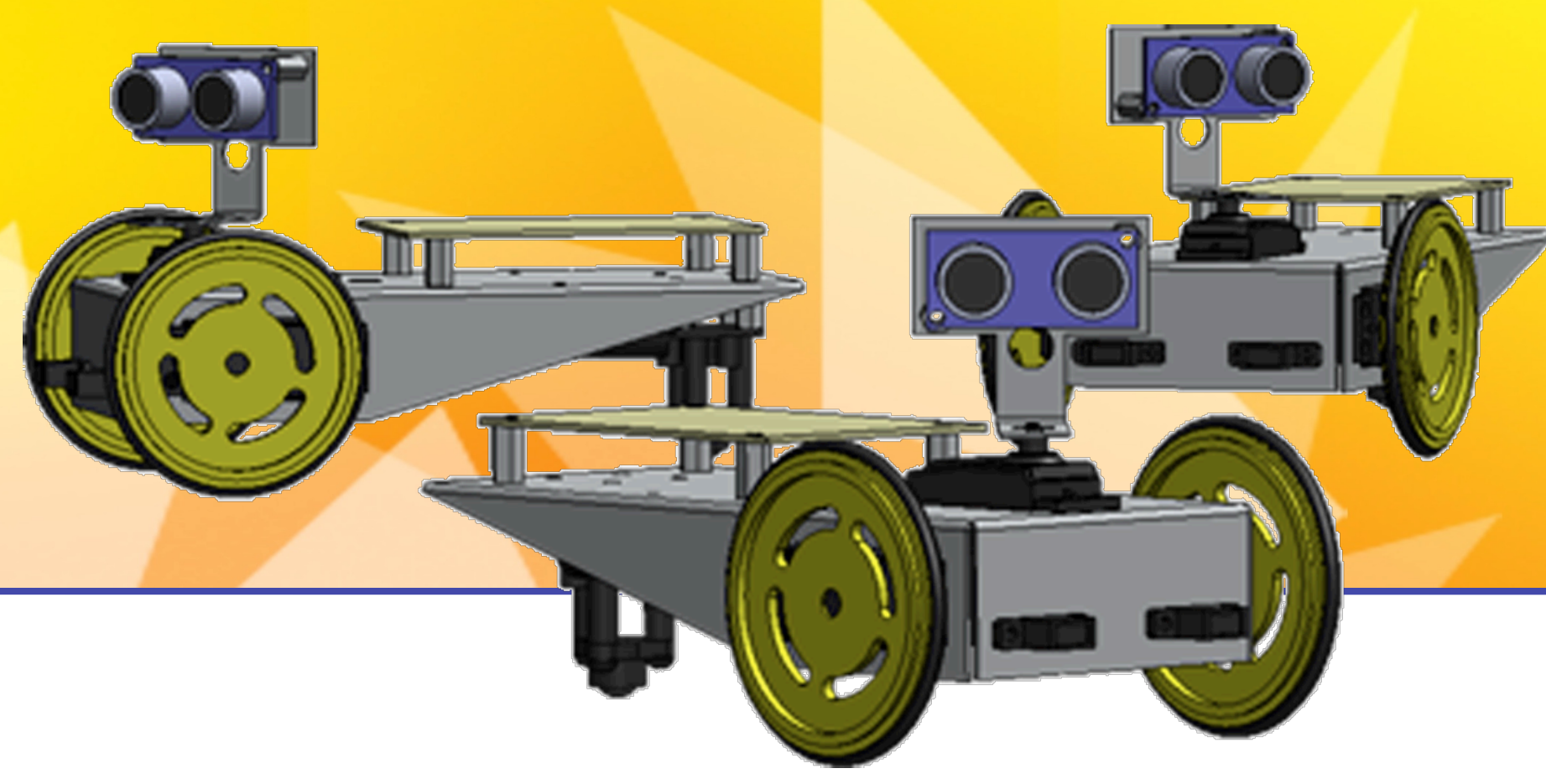


Building a Swarm MapperBot

Raphael Cherney | Daniel Grieneisen | Jacob Izraelevitz
(ID 138) (ID 191) (ID 215)



