Engineering Portfolio

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Self-Stabilizing Rocket

Mar. 2020 - Sep. 2020, Huntington Beach, CA

Traditional hobby rockets utilize static fins for in-flight stability. This project seeks to actively control the pitch and yaw orientation of a rocket during flight with a motor gimbal.

- Developed a [6-degree-of-freedom flight simulation](#) in MATLAB/Simulink to verify PID control gains

- Designed and manufactured a 2-degree-of-freedom actuatable motor gimbal with two 9g servo motors
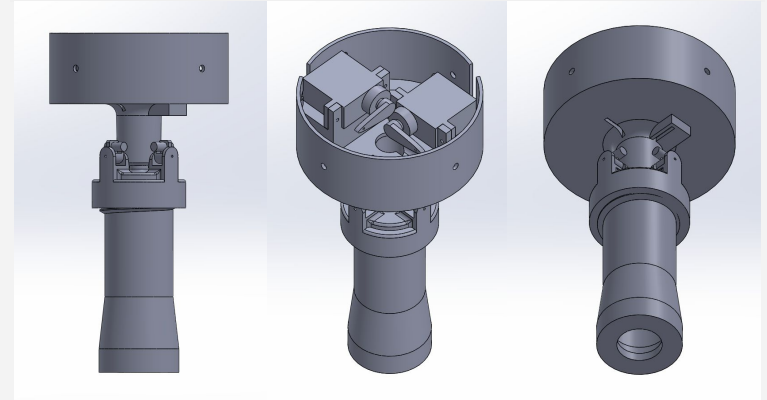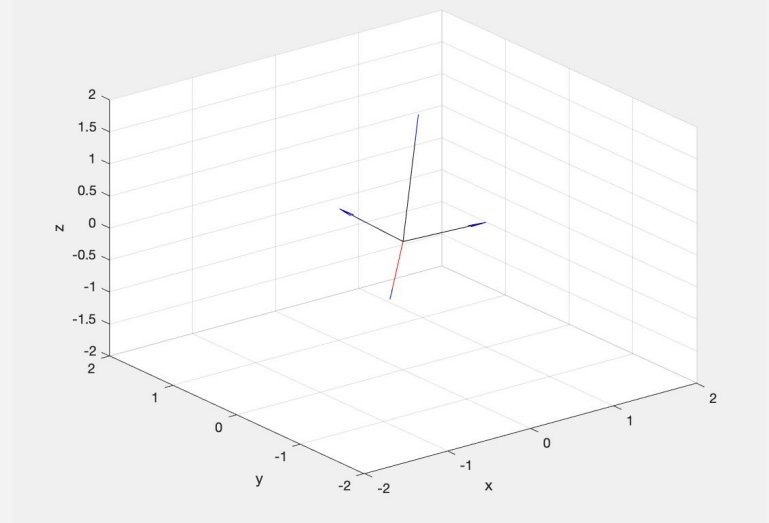
- Developed an embedded flight computer along with [associated flight code](#) sketch to enable feedback control between the orientation estimates of a gyroscopic sensor and the thrust vector set by the motor gimbal servo motors

- Designed an external gimbal to test the stability of the control system when the vehicle could rotate but not translate
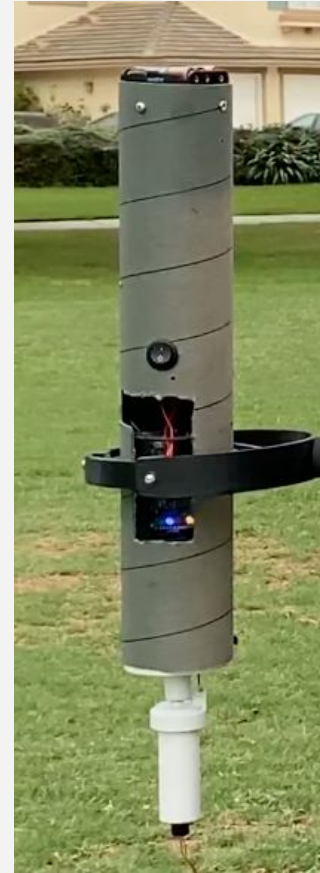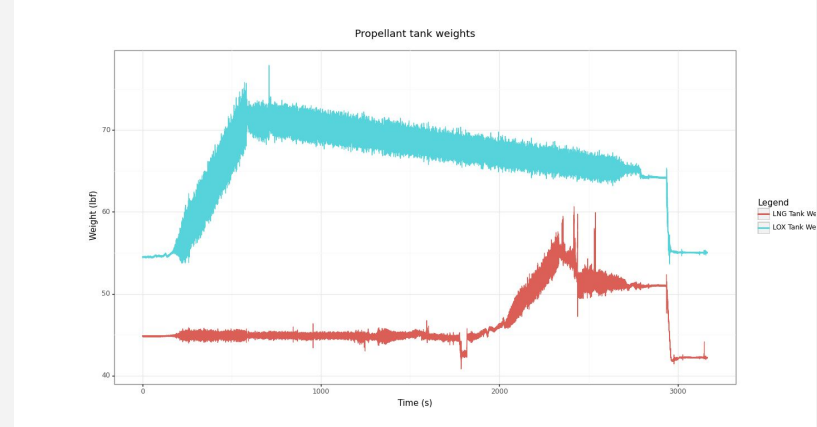
UCI Rocket Project: Engine Data Analysis

