

# Flight Controls Simulator

Kearfott Motion Systems



## PROBLEM STATEMENT

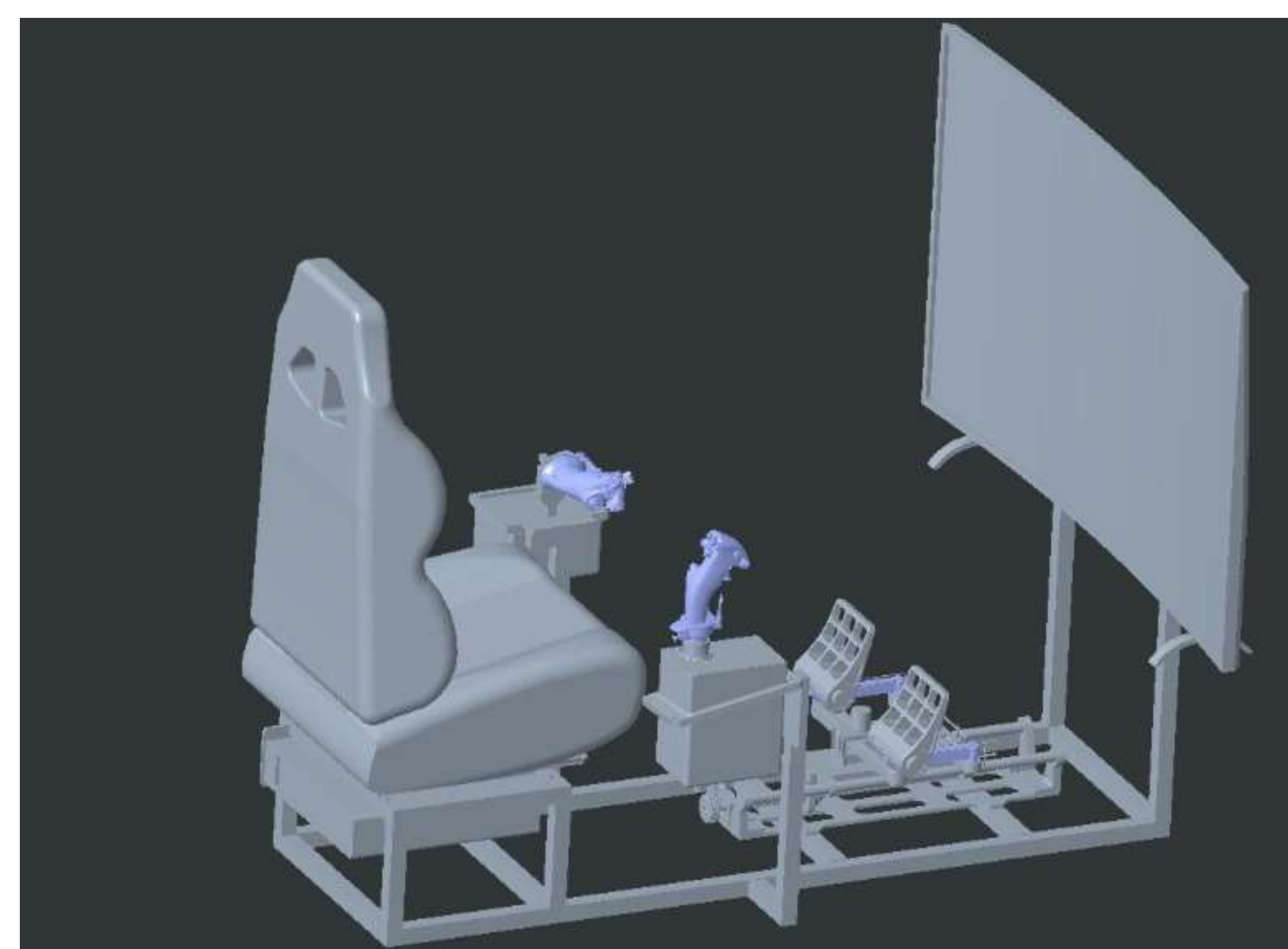
The goal of this project is to design and build a flight simulator rig for Kearfott to display in trade show booths. The simulator must be ergonomic, to accommodate a variety of users, and designed to facilitate quick (90 minutes maximum), easy assembly and disassembly. It must also be able to pack into Pelican cases for traveling between shows.

## REQUIREMENTS

#	Description
1	Display with integrated monitor, flight controls, electronics and PC.
2	Footprint approximately 4' x 6'
3	Transportable in multiple cases weighing less than 75 pounds each.
4	Assembly time less than 90 minutes.
5	Assembly, calibration and packing instructions.
6	Ergonomic design and layout.

## CONCEPTS

Initial design of the simulator used a custom 80/20 frame and TV. 80/20 allowed for extensive customization depending on customer requirements or user ergonomics. The controls will interface with the PC through a custom PCB and act as a controller input for DCS flight simulator.



