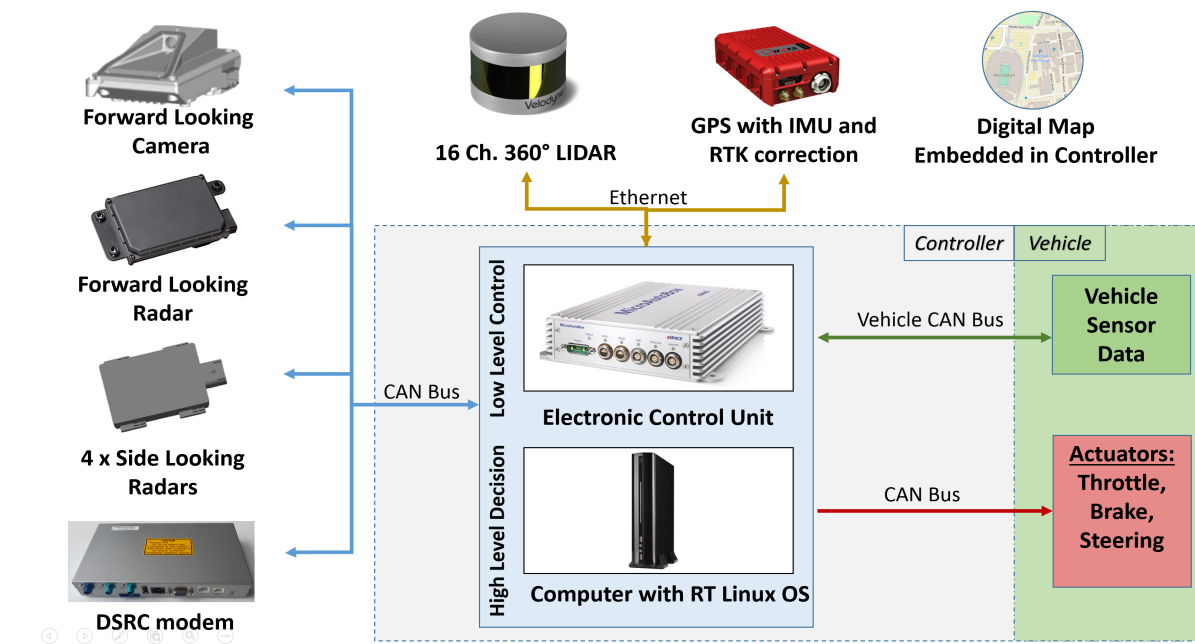AUTOMATED DRIVING LAB | CENTER FOR AUTOMOTIVE RESEARCH

UNIFY - Smart Shuttle

A Scalable and Replicable Architecture for Low Speed Automated Shuttles in Smart Cities
PIs: Prof. Levent Guvenc Prof. Bilin Aksun Guvenc Prof. Keith Redmill (The Ohio State University)

Forward Looking Camera

16 Ch. 360° LIDAR

GPS with IMU and RTK correction

Digital Map Embedded in Controller

Ethernet

Forward Looking Radar

Controller | Vehicle

Vehicle Sensor Data

Vehicle CAN Bus

Low Level Control

CAN Bus

Electronic Control Unit

4 x Side Looking Radars

Actuators: Throttle, Brake, Steering

CAN Bus

High Level Decision

Computer with RT Linux OS

DSRC modem

Impact & Benefits

- The scalable and replicable nature of the Smart Shuttle approach allows results to be easily transferred and adapted to other vehicles, deployment sites and different cities.
- Full mobility solution for people who cannot easily commute to work due to the first-mile, last-mile problem.
- Expected reduction in accidents and traffic jams which will increase the safety and quality of life of those people who are affected by it.
- OSU campus proof-of-concept deployment site will be in an under-served area of campus that connects highly populated labs to the rest of the campus transportation network.

