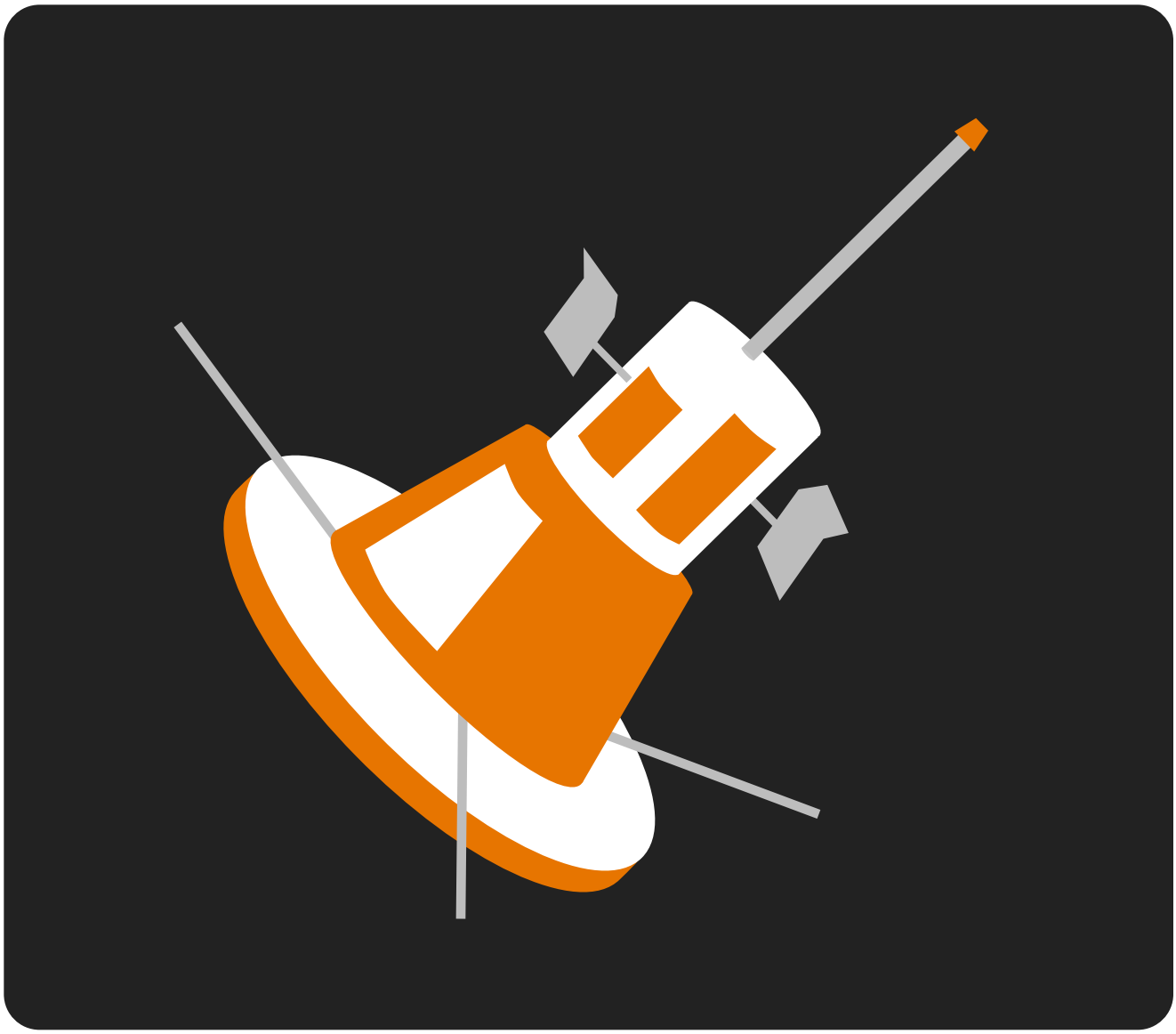

Fig. 1 My rendition of the Parker Solar Probe, one of my favorite satellite missions.