Sep. 2020 - Dec. 2020, Irvine, CA

- Developed an [application in Python](#) to streamline the data analysis of engine tests (static test fires, cold flows)

- Used this application to supply evidence during the investigation of the cause of failure of an attempted static test fire


Propellant tank weights

Mixing and Combustion Code
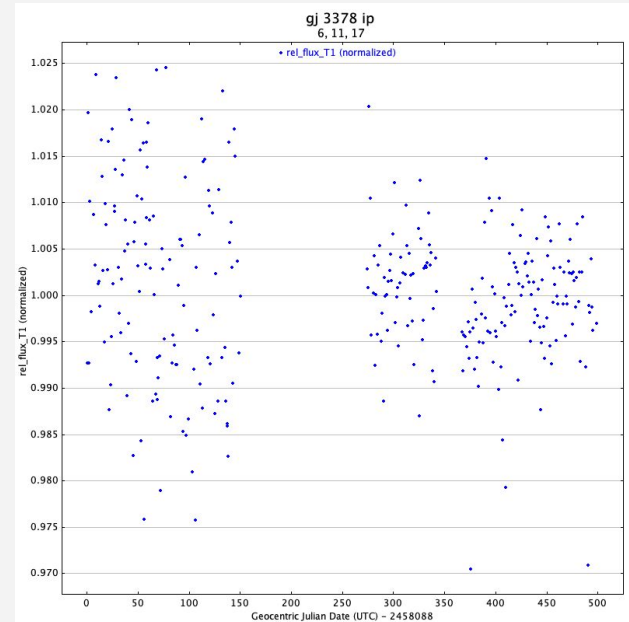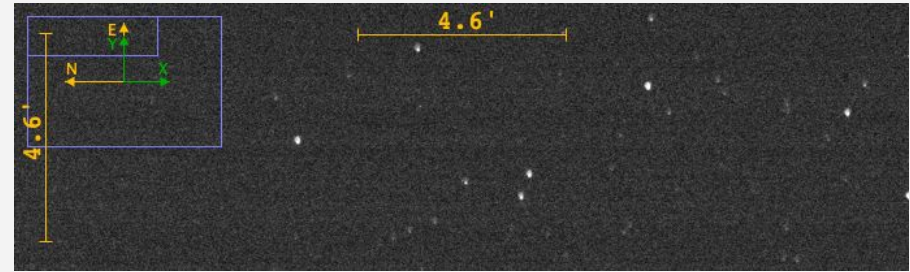
Jan. 2021 - Present, Irvine, CA

- Developed a [Fortran and MATLAB framework](#) for analyzing mixing and combustion in a 2D flow field

- Governing equations solve for parameters explicitly as the calculations march in one direction

- Compared results between my code and the paper that inspired this study and found that they are similar
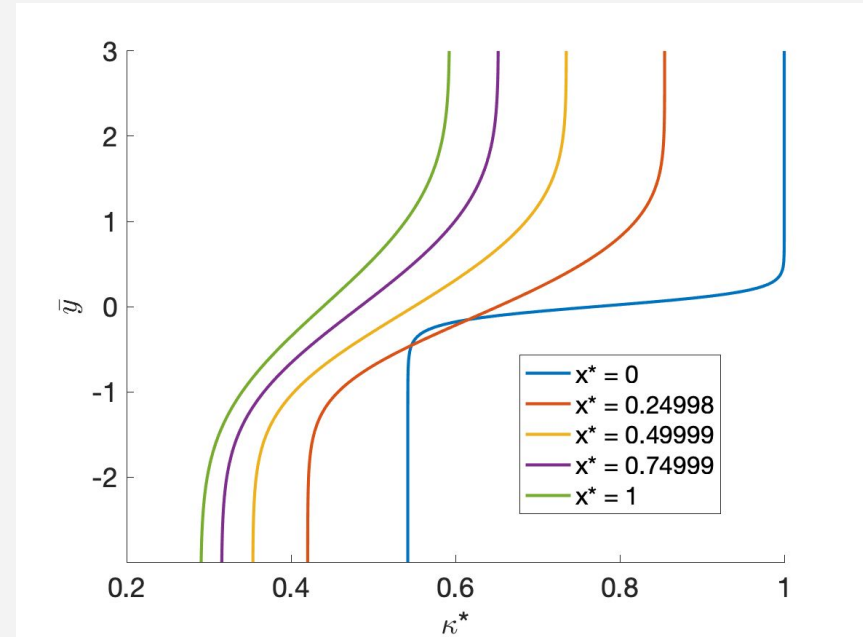
LCO Data Analysis

Jun. 2019 - Aug. 2019, Irvine, CA

- Assisted in an analysis of data from Las Cumbres Observatory (LCO) that resulted in a [publication](#)

- Extracted over 6 terabytes of photometry data for 320 stars from an LCO database and decompressed the data using a Python framework

- Generated light curves for 12 stars from both visible and infrared images using AstroImageJ

Thank You!