

Mcity Test Facility: An Outdoor Lab

The Mcity Test Facility sits on a 32-acre site on U-M's North Campus Research Complex, with more than 16 acres of roads and traffic infrastructure. The full-scale outdoor laboratory simulates the broad range of complexities vehicles encounter in urban and suburban environments.

- State-of-the-art instrumentation throughout the facility includes control network to collect data about traffic activity.
- Augmented reality testing technology allows physical test vehicles to interact with virtual connected vehicles in real time.
- Open-source API controls testing conditions throughout the facility.
- Infrastructure can be controlled with software.
- The facility uses vehicle-to-everything (V2X) communication and 5G connectivity.

Link to interactive map: go.um.city/map

Straight gravel roadway with a rural railroad crossing

Traffic circle, a smaller version of a roundabout that is common in Europe and some older cities in the U.S.

Construction and work zones with flagging, manhole, lane closure

Software-controlled traffic signals within intersections in different configurations, with mast arms, wood and metal poles, and pedestrian crossings

Pavilion with network access and safety equipment

Active railroad crossing with software-controlled gates and signals

Trunk line road, a rural roadway with a fully equipped railroad crossing, guard rail, and temporary and permanent pavement markings

Brick paver road simulated with stamped concrete

Underpass, simulated by a tunnel that blocks wireless and satellite signals from reaching vehicles

Roundabout, an increasingly common approach to intersection design intended to improve safety

ENTRANCE

Garage for test vehicle storage

Bike lanes, bike racks, and bicycles

Variety of pedestrian crossings



Open test area configurable for a wide range of scenarios, including parking lots and novel intersection geometries

4-way stop intersection, with straight as well as tight and sweeping curved approaching roadways

Overhead highway signs

Tree canopy, a simulated tree cover that reproduces the attenuation of signals that pass through trees

Metal bridge deck, a bridge surface that poses special challenges for radar and image processing sensors

Electrical panel for events and vehicle charging

Building facades up to two stories high allow researchers to test the effects of various materials and geometries on sensor performance

Meandering gravel roadway

Sensors for data collection

Limited access freeway with access ramps, highway signage, guardrails, crash attenuators, and a concrete Jersey barrier

Ramp metering

Calibration mound to calibrate inertial measurement sensors on vehicles

Open test area
Robotic platforms include deer and pedestrian mount

Outdoor seating with table, chairs, and bike racks

Adjacent to Test Facility:
Michigan Traffic Laboratory, the traffic control center for Mcity