Smart Intersections and Ann Arbor Connected Environment 2.0 (AACE)

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Connected Environment

Paving the way for safer, greener, and smarter roads

Since 2012, the U-M Transportation Research Institute has served as a leader in connected vehicle research, creating a one-of-a-kind testing environment for all.

Safety Pilot
$30.3M
(2012-2015)

Safety Pilot Model Deployment launched in August of 2012 as the world's first large-scale real-world deployment of CVs.

AACVTE
$15.2M
(2015-2020)

The Ann Arbor Connected Vehicle Test Environment built upon SPMD to become the gold standard for a national deployment.
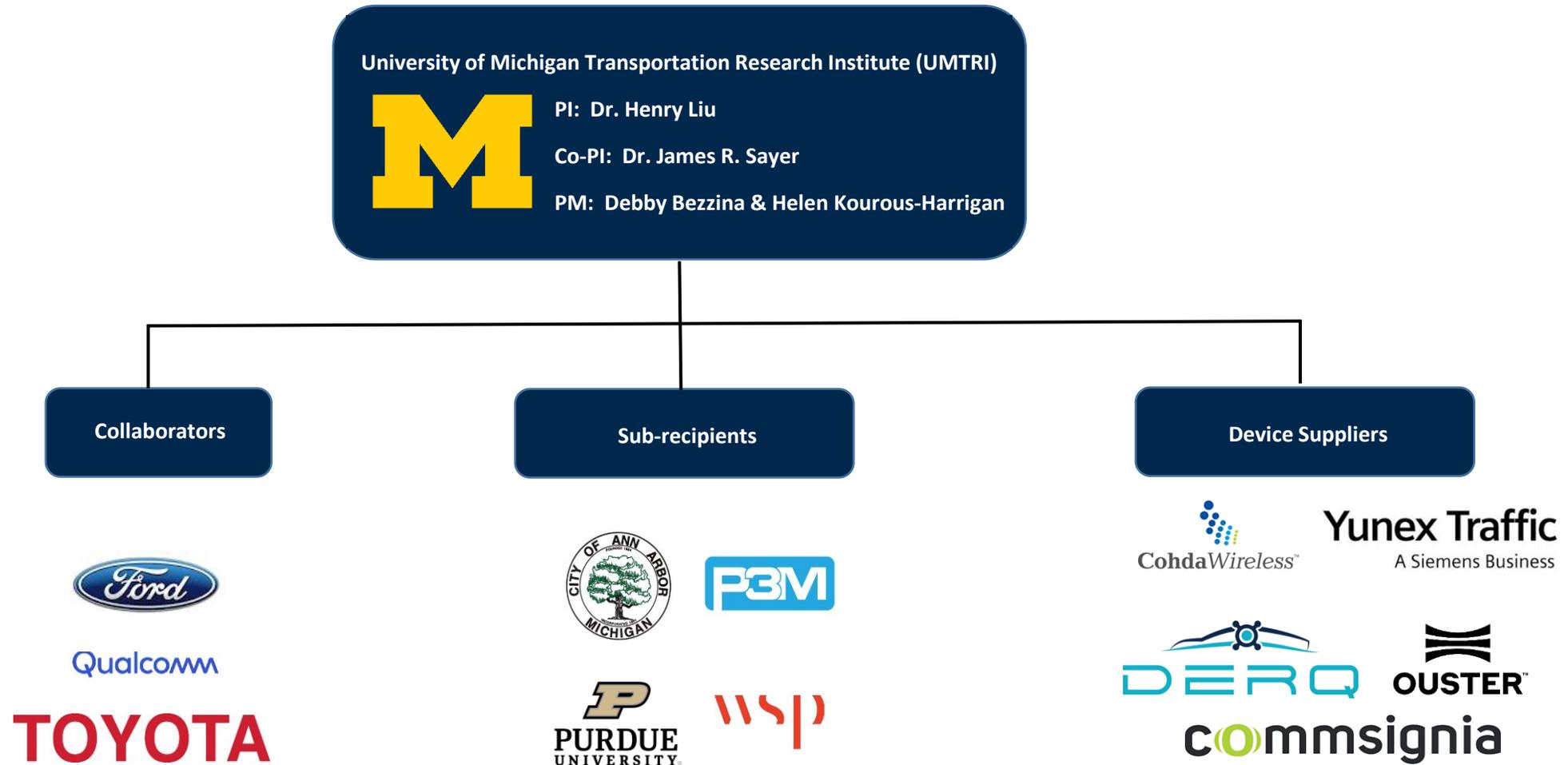
SIP
$19.9M
(2021-2025)