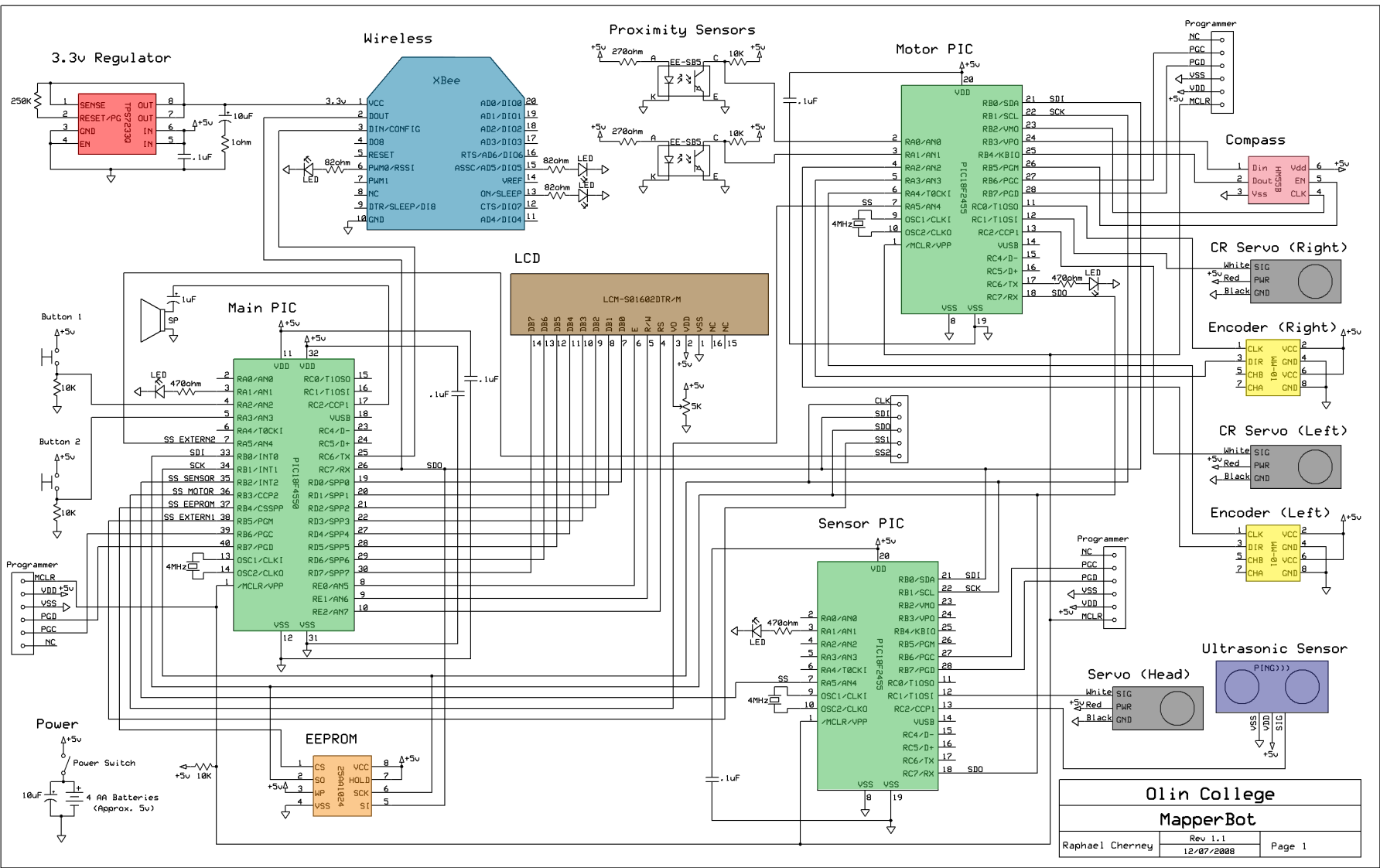
Vision

Carl is a small mapping robot we designed this semester. He currently performs the following functions:

- Autonomously navigates a terrain
- Adds detected obstacles to a global map

Next semester, we plan on expanding this project into multiple intercommunicating robots as a swarm robotics research project.

