



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

Online Credentialing Starts Here!

- HUT
- IFTA
- IRP
- SSRS

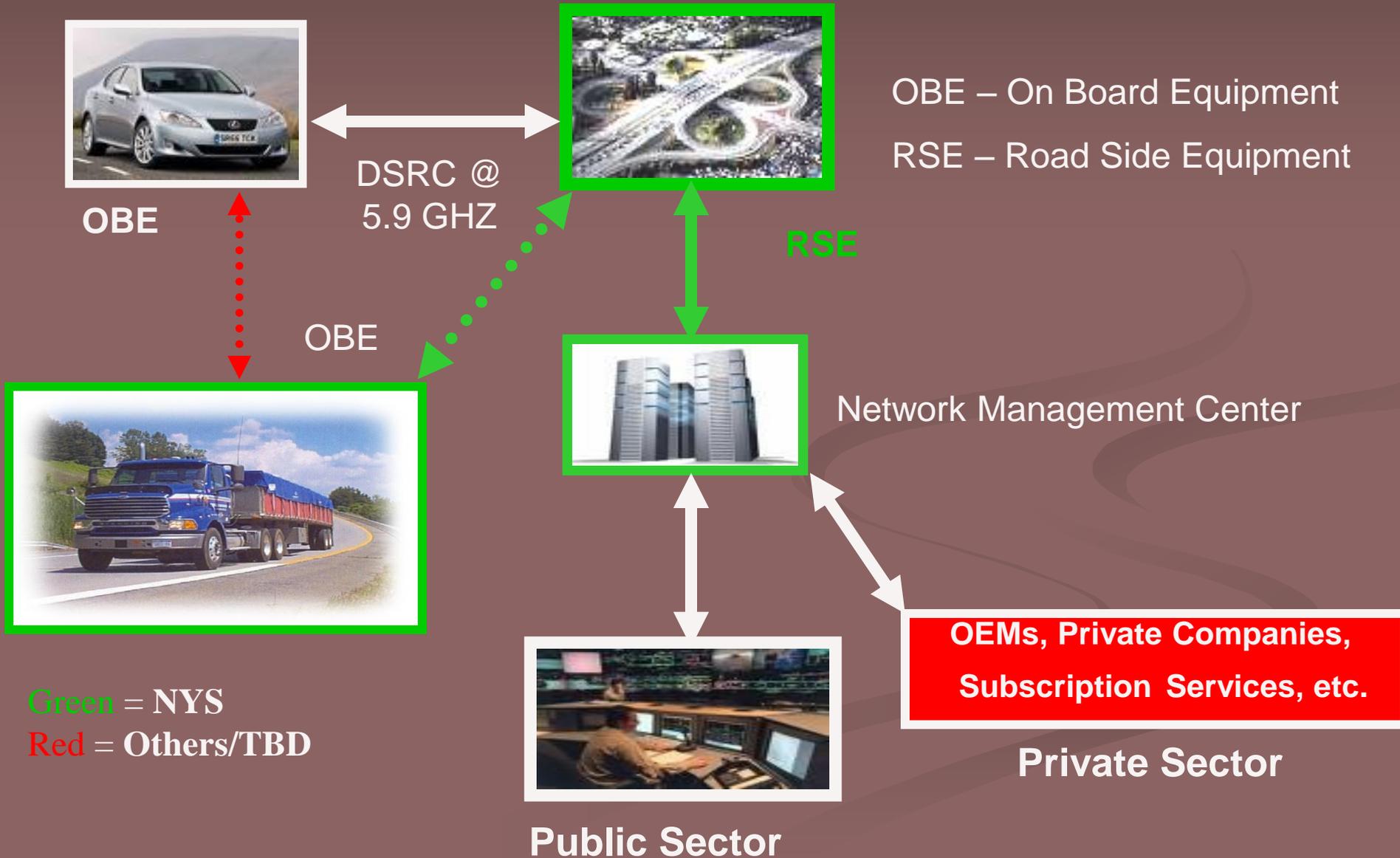


OSCAR
Instant Online Permits



www.oscar.state.ny.us

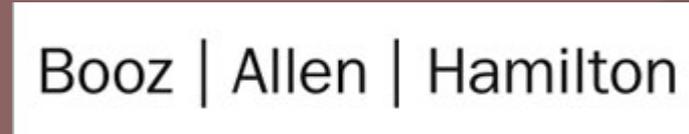
Concept of VII W/CVII!