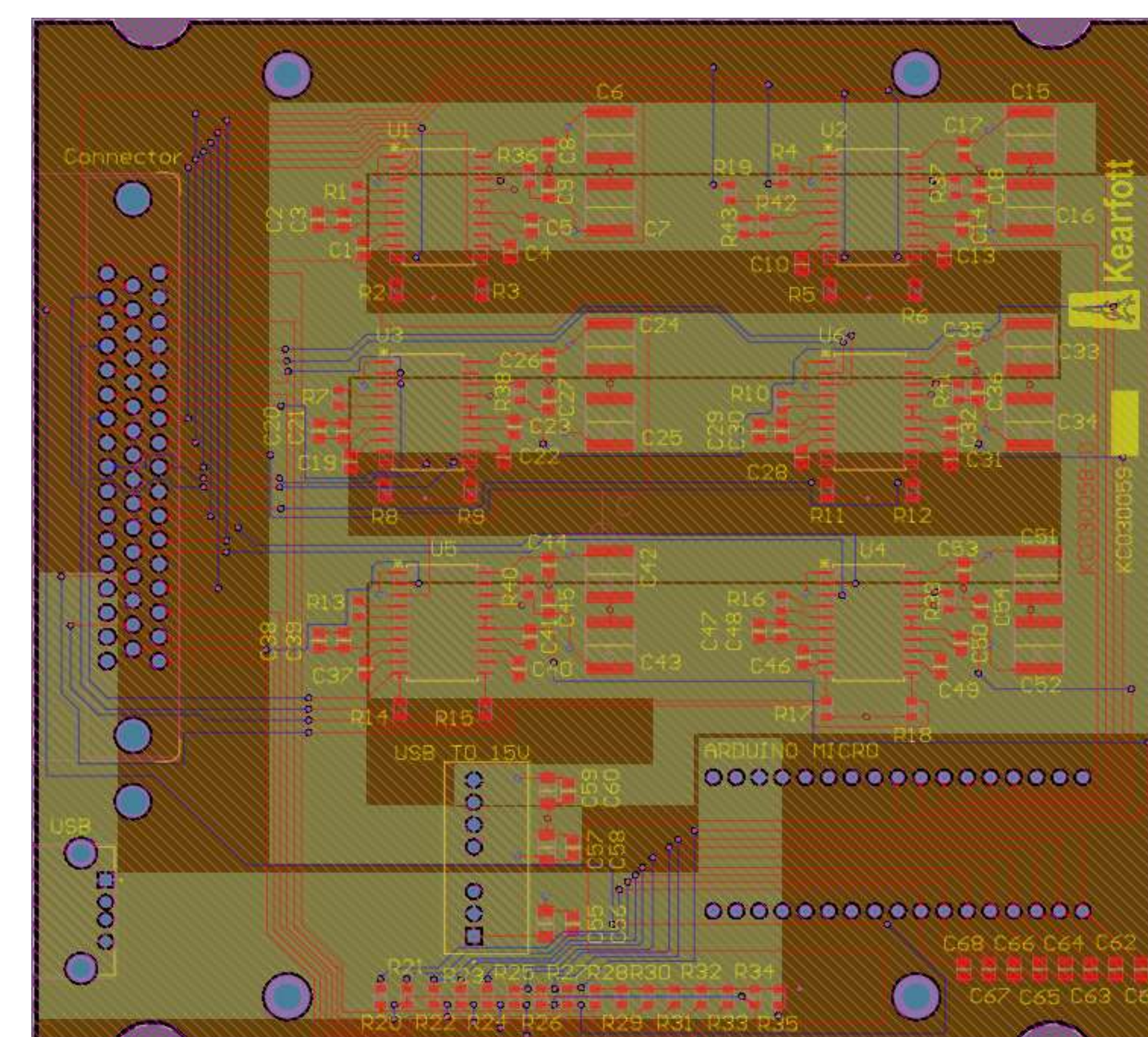
Initial Flight Simulator Rig Design

## FINAL DESIGN, APPROACH, PLAN

The team has developed a flight simulator tradeshow booth; using a prefabricated frame that allows for adjustment based on preferences of the user. The flight stick, throttle, and rudder pedals contain RVDTs to measure angular displacement to detect the position of the components. A custom designed PCB was built to take the signals of the RVDTs and convert them and run them through an Arduino to be seen as game controls on DCS World flight simulator game. A 45" curved gaming monitor is being used to make the simulator more immersive for the user.