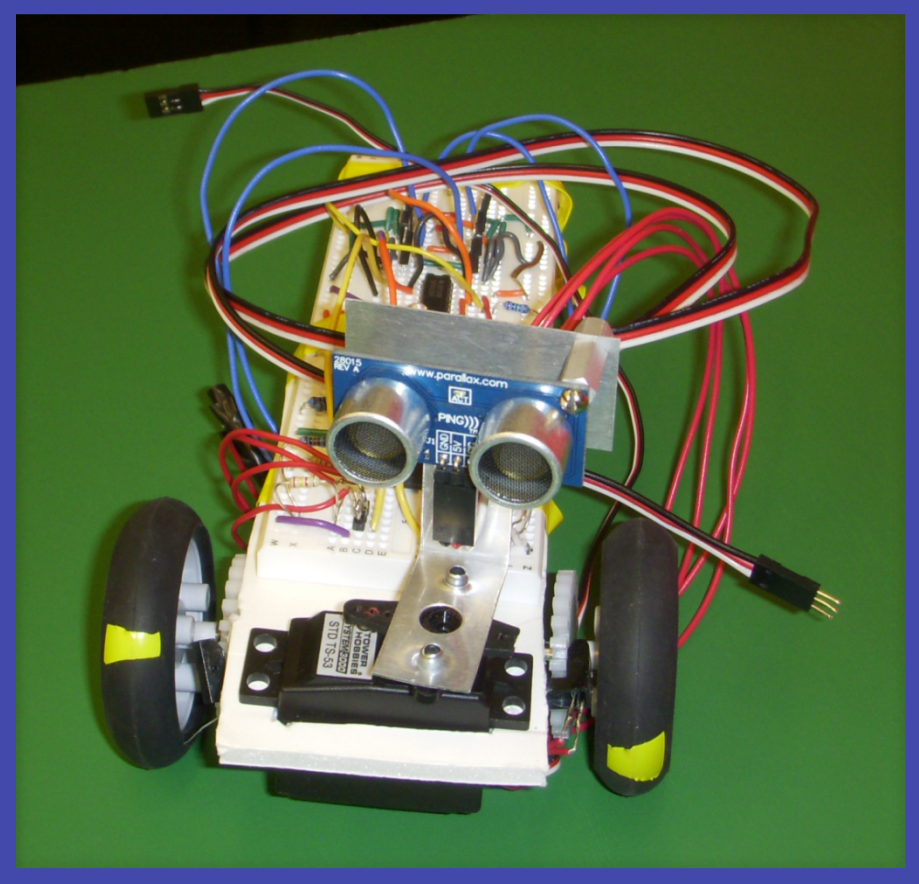
Circuit



Revision History

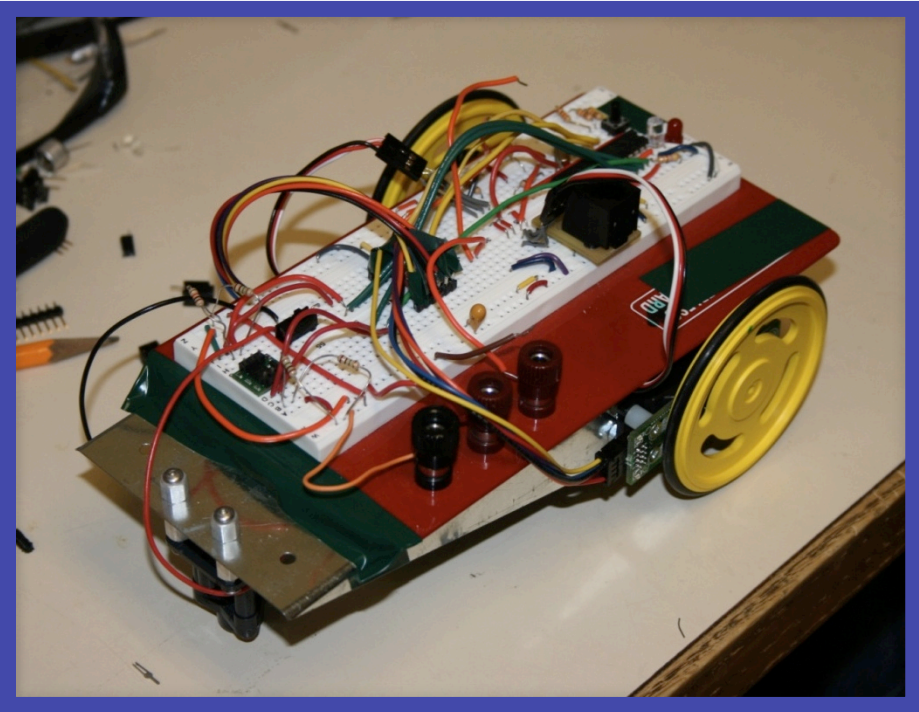
Scotty

- Cheap
