New York State DoT: Commercial Vehicle Infrastructure Integration (CVII)

Jan Hellaker
Volvo Technology North America
CVII Program

- I-95 Corridor Coalition funded program
- Complete interoperability – Communicate with any VII compliant vehicle or infrastructure
- Non-proprietary core system design capable of duplication
- Integrate VII communications device w/SAE J1708 commercial vehicle data bus
- Compliant/utilize the standard message sets SAE J1587, SAE J1939 and SAE J2735
CVII Program

Existing CVII Contract:

- Develop/Test CV VII compliant OBE system including Human Vehicle Interface for basic communication of general transportation related information (I2V)

- Develop/Test CVII DSRC Applications:
  - CV Driver I.D & Verification (V2I)
  - Test Wireless Vehicle Safety Inspection Information (V2I)
  - CV to Maintenance Vehicle Communication (V2V)
CVII Program

Future Actions (near term)
- Heavy vehicle to light vehicle communication
  - Priority safety applications

Future Actions (longer term)
- Partner with Large Carriers for long term field tests/pilot program
- Additional RSE deployments
- Additional applications: truck parking, overturn warning, tolling, restricted routing/geo fencing
- Additional communication pathways (non-DSRC)
CVII Program

Vehicle to Roadside Generic Communications

- Vehicle sends standard anonymous probe data (i.e. current SAE J2735 probe message) to a back-end application
- Vehicle sends truck related anonymous probe data (i.e. current SAE J2735 probe message, enhanced for truck CAN data elements) to a back-end application
- Back end application displays probe data on a GIS map
CVII Program

Roadside to Vehicle Generic Communications

- Back-end application sends network-based static roadside signage information (height restrictions, weight restrictions, curve speed warnings, etc) to the vehicle

- Back-end application sends network-based dynamic travel information (truck travel times, truck parking availability, border crossing wait times, etc) to the vehicle

- Roadside application sends localized time sensitive dynamic travel information (workzones, OS/OW temporary restrictions, geofencing warnings, etc) to the vehicle

- Vehicle receives and displays all the information, following HVI guidelines
Wireless Driver Identification and Verification (Parked Truck Scenario)

- Driver inputs identification information and driver’s identification sent to a roadside application
- Roadside application validates driver’s identification and CDL while the vehicle is still in range of the RSE
- Roadside application sends a message to the driver indicating that his/her CDL is inactive, revoked, or suspended
- Vehicle receives and displays the message to the driver
- Driver is unable to start the commercial vehicle, if the driver’s CDL is inactive, revoked, or suspended
Wireless Vehicle Safety Inspection (Moving Truck Scenario)

- Vehicle sends Safety Data Message Set (SDMS) to a back-end application
- Back-end application validates SDMS data against a combination of real and/or mock safety databases for driver, vehicle and carrier data
- Back-end application sends a message to the driver indicating that there is a driver, vehicle and/or carrier safety violation
- Vehicle receives and displays the message to the driver
CVII Program
Potential Vehicle Safety Information

SDMS information may be sent to:
- State commercial vehicle safety systems
- FMCSA commercial vehicle safety systems
- Statewide operations/law enforcement dispatch center
- Associated inspection station
- Motor carrier/motor coach company

SDMS information may be accessed by authorized:
- Roadside enforcement and compliance staff
- Motor carrier/motor coach company
- Driver
- Safety analysts

Evaluation of SDMS information may result in:
- Updated company safety rating
- Updated driver safety status
- Warning or citation
- Roadside interception
- Standard inspection
- Automated compliance assessment

Safety Data Message Set (SDMS)

**Identifiers** (from a data bus message)
- Driver license jurisdiction, ID
- Vehicle identification number (VIN)
- Motor carrier/coach USDOT number
- Shipping document ID

**Vehicle Data** (red/green status unless marked with * signifying data)
- Brakes
- Engine
- Steering
- Trailer
- Weight
- Cargo
- Fuel system
- Suspension
- Transmission
- Other comp
- Electrical
- Lighting
- *Tires
- *Vehicle position

Electronic On-Board Recorder (EOBR) Data
- Duty Status
- Location of Duty Status Change

Vehicle Data: SAEJ1708/SAEJ1587, SAEJ1939

Roadside VII Equipment
CVII Program

Maintenance Vehicle to Commercial Vehicle Communications

- A moving maintenance vehicle (snow plow) broadcasts a heartbeat-like message with its vehicle type, position and heading

- A commercial vehicle (truck) following the snow plow receives and displays a warning to the driver about the snow plow ahead
Concept of VII W/CVII!

OBE – On Board Equipment
RSE – Road Side Equipment

Network/System Management Center

Green = NYS CVII
Red = Others/TBD

OEMs, Private Companies, Subscription Services, Fleet Management, etc.

Volvo Technology

Public Sector

Private Sector
NYSDOT INFORM VII Test Bed
VII Road-Side Equipment
Spring Valley Corridor Sites
I-84/I-87 Commercial Vehicle Smart Roadside/VII E-Screening Network
Potential Expanded NYS CVII & E-Screening Corridors
VII/CVII Can Enable a Wide Range of Applications!

- **Safety & Security Examples**
  - CV Driver ID/Verification
  - CV Safety Data/Wireless Inspection
  - Road Condition Warning
  - In-Vehicle Signing
  - CV Routing/Geo Fencing
  - Truck Parking
  - CV Overturn Warning/Control
  - Lane/Road Departure
  - Intersection Collision Avoidance
  - Cargo/Container Tracking

- **Mobility Examples**
  - Tolling
  - Traffic Probe Data
  - Travel Time
  - Incident/Accident Info.
  - Electronic Payment
  - Navigation/Directions
Thank You!

??? Questions ???