Candace Do

Engineering Portfolio

Department of Mechanical and Aerospace Engineering (MAE)
Princeton University, Class of 2024

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Updated October 17, 2022

PRINCETON
School of Engineering and Applied Science

Independent Research Project

Intelligent Robot Motion Lab · August 2022 – Present
Advised by Professor Anirudha Majumdar

Researching state-of-the-art depth estimation methods to implement absolute depth estimation capabilities for a small Crazyflie drone. The drone's depth estimation will be used to generate optimal policies for safety guarantee theories.

Using Python to implement machine learning techniques for depth estimation. Packages used include OpenCV2 and PyTorch.

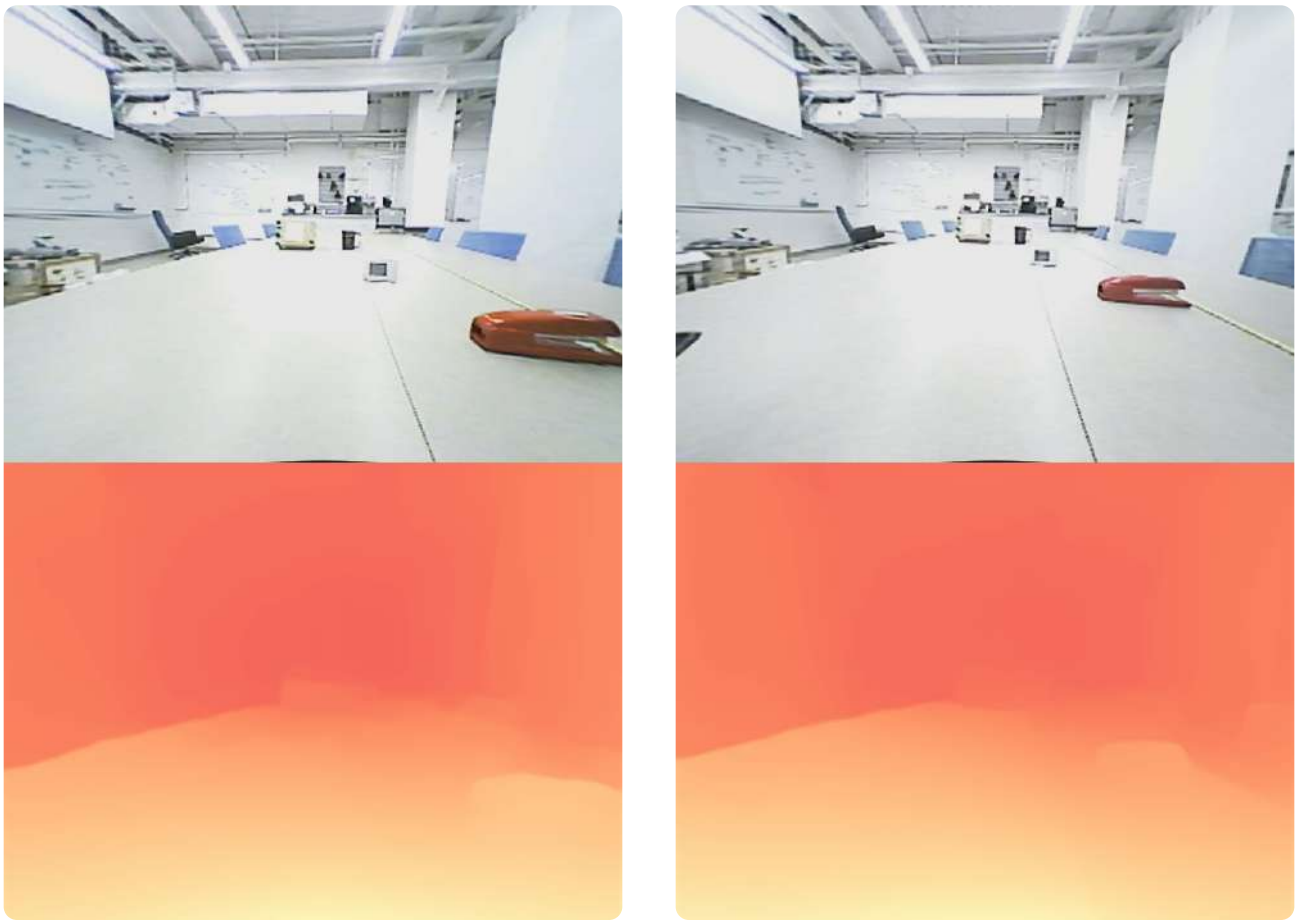

Fig. 2 Sample frames and depth maps from current depth estimator implementation.

