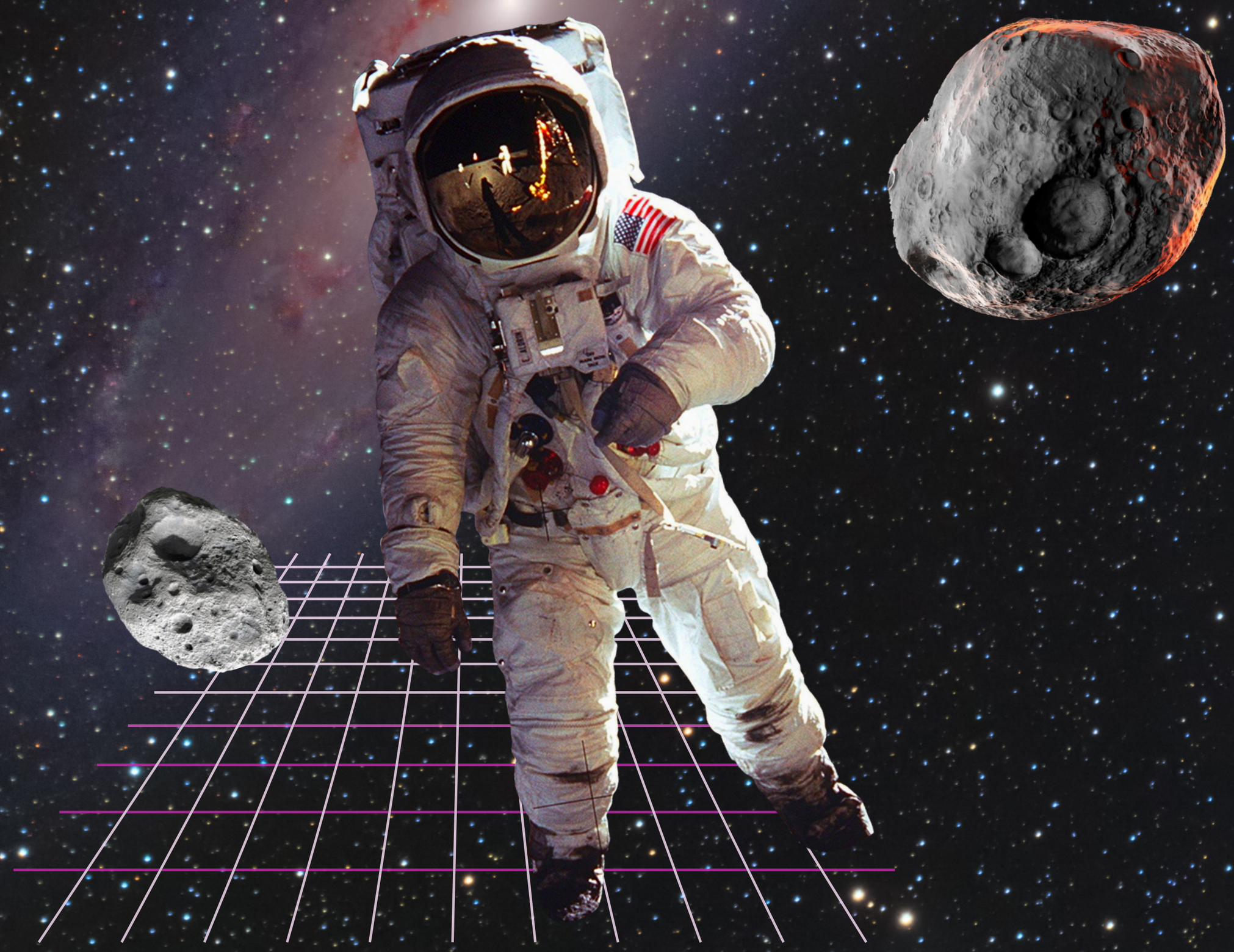
# ASTROGUIDE

THE ASTRONAUTS ' TRUSTWORTHY SIDEKICK ON THE MOON.



