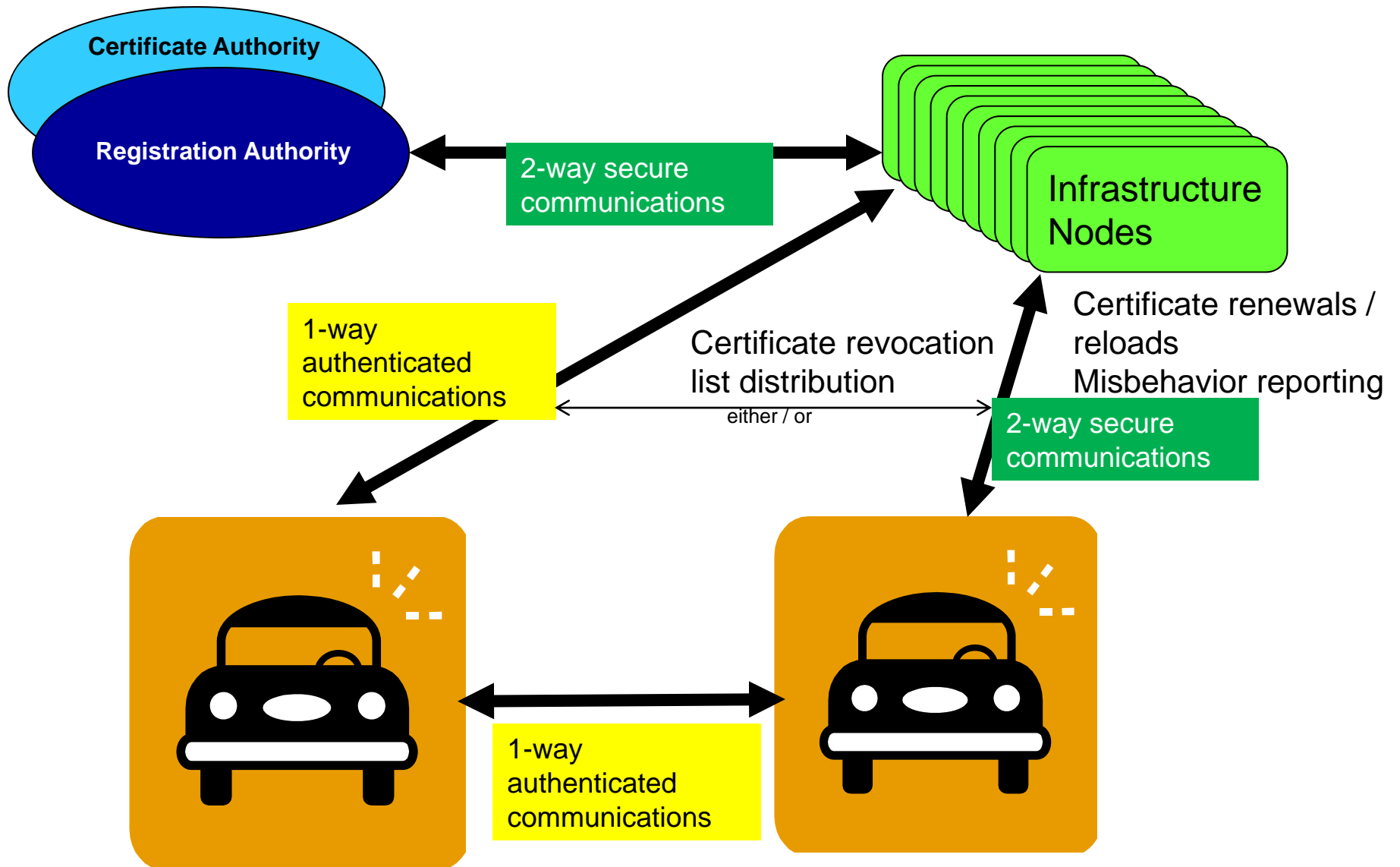
National VII Privacy Policies Framework v1.0.2, 2007

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Security System and Privacy by Design

- ▶ Goal 1: Protect vehicle/data integrity while preserving vehicle and occupant anonymity for all mandatory services
 - Five-Minute Certificate Validity
 - Vehicle ID Change with Certificate Change
 - No “Epidemic” Data Distribution of CRLs or other security msgs
 - Linked Certificates - Public Key Infrastructure (PKI) with encryption
 - Split Certificate Authority Functionality

