

# Vehicle Automation Technologies

- **Automated Vehicles (AVs)** are vehicles in which at least one element of vehicle control (e.g., steering, speed control) occurs without direct driver input
- AVs work by gathering information from a suite of **sensors**, which may include:
  - Cameras
  - Radar
  - Light detection and ranging (LiDAR)
  - Ultrasonic, and
  - Infrared
- **Positioning** systems may include GPS, inertial measurement units, and detailed map data
- AVs may combine these data with other inputs, including vehicle-to-vehicle and vehicle-to-infrastructure inputs

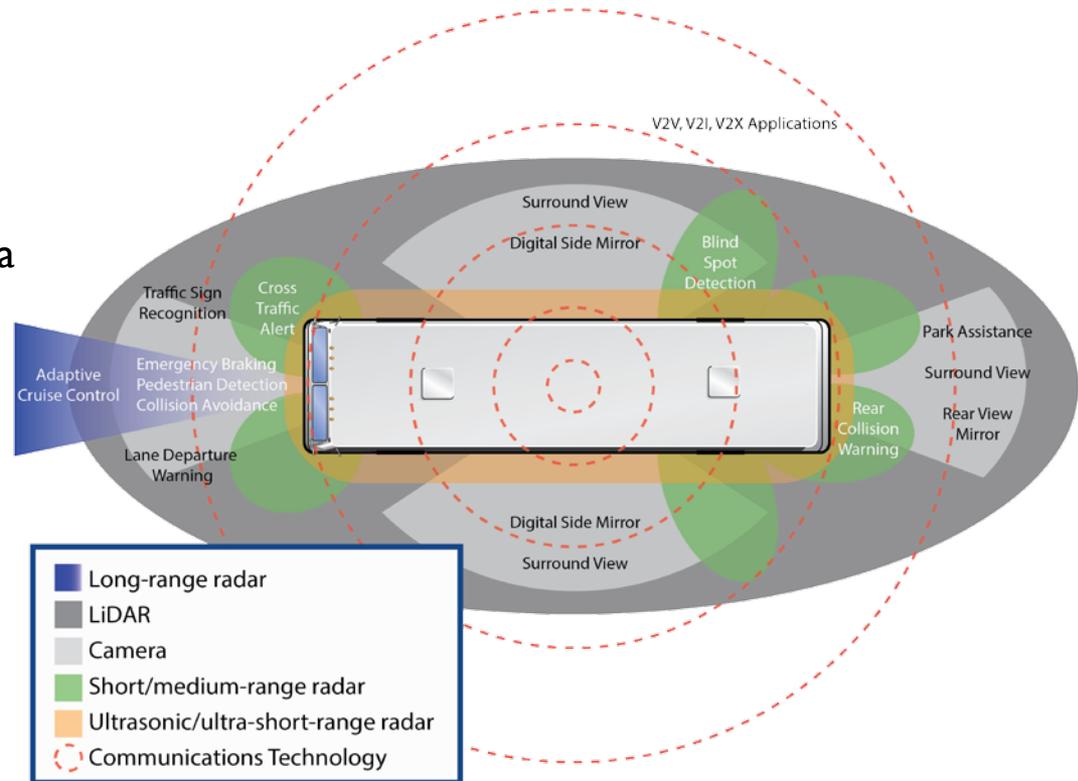
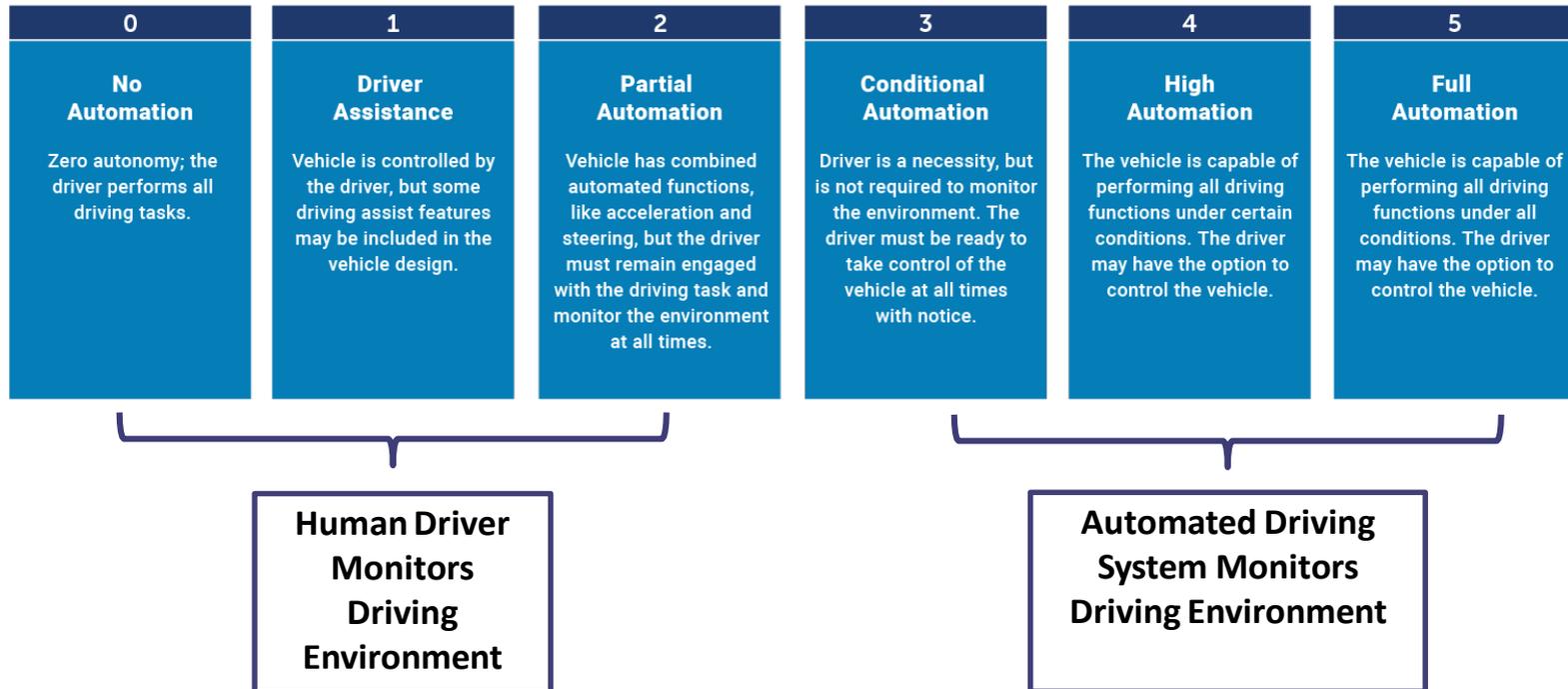
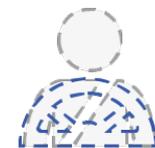
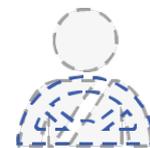


Image Adapted from the Texas Instruments ADAS Solutions Guide

# Levels of Automation

SOCIETY OF AUTOMOTIVE ENGINEERS (SAE) AUTOMATION LEVELS

Full Automation



\*For full description see SAE J3016: Taxonomy and Definitions for Terms Related to Driving Automation Systems for On-Road Motor Vehicles

# Automation in the Transit Industry



**Vehicle Assist and Automation (OR)**



**Bus on Shoulder (MN)**



**Local Motors Olli (MD, NV)**



**GATEway Shuttle (UK)**



**EasyMile EZ10 (CA, TX, CO)**



**Hino (Japan)**



**Optimus Ride (MA)**



**Coast P-1 (FL)**



**Navya Arma (MI, NV)**



**May Mobility (MI)**

*Photo Credits: FTA, ITS PCB, Local Motors, TRL, and Volpe Center*

# Automation at USDOT

- *Automated Driving Systems 2.0: A Vision for Safety*
- Voluntary guidance for automated driving systems
- Technical assistance for state legislatures and highway safety officials
- 12 safety elements for companies to consider and document



<https://www.nhtsa.gov/technology-innovation/automated-vehicles-safety>