ITS PCB Community College Workshop

Session 4: Wednesday July 15, 2020 1:00 p.m. - 2:30 p.m. ET

Andy Berthaume (U.S. DOT) provided a summary of the first three sessions of the ITS PCB Community College Workshop.

Deb Curtis (FHWA) and Leidos staff working at Turner-Fairbank Highway Research Center (TFHRC)'s Saxton Transportation Operations Laboratory (Saxton lab) then gave a virtual tour of the TFHRC areas related to connected and automated vehicles (CAV).

Smart garage: Contains equipment used for development and testing of new applications and use cases, including:

- CAV fleet for the Connected and Automated Research hardware and software (CARMA platform).
    - CAV interior hardware:
        - Sensors that allow for localization, lane detection, and object detection.
        - On-board units (OBU) - allow communication with other CAVs and connected infrastructure.
    - CAV exterior hardware:
        - Radar units, located on the sides and front of the CAV. Allow it to sense objects, speed, and motion.
        - LiDAR unit, located on top of the CAV. Allows it to identify its position and links to object detection cameras in the CAV.
- Trailer with connected mobile traffic sensing system. The system includes a microwave sensor that detects occupancy, volume, speed, and classification of vehicles and can count vehicles.
- Thermal pedestrian detector that identifies pedestrian position and speed information and sends information to vehicle-to-everything (V2X) Hub.

Communications Hub: Room in the Saxton lab where researchers investigate wireless communication tools, including:

- Spectrum analyzer, which can detect wireless communications.
- Network equipment, which enable the Saxton Development Network to function at TFHRC. The network connects the Traffic Management Center (TMC) to the connected intersection.
- Automated weather station, which detects air temperature, relative humidity, precipitation, and solar radiation.
- V2X Hub, a U.S. DOT open-source development project available through GitHub. Saxton researchers recently added plugins for emergency vehicle preemption, pedestrian safety messages, traveler information messages, and performance metrics.
- TMC, a hub for all of the CAV applications' information.

Equipment loan program: Saxton lab loans CAV equipment to academic and research institutions for educational purposes. Community college instructors may find this program useful. Some of the equipment available are networks, tablets, Global Positioning System (GPS) antennas, OBUs, roadside units (RSUs), and traffic signal controllers. The lab also created a Connected and Automated Vehicle environment (CAVe)-in-a-box, a box that contains all the elements for developing a connected environment, that it loans out. To request a loan, email CAVSupportServices@dot.gov.

Connected intersection: Saxton lab tests CAV applications in the connected intersection on the TFHRC campus. The intersection's connected equipment includes:

- Traffic signals.
- Pedestrian push buttons.
- A signal cabinet, which controls the connected intersection and communicates with other connected infrastructure.
- RSUs, which are wireless radios that broadcast signal phase and timing and map messages from the V2X hub, traveler information messages, and messages from the TMC. They send basic safety messages from the OBUs back to the V2X Hub and the TMC for analysis.
- Dynamic message sign, used for curve speed warning application for the V2X Hub.

Deb Curtis and the Leidos team asked attendees to answer poll questions throughout their presentation to understand their familiarity with the CAV equipment at TFHRC. The team will present additional details about its work in upcoming ITS PCB Community College workshop sessions.