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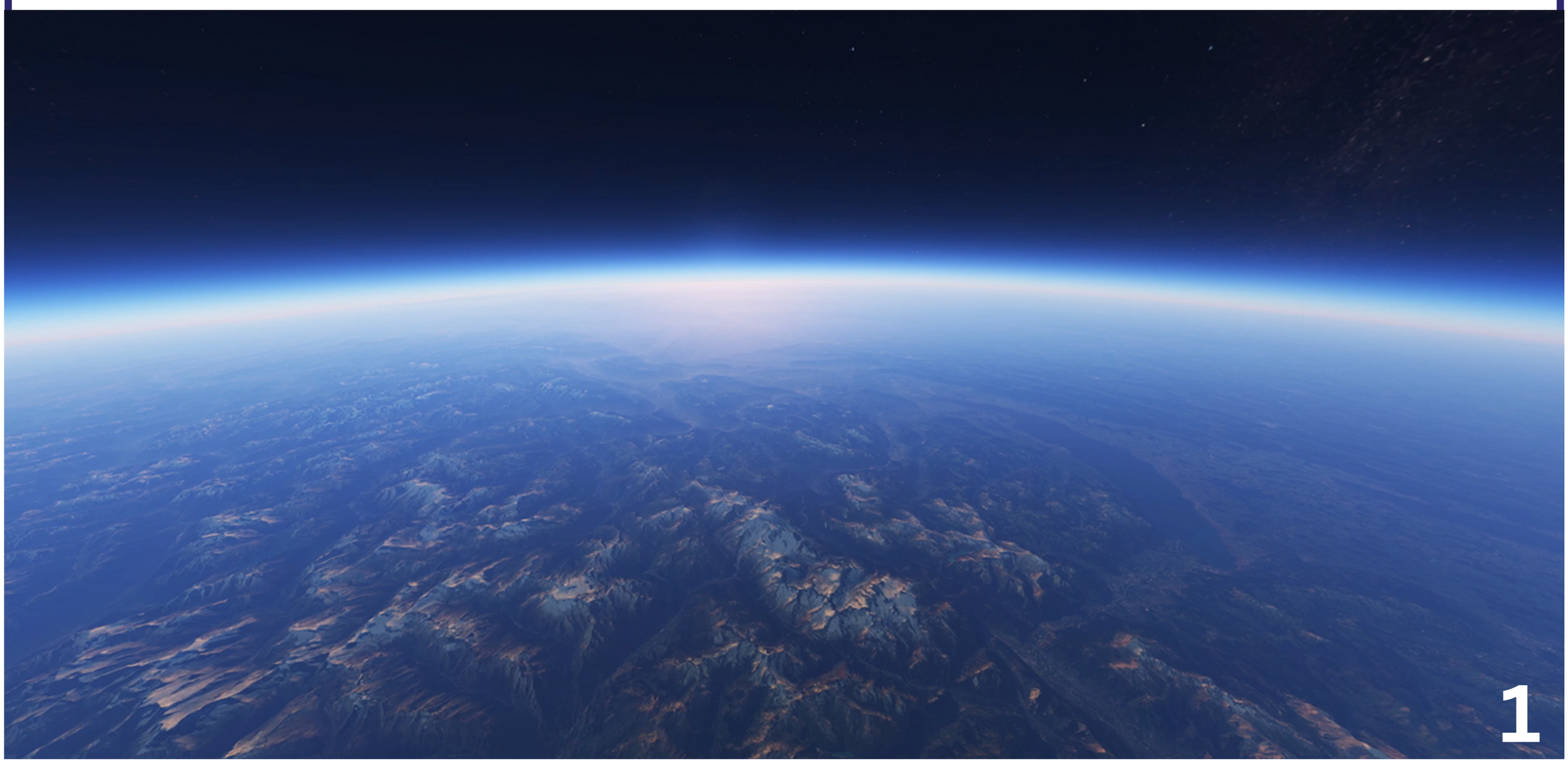


