

Connected Vehicle Policy Research Status

**SAE Government Industry Meeting
January 25, 2012**

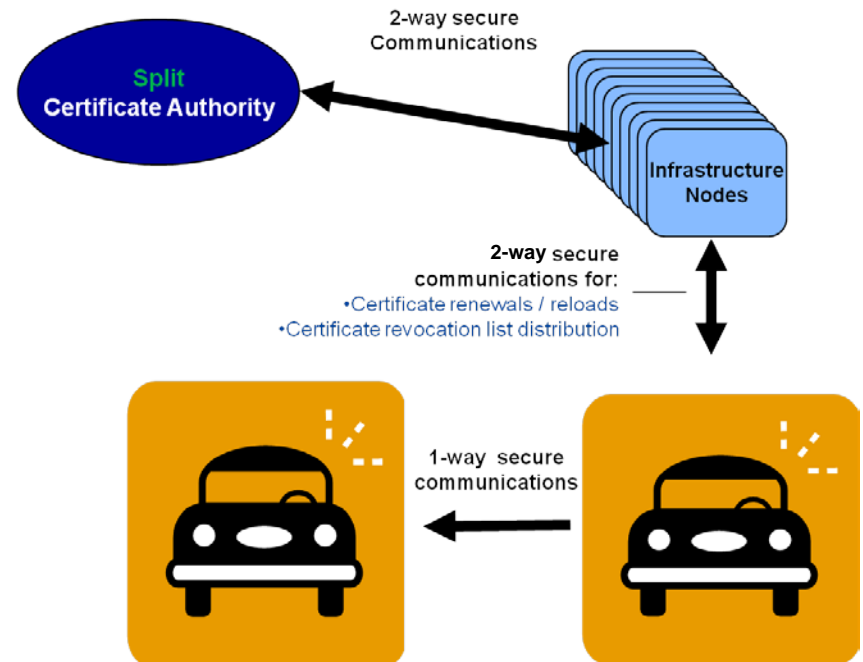
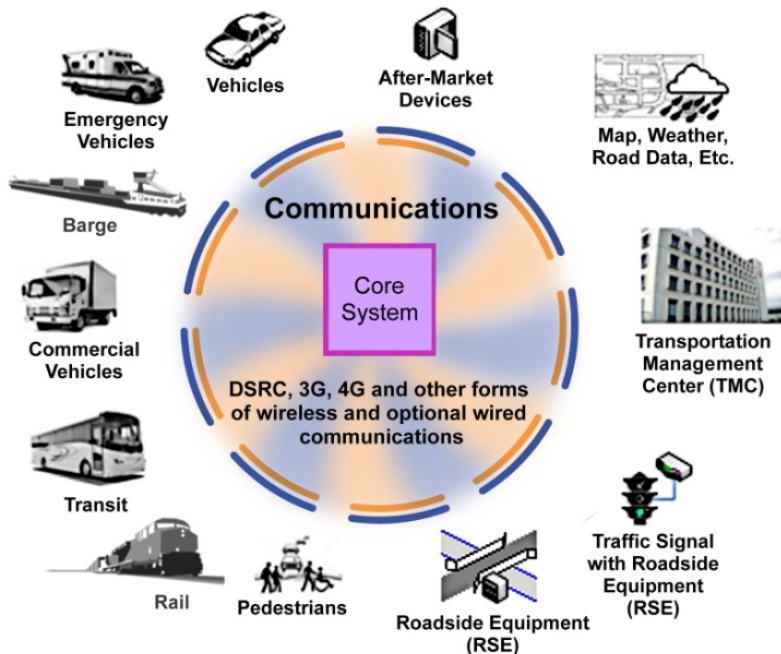
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Policy Research Focus

- **Determine if V2V is feasible to implement**
 - **Security Needs**
 - Functional Requirements
 - Physical/Technical Requirements
 - Operational & Organizational Requirements
 - Financial Sustainability and Responsibility