The Smart Intersections Project will deploy infrastructure-based technology to accelerate CAV deployment and build a roadmap for its commercialization.
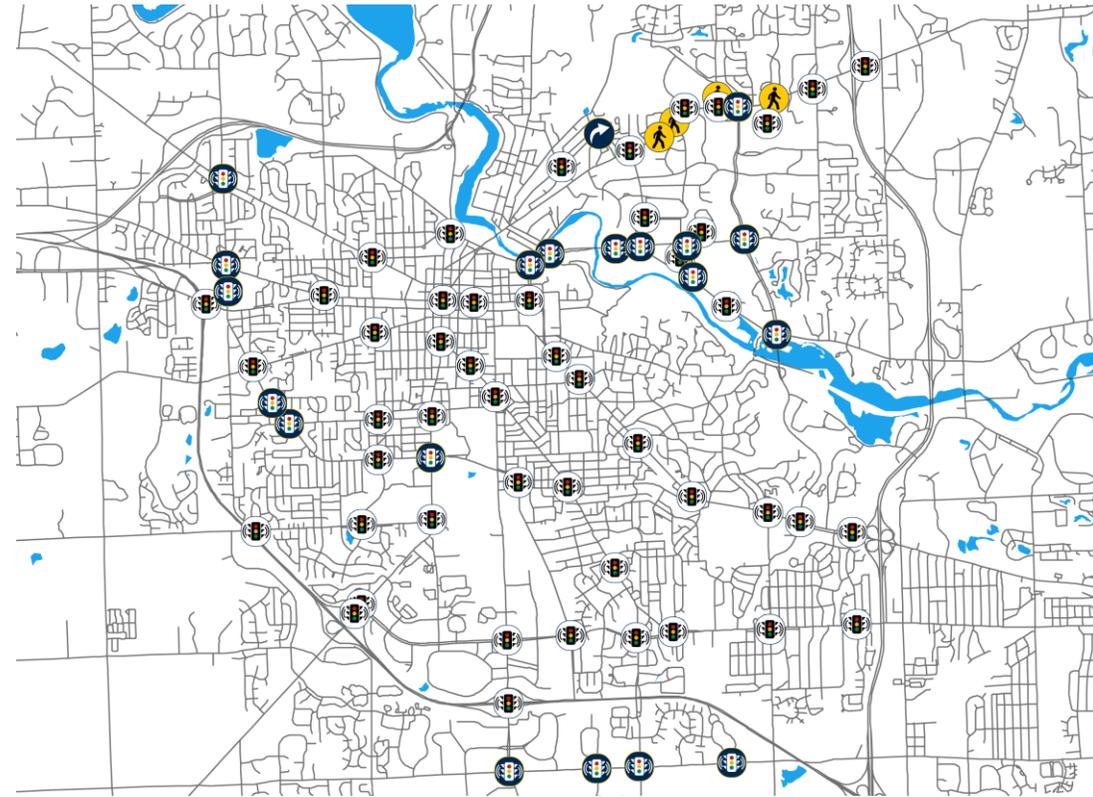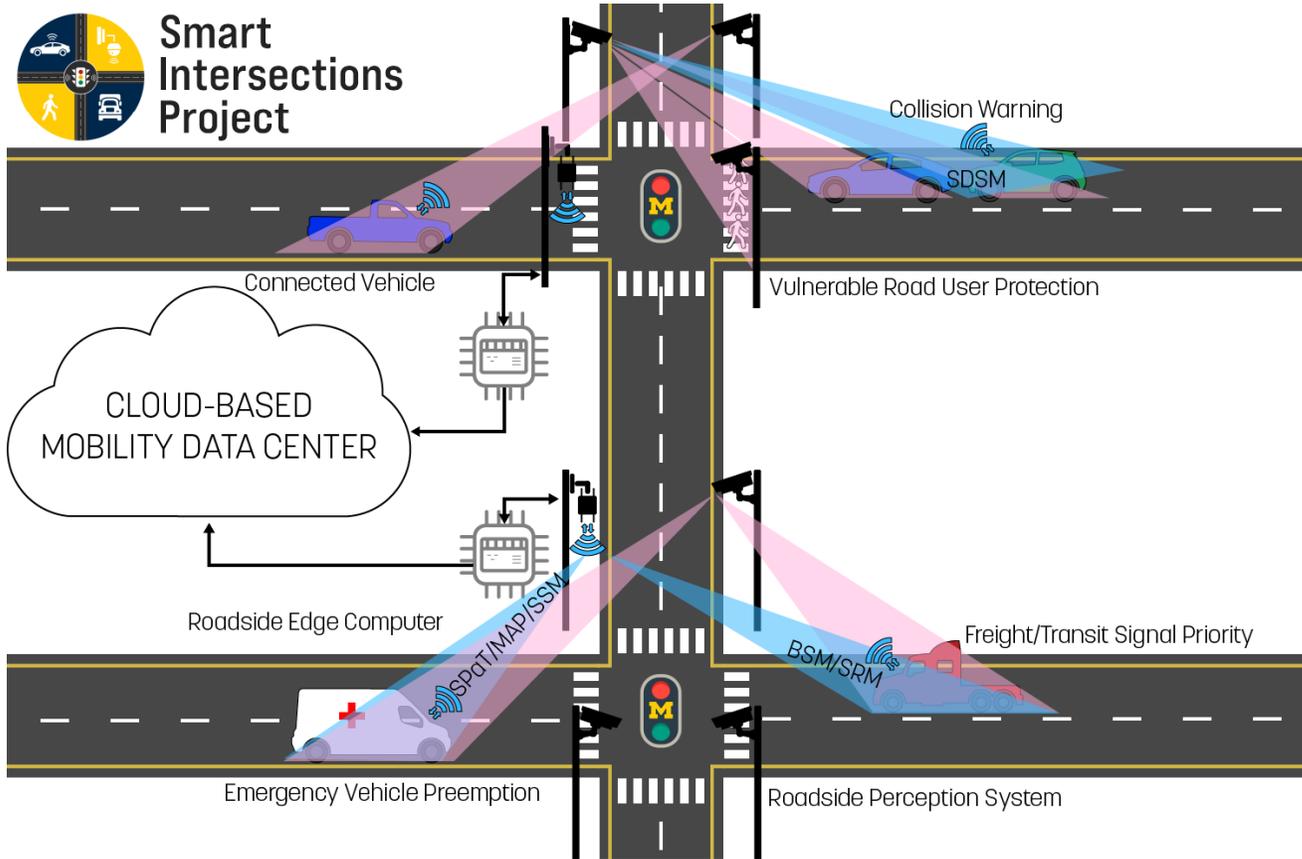
AACE 2.0
$12.7M
(2024 – 2027)