Wing Design Project

MAE 321 (Engineering Design) Final Project · April-May 2022

Collaborated with six other students to build a cantilevered structure modeled after an airplane wing that would support a 75 lb load at one end.

Designed and analyzed wing structure in PTC Creo.

Created CNC manufacturing instructions for the wing spar and bulkheads in PTC Creo.

Used bandsaw, lathe, drill press, CNC, and 3D printing to manufacture airplane wing parts.

Wing was ultimately successful in lifting 75 lbs.

Fig. 3 Final assembly of the wing.

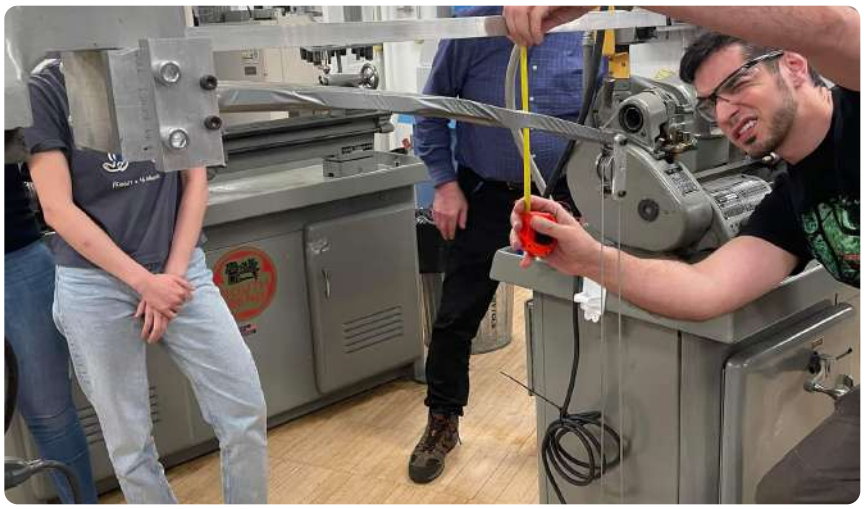

Fig. 4 Measuring the deflection of the wing under load.

Test Stand

Princeton Rocketry Club · March 2021 - Present
Test Stand Team Co-Lead: September 2021 - May 2022
Spaceport America Cup Team Co-Lead: Sept. 2022 - Present

Researched other amateur and university test stands to conceptualize and design a test stand for the Spaceport America Cup team. This test stand will support an N-class experimental motor created by the propulsion subteam.

Hand-sized dimensions for the test stand in Excel based on structural analysis principles and constraints given by the propulsion team.
Designed the test stand in PTC Creo using assemblies.

Collaborated with four other students during the design phase.

