

Elevator Controller for Individual with MS

Client:

Dr. John Fleming

Team Members:

Ashley Matsick (Co-Leader)

Sara Karle (Co-Leader)

Michele Lorenz (Communicator)

Peter Strohm (BWIG)

Alison Boumeester (BSAC)

November 30 – December 7, 2006

Problem Statement:

Our project involves the integration of controls into a device capable of covering the distance from a wheelchair to an elevator call button in the x, y and z directions, then exerting a horizontal force sufficient to successfully push the call buttons in both the standard elevator car and the corresponding hallway. The controls to be integrated must be operable by stimulus generated by movement no lower than the user's neck.

Last Week's Goals:

- Construct mounting arm
- Design weatherproof cover
- Finalize circuitry with the help of Tracy
- Meet one more time with Dave to ensure all components of mounting arm will fit

Summary of Accomplishments:

- Used class time to finalize a list of parts that still needed to be purchased
- Mounting arm group met with Dave to confirm correct dimensions of arm
- Switch group bought necessary parts on Saturday
- Both groups worked in the machine shop extensively on construction of the final prototype
- With input from the group regarding content, Michele designed the poster for Friday's presentation

This Week's Goals:

- Put final touches on switches and mounting arm (including spray painting and preparing display for presentation)
- Print poster and practice presentation for Friday
- Write final paper, turn in on Wednesday
- Schedule meeting with Meriter Home Health and Dave for integration of device with chair

Project Difficulties:

The project was essentially completed, but the Ultimate switch is currently not functioning properly. The switch worked as a momentary contact switch to activate the solenoid while it was hooked up previously. However, yesterday it appeared that the switch had shorted itself out of the circuit, as the solenoid stayed activated even when the switch was not depressed. We have contacted Professor Webster for assistance and Ashley will speak with her circuits professor for guidance.

Additionally, the double pole double throw momentary toggle switch that we purchased to control the actuator didn't work on Wednesday, though it worked on Tuesday. By replacing the toggle switch with the latching toggle switch that was used last semester, we determined that the momentary switch must have been damaged. This is not unexpected as we bent the leads on the switch in order to fit it properly in the housing. Therefore, a new switch has been purchased and

the control box will be sanded down to accommodate the switch, thus eliminating the need to bend the leads.

Due to the difficulty that we have experienced in contacting Meriter Home Health, we have not yet been able to attach the device to Dave's chair. We will display the all of the device free standing components at the poster presentations on Friday, and attach it to Dave's chair after the presentation has been delivered.

Activities:

| <u>Date</u> | <u>Person/Group</u> | <u>Activity</u> | <u>Time Spent</u> |
|-------------|------------------------|--|-------------------|
| 12.01.2006 | Group | Class time: drafted list of parts to obtain | 2.00 hr |
| 12.01.2006 | Ashley, Michele, Peter | Meeting with Dave to finalize dimensions | 1.00 hr |
| 12.01.2006 | Alison | BSAC meeting | 1.00 hr |
| 12.02.2006 | Sara, Alison | Shopping for parts | 4.50 hr |
| 12.02.2006 | Ashley, Peter | Construction of mounting arm | 3.50 hr |
| 12.04.2006 | Alison, Sara | Construction of switch housing & connections | 4.50 hr |
| 12.04.2006 | Michele, Peter | Construction of mounting arm, poster content | 3.00 hr |
| 12.05.2006 | Alison, Sara | Construction of switch housing & connections, poster content | 5.00 hr |
| 12.05.2006 | Michele, Peter | Construction of mounting arm, poster work | 4.00 hr |
| 12.05.2006 | Ashley | Construction of mounting arm, poster work | 5.00 hr |
| 12.06.2006 | Sara, Alison | Construction of switch housing & connections | 8.50 hr |
| 12.06.2006 | Ashley | Construction of mounting arm bracket | 9.50 hr |
| 12.06.2006 | Peter | Construction of housing | 7.50 hr |
| 12.06.2006 | Michele | Construction of housing, poster work | 7.00 hr |
| 11.30.2006 | Sara | Progress report | 0.75 hr |

Budget

| <u>Date</u> | <u>Items</u> | <u>Cost</u> | <u>Comments</u> |
|-------------|---|--|---|
| 09.02.2006 | Ultimate Switch & Sip-Puff Switch | ~\$140.00 | Ordered from enablingdevices.com, paid for by Michele |
| 11.01.2006 | Double pole, double throw latch toggle switch | \$1.25 | Purchased by Sara |
| 11.10.2006 | Double pole, double throw momentary toggle switch | \$7.39 | Purchased by Alison |
| 11.29.2006 | 1/8" thick steel in 3" and 1.5" widths | \$21.08 | Purchased by Ashley |
| 12.02.2006 | Parts for switch control box and mounting | Ace Hardware: \$23.47 Menards: \$11.61 Radioshack: \$17.68 | Purchased by Alison, some returns may be made |
| 12.03.2006 | Parts for mounting arm and housing | Will be calculated within the next week | Purchased by Peter |
| 12.07.2006 | Double pole, double throw momentary toggle switch | \$7.39 | Purchased by Sara |