The Ann Arbor Connected Environment 2.0 will convert the existing connected vehicle deployment to C-V2X.
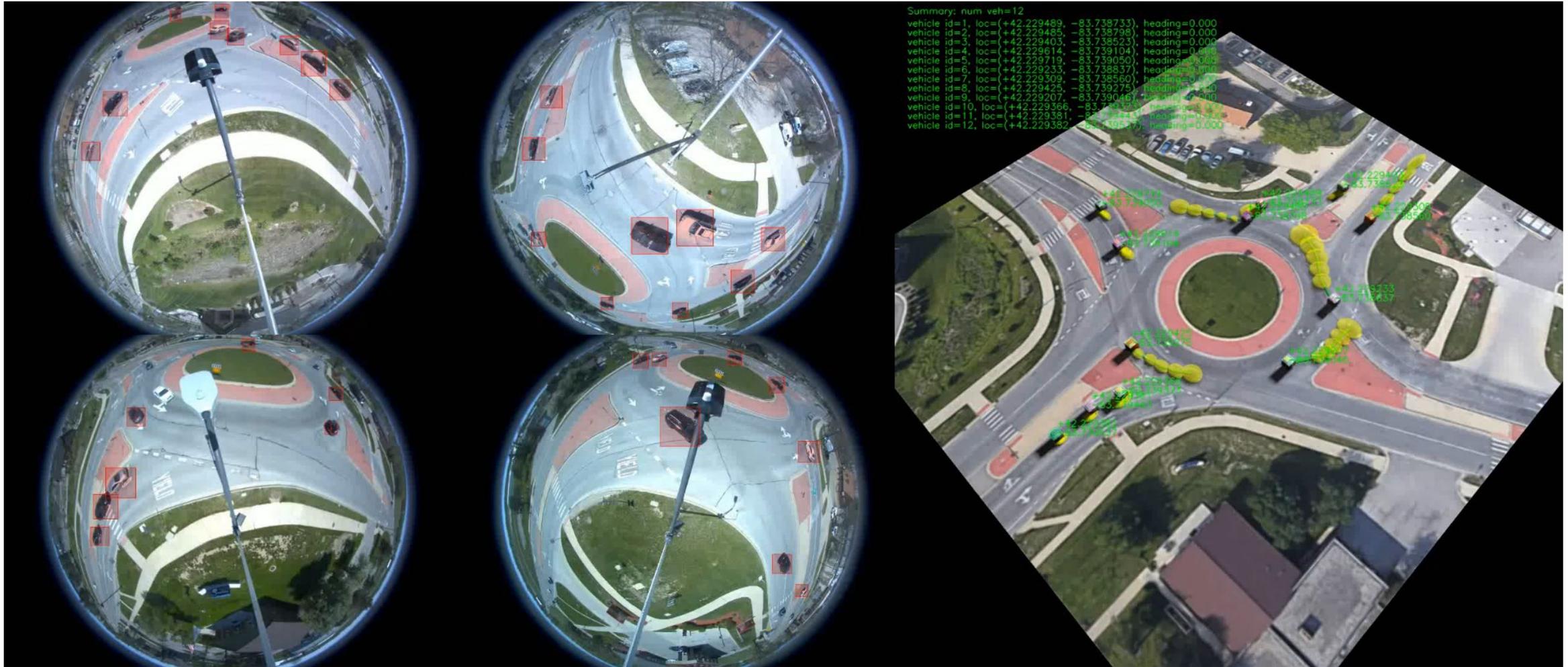
The Smart Intersections Project