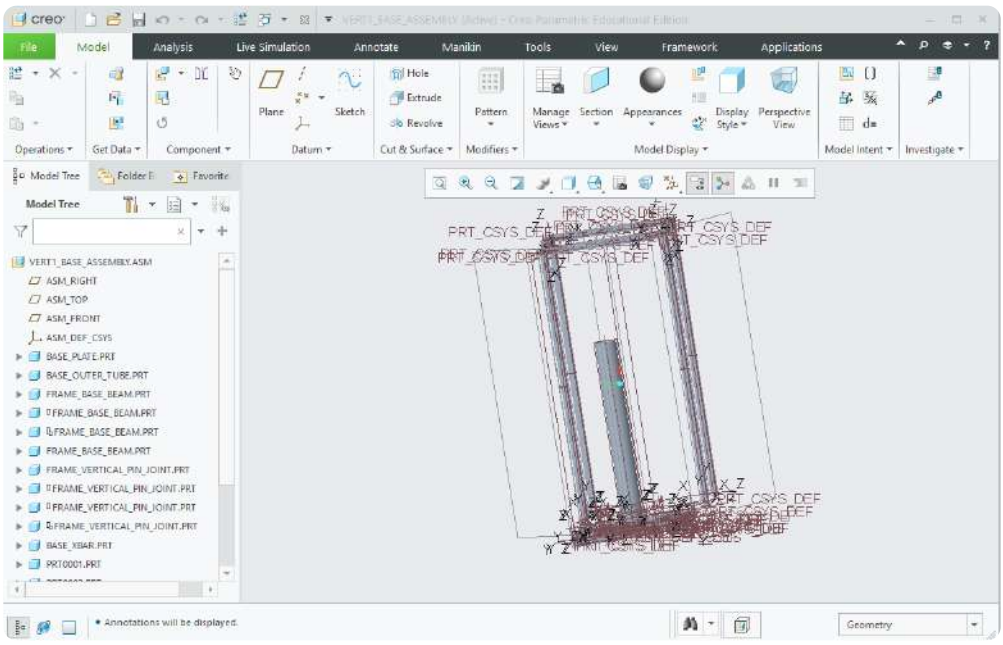

Fig. 5 Working on the test stand assembly in PTC Creo.

During Spring 2022, our team plans to conduct a **design review** with structural mechanics professors and **build smaller models** of the test stand for the propulsion team to use.

Ion Source Research Project

Princeton Space Physics Lab · September 2021 - May 2022

***Contact**: Dr. David J. McComas, dmccomas@princeton.edu*

Collaborated with seven other students to work on the Space Physics Lab's ultra-high vacuum system, which will ultimately be used to calibrate space instruments built in the Space Physics Lab.

Researched ion source design to learn about the lab's ion source. **Proposed experiments** to collect data on ion source capabilities, such as beam intensity and ion species. **Presented PDR** to lab leads and other staff.

Simulated ion source in SIMION software. Collected simulation data to compare to ion source data. **Analyzed** differences between simulation and real data and proposed reasoning behind discrepancies in a **CDR**.

Acquired laboratory skills, including using lab electronics, cleaning space instrument and vacuum system parts, and working with SIMION and Python.

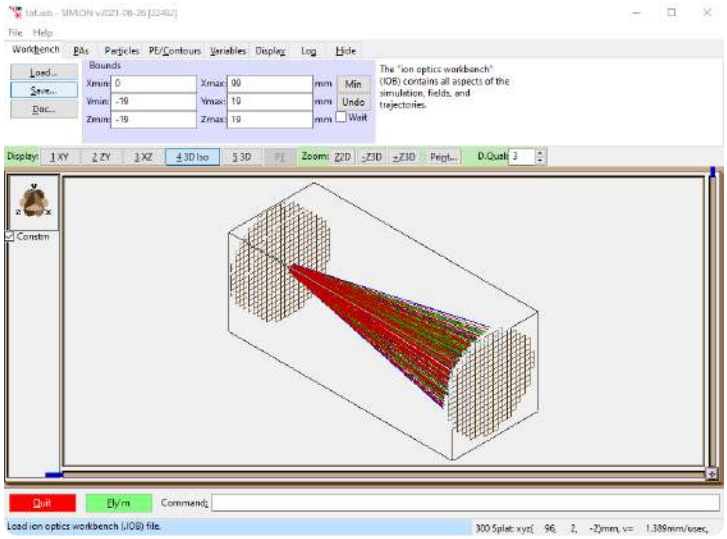

Fig. 6 An example model in SIMION.

Fig. 7 The ion source and precision leak in the vacuum system.

EDL for Enceladus Lander

NASA L'SPACE Academy · May 2020 – December 2020

Collaborated with nine other students to research and plan a mission to one of Saturn's moons, Enceladus, to search for evidence of life by analyzing ground samples.

Designed the entry, descent, and landing (EDL) maneuver for the lander using physics principles and Python.

Wrote a 50-page PDR in LaTeX to submit to NASA technical staff for review.

