



**Pierce
Transit**

Pierce Transit Collision Avoidance and Mitigation Safety Research and Demonstration Project

TFLEX

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Today's Presentation

- The problem
- Background
- Current project
- Q/A



FTA National Transit Database

2017 Data for Rubber Tire Transit Modes

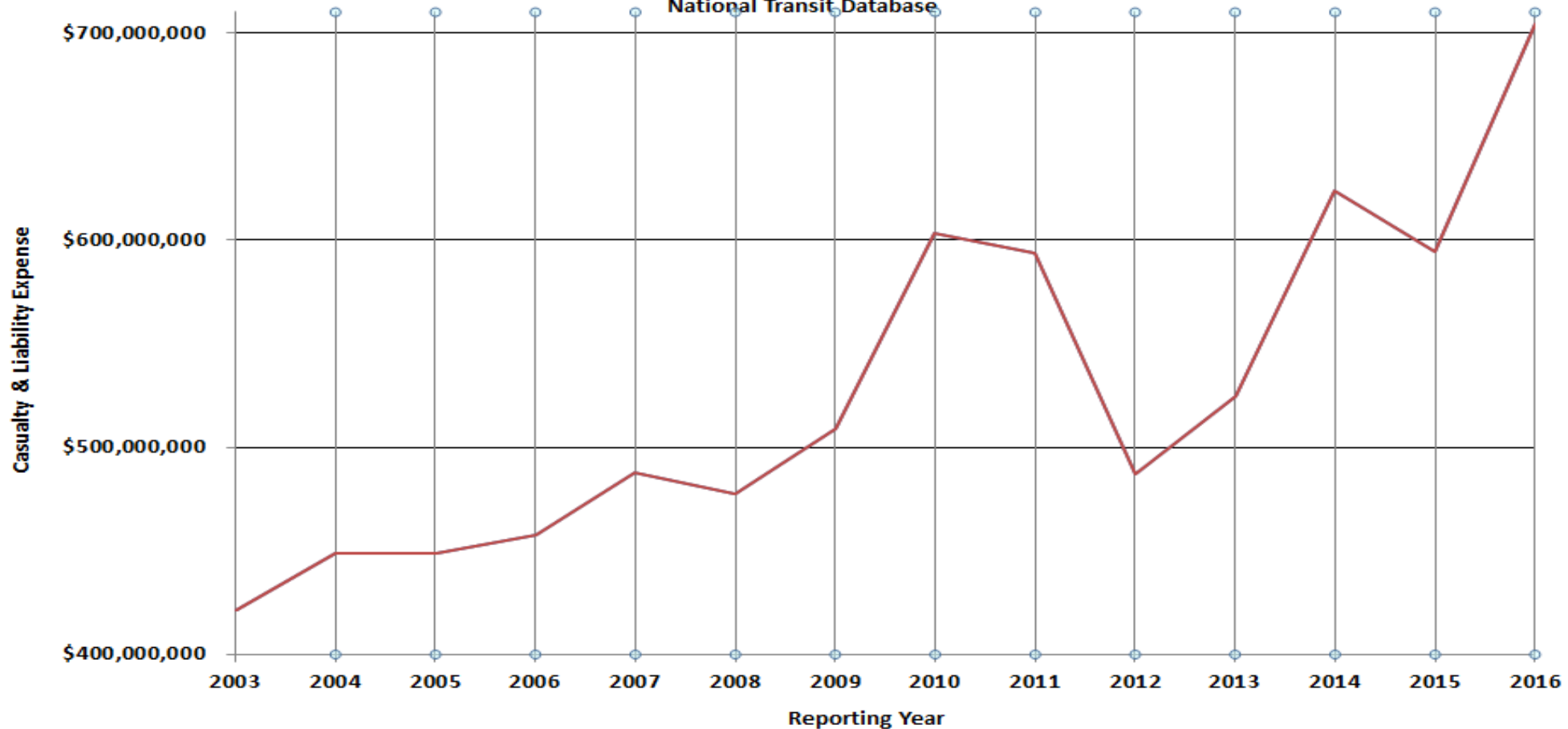
- Collisions = **4,739**
- Injuries = **16,353**
- Fatalities = **98**
- Casualty & Liability Expense = **\$717 Million**