- DC motors and Tamiya gearbox
- Laser cut encoders



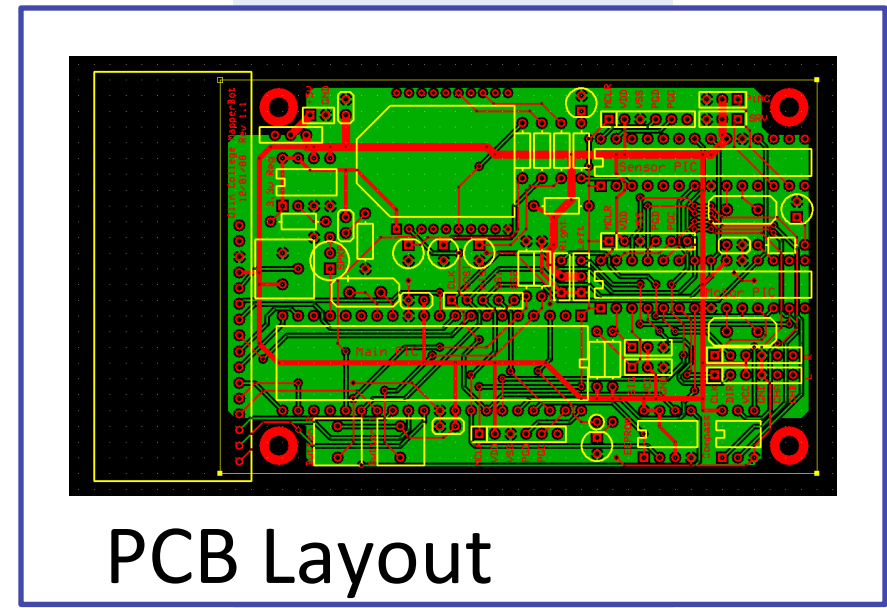
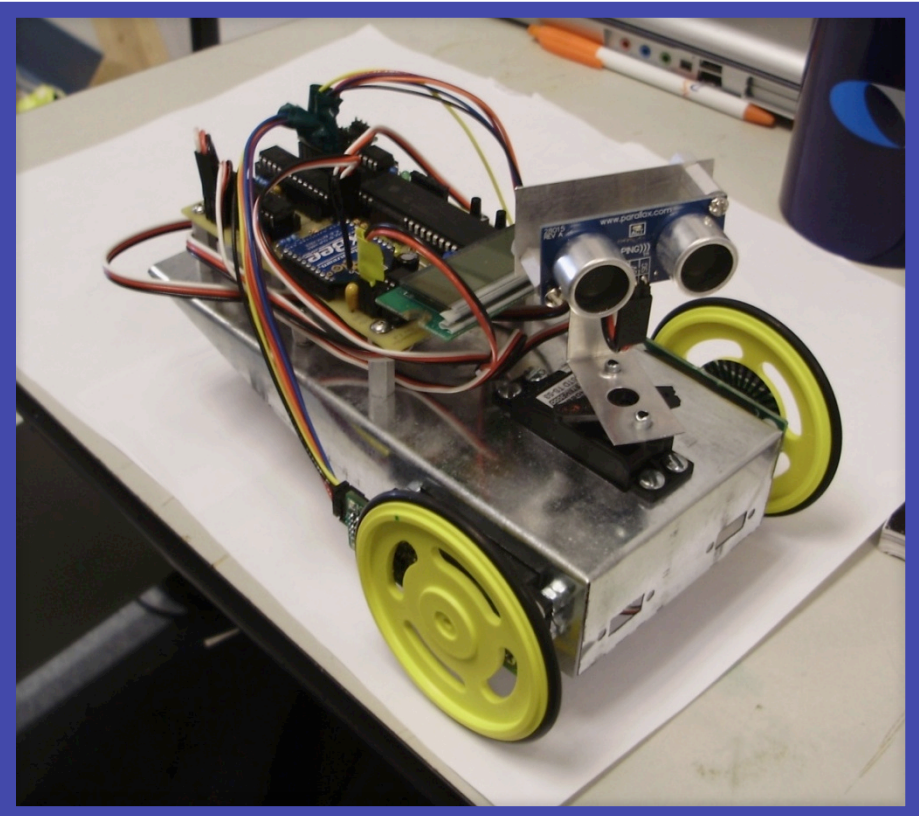
Carl (rev. A)