Recommended Basic Security Configuration



DSRC Privacy Principles / Fair Information Practices

- ▶ Goal 2: Protect personally-identifiable information exchanged as part of opt-in services through FIPs
 - Principle of Respect for Privacy and Personal Information
 - Information Purposes Principle
 - Acquisition Principle
 - Notice Principle
 - Fair Information Use Principle
 - Information Protection and Retention Principle
 - Openness Principle
 - Participation Principle
 - Accountability Principle

From Research to Deployment

In addition to end user acceptance, certain things are indispensable 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 based on standards/regulations
- ▶ Acceptable federal governance structure (incl. rules of use, operations, and access)
- ▶ Liability and intellectual property issues addressed through federal policy

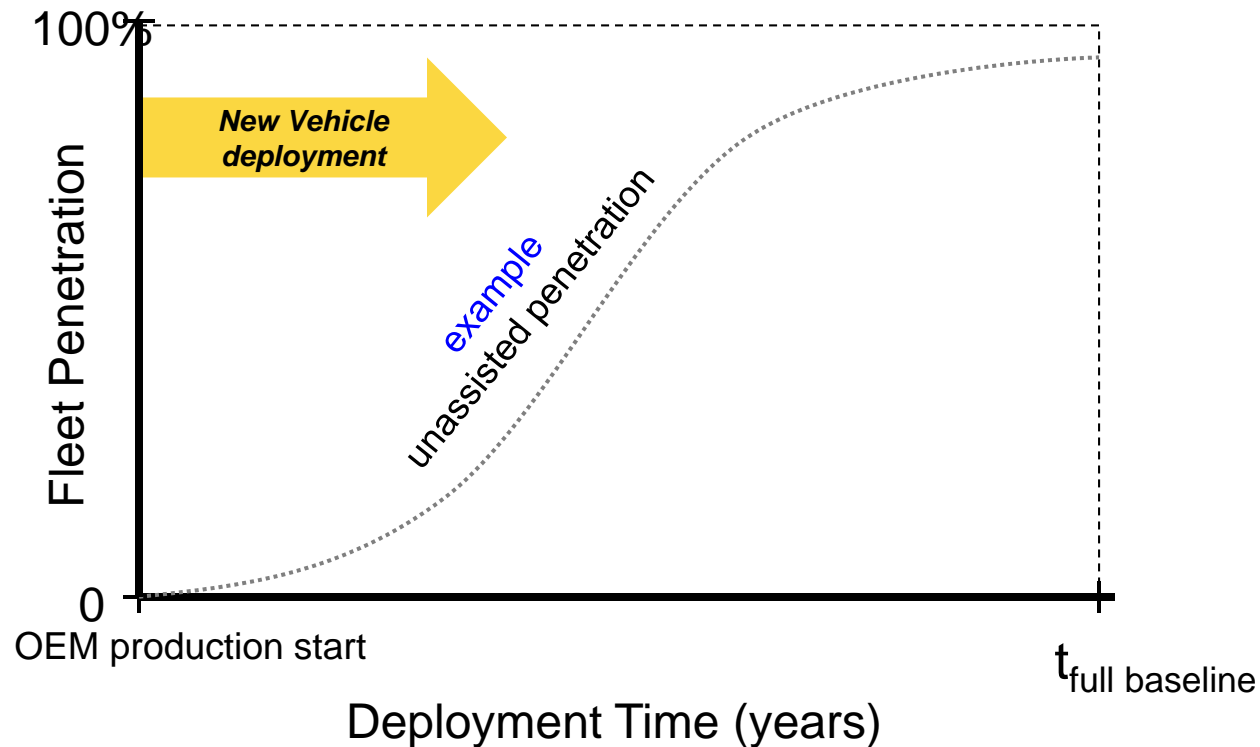
Need for Federal Enabling Legislation

For example:

- ▶ Authorize and finance DSRC infrastructure and backhaul network – at least the initial footprint – and require and maintain network operation over a prolonged period
- ▶ Establish and enforce national priorities (incl. program scope/limits), and to authorize and specify national governance (incl. rules of use, operations, access)
 - Protect user privacy and security
 - Address liability & intellectual property issues
 - Authorize and maintain cross-border agreements
- ▶ Authorize regulation of aftermarket and carry-in DSRC devices