# INTRODUCTION

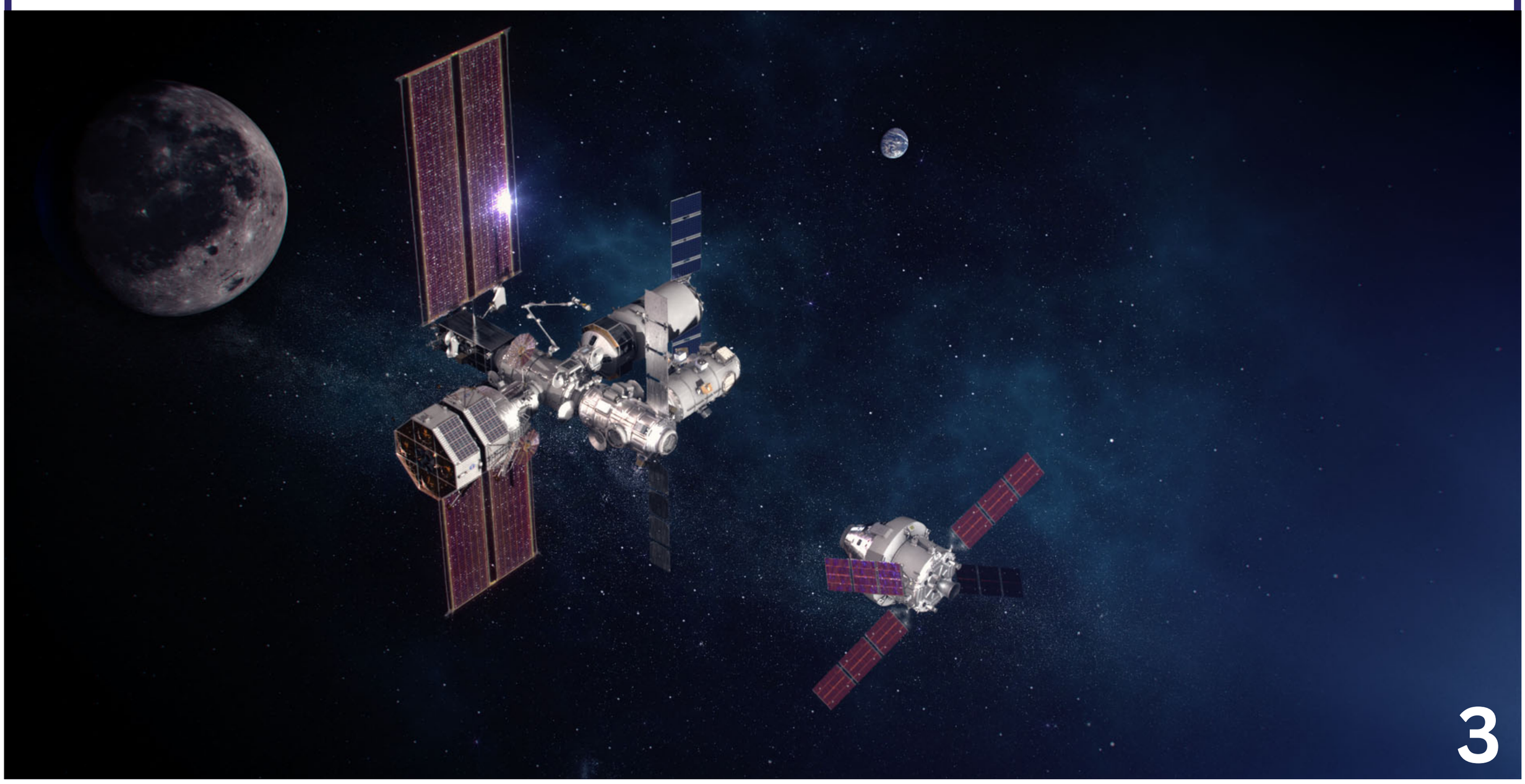
From the discovery of fire by ancient ancestors to present space exploration, curiosity along with the desire for a brighter future has driven humans to explore and develop.
In fact with Artemis missions, NASA will land the first woman and first person of color on the Moon, using innovative technologies to explore more of the lunar surface than ever before.
However with the moon's extremely harsh hostile-to-life conditions and a two-month mission stay, the two astronauts have a very full schedule, hence it is essential to equip them with the appropriate tools to facilitate their mission. And that's where our solution "**AstroGuide**" steps in.