- Sheet metal chassis
- Continuous rotation servos
- Quadrature encoders
- Compass



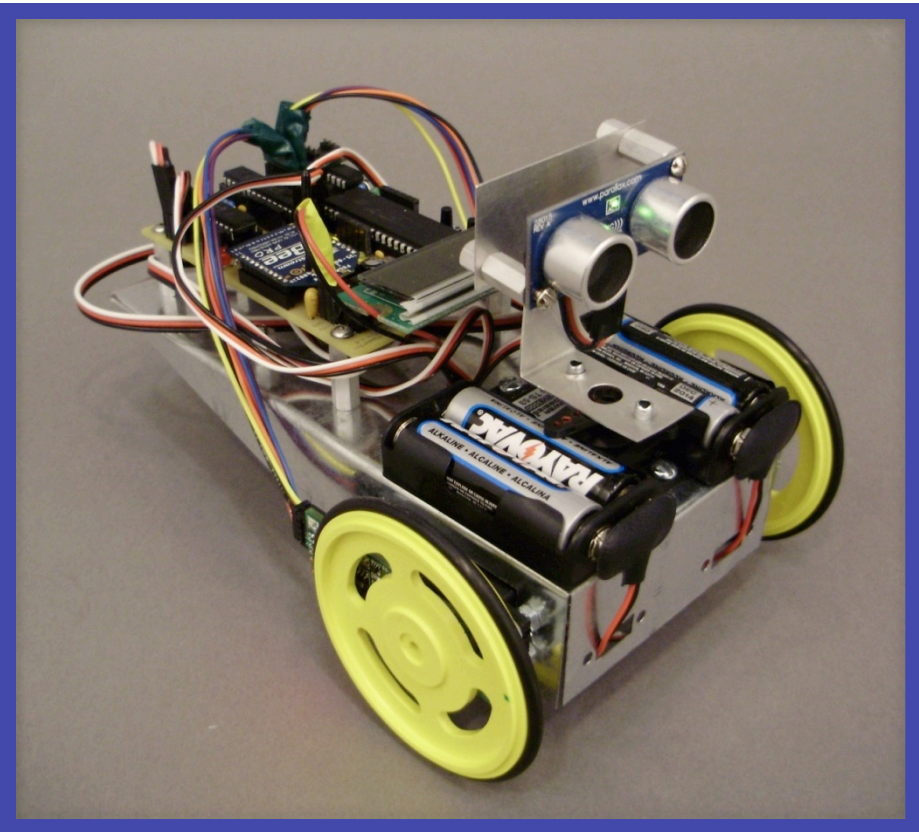
Carl (rev. B)

- Custom PCB
- Full onboard circuit



Carl (rev. C)