Smart Intersection Project Overview

To improve intersection safety by providing infrastructure-based safety-critical messages to connected vehicles
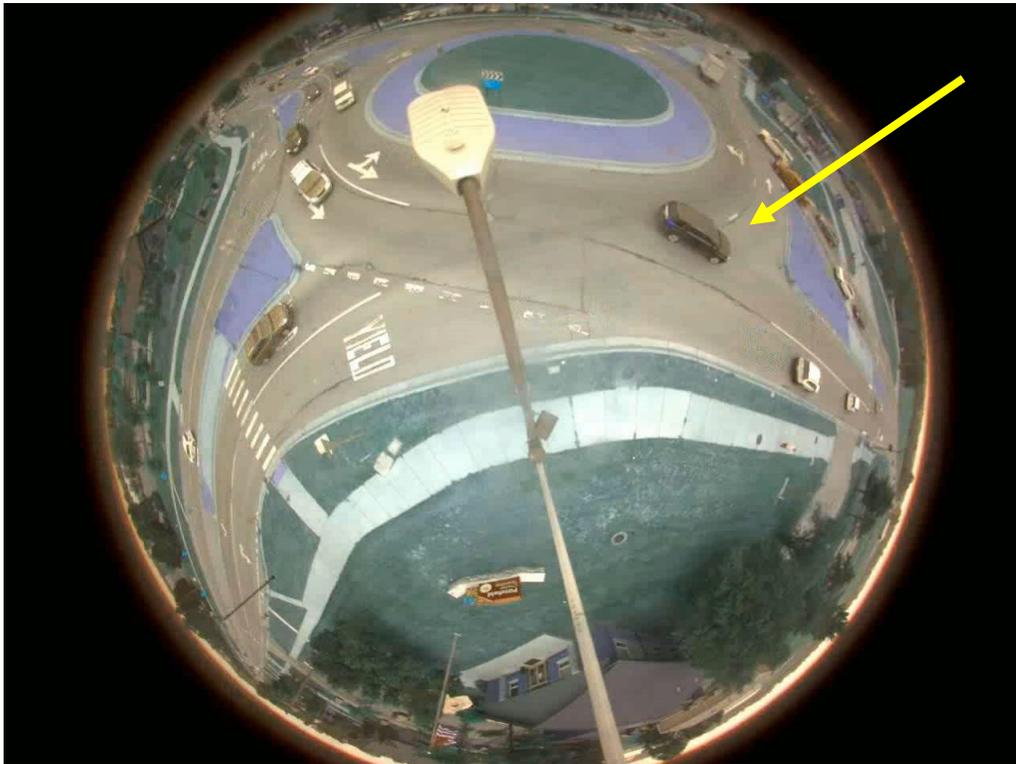
Msight Roadside Perception (Object Detection, Fusion, Tracking, and Prediction) at State St./Ellsworth Rd. Roundabout in Ann Arbor
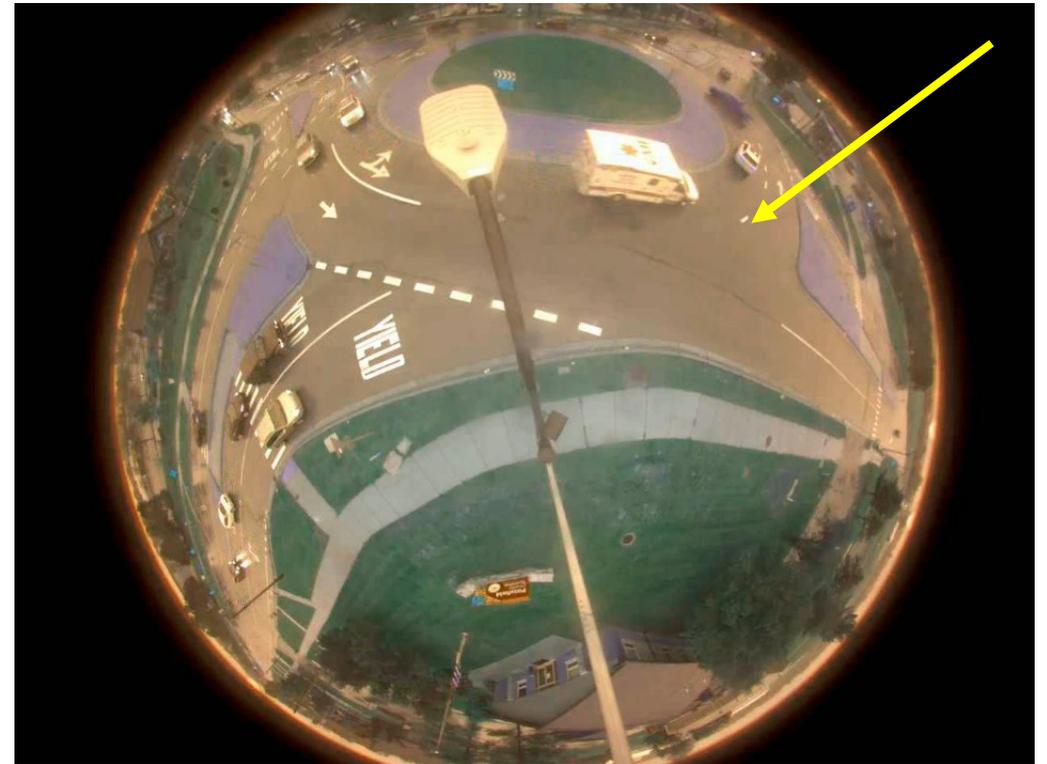
Crash and Near-miss Detection