# PROBLEM DESCRIPTION

Once settled on the moon, the astronauts will have a long list of tasks to execute. Testing advanced robotics and rendering equipment maintenance are among the major tasks.
These tasks must be performed effectively, with zero tolerance for mistakes, and without wasting any precious time.

As part of their basic training, astronaut candidates need to learn how to operate and maintain complex systems and robotics. This phase takes up to two years due to the intricacy of these systems. Sometimes it is physically impossible to memorize all the instructions especially when it comes to highly complex robots, hence the astronauts find themselves obliged to contact the ground base and wait to receive the needed details.

Given how priceless the astronauts' time is, we figured that it is crucial to assist them and enable them to monitor and maintain their systems easily without neither the need to memorize the infinite list of instructions or the urge to contact mission control.



# SOLUTION & TECHNICAL DETAILS

In order to solve the previously mentioned problem we came up with an effective solution that will facilitate the astronauts' daily tasks, we gave it the name of "AstroGuide".

AstroGuide is a wearable device with retractable glasses that will be worn on the forehead under the spacesuit helmet, it uses a combination of advanced sensors and holographic displays to project digital images onto the person's field of view, allowing them to interact with virtual objects in a real-world environment. It is equipped with several high-precision sensors, including infrared cameras, depth sensors, and environmental sensors. These sensors allow the device to track the position and orientation of the user's head, as well as the surrounding environment. The device also contains a sound sensor that allows the astronauts to activate and utilize it through their voices.

Holographic displays are one of the key features of this technology. These displays use an array of tiny lenses and mirrors to project images directly onto the user's retina, creating the illusion of a three-dimensional object floating in mid-air. AstroGuide can generate and display millions of different colors, allowing it to create highly detailed and realistic holograms.

