WOMANIUM GLOBAL ASTROBIOLOGY PROGRAM

WHAT IS ASTROBIOLOGY? HOW DID LIFE ORIGINATE ON EARTH? CAN WE FIND IT ELSEWHERE?

The Womanium AstroBiology module spans biology, chemistry, astronomy, physics, planetary science, engineering, and geology. Think like an astrobiologist and learn how scientists use laboratory experiments, large telescopes, field work, computational modeling, spacecraft and space missions to study earth, other bodies in our Solar System, and exoplanets across the universe.

A comprehensive program covering the Science & Innovations in AstroBiology

+ Womanium Scholarships Available
There are two enrollment categories:
A: Womanium AstroBiology Scholar › Free
B: Participant › $ 25 USD

Team:
Caves and Vents Exploration Seekers
(C.A.V.E.S.)

Members:
David Emanuel Turcu, Sagun Bhandari, Herald Bayoca, Tejaswini Samanta, Elvis Annie

INVITED SPEAKERS AND MENTORS FROM AND SUPPORTED BY

About the instruments:

The istruments used were chosen for as much degree of data collection as possible. We took into consideration past missions, and we looked at what kind of equipment would be needed to obtain useful data sets about the enviorenment. The QMS and GC were also present on the Perseverence and Curiosity missions, which testifies to their usefulness.

HOW DEEP IS IT POSSIBLE TO GO?

AS LONG AS THE TETHER CABLE IS LONG ENOUGH AND THE DRONES DON'T SUFFER ANY DAMAGES, THEY SHOULD BE ABLE TO EXPLORE ENTIRE CAVE SYSTEMS UNTIL THE END. HOW DEEP DO THEY REACH? IT WOULD BE INTERESTING TO FIND OUT!

Life underground:

So far, all Mars missions have taken place above the surface. Perhaps with the surface being the hostile medium it presents itself to be, life has instead retreated far below the ground, finding a safer place to thrive. This mission would be able to confirm these types of hypotesis.

Why is this mission important?

-To gather potential evidence of organic molecules or other biomarkers existing in the Martian soil.

-To discover potential environmental conditions that could support microbial life, either in the present or in the past.

-To identify any potential bio-signatures through chemical and spectroscopic analysis of samples.

-To explore the never touched underground portion of the Martian surface.

How do we acces the underground?

By making use of entrances such as caves or lava vents out autonomous drones, which use the Rover as a "forward base", can explore deeper than it has ever been done before. The drones are equipped with all terrain wheels, two robotic arms for sample collection and debris removal, as well as a simplified "helicopter propeller" to assist with movement when changes in elevation deem it to be required.

C.A.V.E.S
Caves and Vents Exploration Seekers

A MISSION TO EXPLORE AND ANALYZE THE UNDERGROUND ENVIRONMENT OF MARS

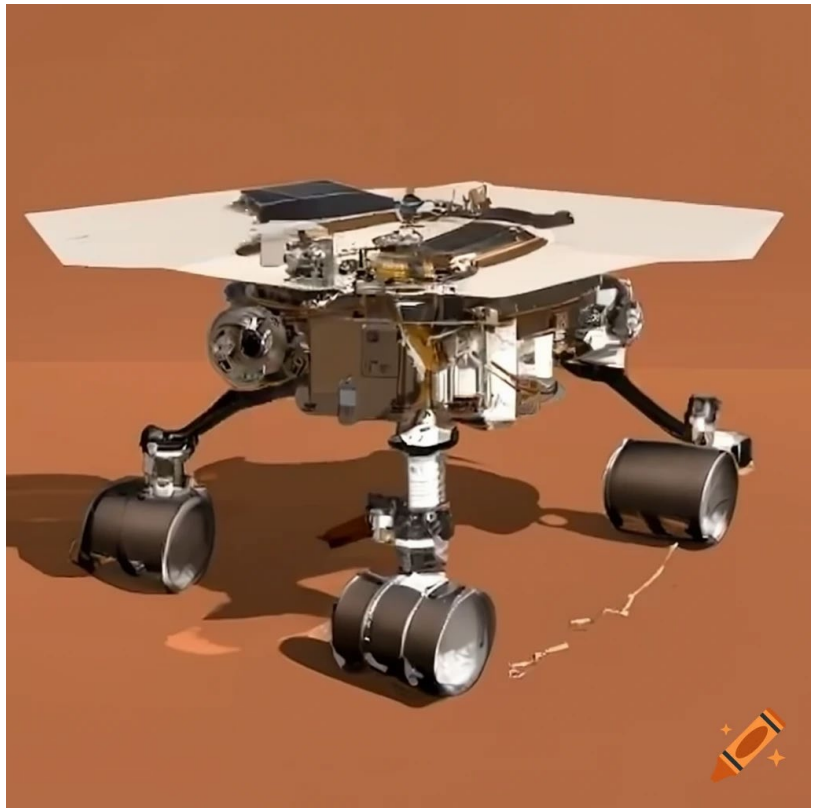
The WHY

EVIDENCE OF BIOMARKERS IN SOIL

DISCOVER ENVIRONMENTAL CONDITIONS THAT COULD SUPPORT MICROBIAL LIFE

EXPLORE MARS UNDERGROUND

The HOW



Credit: Craiyon AI

Instruments:

