

Progress Report 2

Team 8

Parts

We have received all the parts needed to complete the project. The servo and batteries arrived this past Wednesday (11-20-13). Both parts have been mounted and fit perfectly on our platform.

- The servo steering has been tested with a function generator and functions as intended with varying pulse width modulations.
- TI sent a Bluetooth module that works with an Android platform to replace the mix up of sending a module compatible with iPhones. The module is connected to our DRV8301 and successfully tested for connectivity to paired devices using an Bluetooth Terminal app call BlueTerm.
- The motor does not fit in the platform since it is a printer motor, not a motor used for RC cars. An adapter has been fabricated to extend the motor rotor's reach so it can properly spin the driving gear. Securing the motor's position in place is a working progress that requires some machining tools. This is expected to be completed before demonstrating to Udpa and Grotjohn.

Design

A serious issue has arisen in the DRV8301, Piccolo controller, and the Bluetooth module. After working on the equipment, it was observed that the board draws a lot of current and the voltage dropped suggesting that one or all the components are fried. The cause of this is under investigation by the team, but this development is detrimental to progress and completion of the project. The team is continuing in building the physical final platform design and the Android app to control. Testing and implementing these designs, though, is not achievable at this present time.

The platform is practically built, with the exception of a few details like connecting all the components together. The work done with the motor adaptor has allowed for the motor to fit on the platform and successfully turn the driving gear. Modifications have been made to the platform base to support the motor in place. A hole has been cut to lower the motor to the appropriate height. This set up will be secured by a nail or screw underneath the platform to ensure stability. The platform included spaces for the batteries along with velcro to hold them in place in the car. The servo also had a designated spot on the platform and is secured in with the provided screws. It has been attached to the wheel steering and has been successfully tested to turn given a change in its pulse width modulation. The final modification was to mount the DRV. This is done by a Plexiglass frame attached to the top of the drone. This secures the DRV in place while providing protection to the rest of the components.

Communication

The phone is able to connect to the Bluetooth chip through the development app, BlueTerm. Using an oscilloscope, the team studied the bit pattern sent through the phone and compared it against the expected result. For every character sent, the chip adds a logical zero and proceeds to send the byte starting with the least significant bit. Prior to the board failure, it was not configured to accept the incoming bytes, so the communication link was not completed.

Without a working Bluetooth chip, development has ceased for the phone to board communication portion of the project. The java programming efforts have been allocated to other connection aspects of the project. In absence of a Bluetooth connection, the hope is to establish a connection to a computer terminal over Wi-Fi to at least feedback information from the phone's sensor.

GUI

The team designed a simple interface for the phone to control the car locally. This interface consists of four buttons and a slider. Each button corresponds to a binary command: forward, reverse, left, and right. The slider controls the speed of the forward and reverse commands. The final design for the phone controller interface supports control based on the orientation of the phone. The interface retains the buttons for forward and reverse, but the steering buttons are omitted. In order to steer the car, the user will rotate the phone and the magnitude of the component of gravity on the phone's y-axis will determine the steering angle. This design is in the intermediate stages and is able to read the accelerometer data, but has not performed the discretization necessary to send the data over Bluetooth. A bit pattern has been set assuming a maximum steering radius of 45 degrees in each direction, but that may need to be modified depending on the actual turn radius of the car.