CVII Project Team



NYS DOT

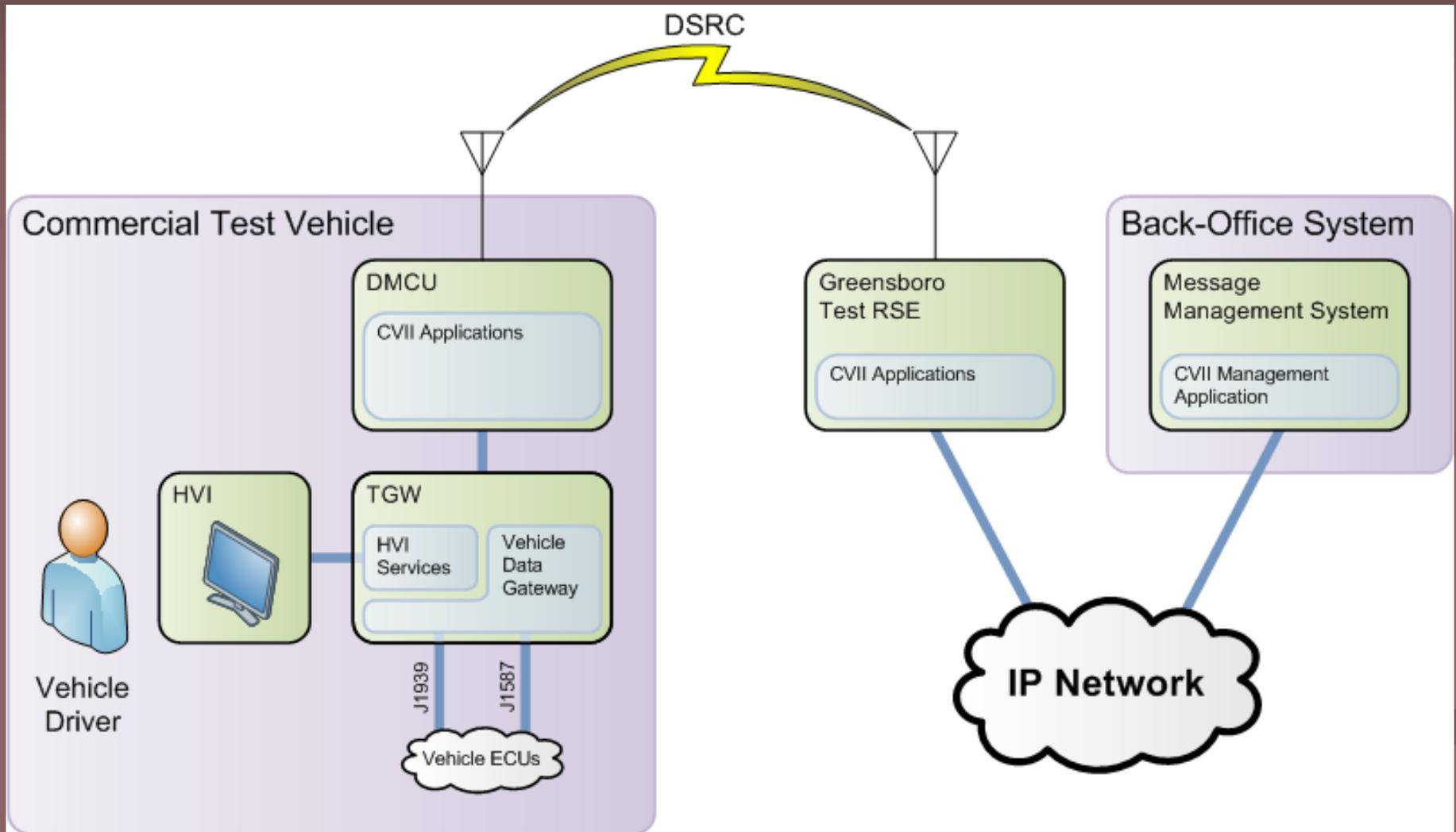


CVII Program Status

- 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





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



CVII Services – Vehicle to Infrastructure (V2I)



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





CVII Services – Vehicle to Infrastructure (V2I)