- Additional battery power
- 5V regulator



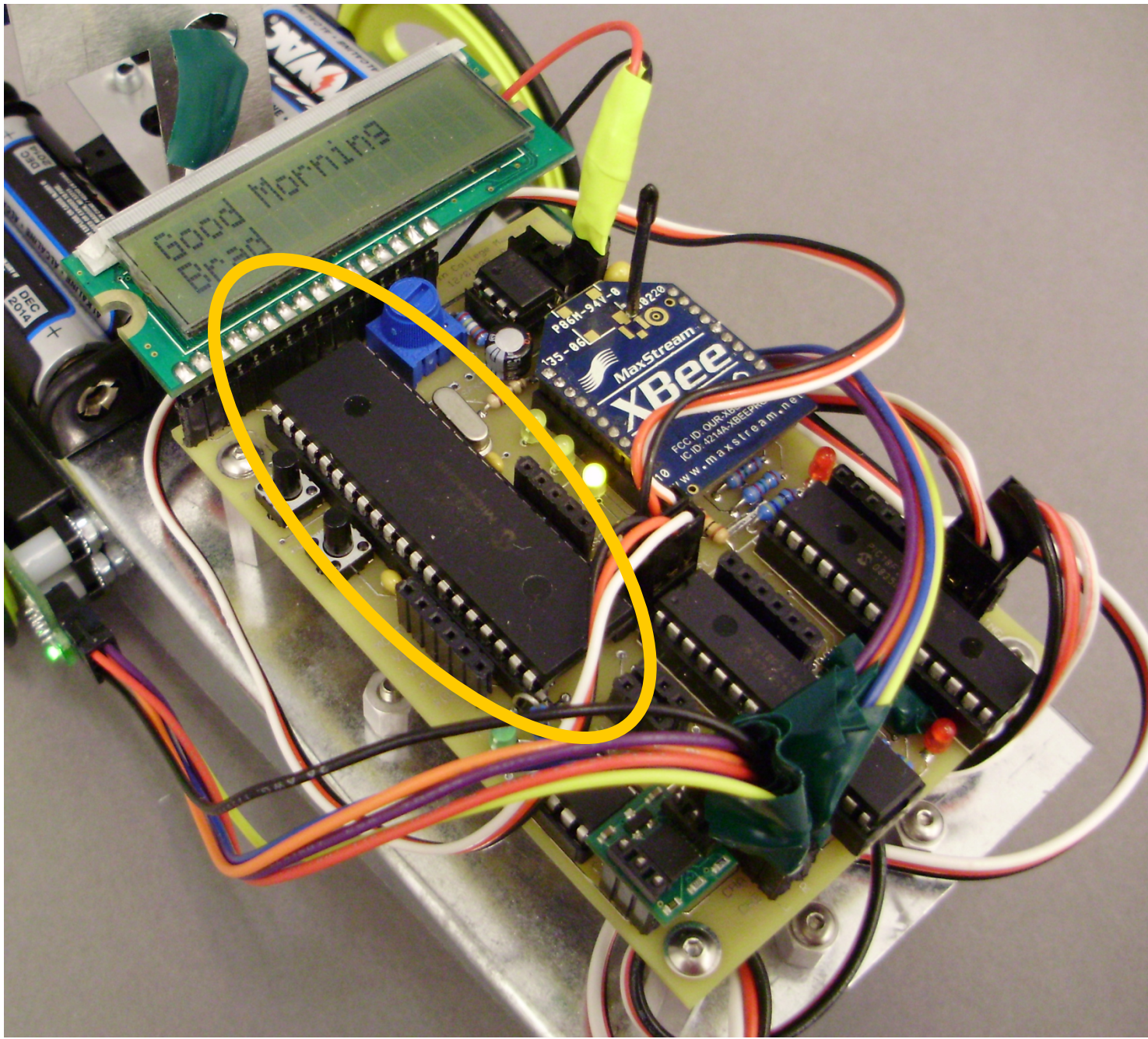
Main PIC

Hardware

- XBee Wireless
- LCD Screen
- External Memory
- SPI Master

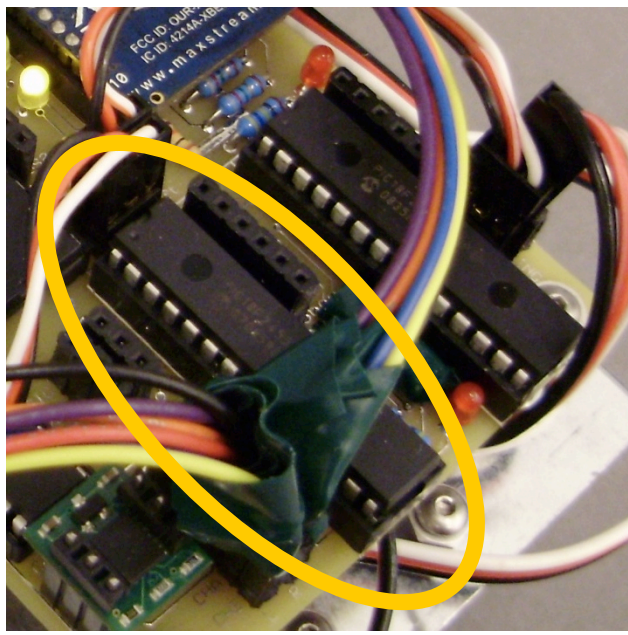
Software

- Control logic
- Global map generation



