Slide 1: Vehicle Hardware/Software Interface

The PATH CACC installation on a given vehicle comprises a PC-104 computer running the realtime operating system QNX 7.0 and four subsystems:

1. Several CAN interfaces to the car and a Panda CAN device for capturing and modifying ACC messages.
2. A DSRC or C-V2X radio for sending and receiving Basic Safety Messages to and from other CAVs and the RSU
3. An HMI interface that can run on a Windows or Linux PC
4. An RTK GPS device for precise geolocation

The PC-104 computer that is running QNX 7.0 contains a control algorithm and four software interfaces corresponding to the hardware subsystems. Interprocess communication is done using native QNX messaging and a memory server called db\_slv that is registered with QNX.

Slide 2: Software Interface

The control algorithm and interfaces of slide 1 are broken out into the corresponding programs. The control algorithm is argonne\_cacc, the hardware drivers in black transduce and encode data from the CAN buses, C-V2X radio, GPS, and HMI, and the database clients in blue convert raw data into physical units for use by argonne\_cacc.

Slide 3: Intersection and Signal Controller Hardware Interface

Depiction of the RSU and signal controller inside the roadside cabinet. In the old setup at UC Berkeley there was a wireless modem that connected with the UC backhaul and then to the Windows computer running Aimsun. This would be replaced by the Cohda or Harman RSU