Work Completed:

With most of the welding now complete, much of the past week was spent cleaning welds, bolting parts together, and analyzing the last stages of fabrication. The vertical bars are still a bit tight inside the square collars of the 2 inch channel piece and were continued to be shaved down. I was able to begin the assembly of the easel face which will support the canvas. Taking the dimensions of Harry’s maximum canvas size (38” wide by 30” high) I constructed the face’s frame from very thin 1 ¼ by ½ inch angle pieces. The spine of the frame is composed of two lengths of ½ inch 80/20 tracking which will allow adjustments to be made along both sides of the easel face. The front will have a mounted clip that will adjust to the canvas’s height while the back side of the spine will allow for further adjustment of the vertical position of the entire canvas. This feature is due to the limited movement from the 6” traveling actuator. The artist will be given a greater range of vertical positioning by having a supervisor manually adjust this setting.

The easel face was bolted together instead of being welded to allow for different position types. The thin cast aluminum angle pieces are also a bit to delicate to be fully welded together, and it would be especially difficult to weld the 1/16th gage aluminum to the thick walled 80/20 tracking. I was able to drill pilot holes from the angle through the tracking. Adam will use self tapping screws to attach the “A” frame of the easel to the spine.
Welds were also ground down along the screw drive assembly, including grinding a slot through an end cap of the tracking so it will slide nicely onto the carriage bolt mounts of the vertically moving channel piece. With the screw drive attached I conducted some mechanical analysis of how the tilting function now operates with the added weight of the tracking. The actuators seem to work just as well with the added weight. The device also folds together nicely still, another main objective of the easel.

Adam and I also discussed how to enclose the different electrical devices including the gear motor and joystick. It was decided to make these boxes out of sheet metal and bolt them to the device. I will perform any tacking or welding if needed.

Future Work:

With one more week to go we are cutting down to the wire. This Friday we will assemble the device with all moving parts together, and conduct tests on each movement while wired to a power source and the rest of the electrical system. From there I will head to the shop Saturday and finish the minor welding tasks needed to complete the finalization of the project. Parts will be cleaned next week and be ready for re-design, painting, and shipping.

Project Review:

With all of our parts now in the lab, we can successfully complete the fabrication of the easel. A few problems still under consideration for failure include the damped movements of some actuators and the end of the screw drive due to friction of the slides and bearings. This was caused by the aluminums tendency to warp under the extreme temperatures of welding. Through careful filing, sanding and grinding of these integrated parts, smoother motions will come about. I do not see anything too severe to hinder the completion of the device over the next week or so, and I certainly expect a great final product.

Hours Worked:

I spent 10 hours the last week putting the finishing touches on welds, tapping holes and assembling the easel face.