STATE OF MICHIGAN TRAFFIC CRASH REPORT

Crash verified with police report
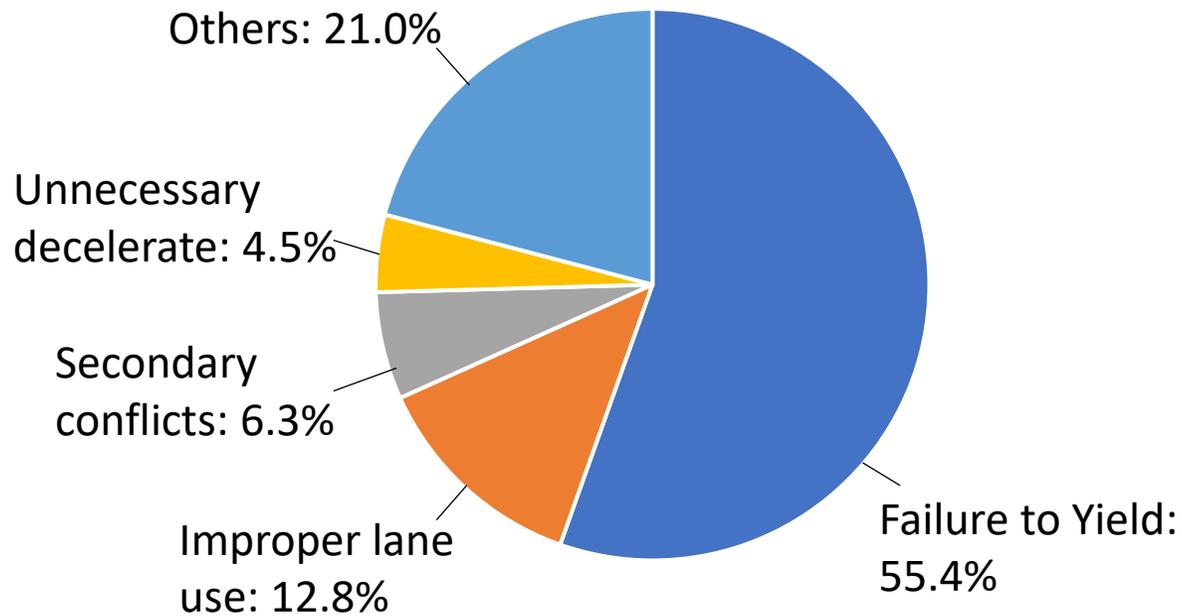
Near-Miss Detection
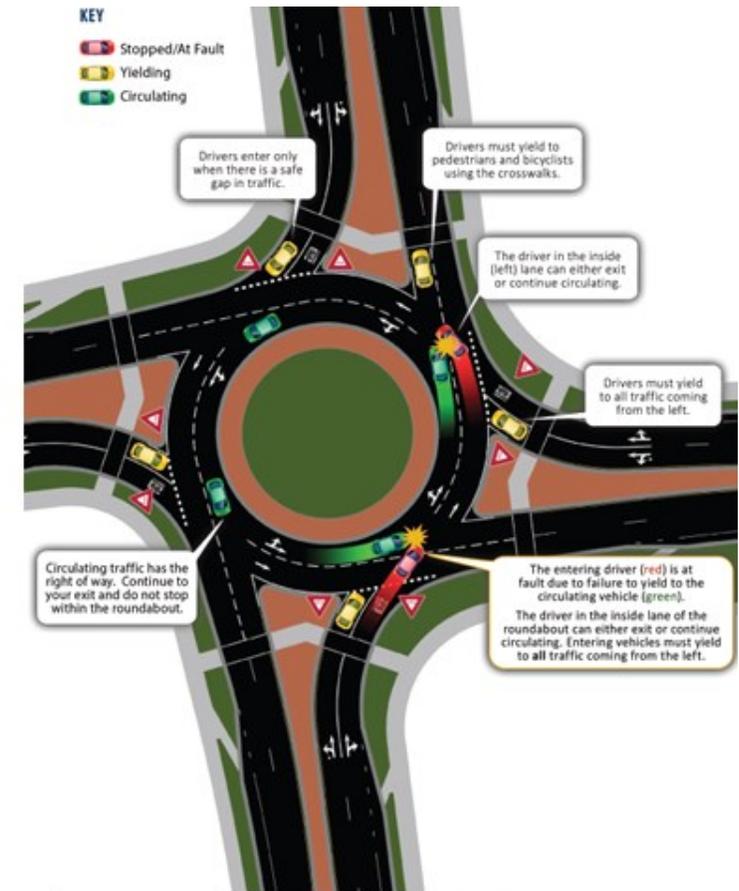
A crash detected on Sep 13th, 2021, 14:04:56

A Conflict detected on Oct 24th, 2021, 17:52:18

Near-miss statistics at State St./Ellsworth Rd. Roundabout in Ann Arbor

❑ During 07/07/2023 – 08/07/2023:

❑ Statistics of 397 detected conflicts are shown as follows:

Others: 21.0%

Unnecessary
decelerate: 4.5%

Secondary
conflicts: 6.3%

Improper lane
use: 12.8%

Failure to Yield:
55.4%

Statistics on reasons leading to conflicts

KEY
- Stopped/At Fault
- Yielding
- Circulating

Drivers enter only when there is a safe gap in traffic.

Drivers must yield to pedestrians and bicyclists using the crosswalks.

The driver in the inside (left) lane can either exit or continue circulating.

Drivers must yield to all traffic coming from the left.

Circulating traffic has the right of way. Continue to your exit and do not stop within the roundabout.

The entering driver (red) is at fault due to failure to yield to the circulating vehicle (green).

The driver in the inside lane of the roundabout can either exit or continue circulating. Entering vehicles must yield to all traffic coming from the left.

