TerpVISIO

University of Maryland: College Park

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Meet the Team

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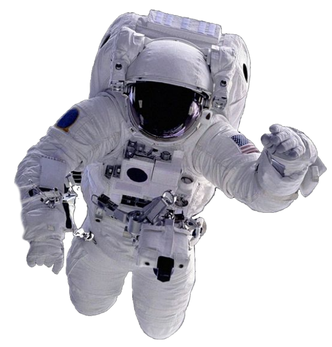
Project Overview

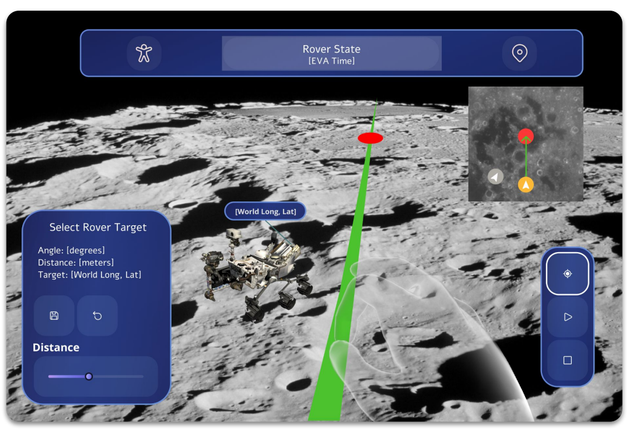
TerpVISIO, a group of undergraduate students at the University of Maryland: College Park, is proud to compete in the NASA SUITS Challenge to pioneer augmented-reality interfaces that will assist astronauts on future Artemis lunar missions. We have created a variety of interfaces and tools that will assist the astronauts in a variety of tasks: enabling astronauts to analyze and save geological findings, navigating the astronauts across the lunar surface, remote controlling the lunar rover to a desired destination, and guiding the astronauts in successfully performing the Umbilical Interface Assembly (UIA) procedure. We have strived to build these interfaces so that they are most effective for the astronaut while letting them focus on what matters most: the Artemis mission. Our team members have greatly appreciated participating in this competition, as they have picked up valuable industry skills such as Unity, C#, and the Mixed-Reality Toolkit.



Objectives

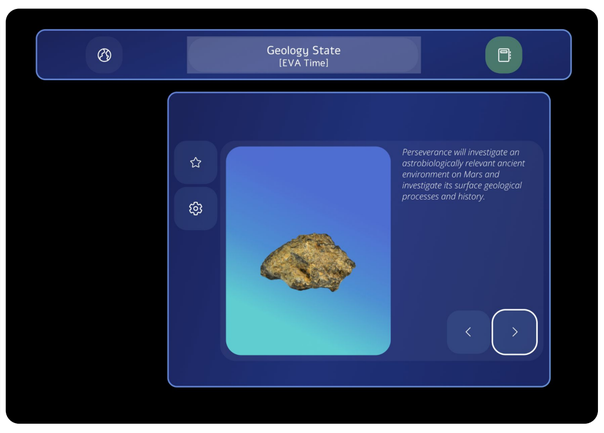
Our goal was to provide astronauts with intuitive augmented-reality interfaces that were functional yet as minimal as possible. An astronaut's responsibilities on the moon are intensive (their agendas are often scheduled down to the second!). Thus, we wanted to ensure that the astronauts find our interfaces to be helpful in their field work and not a cumbersome distraction; **we wanted them to show just the right amount of information in an easy-to-use manner**. Moreover, while the HoloLens 2 is a hallmark of current augmented-reality technology, its limited field of view poses a design challenge for building glanceable and easily-navigable interfaces. Therefore, our designs feature a central "status bar" such that a quick glance at it will give the astronauts all the information they need to know their overall health and system statuses. This resides near the top of the astronaut's vision, which makes it easily visible despite the limited field-of-view and allows them to maintain their focus on their hands and the lunar surface. Buttons on this status bar allow the astronaut to open more-detailed information and menus when they deem necessary.

Design Showcase



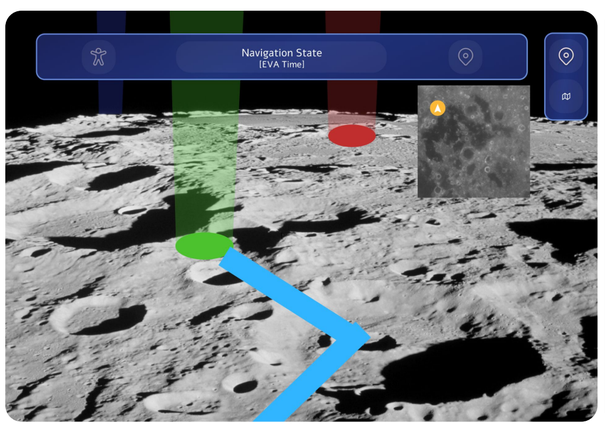
Rover Navigation

Assists the astronauts in controlling the rover



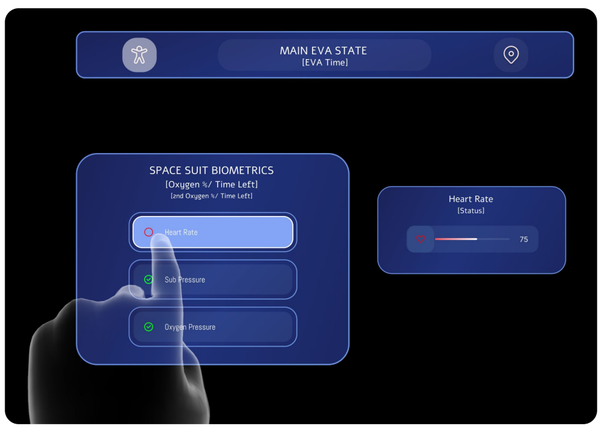
Geology

Provides a logbook for astronauts to record their geological discoveries



Navigation

Guides astronauts across the lunar surface using waypoints and "breadcrumbs"



EVA State

Allows astronauts to easily see their personal and system health at a glance

Outreach

TerpVISIO visited a local middle school to give the students an overview of the NASA SUITS challenge and what it strives to accomplish: using state-of-the-art technology to aid Artemis astronauts in their mission to the moon and beyond. In this workshop, we encouraged students to share their passion for space exploration and STEM by asking them a variety of trivia questions and thought-provoking questions, such as: why would astronauts want to use augmented reality on the moon? What are some of the challenges of using electronic devices on the moon? Why is giving too much visual information to the astronauts problematic? We also let them experience a variety of space-themed augmented and virtual-reality games and applications. Many of them had never tried a virtual-reality headset before, let alone an augmented-reality headset like the HoloLens, so they were absolutely blown away by what immersive technology can do!