2. Overall Description

2.1 Product Perspective

The NASA Type-M asteroid spacecraft simulator will be a standalone web application accessible through modern web browsers. It will ultimately utilize advanced physics and graphics engines to provide realistic simulations of spacecraft operations and mining techniques on Psyche.

2.2 Product Functions

- Simulate approach trajectories, landing maneuvers, and sample mining operations.
- Visualize mining operations and evaluate extraction techniques.
- Allow users to manipulate spacecraft parameters such as thrust, angle, and speed.
- Provide real-time data feedback and analysis based on user-defined scenarios.

2.3 User Classes and Characteristics

NASA Engineers: Require precise simulations for mission planning and design validation.

NASA Managers: Seek insights into project feasibility and resource allocation.

NASA Public Affairs Personnel: Need to communicate mission objectives to the public effectively.

Spacecraft Industry Engineers: Focus on design assessments and technology evaluation.

Scholars and Researchers: Require data for studies on asteroid characteristics and mining feasibility.

Mining Experts: Assess potential resource extraction methods and efficiencies.

Science Teachers: Use the simulator as an educational tool for teaching space science concepts.

General Public: Engage with simplified simulations for educational and recreational purposes.

2.4 Constraints

- A stable internet connection is required to access the simulator.
- The application must be compatible with major web browsers (Chrome, Firefox, Edge).
- Compliance with NASA’s security and data management protocols is mandatory.