CAR-CAR 2
First Person Viewing and Control of Remote Vehicles

In 2013-2014, a team from ELE worked on a capstone project, CAR-CAR. This acronym stands for Computer Assisted Remote Car, and the goal of the project was to develop a simulator like experience while viewing a live camera feed, and the ability to control a wireless scale car. While the operation of the target vehicle may be unrealistic in terms of the speed, acceleration, and turning ability, the feedback delivered to the driver will be similar to the sensation experienced as if the driver was in the vehicle.
The team, which included Cory Jalbert and Christopher Grayson, completed the project with great success. We now have a working remote controlled car, with First Person Viewing capabilities, and with onboard sensors that transmit car dynamics data back to the host computer. A video of this is at http://youtu.be/igOfVio3ML4

This year, the capstone project involves further development of the concept to include the following features:

1. The bandwidth from the remote camera has to be increased to support communication from multiple on-board cameras.
2. Development of driver feedback devices including tactile, haptic and force feedback.
3. Use of Oculus Rift or other VR device to display video data.
4. Extend communication range.
5. Replicate CAR-CAR1 with second vehicle.

This project will require 2 Electricals and 1 Computer engineers. The role of the participants will be:
Electrical: To improve circuitry for CAR-CAR and CAR-CAR2. Refine onboard computers and sensors to collect car and roadway data. Develop and integrate sensors for GPS, vibration/acceleration from different placements in the vehicle. Design and develop devices for transmitting received feedback to the driver (vibration, force, point-of-view translation). Develop and integrate distance and car-2-car communication sensors to facilitate autonomous and platooned driving.
Computer: Develop simulations and implement algorithms for autonomous driving for CAR-CAR and CAR-CAR2. Display data received on VR device.