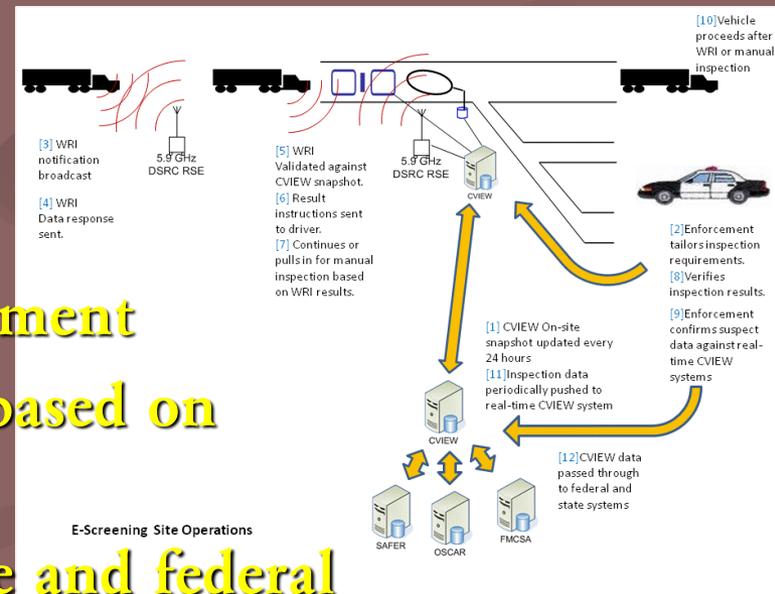
Task #4 – Vehicle Safety Data from Databus

- 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



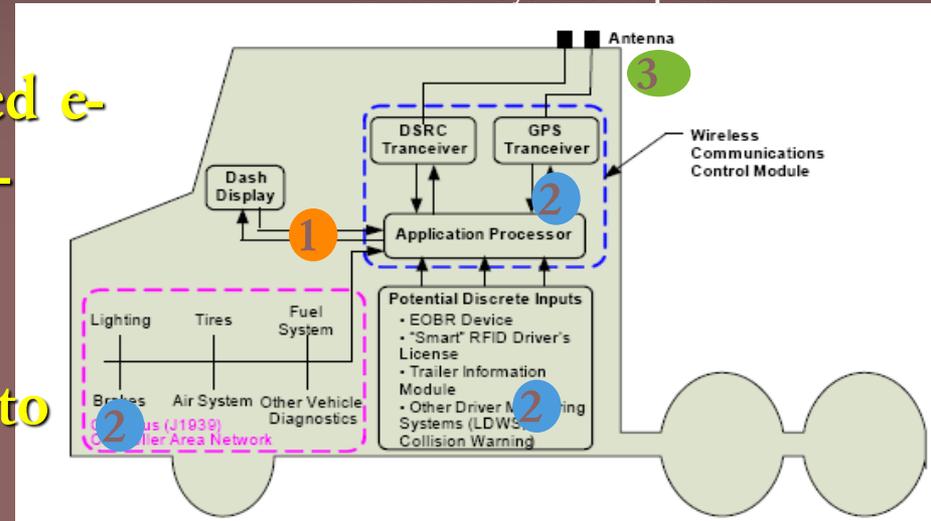
- Enhances existing screening information (weight, credentials, etc.) with driver and vehicle level data
- Wireless inspection (WRI) requested by roadside device (RSE)
- Commercial vehicles send WRI data to roadside infrastructure (RSE)
- WRI data validated against network information (NYS CVIEW/SAFER)
- 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



