Sustainable Freight: Opportunities for ITS and Connected Automation

- **Truck Platooning**
  - Coordinated Adaptive Cruise Control
  - Energy consumption & emissions reduction by 5% - 15%

- **Truck Eco-Routing**
  - Calculate route that minimize fuel consumption or a specific emission
  - Account for real-time traffic, road grade, and combined vehicle weight
  - Simulation shows tradeoff between fuel consumption and travel time: 9%-18% fuel savings with 16%-36% travel time penalty
**Connected Vehicle Applications for Freight**

**Freight Eco-Approach and Departure at Signalized Intersections**

Source: Noblis, November 2013

Vehicle Equipped with the Eco-Approach and Departure at Signalized Intersections Application (CACC capabilities optional)

Traffic Signal Controller with SPaT Interface

Traffic Signal Head

Traffic Signal Controller Unit

V2I Communications: SPaT and GID Messages

V2V Communications: Basic Safety Messages

Roadside Equipment Unit

Vehicle Equipped with the Eco-Approach and Departure at Signalized Intersections Application

**Freight Signal Priority**

V2I Communications: BSM + Environmental Data + Signal Priority Request (may include schedule adherence, number of passengers, etc.)

Source: GDOT, February 2014

**Truck Eco-Driving**

Source: University of Michigan Transportation Research Institute, MICHTEC 2015
Dynamic Management of Energy and Emissions (DEEM)

- Managing Energy Consumption and Emissions in Real-Time
  - Dynamic in terms of both spatially and temporally
  - Management from both industry and regulatory perspectives
  - Emissions of greenhouse gases, criterial pollutants, and air toxics

- Objectives of DEEM strategies

Disadvantaged Communities