VIPER Rocks!

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BACKGROUND

The Volatiles Investigating Polar Exploration Rover (VIPER) embarks on a groundbreaking mission to explore the Moon's South Pole. This robotic explorer will:

- Land on the Southern Pole of the Moon, a region with potential for hidden water ice deposits
- Take images of the Moon's surface, revealing features never seen before
- Engage citizen scientists to map and classify distribution of rocks found

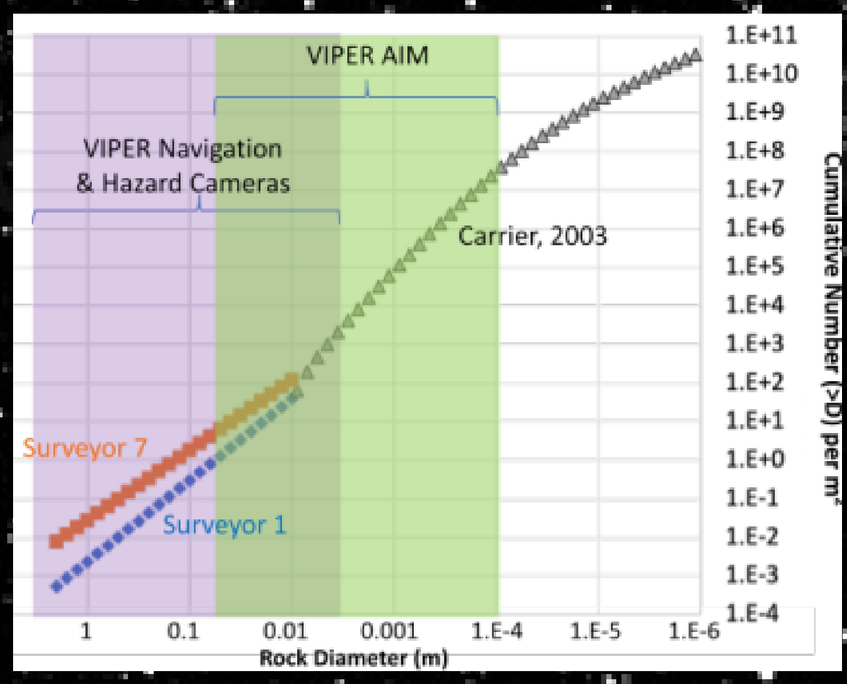
Why is that important?

- By analyzing the data collected by VIPER, scientists can gain insight into the Moon's formation and evolution and provide crucial information to guide future missions

OBJECTIVES

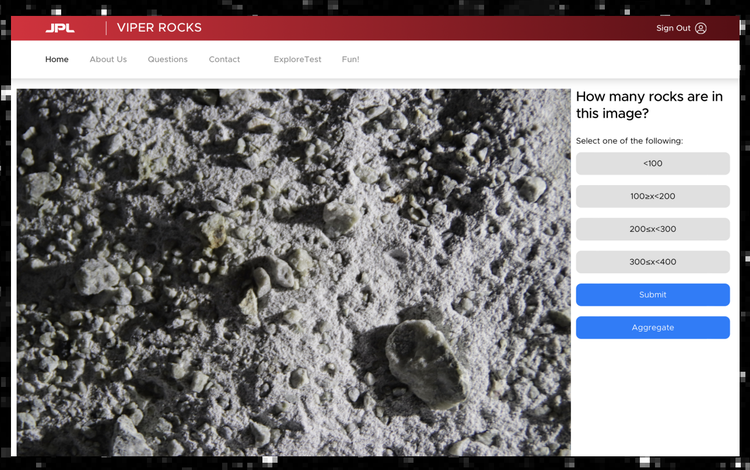
VIPER ROCKS! is a web application designed to engage citizen scientists in the VIPER mission. Through this platform, users can contribute to our understanding of the Moon's surface by participating in the following tasks:

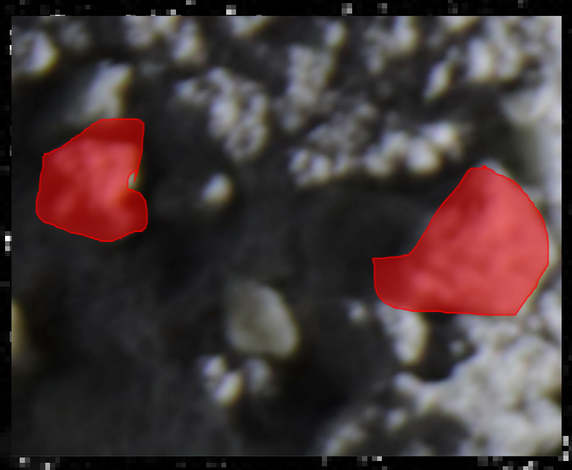
- **Scout**: Users will count the amount of images in a rock, which helps segment the images, allowing for more focused analysis of the rocks
- **Size**: Users will use a drawing tool to outline rocks in a partition to provie insights into distribution and size variation of lunar rocks
- **Classify**: Users will classify rocks into 5 distinct categories: Rounded, Sub-Rounded, Sub-Angular, Angular, and Ambiguous.