Diagram courtesy of Ourston Roundabout Engineering

Common mistakes at roundabout from Ann Arbor Police Department

Application 1: Roadside Assisted Collision Warning for Cooperative And Connected Intersections
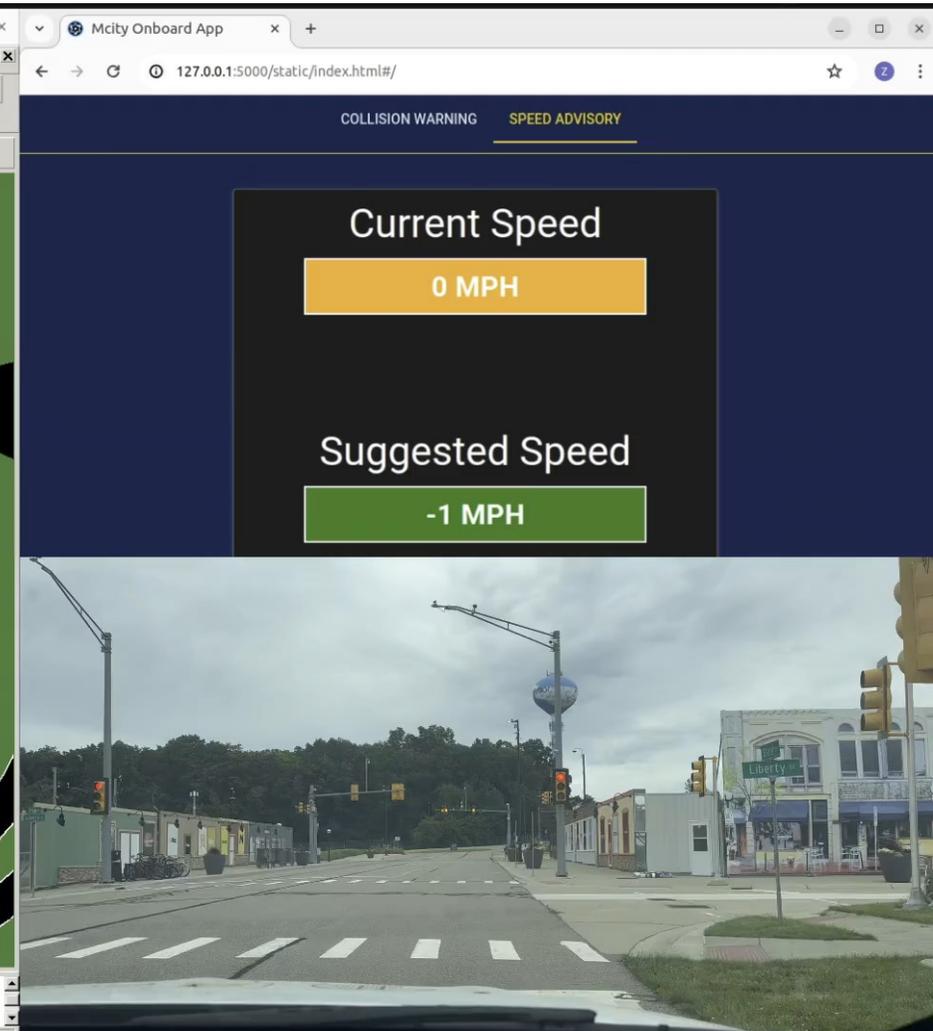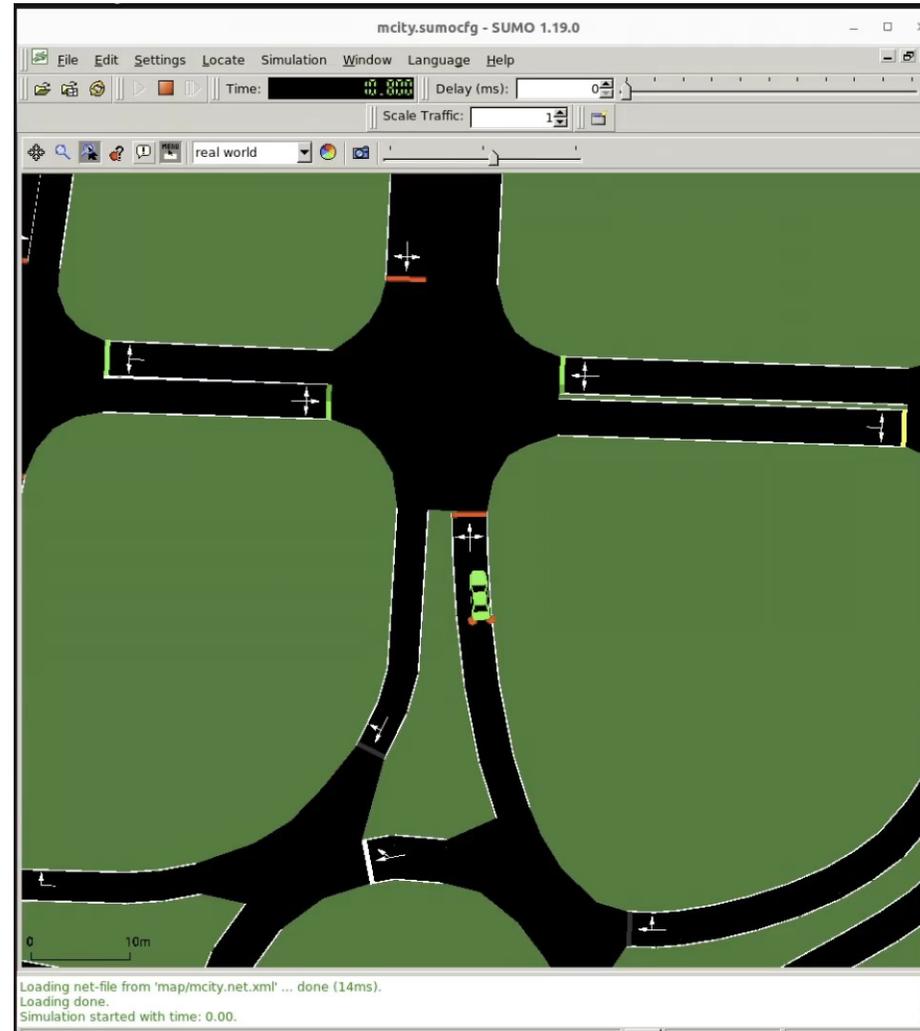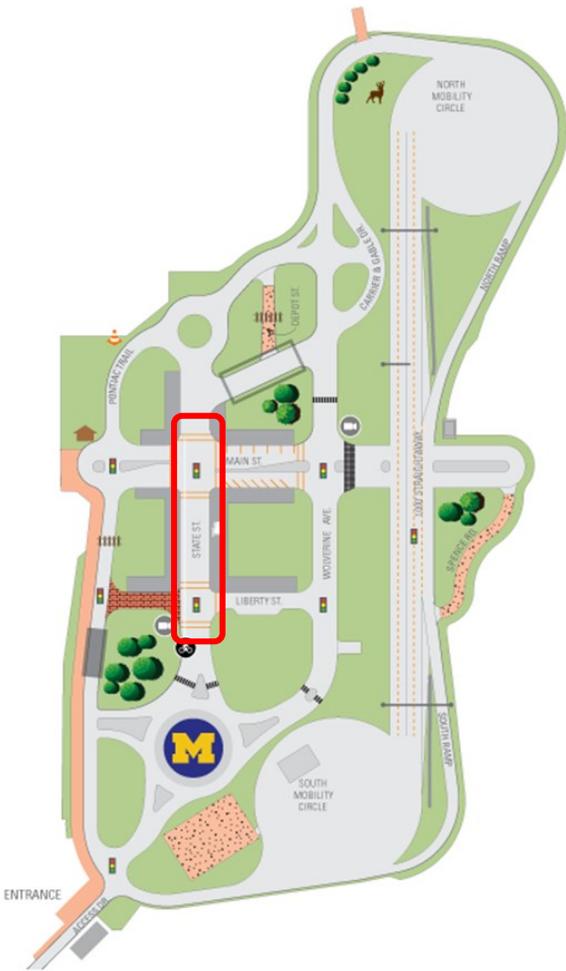

Roadside camera 1
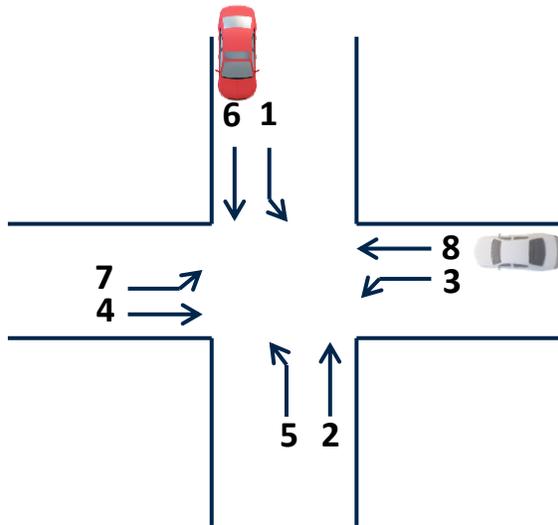
Roadside camera 2

Ego vehicle

Roadside Perception

Ego vehicle

Application 2: Green Wave Speed Advisory for Connected Intersections

Application 3: Traffic Signal Priority

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5 ↖	2 ↑	7 ↗	4 →

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