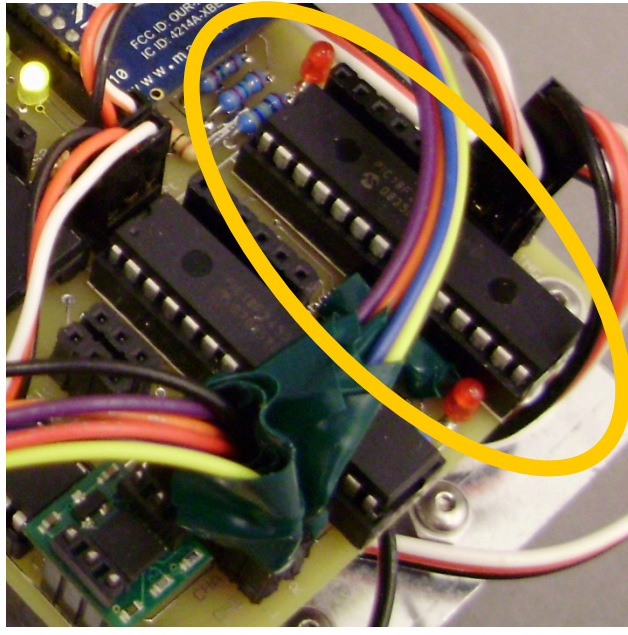
Motor PIC

- Continuous Rotation Servos
- Quadrature Encoders
- Compass Module
- SPI Slave



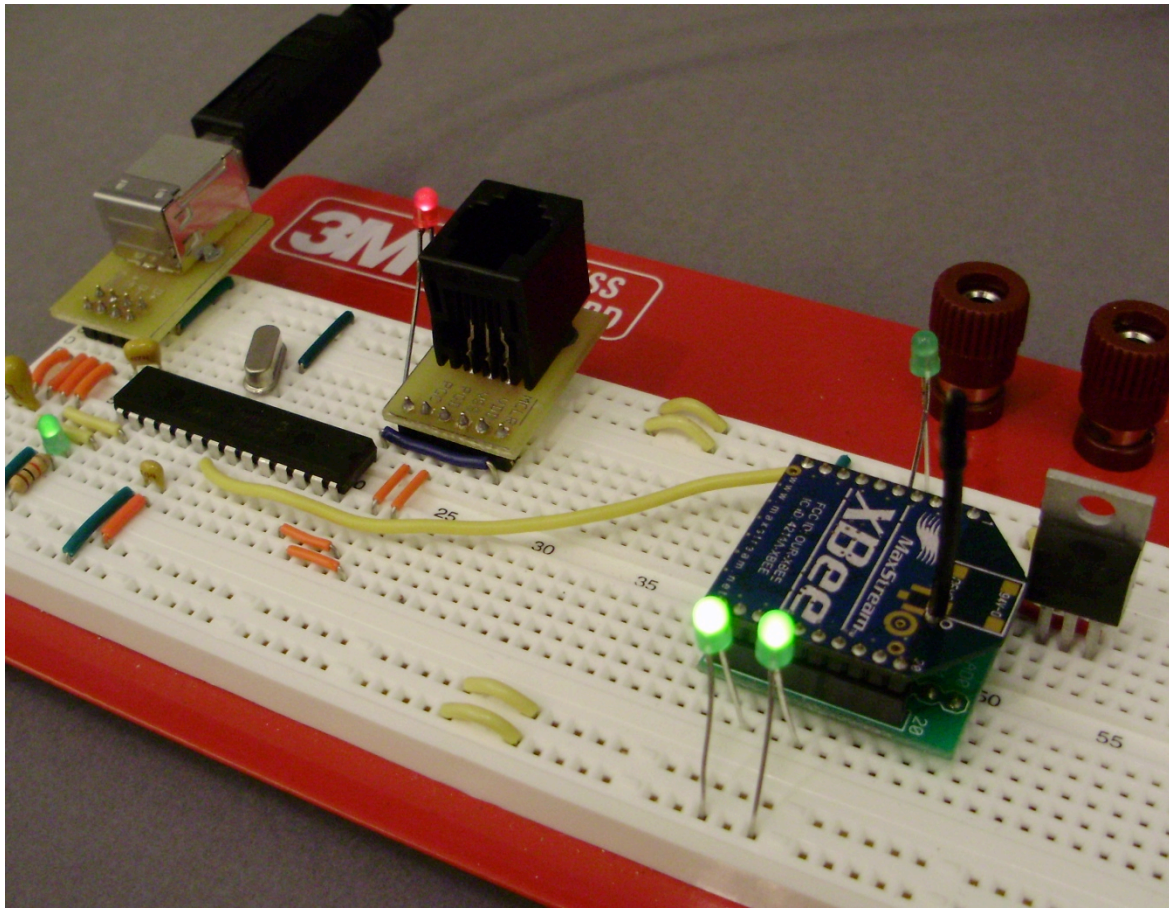
Sensor PIC

- Head Servo Control
- Ultrasonic Rangefinder
