F1/10

Submitted by [akarns](#) on Wed, 05/08/2019 - 10:46am

F1/10 is a high-performance autonomous racing car that is 1/10th the size of a real car and can reach a top speed of 50mph. It carries a full suite of sensors; the

perception, control and networking software stacks that make it autonomous. Out of the box, F1/10 can map an environment, plan a path in it, and follow that path while avoiding obstacles. If you needed to augment the capabilities of the car to enable the research (e.g. add an existing vision algorithm, or a coordination algo), you would share that back with the community. F1/10 makes it easy to facilitate a wide range of experimental research in Safe, Secure, Coordinated and Efficient Autonomy. More details at http://f1tenth.org/

Over the past 3 years, we have developed F1/10 into an autonomous vehicle research and education platform with several international racing competitions. We now want to turn F1/10 into a community effort so it can support research on autonomous systems and self-driving cars in perception, planning, control, verification, and real-time systems. As a community platform, it will include:

1.

Wifi Control

Electronic Speed Controller

LiDAR

RBG Depth Camera
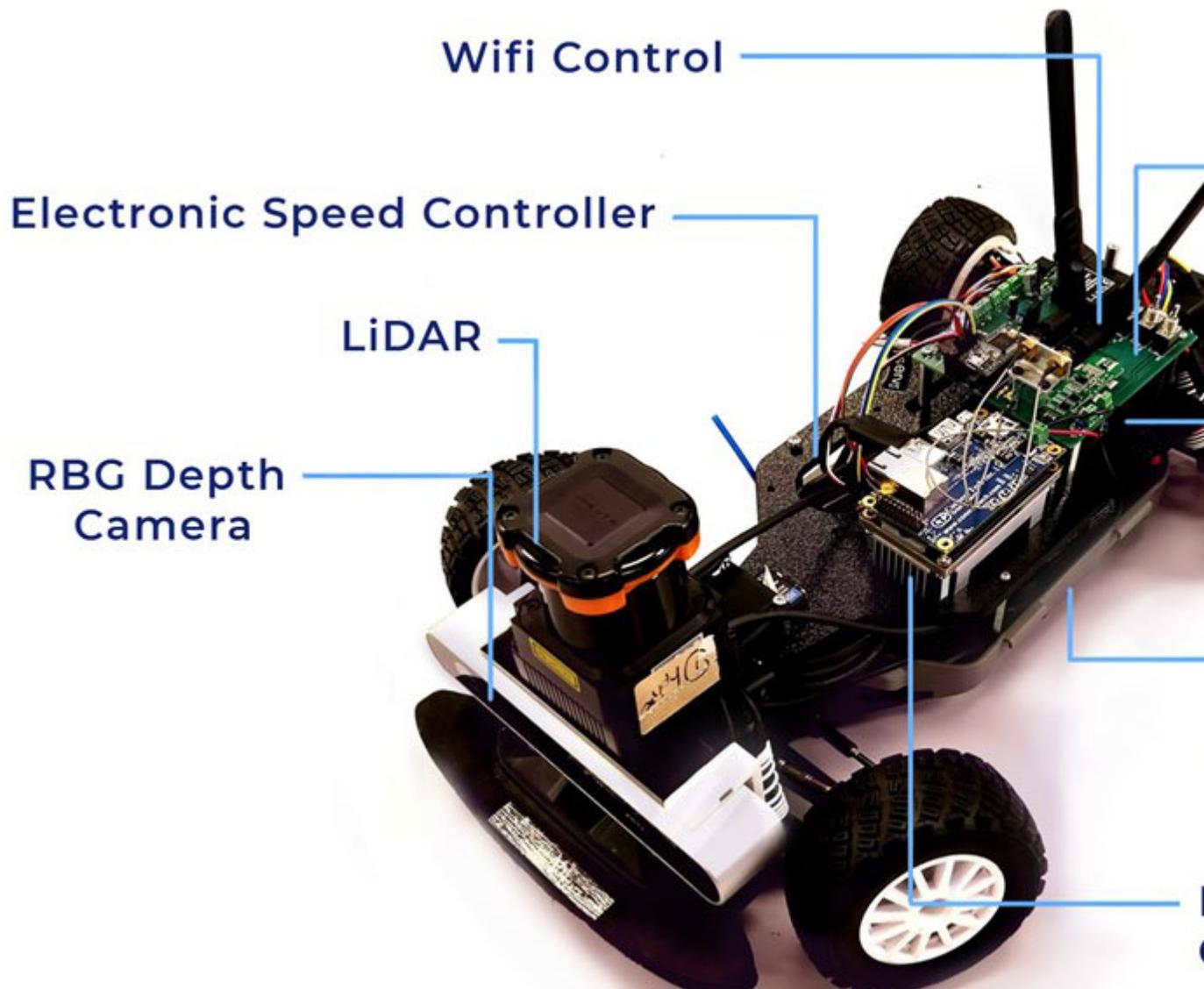
    A complete, ready-to-race, 1/10th-scale self-driving car. This includes the hardware (on-board GPGPU computer and AV sensors), system software (drivers, telemetry, speed control), and an algorithms suite (code for perception, planning, control, and verification). All software is built using the Robot Operating System (ROS) in a modular and easily extensible way. The high-performance mechanical chassis can reach speeds of 40mph, and the on-board computer is an Nvidia Jetson TX2, the de facto workhorse for autonomous systems. Schematics for all custom-made components are also included, whether 3D-printed, laser-cut, or printed circuit boards.

2. **Reference manual:** A professionally-produced comprehensive guide to every step of acquiring the car's

components, building it, programming it, driving it and racing it.

3. **Material for a semester-long class on self-driving cars:** this includes the lecture slides, recorded lectures for a flipped classroom, reference papers, lab handouts, starter code for the labs, and complete solutions for both the theoretical and coding parts of each lab.

4. **Demo kit:** a script to follow when demonstrating the F1/10 car at local outreach events, such as high schools and museums. It includes the script to follow, slides, videos, code for the demonstration, schematics, bill of materials for laying a racing track, and much more.

5. **f1tenth.org Website:** a one-stop shop for all things F1/10, including the Reference Manual and a discussion forum for F1/10 racers from around the world.