Security Network

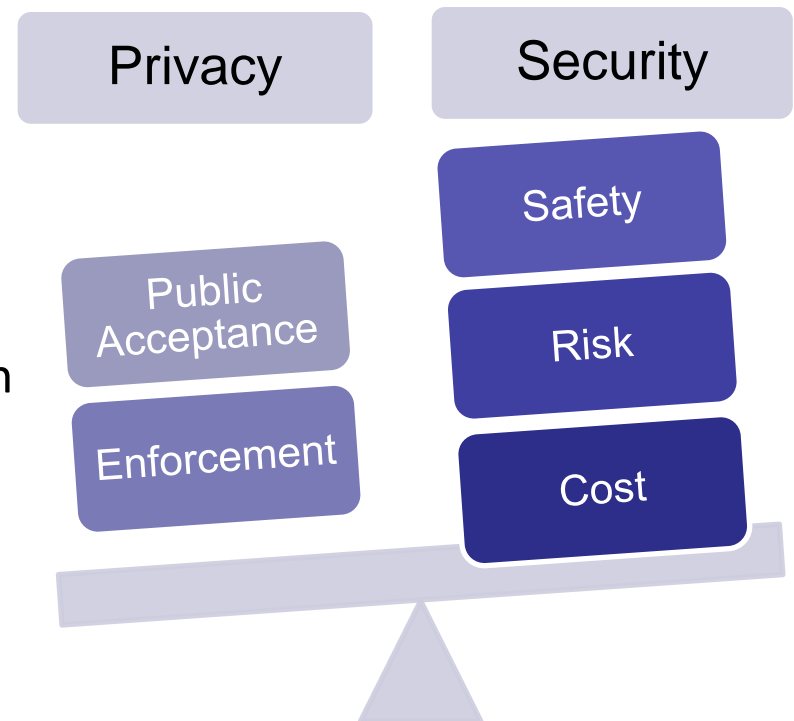
- The V2V/V2I system requires communications media for two critical purposes:
 - Secure communications for distribution of certificates and revocation lists to make sure that entities on the system are legitimate users
 - Trusted communications for delivering safety application data and messages (and, potentially, other applications and services)



Communication Security Requirements

Choice of media must meet requirements:

- ✓ Enable **trusted** communication between vehicles and **secure** communication between vehicles and the network
- ✓ Provide reasonable defense against attacks
- ✓ Protect privacy and personal information of users
- ✓ Reasonably balance privacy needs against security requirements



Critical Questions

- **Which communications media can support the needs for distributing security certificates? Choices include:**
 - Existing Cellular Networks
 - Dedicated Short Range Communications (DSRC)
 - WiFi
 - No infrastructure option
- **What are advantages and limitations of each?**
- **How should the organizational functions of security certificate distribution and management be structured?**
 - Who should be responsible for them and how should they be funded initially and over time?

Communications Network Options and Analysis to Date

Cellular Network

Advantages

Current privacy limitations are known and accepted through an opt-in option

Cellular network in place

In theory, meets the requirement to assure daily access to certificates

Limitations and Questions

Does not support **privacy** framework as it allows tracking and recording; can identify users

Usage is **subscription-based**

Lacks broadcast capabilities; existing networks would require enhancements—what are associated costs?

Vehicles using cellular for certificate management would **also need DSRC** for safety applications.

Communications Network Options and Analysis to Date

5.9 GHz DSRC

Advantages

Meets the requirements for **privacy** and “anonymity by design”

Spectrum allocation gives **greater control** over access/rules of use

Full integration for V2V and V2I

DSRC network can be nationally scaled, works w/ high vehicle density

Limitations and Questions

No existing nationwide network—How much infrastructure is needed? Who owns, operates, and maintains?

High investment — How to fund implementation, operations, and maintenance?

Will need to have some sort of revenue stream or payment mechanism to support ongoing operations and maintenance.

Communications Network Options and Analysis to Date

Wi-Fi

Advantages

Current privacy limitations known and accepted

Widely implemented and accessible

Commercial interests can support further implementation

Limitations and Questions

Does not support privacy framework

No coherent nationwide network

Coverage range is limited

Security is an issue

Allows tracking and recording

Communications Network Options and Analysis to Date

No Infrastructure/Network

Advantages

No infrastructure or network requirement

Limitations and Questions

Closed or open system?

No ability to interface with infrastructure/network or aftermarket devices

Access to probe data for V2I applications?

Analyze Data Delivery (Network) Options:

Requirements Definition: Fall 2011

Communications Options Analysis: Winter 2011/12

Business Models Analysis: Spring/Summer 2012

Operational and Organizational Requirements

- **Develop (Security) Certificate Management Organizational/Operational Models:**
 - Roles and responsibilities
 - Organizational models
- **Project Schedule:**
 - Options due in winter 2011
 - **Public meeting in April 2011 (for organizational analysis and network options – interim analysis for both projects)**
 - Prototype testing: June 2012
 - Test Results and Evaluation of Approach: Jan 2013
 - Final Report: July 2013

Financial Models

- **All security network options require financing for operational support**
 - **All public** – politically feasible?
 - **Public/private partnership** – what type of framework?
 - **All private** – where's the value?
 - Data
 - Transactions
 - Spectrum
 - Other

U.S. DOT Principles and Authorities

- **Statement of U.S. DOT Principles** – Draft under review
- **Analysis of U.S. DOT authorities** – Internal U.S. DOT legal working group

All policy work is aligned to support a 2013 NHTSA agency decision

For More Information

www.ITS.DOT.GOV

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