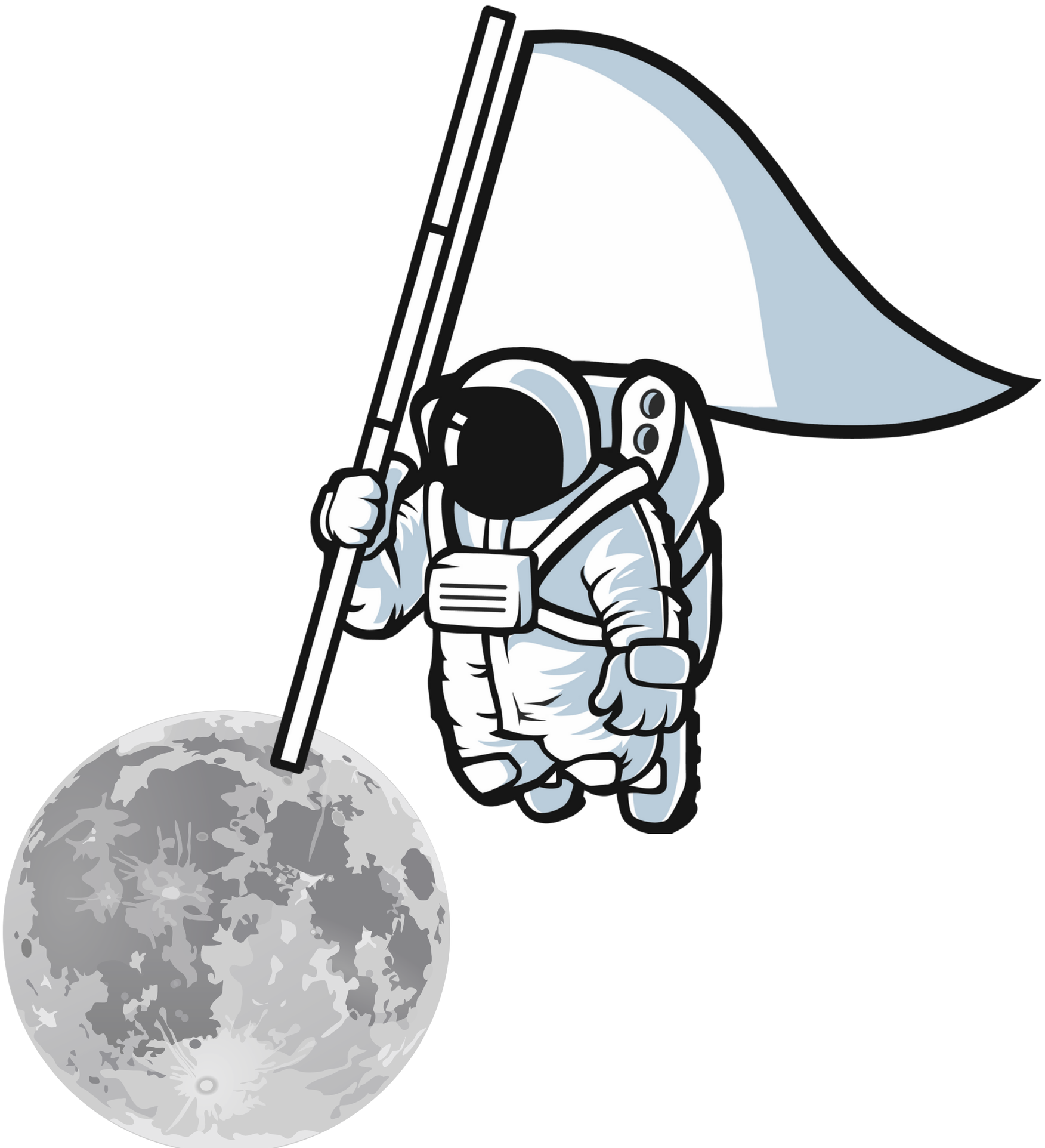
We will use this Mixed Reality Headset Technology to implement various scenarios to assist astronauts in using complex robotics and maintaining and repairing their machines by using an interactive holographic 3D model and providing visual indicators on what steps to take, which will be much easier to follow than voice commands from mission control, thus, reducing the human error rate, avoiding communication disruption with earth, and optimizing the Extravehicular Activity's durations.

The use and functioning of the AstroGuide will be as follows: when the astronauts want to know certain information or want to learn how to do specific tasks, they can activate the device through their voice, wait till the glasses move down to cover their eyes, then order it to display the specific 3D simulation they need. After they finish, they can vocally call it to get deactivated and the glasses will retract back to their initial position.

# LIMITATIONS

## Limitations:

- The headset's storage is currently limited to 64 GB.
- The 3D models created by NASA's technical team need to be accurate and will be more sophisticated and modular.
- In case of a missing scenario, updating the headset with the needed scenes might take some time causing a minor increase in the response time.



# Conclusion

In conclusion, it should be said that the Artemis mission is a momentous occasion in the history of space exploration, and the astronauts who will land on the Moon will face a unique set of challenges as they embark on their two-month mission.

To overcome these challenges and achieve their goals, the astronauts will need a range of specialized tools and technologies to support them. This is where **AstroGuide** comes in - as a comprehensive and innovative solution, it is designed specifically to meet the needs of the Artemis mission and to help the astronauts navigate and complete their tasks efficiently on the lunar surface.

With its advanced features and capabilities, **AstroGuide** will be an invaluable resource for astronauts as they explore the Moon and push the boundaries of what we know about our celestial neighbor. Ultimately, **AstroGuide** is an essential part of the Artemis mission and the larger effort to achieve a brighter future for all humanity.