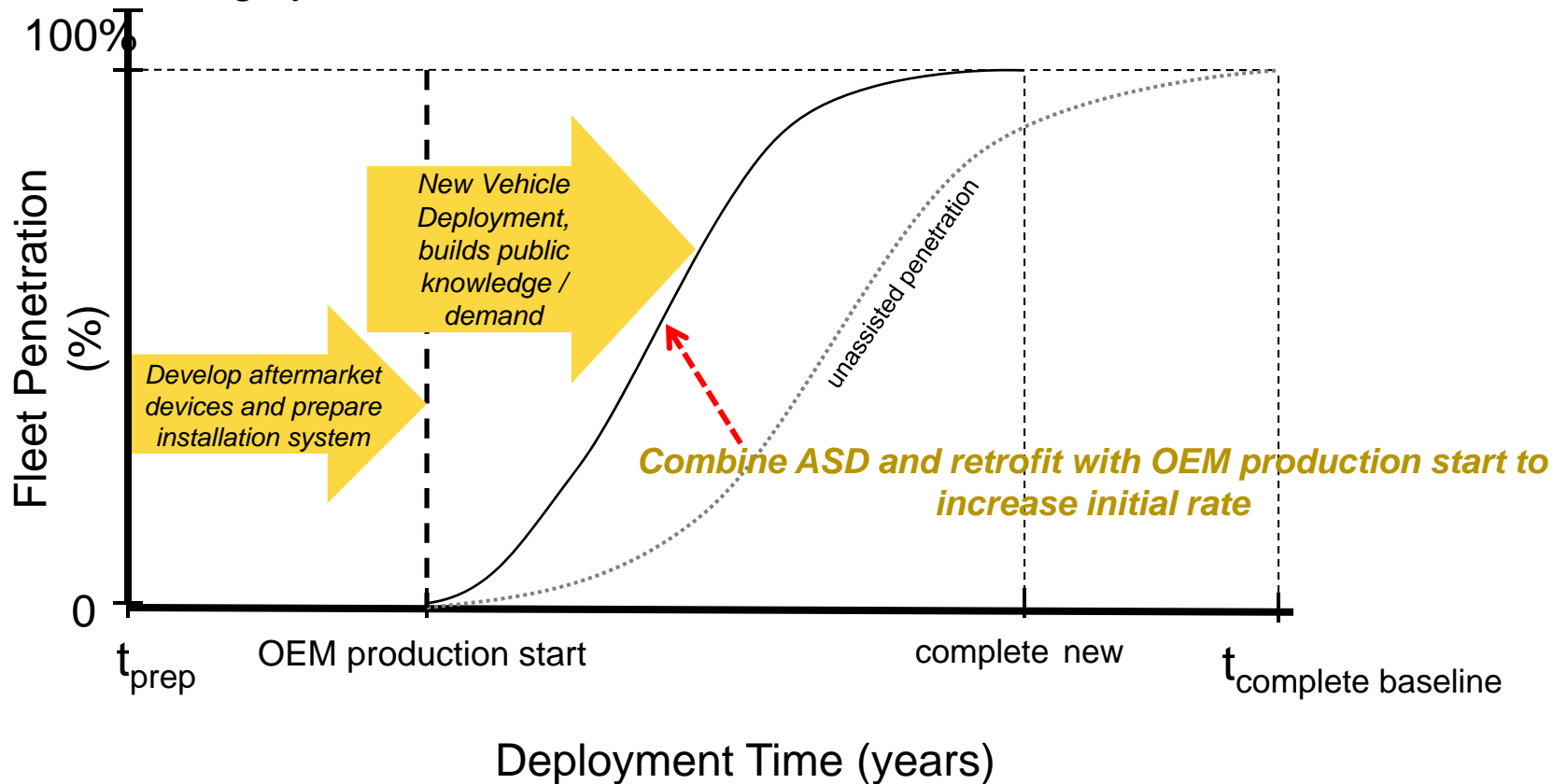
Accelerating Deployment

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



Retrofit/Aftermarket DSRC Devices

- ▶ There appears to be some potential for retrofit or aftermarket device deployment to increase penetration rate and the resulting system benefits.



Summary

- Interoperability and Security are key deployment enablers for safety and mobility applications.
- An appropriate balance between privacy, safety, and security is needed to preserve anonymity for mandatory applications and to protect the privacy of personally identifiable information for opt-in applications.
- National coordination of vehicle and infrastructure deployment in both urban and rural regions is needed.
- Strategies to accelerate safety and mobility benefits using retrofit or aftermarket devices show promise, but key assumptions remain untested.
- Deployment will require Federal enabling legislation.

Thank You

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