-Quadrupole Mass Spectrometer (QMS)

-Gas Chromatograph (GC)

-Raman Spectroscope

Means of acquiring samples:
- The Drone

The HOW the Instruments

-Quadrupole Mass Spectrometer (QMS) - Measures the mass and quantity of ions. Can identify and quantify the elements and isotopes present in the sample

-Gas Chromatograph (GC) - Separates and analyzes the volatile compounds identifying organic compounds and their isotopic composition.

-Raman Spectroscope - Measures the scattered light, allowing to better identify mineral presence.

The HOW the DRONE

-TETHERED TO THE ROVER

-SMALL SIZE ALLOWS ENTERING SMALL SPACES

-PROPELLER FOR EXTRA MANEUVERABILITY

-COLLECTS SAMPLES WITH ROBOTIC ARMS

-UNLOADS AND RECHARGES AT ROVER

-AUTONOMOUS NAVIGATION

-OWN CAMERA FOR IMAGE FEEDBACK

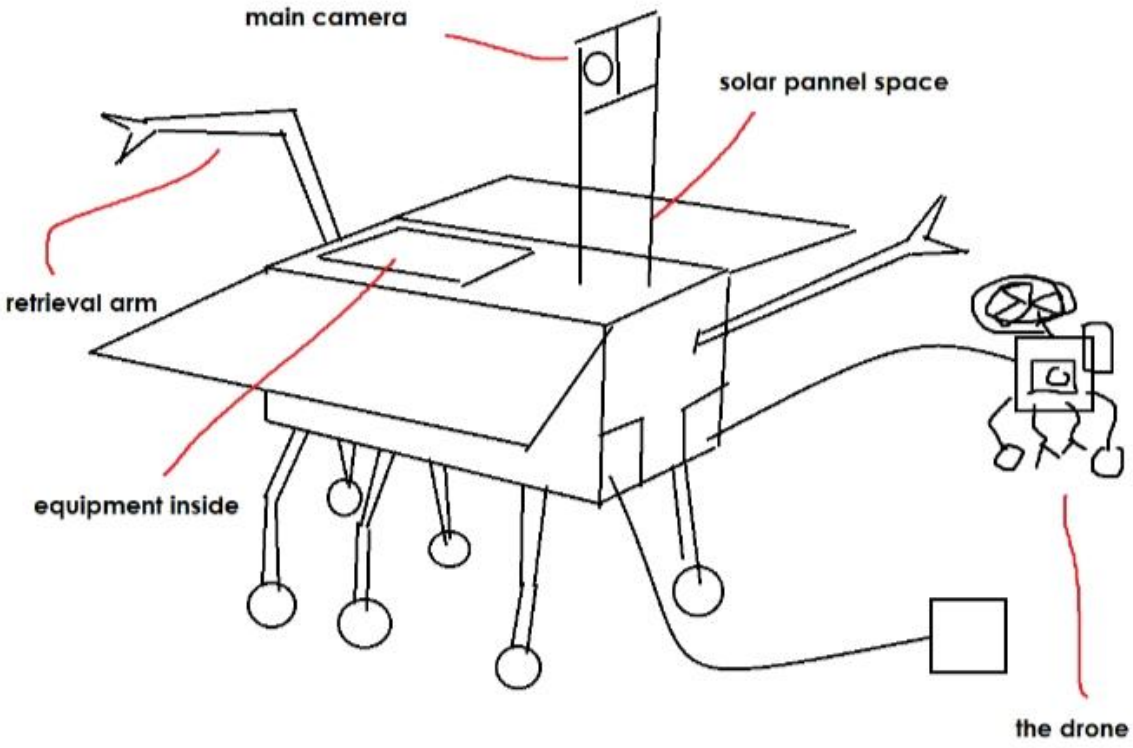
The Significance

ACCESS TO MARTIAN UNDERGROUND

NEVER BEFORE SEEN DATA

DISCOVERY OF POTENTIAL LIFE THRIVING ENVIRONMENTS

ROUGH MODEL OF C.A.V.E.S. AND ITS FUNCTIONS



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7. **"The Role of Geophysics in Planetary Exploration"**
   Authors: D. A. Paige

8. **"Mars Sample Return: Optimizing the Science and Minimizing the Risks"**
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   And besides these, many many YouTube videos and google searches that we are unable to list.