FSC: Flight Simulator Chair

UCI Samueli School of Engineering

Background

Flight simulation units have been around for decades and are most often used for pilot training and research in aircraft design and development, as well as in aircraft characteristics and control handling. Most flight simulations either project or utilize monitors as a graphical display for the user.

Project Goal

Our goal is to take the user experience to a new level by incorporating virtual reality and allow two types of flight control. The first is driven by remote control (RC) and the second is driven by virtual reality (VR) simulation. We will use compressed air as our driving force and integrate a control law to regulate air flow to two pneumatic pistons for roll and pitch movement.

Objectives

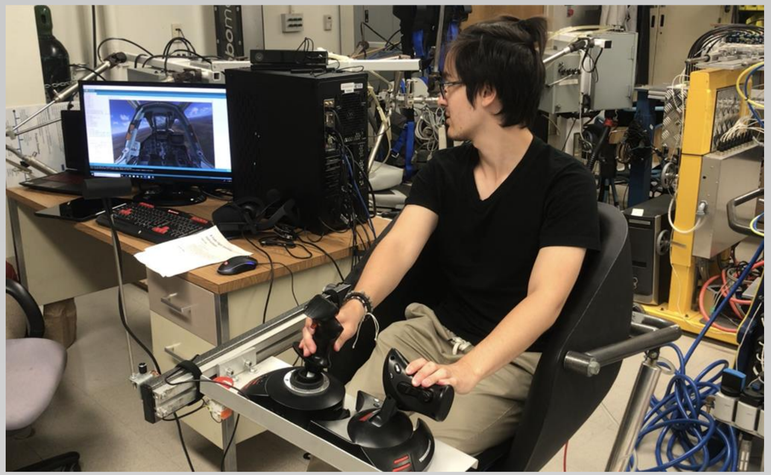
- Animate chair with 2 DOF (degree of freedom)
- Establish communication between simulation program and Arduino
- Integrate Oculus Rift virtual reality system

Timeline

Fall 2019
Hardware troubleshooting and software design.

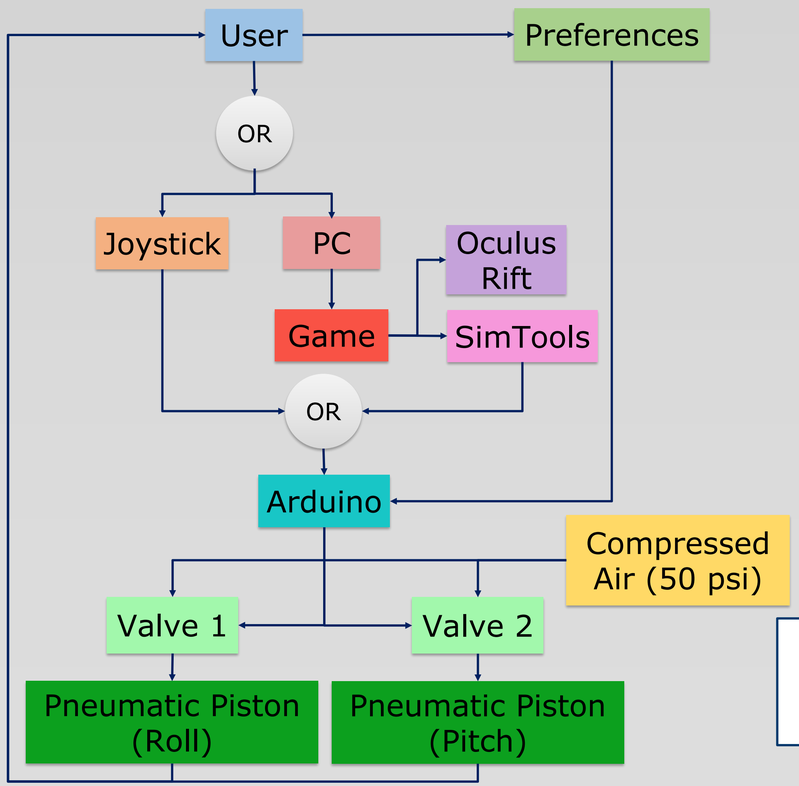
Winter 2019
Redesign circuitry and mechanical systems as necessary.

Spring 2020
Integrate VR system, improve quality of simulation experience.



DCS World provides a first-person view from inside the cockpit [left] while the user controls movement from the chair and provided controllers [right].

Controls



Project Status

Remote control has been realized but requires further refinements to eliminate signal errors. Due to our unique propulsion system, communication between simulation program and Arduino is still undergoing design.

Next Steps

- Edit gain settings to achieve stable, critically damped controls system
- Continue research on simulation program

Team Members

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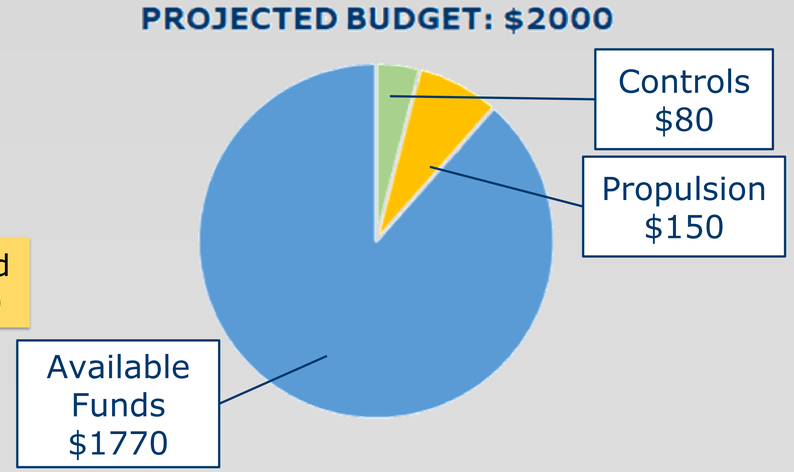
PROJECTED BUDGET: $2000



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