Commercial Vehicle Infrastructure Integration (CVII) Program

The New York State Department of Transportation
In Partnership With
the
I-95 Corridor Coalition

FMCSA Safety Technology Showcase
October 14th, 2010
Greene County, Tennessee
IntelliDrive/CVII

Background

- Dedicated Short Range Communication (short to medium range wireless protocol specifically designed for vehicle use)
- 5.9 GHz (FCC & $$$!)
- Extremely high speed, high capacity, low latency, highly secure data transmission
- “Smart vehicles, smart highways”
- “Internet” for the highway/transportation system
- Vehicle crash avoidance capabilities
CVII Program

Background & Requirements

- Past national 5.9 GHz DSRC VII/IntelliDrive research & development for passenger vehicles only!

- I-95 Corridor Coalition funded program to use 5.9 GHz DSRC in commercial vehicles (CVII)

- Complete interoperability! Communicate with any VII compliant vehicle or infrastructure

- Non-proprietary core system design capable of duplication/scalable!

- Integrate VII communications device w/SAE J1708 commercial vehicle data bus
Concept of VII W/CVII!

OBE – On Board Equipment
RSE – Road Side Equipment

DSRC @ 5.9 GHZ

Network Management Center

OEMs, Private Companies, Subscription Services, etc.

Public Sector

Private Sector
CVII Project Team

NYS DOT

Booz | Allen | Hamilton

Southwest Research Institute

CVII

Commercial Vehicle
Infrastructure Integration

Fitzgerald & Halliday, Inc.
Planning Consultants
CVII Program Status

- Winning Team led by Volvo Technology of America w/Kapsch, Booz Allen, Cambridge Systematics, Southwest Research Institute, Fitzgerald & Halliday

- Started program May, 2009

- 2 Year Schedule (Phase I)

- $1.05 Million (1-95 CC)

- Additional $400K Available
CVII Architecture

[Diagram showing the CVII Architecture with components like Commercial Test Vehicle, Back-Office System, DSRC, IP Network, and various systems such as DMCU, HVI, TGW, Vehicle Data Gateway, and Vehicle ECUs.]
CVII Program

Commercial Vehicle Data Bus
CVII Program

- Develop/Test CV VII compliant 5.9 GHz DSRC OBE system including Human Vehicle Interface - **Complete**
- Develop/Test CVII DSRC Applications:
  - CV Driver I.D and Verification - **Complete**
  - Test Wireless Vehicle Safety Inspection Information (brake condition, tire pressure, light status, etc.) - **Complete**
  - CV to Maintenance Vehicles Communication - **Underway**
CVII Program

Volvo Truck Interior with Card Reader
Task #3 - Wireless Driver Identification and Verification

- Driver inputs identification information; it’s sent to roadside device
- Roadside application sends a message to the driver indicating that his/her CDL is valid, inactive, revoked, or suspended
- Driver is unable to start the commercial vehicle if the driver’s CDL is inactive, revoked, or suspended
- Driver ID will be integrated with existing e-screening information (weight, credentials, etc.) for expanded 5.9 GHz DSRC screening
- Coordinated with FMCSA’s WRI program
Task #4 – Vehicle Safety Data from Databus

- Vehicle Safety Data – from databus via 5.9 GHz DSRC
- Includes brake, lights and seatbelt data
- Vehicle safety data will be integrated with existing e-screening information (weight, credentials, etc.) for expanded 5.9 GHz DSRC screening
- Coordinated with FMCSA’s WRI program
CVII/WRI Concept Model

- Enhances existing screening information (weight, credentials, etc.) with driver and vehicle level data
- Wireless inspection (WRI) requested by roadside device (RSE)
- Commercial vehicles send WRI data to roadside infrastructure (RSE)
- WRI data validated against network information (NYS CVIEW/SAFER)
- Results returned to driver and enforcement
- CV driver follows in-cab instructions based on screening results (pull in/by pass)
- Inspections results sent to carrier, state and federal backhaul systems
In order to implement advanced e-screening, the vehicle requires on-board equipment (OBE) that can capture diagnostic data from the vehicle CAN bus and transmit it to the roadside equipment.

Depending on the level of diagnostics and monitoring required, additional interfaces might be required to capture data from GPS transceivers, optional tire pressure and brake monitoring systems, and driver data loggers.
In Vehicle Systems Required

- Information is captured by the OBE and transmitted to the roadside equipment (RSE) which is integrated with license plate and WIM data captured by existing sensors as a standard safety data message set (SDMS).

- The SDMS is captured by the DSRC transceiver and transmitted to the back-office via a data link for analysis and enforcement decisions.

- The back office makes a go/no-go decision utilizing the real time information that is transmitted back to the carrier, enforcement and vehicle for driver action.
Detailed OBE/MMC Information
(click on events or truck icons for info)

FAIL!!

Identification Information
- Carrier Name: Volvo Truck - North America, Inc.
- USDOT#: 335611
- Address: 7900 National Service Road, Greensboro, NC 27409-9416
- Phone Number: 336-393-2060
- Screening ID: X123
- Location: New York, I-95, Exit 51
- VIN: 1V1NZ9829VIN12345
- License Plate: NC/LX9999
- Veh. Make/Model/Color: VOLVO/VHD/BLUE

Screening Result: Fail

Vehicle Status
- Out-of-Service Order
  - IRP: Pass
  - OS/OW Permit: Pass
  - Off-Route: Pass
- GVW: Fail
- Axle Weight: Fail
- Brake Lining: Pass
- Brake Stroke: Pass

Carrier Status
- Out-of-Service Order
  - IFTA: Fail
  - ISS-2: Pass
  - PRIMS: Pass
  - URC: Pass
- Unsafe Driving: Fail
- Fatigued Driving: Fail
- Driver Fitness: Pass
- Controlled Substance: Pass
- Vehicle Maintenance: Pass
- Improper Loading: Pass
- Crash Indicator: Pass

Driver Status
- CDL Status: Pass
- Seat Belt User: Fail
- Driver Safety Screening: Pass

(Click red hyperlinks for more detailed information)
CVII Program

Additional Scope Items

- Phase 2 – **Pending**
- Heavy Vehicle to Light Vehicle Driver Safety Warnings ; Grade Crossing Driver Warnings

- Phase 3 – **Proposed for Funding**
Real Time Routing with Driver Warnings with Geo-fencing/Disabled Vehicle
CVII Program
Advisory Team

- I-95 Corridor Coalition
- FHWA
- ITS JPO/RITA
- FMCSA
- NYS Thruway Authority
- NYS Bridge Authority
- Washington State DOT
- Commercial Vehicle Safety Alliance
- AASHTO
- NYS Energy Research and Development Authority
- NYS Motor Truck Association
- American Transportation Research Institute
- VII Consortium (Auto OEM)
- Michigan DOT
- Intelligent Transportation Systems of America
- U. of North Carolina Highway Systems Research Center
- American Trucking Association
Thank You!

Rick McDonough, NYSDOT
Planning and Development Bureau
Office of Modal Safety & Security
New York State Department of Transportation
Albany, New York
(518) 457-5871
rmcdonough@dot.state.ny.us