

5. Use Cases

The Software Requirements Specification (SRS) document for the NASA Psyche Mission Simulator outlines a wide range of use cases that cater to different user groups. Here are some typical use cases derived from the provided SRS:

Use Case 1: Mission Planning for NASA Engineers

Scenario: Engineers use the simulator to model various approach trajectories and landing strategies for the Psyche mission.

Goal: Optimize spacecraft dynamics to ensure a successful landing and sample collection.

Use Case 2: Project Feasibility Assessment by NASA Managers

Scenario: Managers analyze simulation results to evaluate mission feasibility and resource allocation.

Goal: Make informed decisions on budget and resource deployment for the mission.

Use Case 3: Public Engagement and Education

Scenario: General public users engage with a simplified version of the simulator to learn about asteroid mining and space exploration.

Goal: Increase public interest and understanding of NASA's missions.

Use Case 4: Research and Data Collection for Scholars and Researchers

Scenario: Researchers utilize the simulator to gather data on asteroid characteristics and mining techniques.

Goal: Support academic studies and contribute to scientific literature.

Use Case 5: Design Assessment by Spacecraft Industry Engineers

Scenario: Industry engineers test and evaluate design concepts for spacecraft and mining technologies.

Goal: Enhance the development of innovative solutions for space missions.

Use Case 6: Educational Tool for Science Teachers

Scenario: Teachers incorporate the simulator into their curriculum to teach concepts of physics, space science, and engineering.

Goal: Provide an interactive learning experience that reinforces classroom lessons.

Use Case 7: Collaboration and Data Sharing

Scenario: Users share simulation outcomes and strategies with peers, family, or online communities to foster discussion and collaboration.

Goal: Promote a collaborative approach to learning and exploration.

Use Case 8: Error Handling and Recovery

Scenario: A user encounters an error during a simulation and uses the error handling features to rectify the issue and continue.

Goal: Ensure a smooth user experience by allowing for easy recovery from errors.

Use Case 9: Customizing Simulation Parameters

Scenario: Users adjust various parameters such as thrust, angle, and speed to explore different mission scenarios.

Goal: Understand the effects of different variables on mission success.

Use Case 10: Real-Time Data Analysis and Feedback

Scenario: Users monitor real-time data during simulations, assessing performance metrics and making adjustments as needed.

Goal: Enhance decision-making through immediate feedback on simulation outcomes.

These use cases highlight the versatility of the simulator, addressing the needs of diverse stakeholders, from engineers and managers to educators and the general public. Each use case not only supports mission objectives but also promotes education and engagement with space science.