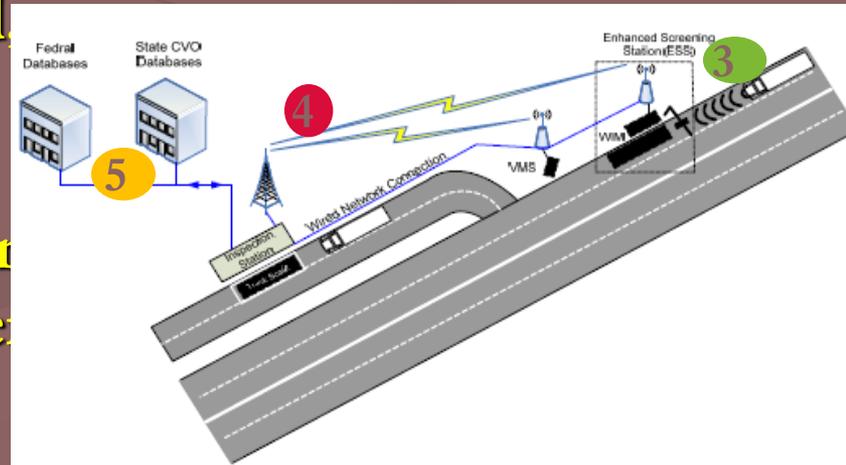
CVII/WRI

Electronic Screening Application

In-Vehicle Systems Required



Roadside Equipment Required

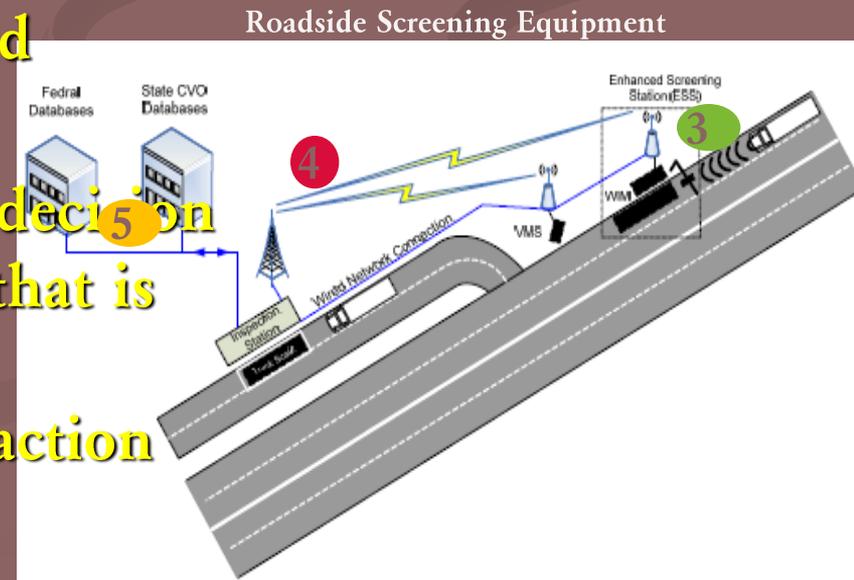
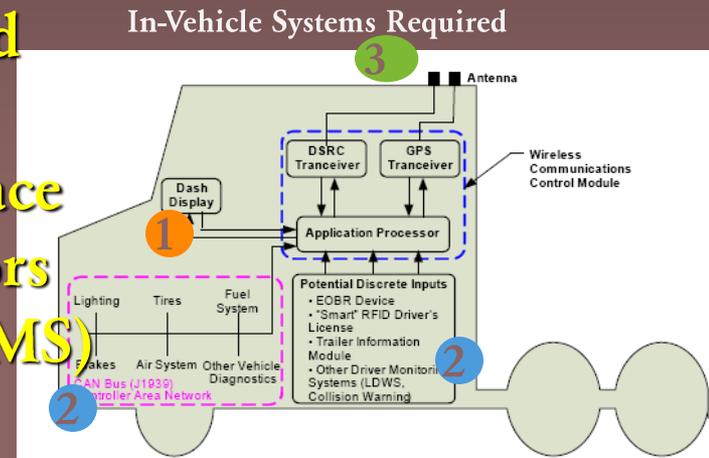


■ 1 In order to implement advanced e-screening, the vehicle requires on-board equipment (OBE) that can capture diagnostic data from the vehicle CAN bus and transmit it to the road side equipment

■ 2 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

CVII/WRI Electronic Screening Application (Con't.)

- **3** 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





Commercial Vehicle Infrastructure Integration



Roads&Satellite Satellite Only Roads Only

Live Data Feed

Verification Details Inspection Advisories



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
 City, State, Zip Greensboro, NC 27409-9416
 Phone Number 336-393-2000

Screening ID X123
 Location New York, I-495, Exit 51

VIN 1VINZ99Z9VIN12345
 License Plate NC/LX9999
 Veh. Make/Model/Color VOLVO/VHD/BLUE

Screening Result **Fail**

Vehicle Status

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

Carrier Status

Out-of-Service Order	Pass	Unsafe Driving	Pass
IFTA	Fail	Fatigued Driving	Pass
ISS-2	Pass	Driver Fitness	Pass
PRIMS	Pass	Controlled Substance	Pass
URC	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)

OBE Events

Event ID	Date	Event Type	OBE/Driver ID	Status Info
1	3-12-10, 9:00:00AM	Upload WRI	OBE_ID_1	Upload received
2	3-12-10, 9:01:05AM	Query Status	OBE_ID_1	Verification request received
3	3-12-10, 9:02:15AM	Query Status	OBE_ID_1	Verification processing
4	3-12-10, 9:03:20AM	Query Status	OBE_ID_1	Waiting for GSCS response
5	3-12-10, 9:04:07AM	Query Status	OBE_ID_1	Verification failed - see details at right

GSCS Events

Event ID	Date	Event Type	OBE/Driver ID	Status Info
1	3-12-10, 9:00:10AM	Request verification	OBE_ID_1	Data sent to GSCS for processing
2	3-12-10, 9:00:51AM	Query verification	OBE_ID_1	No data received
3	3-12-10, 9:02:10AM	Query verification	OBE_ID_1	No data received
4	3-12-10, 9:03:45AM	Query verification	OBE_ID_1	Verification failure received



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

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