

## FHWA STOL Project

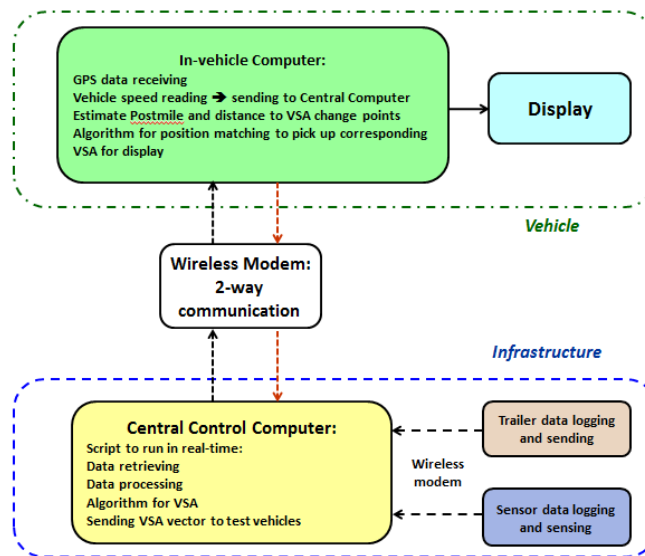
# System Specs: Hardware and Software

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## 1. Overall System Structure

The overall system structure for the test is shown in Figure 1, which includes the test vehicle, traffic detectors, on-vehicle computer and display on each vehicle, cellular communication unit (such as 4G modems), and a central control computer. They are linked with the central computer located at the STOL using 4G cellular modems (V2I). This 2-way communication can pass the advised speed to the test vehicle and the actual vehicle speed can be passed to the Central Computer, where it will be used as a probe vehicle speed sensor. This is beneficial in the cases when the test vehicle is driving at a lower speed than the set speed due to slow traffic in its immediate front.



**Figure 1.** Concept of Operation - Overall system structure

## 2. Component Specs for SAIC Lab Server

### (1) Computer system:

- Main server computer at SAIC Lab
- Computer on vehicle
  - o Desktop computer
  - o Serial port

- o USB port
- o Memory 4~8 G
- o Hard disk: 500G
- o 3~5 cores

(2) Operating System

- QNX Real-Time Operation System: Version 6.0 ~ 6.5

(3) Functionality of the Computer:

- Run 4G Modem
- Run speed sensor
- Run radar and lidar
- Run GPS
- Packing all data and send to SAIC central control computer
- Receiving data from SAIC central control computer

(4) 4G Modem and Antenna, Amplifier

3. Roadside Sensors (Trailers)

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4. Component Specs for Systems on CACC Vehicles

(1) Computer System

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- Serial port
- USB port
- Memory 4~8 G
- Hard disk: 20G ~40G
- 3~5 cores
- Power supply
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(2) Operating System

- Linux or QNX

(3) LED Display and Mounting

(4) Modem Antenna

(5) Cables

(6) Speed sensor and interface with computer

(7) GPS (5~10 Hz) and interface with computer

(8) Radar and/or Lidar (with detection range: 120m) and interface with computer

Xiao-Yun: The specification of sensors and interfaces with them, would depend on the requirements of the algorithms that decide on position (dead reckoning & GPS on the vehicle) and the variable speed advisory (from the VSA server). The latter also would have to take into account the network latency implicit in sending speed and position to the server via a cellular modem. I spoke with Christopher Nowakowski about the requirements for the Renault project