SEATTLEU
COLLEGE OF SCIENCE AND ENGINEERING

NASA Psyche VR Exploration Experience

COMPUTER SCIENCE
TEAM CS 26.16

CS 26.16

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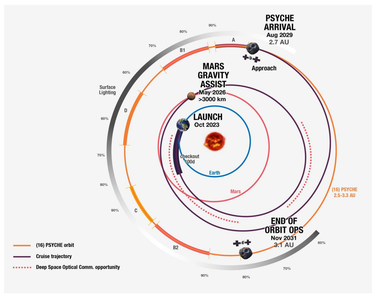
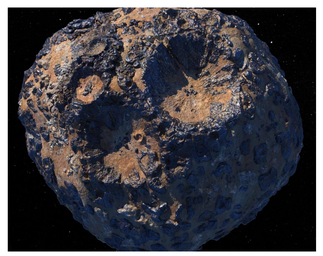
NASA Psyche Mission

NASA's Psyche Mission, led by Arizona State University in partnership with NASA, aims to study the asteroid Psyche, which scientists believe may be the exposed metallic core of an early planet. Launched in October 2023, the Psyche spacecraft is expected to arrive at the asteroid in 2029.



Unlike rocky or icy asteroids, Psyche is thought to contain large amounts of iron and nickel, providing researchers with a rare opportunity to study planetary formation and the building blocks of terrestrial planets like Earth.



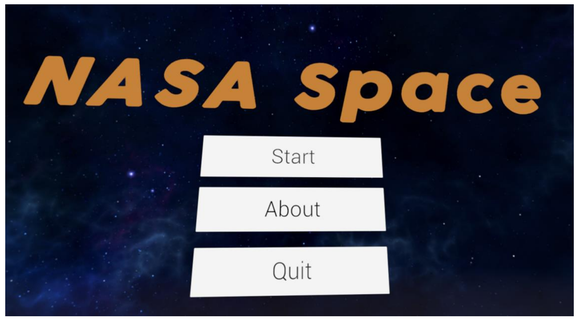
THE VIRTUAL REALITY GAME

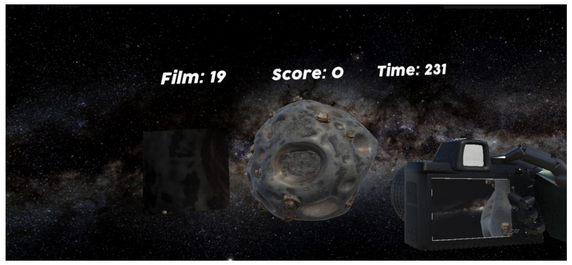
The NASA Psyche VR Exploration Experience is an educational virtual reality application designed to immerse users in the exploration of asteroid Psyche. Players use a virtual camera to identify and photograph scientifically significant features with each successful discovery awarding points and educational feedback, encouraging exploration while reinforcing scientific learning objectives.

PRESS PLAY TO START!
Players are placed near a rotating asteroid environment inspired by NASA's Psyche mission. During the timed experience, users search for scientifically important metallic formations embedded within the asteroid.

GAMEPLAY FLOW

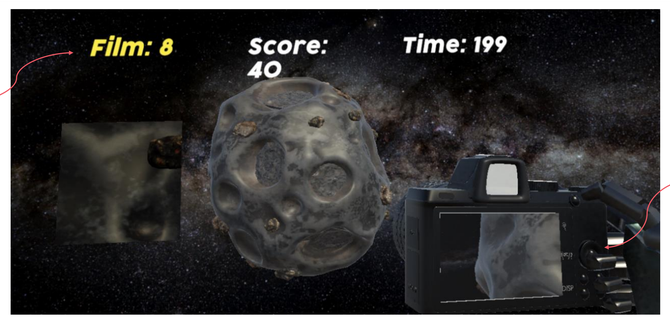
1. **Explore** the asteroid environment in VR
2. **Locate** metallic ore formations and geological features
3. **Capture** discoveries using a virtual camera
4. **Earn** points based on identified objects
5. **Review** discoveries in the interactive Discovery Book





KEY FEATURES

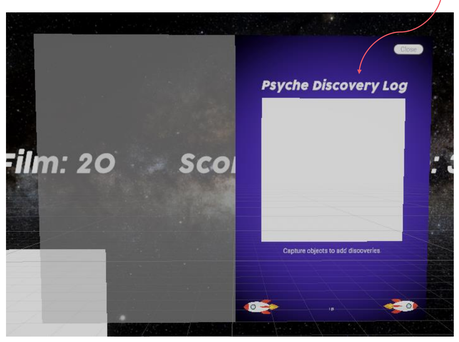
Heads-Up Display that dynamically tracks user's camera film left, score, and time remaining



Virtual camera with picture-taking functionality

Game-over panel displays final score and reason session has ended

Post-game discovery log that displays the object types the user captured throughout their session



This work was created in partial fulfillment of Seattle University Capstone Course "CPSC 4890". The work is a result of the Psyche Student Collaborations component of NASA's Psyche Mission (https://psyche.ssl.berkeley.edu). "Psyche: A Journey to a Metal World" [Contract number NNM16AA09C] is part of the NASA Discovery Program mission to solar system targets. Trade names and trademarks of ASU and NASA are used in this work for identification only. Their usage does not constitute an official endorsement, either expressed or implied, by Arizona State University or National Aeronautics and Space Administration. The content is solely the responsibility of the authors and does not necessarily represent the official views of ASU or NASA.

TECHNICAL IMPLEMENTATION

The project integrates multiple systems to create a responsive and educational VR experience.

Core Systems

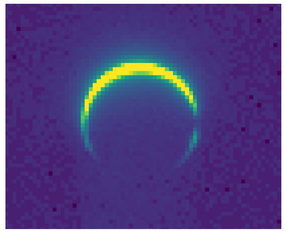
- VR interaction system using Unity XR Toolkit
- Photograph detection and validation system
- Dynamic scoring and feedback system
- Real-time HUD updates
- Discovery tracking and educational data storage
- Game state and timer management

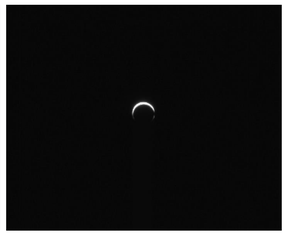
Technologies Used

Unity · C# · Meta Quest

EDUCATIONAL IMPACT

The experience was designed to make planetary science more engaging and accessible through immersive technology. Traditional educational materials often rely on static images and text, while VR allows users to actively participate in exploration and discovery.





By combining gameplay with scientific information, the project encourages curiosity about astronomy, planetary science, and NASA missions while demonstrating the educational potential of virtual reality environments.

CONCLUSIONS

The NASA Psyche VR Exploration Experience demonstrates how virtual reality can transform educational outreach by combining immersive interaction with scientific learning. Through exploration, object discovery, and interactive feedback, users gain a deeper understanding of the Psyche mission and the importance of metallic asteroids in planetary science.

This project highlights the potential of VR technology to create engaging educational experiences that inspire interest in space exploration, STEM learning, and emerging interactive technologies.