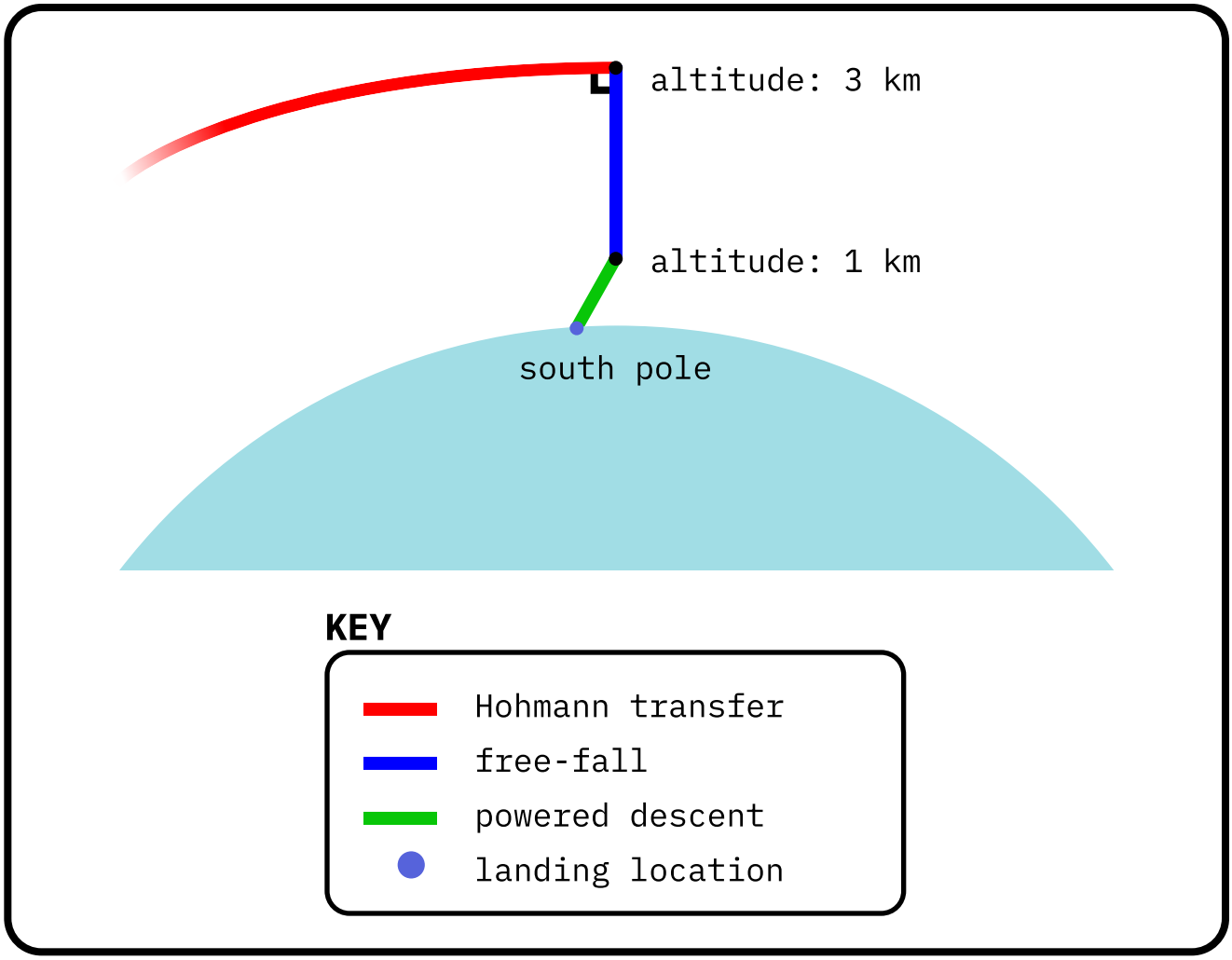

Fig. 8 A simple depiction of the EDL maneuver as presented in the PDR.

NAR High Power Rocketry Level 1 Certification

Personal Project · May 2018

Built a high-power rocket using Apogee Components' Sumo kit.

Simulated the rocket in OpenRocket to determine key launch parameters, such as motor choice and additional nose weight.

Launched the rocket at Fire in the Sky in Mansfield, WA.

Successfully recovered the rocket to receive my National Association of Rocketry (NAR) High Power Rocketry Level 1 Certification.

Fig. 9 Preparing to paint the rocket.

Fig. 10 The rocket launch.
Image courtesy of Venkatesh Rao.