FTA National Transit Database

Annual Casualty and Liability Expenses 2003-2016 Bus/Rubber Tire Transit Modes

Source: Federal Transit Administration
National Transit Database



Project Origin



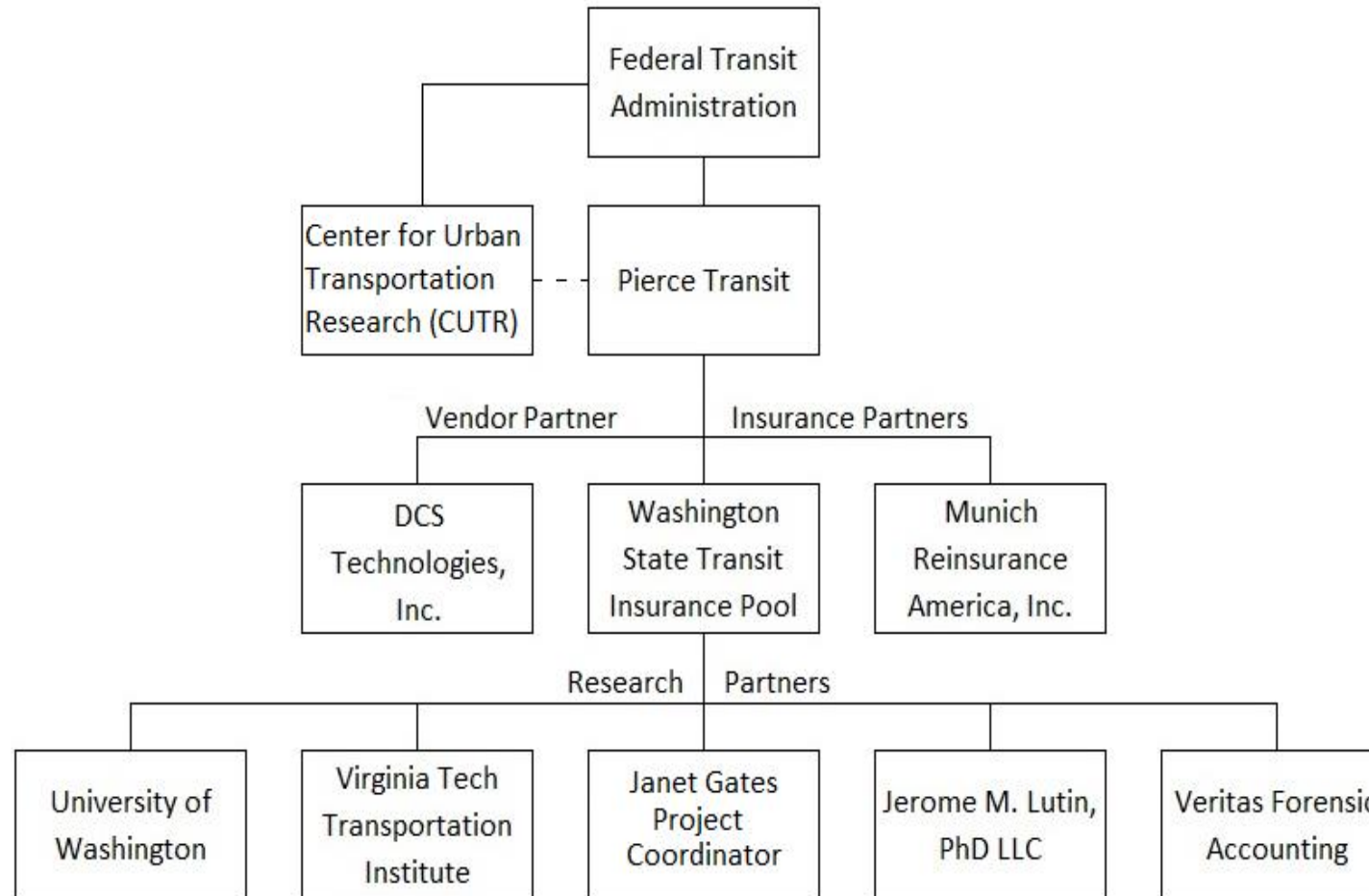
Transportation Research Board Program Innovations Deserving Exploratory Analysis (IDEA)

Active Safety-Collision Warning Pilot in Washington State

TRANSIT-82



Project Organization and Partners



CAWS/AEB System being tested

- DCS Technologies, Inc. Pedestrian Avoidance Safety System (PASS)
- Detects objects using three Light Detection and Ranging (LiDAR) sensors
- Actuates de-throttling
- Actuates braking
- Warns driver
- Locates bus position using GPS
- Logs events when system is activated



