Challenge #8 Autonomous Driving with Remote Monitoring and Control

Your Task: create a system that drives your vehicle through an indoor course without operator (human) control. The system should leverage control strategies for driving the collision avoidance (from challenge 4) and indoor positioning (from challenge 6). Your solution should also provide a real time data stream (challenge 3) including position information that should be displayed on a remote computer console (challenge 2) illustrating position information of your vehicle. Your system should also allow a human to take control remotely (challenge 3).

You will integrate the following solutions

- Autonomous driving and collision avoidance using provided sensors, speed control and servo steering
- Indoor location sensing and reporting to a base station to log location information at the base station
- Real-time visualization of position based on logged information, displayed at a remote terminal
- Remote control from a disparate IP network to permit course corrections and safety features and to take over control of vehicle
- First-person video streaming from the crawler to the remote site where the crawler is being controlled

Very important: This effort requires achieving two modes: controlled remotely, a human will be able to toggle between these modes:

A. Self-driving the course (first lap)
B. Remote control with accident avoidance (second lap)

Notes:

- The course will use the single loop around the west end of the 4th floor in Photonics passing the windows at the West end and passing the elevators in the middle.
- The use of the pi as host for position data is a bonus
- The use of multiple access points is encouraged to overcome limits of a single Linksys router.
- Please see the rubric for the required and qualitative assessments.

Learning objectives: synthesize work in sensing, networked feedback control, localization with beacons, remote access, and visualization to achieve an autonomous navigation and control problem.