Work Completed

During the past week I have focused mainly on finding components that will be needed for the control system and for modification to the steering system. After spending a moderate amount of time researching switch types I believe that I have found a solution that will be effective for the steering-mode braking and acceleration control. Additionally, I have found a part that will work well as the mode select switch for the vehicle. In order to find a solution to the problem that we are having with the steering system modification, I tried to assist Travis in finding a linear potentiometer to be used in determining the location of the steering rack but found such devices to be very expensive. Finally, I worked on a simple method for determining the dimensions of the circular gear or wheel that will need to be used in the steering modification.

Until recently we had planned on using two separate steering wheel-mounted buttons—one to control acceleration and one to control braking. These buttons would have to be water resistant to withstand a moderate amount of moisture and dust. As shown below, we planned to mount the buttons on the inner portion of the right hand grip.

While I was researching waterproof buttons on West Marine, a retailer of aftermarket boating parts and accessories, I came across a rocker switch that I feel will better meet the needs of our specific application. The Contura Rocker Switch (Model # 7808223) retails for $30. This switch is a M-On/Off/M-On type switch, meaning that in the center position the switch is off, and when the top or the bottom of the switch is depressed one of two individual circuits is completed. When the user releases the button the switch immediately returns to the off position. This component is waterproof and should prove to be an easy method for the user to control the
vehicle, where pressing on the top of the switch will initiate acceleration and pressing the bottom of the switch will control the braking function. The component is shown below in Fig. 2.

![Contura rocker switch](image)

**Figure 2: Contura rocker switch.**

This part is also desirable in that it will prevent the acceleration and braking functions from being performed simultaneously—an issue that previously would have been handled through the use of software. This switch will be mounted in the same location as previously determined and will need to be housed in a small box that will be connected to the hand grip through the use of circular clamps.

For the mode select switch I plan to use a simple, waterproof rocker switch that can also be purchased through West Marine.

In an attempt to help Travis with the steering system modification I contacted numerous companies about purchasing linear potentiometers that could be used to determine the location of the steering rack. The use of a linear potentiometer for this application would be best due to the simple design of the device and the ease of mounting and integration into the control system. However, I arrived at the same conclusion as Travis—these devices are far too expensive for our application and are simply out of our budget. Of the five companies that I contacted, only two responded and both had quotes that were in excess of $300. As a result we will have to create our own solution to this problem through the use of cheap components.

We have discussed using a circular gear and linear gear setup in the past, and Travis would like to go with a wheel and track design, which is basically the same but relies on the friction between the components rather than between the gear teeth. With this in mind I came up with a method for determining the required radius of the wheel or circular gear based on the degree of rotation that will be allowed on the steering wheel. If the steering wheel is to rotate 45 degrees in each direction, the wheel in the wheel and track setup will need to be 3.2 in. in diameter. This is fairly large considering the tight space in which this device will need to be mounted (along with the steering linear actuator). As a result we may have to look into other options for tracking the location of the steering rack.

### Future Work

Future work involves the mounting and wiring of the accel/braking rocker switch and mode select switch once these parts arrive. Additionally I will have to mount the steering linear actuator once Travis has developed the method for tracking the location of the steering rack. The work with the steering linear actuator must be completed soon so that Kevin can fine-tune the control system and ensure that the controls work as intended. Finally, I plan to assist Allison in the fabrication and installation of the braking system, which will likely take place at the beginning of next week.
Project Review

The project is still progressing nicely but we are reaching the point where a great deal of work must be completed to avoid major problems at the end of the semester. In order to make the progress necessary for success I will have to devote much more time to working in the lab over the next few weeks. With only 30 days remaining we have a great deal of work that still needs to be done. However, I am confident that the next couple of weeks will be very productive. The current budget is approximately $500.

Hours Worked

Time spent on the project 3/6/2008 – 3/19/2008: 12 hours