

X-FADE: FLIGHT SIMULATOR CHAIR

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The DCS World simulator allows the user to look around inside the cockpit.

PROJECT GOAL

Our goal is to accurately simulate the flying experience by using virtual reality goggles and a dynamic control law that regulates air flow to two pneumatic pistons - one for pitch and one for roll motion to mimic the acceleration forces felt in an airplane. We will also integrate rudder pedals, a weight sensor in the seat, and user-defined gain in order to adjust the response of the system based on the user's preferences.

OBJECTIVES

- Integrate Oculus Rift headset and infrared camera
- Improve response-time of system with improved control law
- Make user-friendly
 - Simple startup/shutdown procedure
 - Ease of manipulating gain

PROJECT TIMELINE

10/25 Switch from X-Plane Simulator to DCS World SimTools patching

12/8

reinstallation

New Computer Software/simulator 2/24 Improve Wiring Solder connections

Eliminate breadboard

5/26

Test and troubleshoot

11/14 Purchase Oculus Rift Begin design of mounting for IR camera

New Control Law

 Account for weight of user Reduce lag

4/21 Human Interface Integrate rudder pedals and flight stick Attach Oculus IR

camera to chair

BACKGROUND

Due to high operational costs of real airplanes, flight simulators have gained popularity for pilot trainees as well as average enthusiasts. Most existing flight simulators have two or three degrees of freedom of motion and use a combination of computer monitors to display graphics in front of the user. Our flight simulator takes the experience to another level, providing the user with a more realistic and immersive experience of what it feels like to fly a plane through the use of virtual reality goggles.

CONTROLS PREFERENCES OCULUS RIFT GAME SIMTOOLS ARDUINO COMPRESSED AIR VALVE 2 SUPPLY (50 PSI) VALVE 1 **PNEUMATIC PNEUMATIC** CYLINDER (ROLL) CYLINDER (PITCH)

TEAM STRUCTURE



Purchasing Manager

MCHENRY CARLSON

Team Manager



MATTHEW GUTIERREZ Safety Officer



ETHAN PENG Documentation Manager



Our current chair uses a computer monitor and does not have any rudder pedals.

ESTIMATED BUDGET —\$2,000