Unified – Replicable – Scalable

- Unified architecture that can be implemented on different vehicles to make them autonomous.
- Replicable design solution that can be transferred from one vehicle to another.
- Scalable lateral and longitudinal controllers and automated driving tasks (path following, car following, collision avoidance) that can be used to control different types of autonomous vehicles.
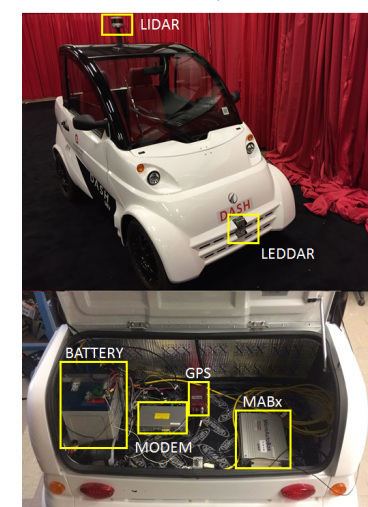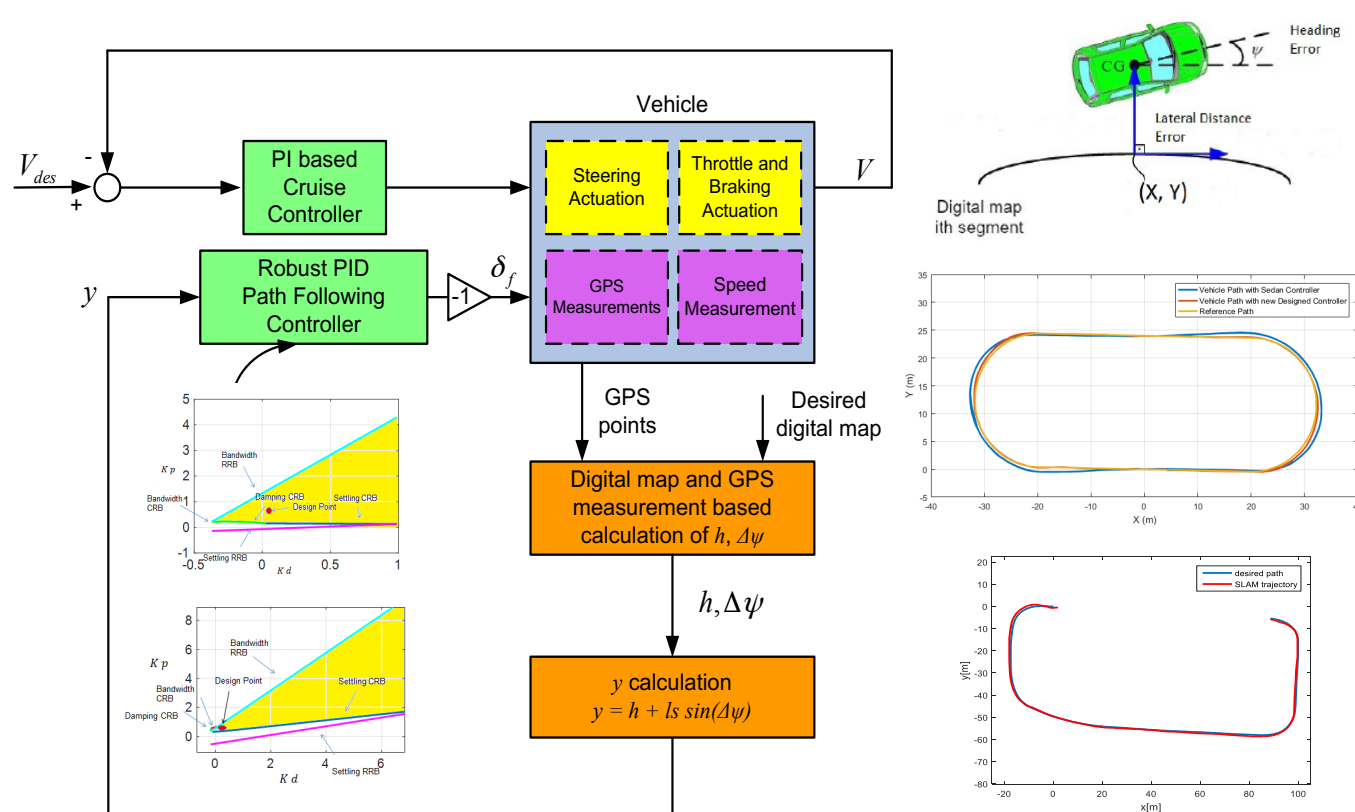

Replicability

Scalability

Scalability

Replicability

Proof-of-Concept Deployment Sites

- Vehicles are first deployed in realistic CAV hardware-in-the-loop simulator (HiL).
- Smart Autonomous Shuttle (Dash) deployed successfully in private parking lot (above).
- Smart Autonomous Shuttle (Dash) will be deployed in OSU AV pilot test route (below).

Acknowledgement

THE OHIO STATE UNIVERSITY

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