My remaining tasks for the project have been the bending bar attachment, CCD camera mount and temperature control loop. Two of these three tasks were completed in the past week. The bending bar attachment is completely fabricated and attached to the linear actuator. The camera mount is also completely fabricated and only needs to be painted before being finished. The temperature control loop is the last task on my list and will be completed by Wednesday of next week.

The bending bar attachment had nearly been completed for a couple weeks, but I had been waiting on a few key dimensions before it was completed. Until last week we had only ordered one set of bending bars with a 0.020 inch diameter. However, the bending bar mount needed to account for all sizes of bending bars, so I did not want to drill these holes without knowing the final size of the bending bars. Last week I ordered three new sets of brass rods with the largest being 1/16 of an inch in diameter. With this final size I was able to finalize the bending bar mount. All that remained at this point was drilling the holes for set screws and attaching the entire mount to the linear actuator. This required some new hardware and once I had purchased it I was able to completely finish the bending bar attachment. The only point that remains is that I would like to paint both the camera mount and bending bar mount black before finalizing the device, but this is not necessary to completion of the device. The entire system is shown in Figure 1.

I had found materials and been designing the camera mount over the past couple of weeks, but I had not been able to spend a large amount of actual fabrication time on this system. This week I was able to spend nearly three full days in the machine shop and finish the camera mount. The most difficult step was cutting the slots through the stainless steel bars because I have never worked with this material and the machining is much more time consuming. In the end I think the overall system will
benefit from the use of stainless steel for these parts, it has added stability and rigidity to the overall setup. These bars are critical to the performance of the entire system. Also when I originally began machining the attachment and mounting plates there had been an error in dimensions and things were not lining up properly. I had resized a certain piece without accounting for the adjustment on the other piece, so specific holes were not lining up between the two plates. Luckily I noticed this before drilling the holes in the mounting plate and was able to rethink the dimensions before proceeding. Now the holes are aligned and the mounting plate perfectly rotates on the attachment plate between the testing and calibration position. The only part of the system that I did not completely finish is the base plate for the stand. At this time we are not sure whether we are going to purchase a mounting table for the entire device, or use a piece of plywood to mount everything on. Using the plywood is clearly more cost effective, but the mounting table is more versatile and adds to the professionalism of the entire device. We will attempt to have the purchase of a mounting table approved. This entire system is shown in Figure 2.