- SPI Slave



Base PIC

- USB Peripheral Device
- XBee Wireless
- Global Map Transfer to PC



SPI Transfer

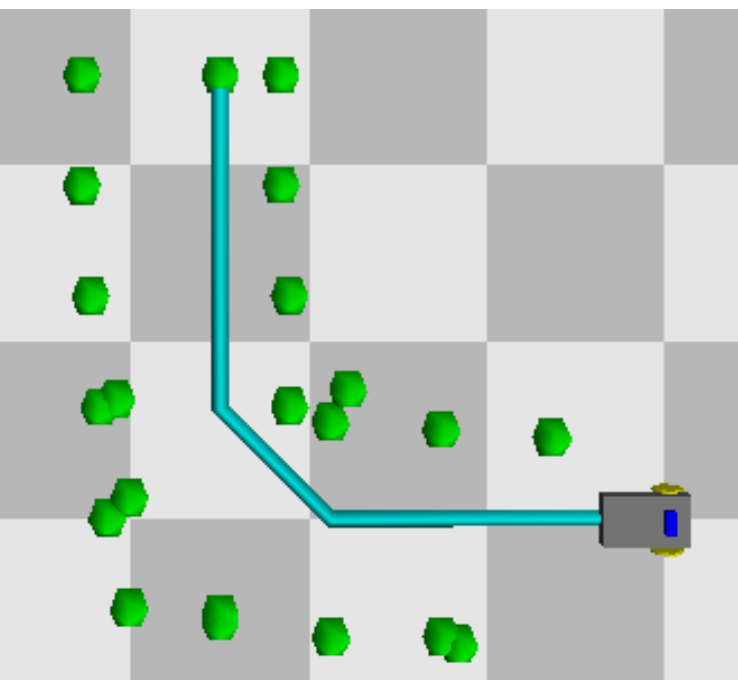
Wireless Serial

USB Transfer

PC Visualization



Actual terrain



Python visualization of robot data