ITS PCB Community College Workshop

Session 6: Wednesday July 29, 2020 | 1:00 p.m. - 2:30 p.m. ET

Key Points (as shown in the webroom)

- CAVe-in-a-box is targeted for transportation education and technical workforce development/training. CAVe stands for "Connected and Automated Vehicle environment."
- It is an implementation of portable infrastructure and mobile components of intelligent transportation system.
- It is designed to close the gap due to limitations in hands-on experience between existing transportation curriculum and the technology in the field.
- Some examples of the CAVe-in-a-box use in the classroom are:
  - Use the mobile kit to broadcast a Basic Safety Message and understand how the message varies over time as the vehicle travels.
  - Understand the correlation among signal phase seen in traffic lights, signal phase shown in the signal controller, and contents of the Signal Phase and Timing (SPaT) message.
  - Understand how dedicated short-range communications (DSRC) can leverage wireless communication between vehicles and infrastructure.
- CAVe-in-a-box can be loaned out from the Equipment Loan program through Saxton Transportation Operations Lab.
- A system design document will be made available early next year that provides detail description of the design and build.
- A typical CAVe-in-a-box costs about $10,000 to build from scratch.

Additional Notes

- Target audience: community college educators, educational laboratory and hands-on learning users and instructors, and researchers interested in connected and automated vehicles (CAVs).
- There two types of CAVe-in-a-box: Infrastructure kit and mobile kit. There are two types of mobile kits: On-board unit (OBU) and OBU with touchscreen.

The Infrastructure kit contains the following:	The mobile kit contains the following:
Traffic controller	OBU
Network router	Controller area network (CAN) connector
Vehicle-to-everything (V2X) Hub	Car power
The box	Wired network switch
The power strip	Antenna mount
Shelves	Touchscreen (in the kits with touchscreen)
Roadside unit (RSU)	

- CAVe-in-a-box uses the following data flows: Ethernet, fiber, wireless (DSRC, cellular-V2X, cellular).
- CAVe-in-a-box will be available through the equipment loan program free next year.
- The ITS PCB Program will continue to communicate between its network of community college instructors and the Turner-Fairbank Highway Research Center (TFHRC) to keep them up to date about progress regarding CAVe-in-a-box.

Q&A

- Can CAVe-in-a-box generate a problem that students can then diagnose and repair? Students who will probably go into technician roles will need to be able to diagnose connection problems, rewire connections, recalibrate devices, and perform other maintenance.
  - TFHRC plans to release software for evaluation through CAVe-in-a-box. They can build this capability into the software because it sounds like a great additional use for CAVe-in-a-box.
- Is there anything we can do in our software and programming classes to complement CAVe-in-a-box, such as develop an app?
  - Yes, students can develop an app in class to be used with CAVe-in-a-box. TFHRC can also develop an app that students can then debug.