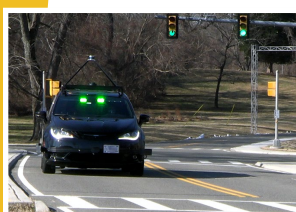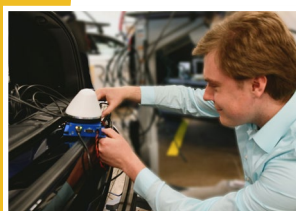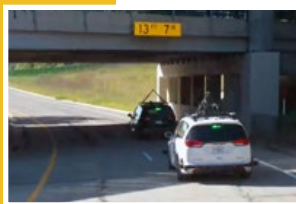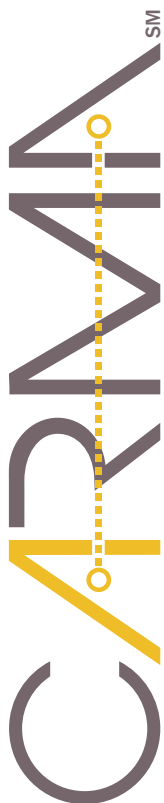# COOPERATIVE DRIVING AUTOMATION

All Photos: FHWA

CARMA^{SM}

Experience All That CARMA_{SM} Has to Offer

Collaborate with the Federal Highway Administration (FHWA) Office of Safety and Operations Research and Development (HRSO) and help create a safer and more efficient transportation system.

U.S. Department of Transportation
Federal Highway Administration

Computer/Control Equipment

○ AStuff Spectra PC with nVidia RTX 2080 graphics processing unit (GPU) running Ubuntu®version 20.04.

○ Crystal™ Rugged RS252S13 2U server for onboard data storage.

○ NovAtel PwrPak7D™ global navigation satellite system (GNSS) with IMU-IGM-S1 inertial measurement unit (IMU).

○ **SoundOff Signal nForce®** light bars mounted in the front and rear windows flash a variety of patterns to indicate status of the vehicle or control system to external observers.

Drive-by-Wire Controllers

○ **AStuff PACMod** drive-by-wire controller. *(Blue and Silver Lexus RX 450h)*

○ **Dataspeed** drive-by-wire controller. *(Ford Fusion)*

○ **New Eagle** drive-by-wire controller. *(Black and White Chrysler Pacifica)*

Communications Equipment

Cohda MK5 onboard unit (OBU) for Dedicated Short Range Communications (DSRC).

○ **Cradlepoint COR IBR900** mobile router for Wi-Fi and 4G long-term evolution (LTE) connectivity.

○ *Pending Addition:* **Cellular vehicle-to-everything** OBU.

Sensors

○ Two **Allied Vision Mako G-319C** cameras with Mobileye® camera development kit.

○ Four **Aptiv SRR2** (formerly Delphi) radars, each mounted on a different corner of the vehicle.

○ One **Aptiv ESR 2.5** (formerly Delphi) for forward-looking midrange, and long-range detection in the front.

○ **Ergoneers Vehicle Testing Kit**. *(Silver Lexus RX 450h)*

○ **Mobileye® 630** camera development kit.

○ **Velodyne Ultra Puck™ VLP-32C** for localization and object detection.

DRIVERS

Follow these links to access CARMA-compatible drivers for the listed hardware:

Allied Vision Mako G-319C

[**GitHub**]

Aptiv (formerly Delphi) ESR 2.5

[**GitHub**]

Aptiv (formerly Delphi) SRR2

[**GitHub**]

AStuff PACMOD

[**GitHub**]

Mobileye 630

[**GitHub**]

New Eagle

[**GitHub**]

NovAtel PwrPak7D

[**GitHub**]

SoundOff Signal nForce

[**GitHub**]

Velodyne Ultra Puck VLP

[**GitHub**]

CARMASM VEHICLE SPECIFICATIONS

Lexus RX 450h - Blue

Lexus RX 450h - Silver

Chrysler Pacifica - Black

Ford Fusion

Chrysler Pacifica - White

All Photos: FHWA

U.S. Department of Transportation

Federal Highway Administration