Project Evaluation Performance Measures

- System Effectiveness
 - System Accuracy
 - Change in Driver Performance
 - Reductions in Stopping Forces, Reaction Time, and Effect on Bus Passengers
 - Driver Acceptance
- Safety
 - Collisions
 - Injuries
 - Fatalities
- Return on Investment
 - Insurance Claims
 - Internal Costs
 - Equipment Life Cycle Costs
 - Net Benefits

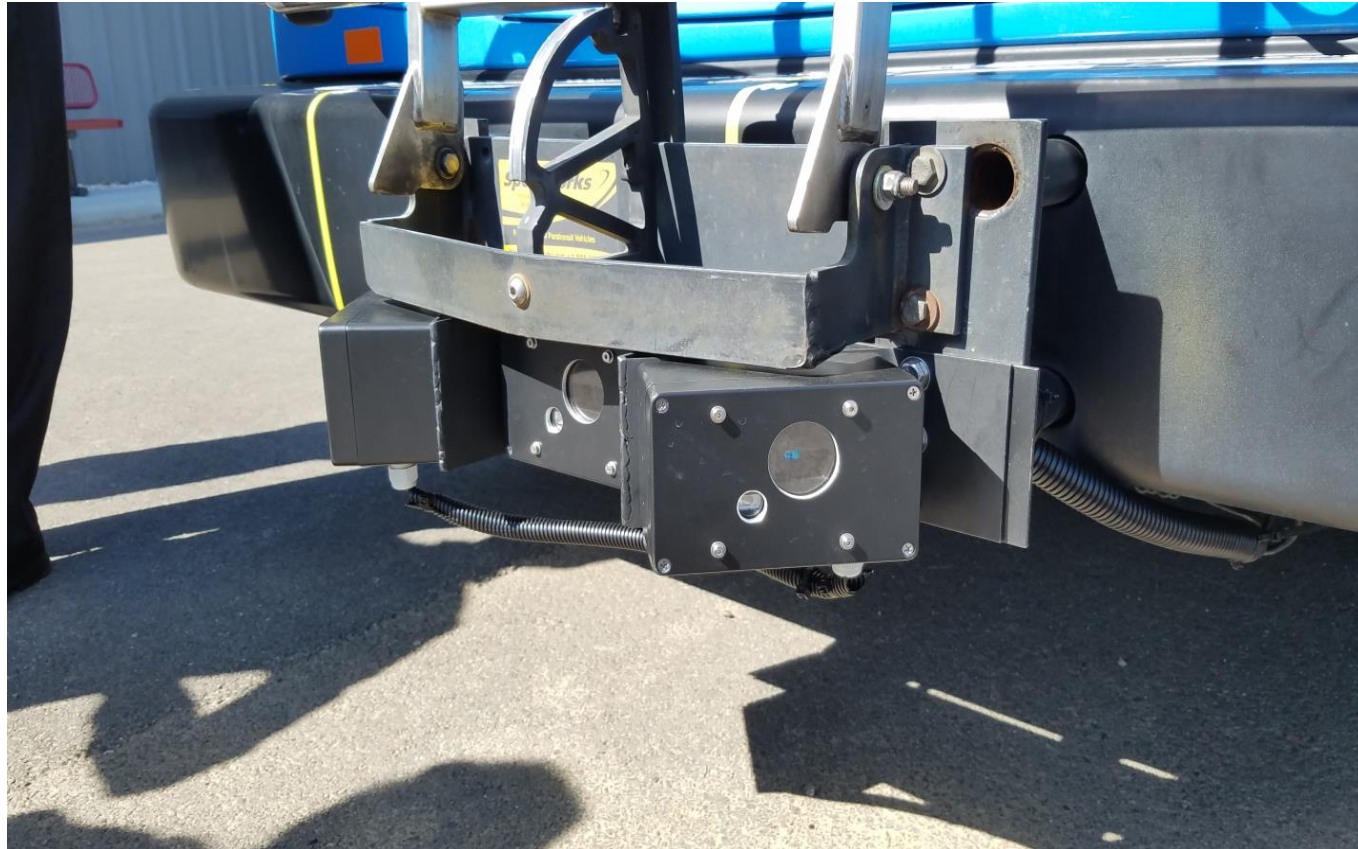


Project Phases

- Phase A. Test planning, instrumentation, and documentation
- Phase B. Closed-Course Alpha Testing and Passenger Motion Testing
- Phase C. In-Service Engineering and Data Collection Testing - 4 buses
- Phase D. Revenue Service Field Demonstration – 30 buses
- Phase E. Project Reporting and Evaluation