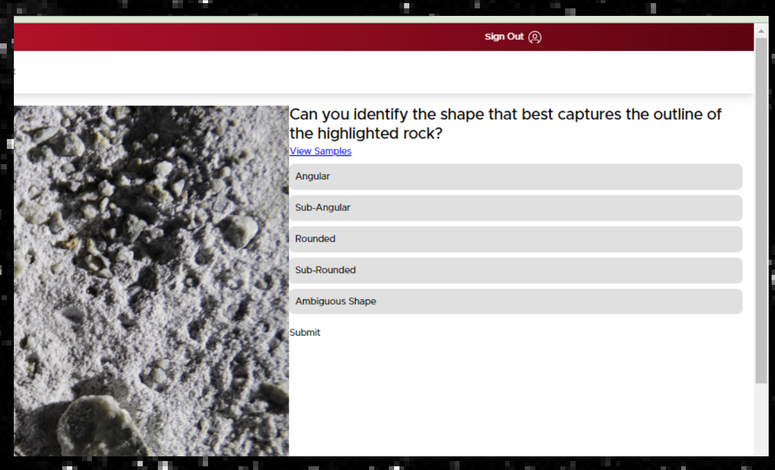


Low-latitude lunar rock size frequency distributions(FDs) using Surveyor data and Apollo samples. The VIPER camera suite will enable the first high- latitude lunar size-FDs over 4 orders of magnitude ins spatial scale.

SCOUTING → SIZING → CLASSIFICATION







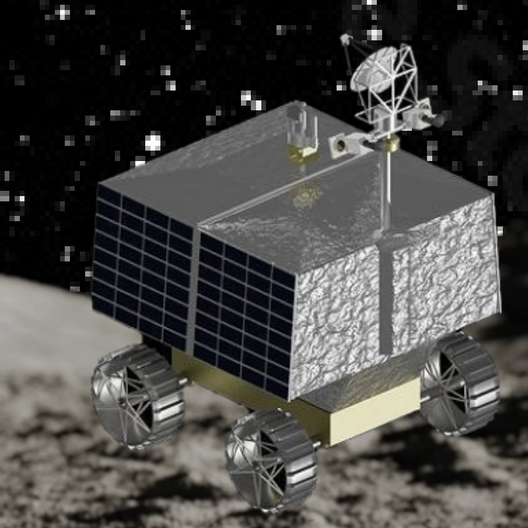
FUTURE APPLICATIONS

The aggregated data from the combined efforts of citizen scientists using VIPER Rocks! will be analyzed by researchers to unveil crucial information about the composition and formation of the Moon's rocky terrain.

- Rock **Size-Frequency** Distributions
  - Data will provide insight into age of rocks, exposure of surface, and hazard assessment for future exploration of the surface
- Rock **Shape-Frequency** Distributions
  - Data will provide insight into thermal and physical degradtion or erosion of surface.
- Rock **Albedo-Frequency** Distributions
  - Data will provide insight into albedo of rocks within an image.

CONCLUSION

- **Citizen Science :**
  - VIPER Rocks! exemplifies the power of citizen science in advancing our understanding of planetary bodies. Through this platform, citizen scientists play a critical role by analyzing, identifying, categorizing, and annotating surface features from spacecraft data like those captured by the VIPER mission. This collective effort unlocks valuable insights that would be difficult to achieve through traditional research methods alone.
- **Mutual Benefits :**
  - Citizen scientists on VIPER Rocks! not only contribute to groundbreaking research, but also gain valuable individual benefits. Their participation enhances problem-solving skills, fosters a sense of recognition and personal satisfaction, exposes them to diverse scientific perspectives, and encourages teamwork.
- **Platform Benefits :**
  - VIPER Rocks! provides a user-friendly platform equipped with comprehensive tools specifically designed to facilitate citizen science contributions. This platform empowers individuals to participate in exciting lunar exploration missions, analyzing data from past present, and future endeavors.



Note: **Citizen Scientists** are individuals who actively engage in scientific research alongside professionals to assist JPL in scouting, sizing, and classifying lunar rocks.

TOOLS/ TECHNOLOGIES

Ai · Ps · React · K · PostGIS PostgreSQL · Node.js · Vercel · Next.js · Prisma · QGIS · JS · SQL