Progress Report – March 23rd, 2011

ErgoForm Design is currently on schedule for delivery and demonstration of our prototype Adjustable Toilet Seat (ATS) in mid-April 2011. Considerable time and effort has been placed on the project with crucial parts constructed and now undergoing the integration phase.

Requirements Analysis

As specified in our functional specification the ATS will be designed for the elderly or physically handicapped user. This has placed the onus on us as designers to ensure that the user interface is easy to understand and use. This led to the gradual shift from a dual button set up to adjust the up and down heights to a single pole double throw switch.

System-level Analysis

The overall block diagram seen in our functional and design specifications has been met. All of the hardware required to make our system has been obtained and we are currently commencing the integration phase.

During the course of the project we invested significant amounts of time tweaking our initial ideas to ensure that we have the most robust solution at the end. All of the switches used in the project have extremely high wattage tolerances (500W) to ensure that failure on that level is minimized. Our motors have also been obtained and accommodate a load of 1 ton each. To build the angled seat we have opted to go with gas cylinders to apply the feedback pressure when a load is applied. This prevents the use of springs which are possible points of injuries.

The overall system will be powered by a 12V 7A power supply. This will be located externally of the system to prevent damage from the humidity. During maintenance an emergency shutoff switch can be triggered to turn the device off.

The jack screw unit that is driving the lifting mechanism will consume approximately 40W on initial load and it subsequently drops off to 24W. We have already designed the circuit that will incorporate two of these motors in parallel. Limiter switches are also installed to ensure that the jack screw lift ceases functions once the minimum and maximum heights are realized. The entire jack screw lift mechanism will be encased in a wooden housing.

To drive the up and down motion an H-Bridge circuit will be used in conjunction with the switches. LEDs will also illuminated giving the user insight that the device is currently doing.

Technical Specifications

Our project has evolved ever since the original proposal. Our initial idea which included a wireless adapter and an Arduino controller were both removed. After careful consideration we realized that the extra features that we hoped to introduce would detrimentally affect the performance and upkeep of

the device. However, despite the changes made our device still functions as an adjustable toilet seat that aids the elderly and physically challenged the ability to use their facilities comfortably.

Budget

Currently our actual expenditures are around $300. The costs were saved by purchasing equivalent components at cheaper costs. The only caveat with that method of acquiring items was that it took considerably longer to obtain our parts. The remaining funds will be used for emergencies and extra features should we have enough time.

Team Dynamics

Upon initial analysis our group had an extremely conflicting schedule either due to academic commitments or employment. However, we were all able to rise to the occasion and work in shifts. We have worked hard to get to this point with no conflicts. Group meetings are still planned and archived in our team wiki for future reference. Most communication occurs through e-mails and online chatting tools such as Windows Live Messenger.

Action Items

The outstanding tasks of our project includes the electrical circuitry and mounting the angled seat to the lifting mechanism. There will also be testing performed such that the entire unit is safe to use and able to handle the corner cases as specified in our functional specification documentation. We predict that these tasks should wrap up by March 31st 2011. Our presentation date is still up in the air but our project will be finished by then.