PASS lidar sensor package for collision avoidance



Drone view and graphical overlay of bus approaches on test track intersection at VTTI



VRU Collision Avoidance Test



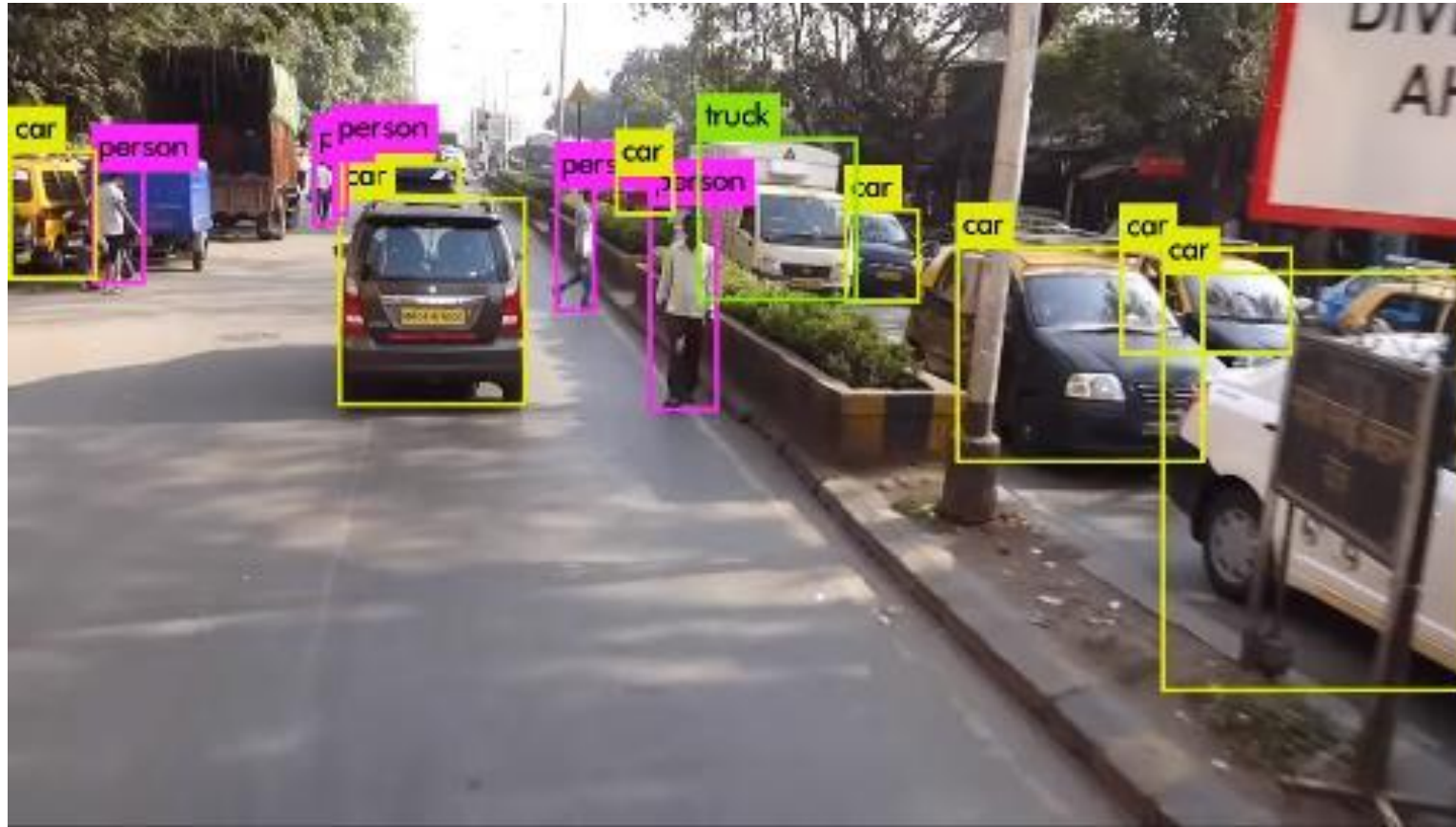
Forward Collision Testing at Virginia Tech Smart Road Facility



Passenger Motion Testing



University of Washington Transit Event Logging System (TELS)



Q/A

