Team 501: Landing System for Uncertain Terrain

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The objective of this project is to design a landing system capable of safely landing on the assumed range of hypothesized surfaces and terrains of (16) Psyche.

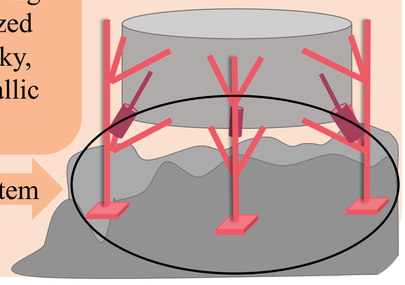
Project Background

Asteroid 16 Psyche is believed to be an exposed core of an early planetesimal that lost its rocky outer layers due to violent collisions billions of years ago. Psyche could potentially provide information about Earth's core.

Key Goals

Accommodate lander for a range of hypothesized surfaces (rocky, uneven, metallic surface)

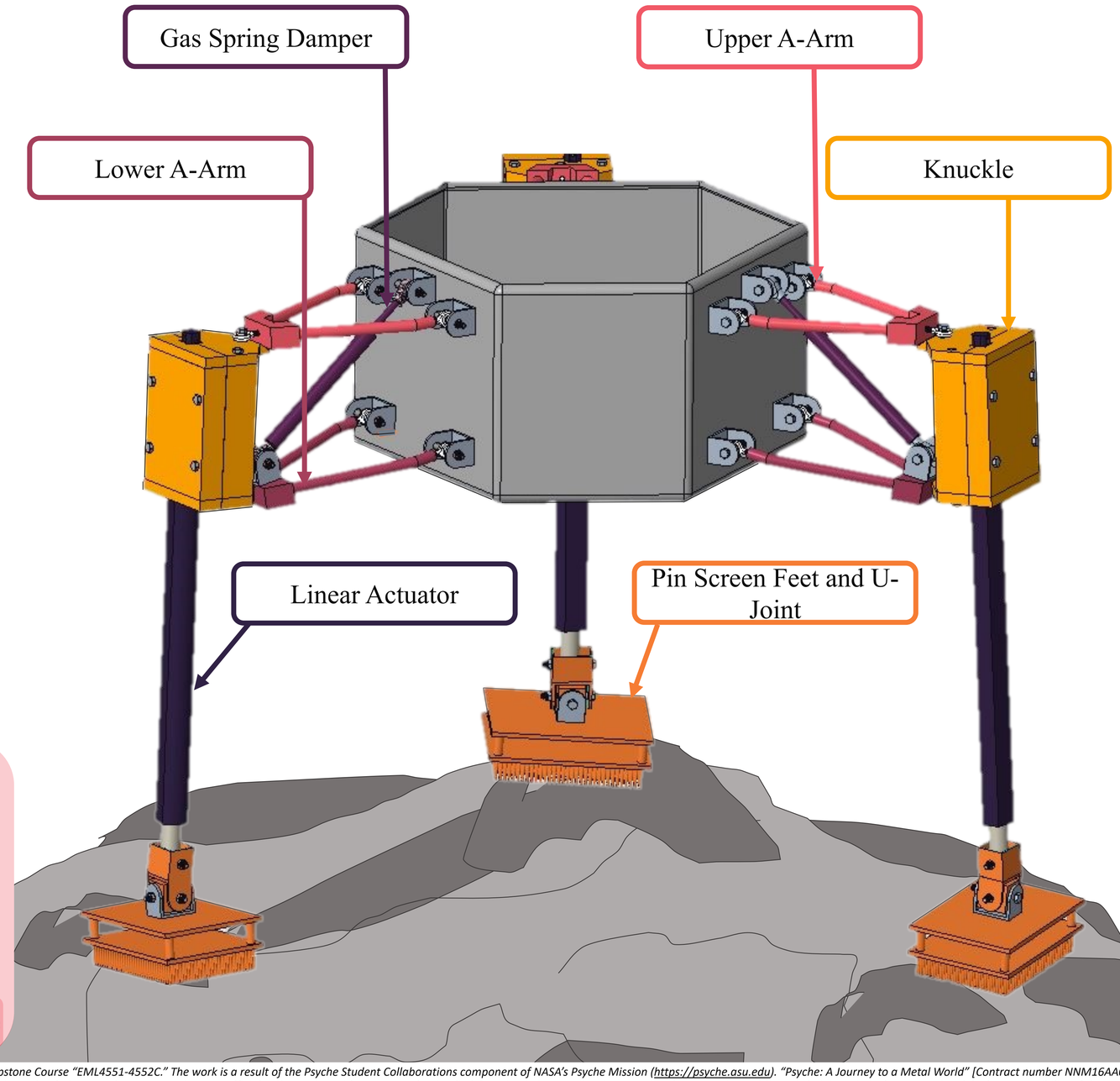
Design landing system that supports spacecraft



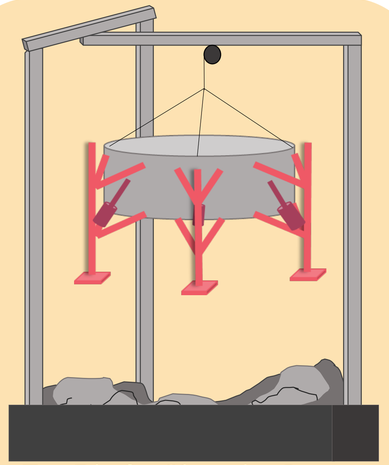
Project Targets

	Lander Mass	Impact Velocity	Weight
Earth	23 kg	0.93 m/s	21.6 N
Psyche	150 kg	6 m/s	225.6 N

Earth prototype | Psyche prototype



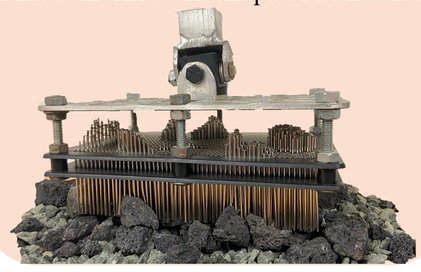
Prototype Testing



Test Rig for Observing Impact and Validating Targets

Pin Screen Feet Details

Pins conform to the shape of a 3D relief



Future Work

- Test with multiple different height terrains
- Experiment with crushable honeycomb dampers
- Look into space grade materials

This work was created in partial fulfillment of FAMU-FSU College of Engineering Capstone Course "EML4551-4552C." The work is a result of the Psyche Student Collaborations component of NASA's Psyche Mission (https://psyche.asu.edu). "Psyche: A Journey to a Metal World" [Contract number NNM16AA09C] is part of the NASA Discovery Program mission to solar system targets.