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Ethan Hinds' Contribution to

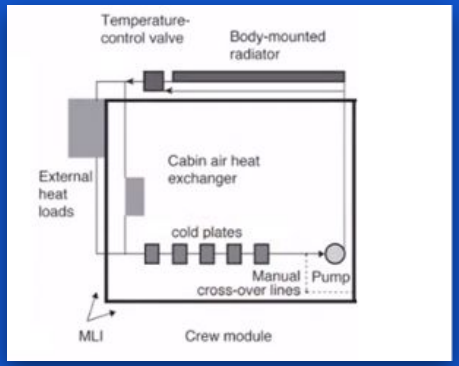
2021-2022 AIAA Undergraduate Space Mission Design Competition

Complete Project Requirements

- Design an Exploration Excursion Vehicle (EEV) for the Martian moons: Phobos and Deimos

- EEV must:

- *support 2 crew members to conduct scientific experiments on the moons*
- *retrieve 50 kg of samples from each moon*



Thermal Control System

- Optimized system design to fit within mass and volume constraints
- Performed worst-case temperature study to ensure system integrity and crew safety

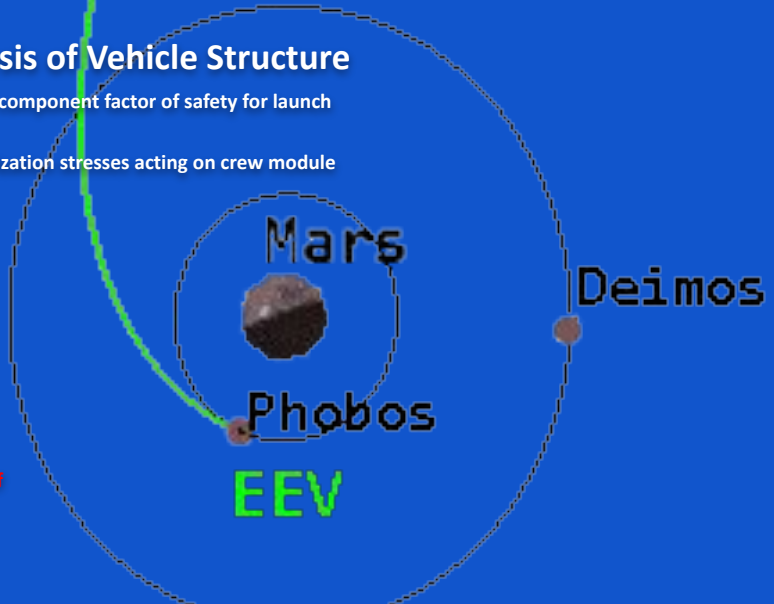
Exploration Excursion Vehicle

Orbital Mechanics

- Calculated transfer orbits to escape Earth and rendezvous with both Martian moons within the mission timeline
- Optimized orbital trajectory and launch windows using STK to minimize fuel consumption

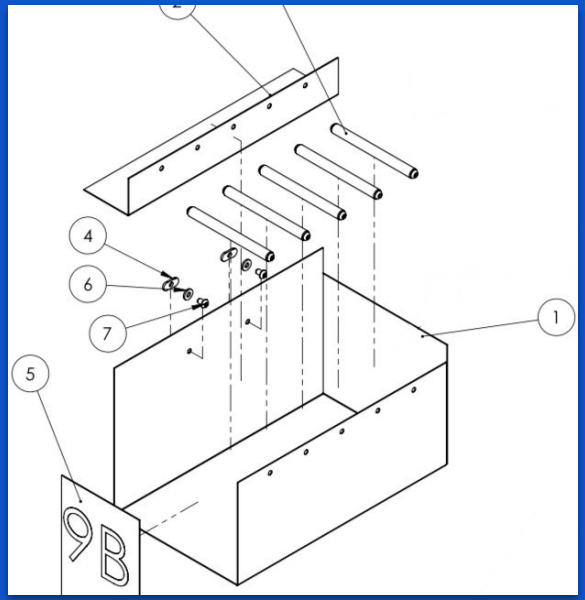
Stress Analysis of Vehicle Structure

- Evaluated structural component factor of safety for launch and landing
- Analyzed air pressurization stresses acting on crew module



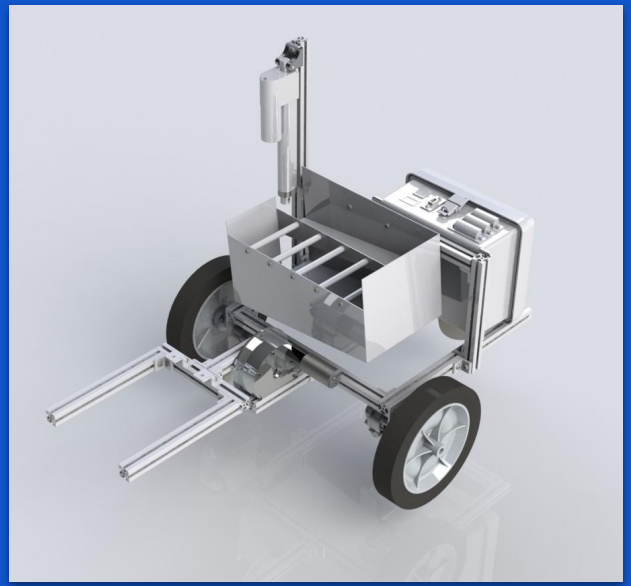
Read the full report at:
https://www.1023mb.net/Hinds_AIAA.pdf

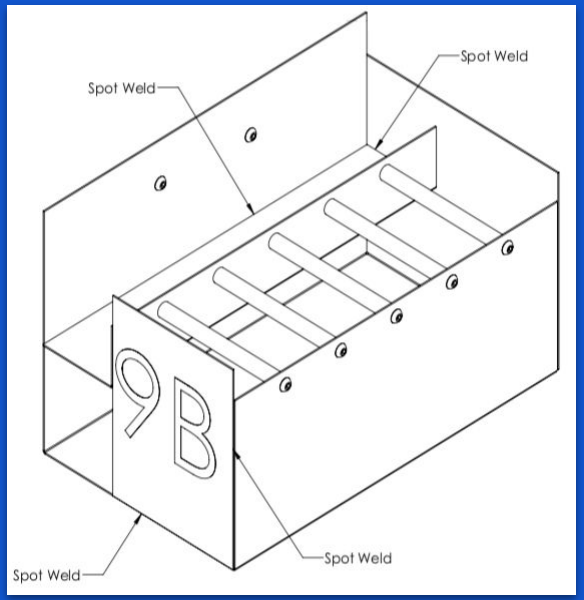
2020
Design and Manufacturing Lab Competition



Project Requirements

Design and manufacture a robot to navigate a course, pick up balls from a bucket, sort them, and release them by size





- Designed arm to grab and lift the bucket of balls and drop them into the hopper
- Devised and modeled hopper to sort the balls and release them according to size
- Assembled components, mounting the hopper to the robot chassis

- Calculated estimated manufacturing time and costs
- Created step-by-step documentation of manufacturing process for the hopper and arm subsystems

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