Flight Simulator Rig with Flight Stick, Throttle, Rudder Pedals, and Gaming Monitor



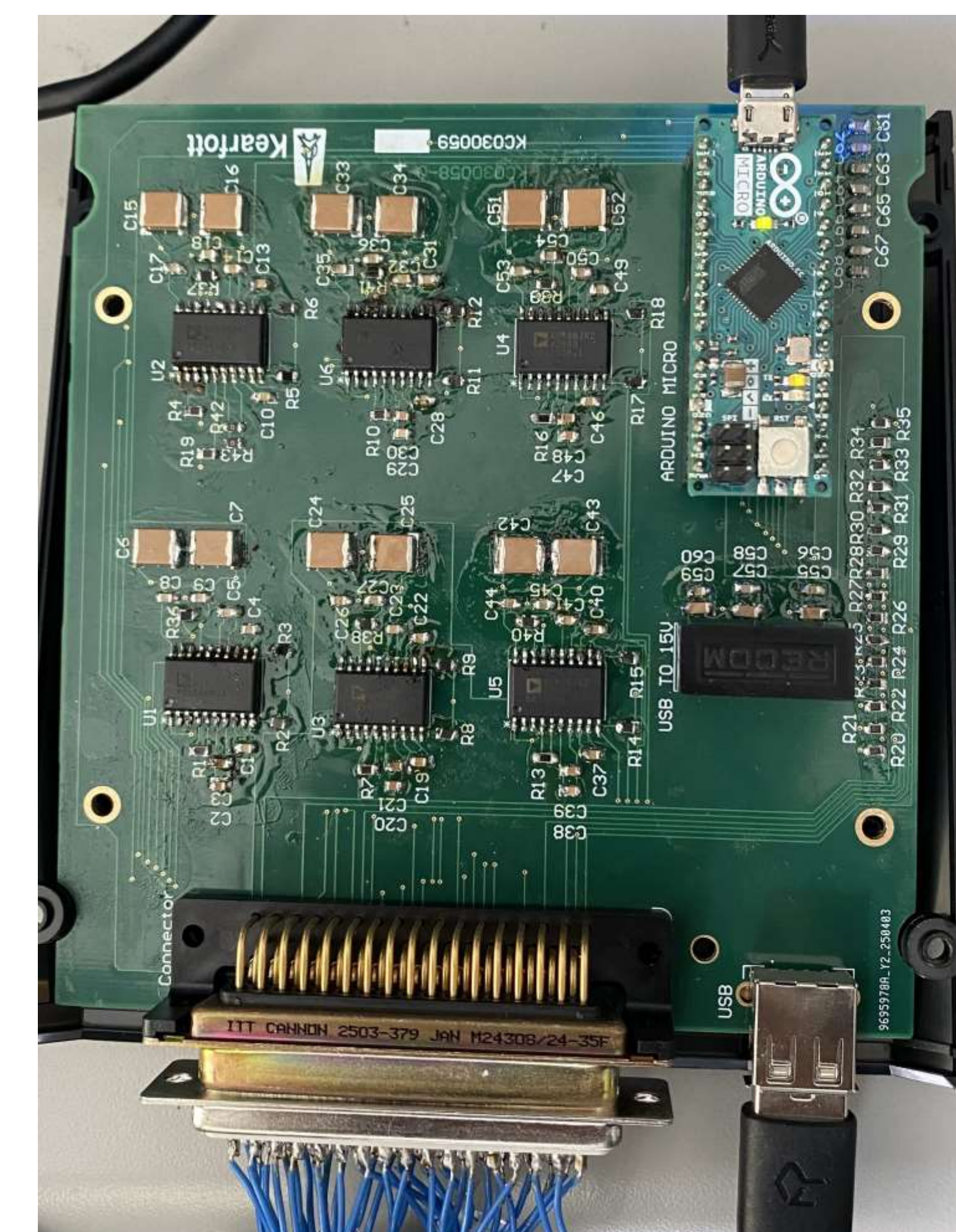
Altium PCB Design for Flight Simulator

## RESULTS

The Final design uses an off the shelf flight simulator rig which has been modified with custom aluminum brackets to mount Kearfott's flight controls. Housed under the seat is the PC and custom PCB which interfaces with the flight controls. The simulator will break down into multiple pelican cases for easy transportation.



Assembled Simulator Rig



Final PCB Design

## SUMMARY AND CONCLUSIONS

Our team has built a flight simulator using Kearfott's flight control hardware that will give potential buyers an interactive experience with Kearfott's products while at trade shows. The simulator is also designed so that Kearfott can easily disassemble and transport it to different events.

## FUTURE WORK

The simulator is built in such a way the if needed, more button inputs for the controls can be easily added with a few modifications. The design of the frame and brackets also allows for easy modification to support new hardware.

## TEAM & ACKNOWLEDGEMENTS

- David Queen (ECET)
- Dara Brunner (ECET)
- Joshua Wright (ME)
- Jack McCrea (ET)
- Faculty Mentor: Adam Harris
- Chris LaBorde (Kearfott)
- Ethan Anderson (Kearfott)
- Kris Veronesi (Kearfott)

