Weekly Progress Report  
Week 3: 2/2/09-2/10/09  

Travel Computer Mount  

The travel computer mount is now complete. We plan to obtain a release form and have the Stenglein family sign it so we can hand the mount over to them this week. The family is very excited to use the mount; because it has been something they have wanted and needed for a long time. We plan to have this all worked out for our meeting with the family the evening of Friday the 13th. In the meantime, we will have to take pictures of the mount and start preparing a user manual and final report.

Assistive Jumping Device  

The AJD is coming along approximately on schedule. At the start of the week, the Tumble Forms seat had been cut to make it a suitable harness for a standing user, and the exposed foam was sealed off on the arms of the chair. Figure 1 shows the modified harness at the start of week 3.

Figure 1: Harness at the start of week 3.

My main goal for this week was to devise a way to attach the children’s pelvic climbing harness to the rigid harness. In order to do achieve this, the attachment must be strong and reliable to maintain safety, and must accommodate for adjustment. We decided the pelvic harness should have 4 attachment points: to provide safety and to evenly distribute the load.

We decided to rearrange the seat buckles that came with the seat so that the front of the pelvic harness could be buckled into the chest support straps. First we detached the waist buckles. With the extra unused waist belt, Kelly and I cut 6 inch pieces of seatbelt and applied super glue to the cut ends to eliminate fraying. These 6 inch pieces will be looped around the front waist belt of the pelvic harness and will attach to seat belt buckles. The buckles on the pelvic harness will then click into the buckles attached to the
chest support straps. Since the chest straps wrap around the head of the harness, even with the modifications, the height will still be easily adjustable. Figure 2 shows the approximate locations of where the seatbelt buckles will be attached. They are temporarily duct taped in place.

Figure 2. Seat belt buckles reattachments.

Attaching the back of the harness was a little more difficult. There were utility loops on the back of the harness, but after consulting Dave and a climbing expert at EMS, we decided that these were not sufficient attachment points. Kelly talked extensively with an EMS employee and found out that the best way to attach the back of the climbing harness to the seat would require two carabiners around the back of the waistband. On Friday Kelly and I purchased two carabiners from EMS. Using two left over seat belt straps and clips from the car seat I was able to devise a way to attach the back of the harness. Two carabiners were looped around the back belt of the harness. I looped a seatbelt around each of these carabiners, secured the loop with a clip, and bolted them to existing bolt holes on each side of the seat. The clips lock the harness in place and allow for height readjustment of the pelvic harness. Figure 3 shows the side of the seat where the straps are bolted in.
Once we figured out how to secure the pelvic harness to the modified child seat, we had Kelly try it on to test the comfort. Although, she did not quite fit into the harness she found the leg straps uncomfortable. There was also the issue of the carabineers moving against her back. We decided that we should pad the legs of the pelvic harness, and create some sort of padded pockets to hold the carabineers in place along the back of the harness. Figure 4 shows Kelly in the modified harness with newly added pelvic support.
Kelly and I decided to go to JoAnn’s Fabrics on Friday because we still needed a new vinyl covering to reupholster the bottom of the chair, and we needed some sort of padding for the harness. We were able to find very inexpensive silver vinyl fabric that we could use to cover the bottom of the chair. Then we purchased a couple packs of shoulder pads for the harness. We got large shoulder pads for covering the legs of the harness, and smaller shoulder pads to cover the carabineers along the back of the harness. We decided that the pads may not be strong enough to hold the carabineers in place alone so we cut four 3 inch pieces of the extra seat belt that will serve as pockets for the carabineers. Figure 5 shows the pads in place, they just need to be sewn in.
Figure 5. Padding on legs and back of harness.

To end the week I created a pattern for reupholstering the bottom of the chair and cut out the vinyl pieces. I used paper to trace the contours of the seat and then used felt to see how cloth would work over the seat. I created an almost diaper like piece of felt for covering the front and back of the lower chair, and sleeves with caps for covering the arms. From these felt pieces I traced and cut pieces from the vinyl. A friend of mine will be helping me sew the “jacket” for the seat. Figure 6 shows the vinyl pieces and figure 7 shows how they will be used to cover the bottom of the harness.

Figure 6. Vinyl cut-outs.
I also ordered the vertical rail and trolley this week from Igus inc. The rail is extremely lightweight, dirt and corrosion resistant, and offers very low friction gliding. I think that the rail will work perfectly for our design. The company was also able to give me the dimensions for both the rail and the trolley so I can begin working on attachment brackets.

This coming week, I need to consult someone to help me sew the vinyl jacket for the harness, the pads on the legs and back of the harness, and the seat belt attachments. Once this is done I will secure the jacket on the harness with spray adhesive, and the harness will be more or less completed. We will have Sean try it on when we visit the family on Friday to test for comfort.

Then I will begin work designing brackets to attach the harness to the vertical rail trolley, and to attach the vertical rail to the horizontal trolley. I will brainstorm ways to make these connections and will go to the machine shop to see if they have any spare parts that we can use.

We will also see how Sean feels on a trampoline when we go visit the Stenglein family this Friday. At this point we will determine whether Sean needs more or less head and neck support as he jumps. In addition to these goals, we need to finalize an order for the bungee cords.

All together I have spent approximately 14 hours working on the project this week.