

AN EXPERIMENTAL STUDY OF ASTROBIOLOGY FOR SUSTAINABLE DEVELOPMENT AND SETTLEMENT ON THE LUNAR SURFACE Jayashree Sridhar,C-3 Icl Jubilee Apartments, No 16 Second Main Road, Gandhinagar, Adyar, Chennai-600020, Tamil Nadu, India.+91-44-24424969,+91-44-42115269, jayashree92@yahoo.co.in.

Introduction: The human presence on the moon was first marked by the Apollo missions. Now moon is emerging as a testing base for space technology. For a sustainable life on moon biology is the vital subject with which we have to deal. From the examination of the scientific, cultural and political imperatives the moon appears as an important destination. Moon will play a key role in answering the fundamental human questions that we are now poised to address and realistic and achievable investigations can be defined that will meet the science objectives.

- It is amendable to human exploration in the next 50 years , with reasonable investment in foreseeable technologies
- It also represents an important stepping stone towards the following destination and ultimately to mars and establishes an important component of a permanent human presence in the solar system

Robotic Mission: Robotic missions will continue to play an important role in comprehensive human exploration program. From the outset of the space program, human activities have been preceded by and enabled by robotic missions as we move out into the solar system. Permanent human presence will be preceded by intensive Nano- Tech Bionics robotic exploration at each destination as it performs tasks like humans.

EXPLORATION OBJECTIVE	OBSERVATION SITE
Origin of Lunar surface and resources	At the Regolith
Presence of Water and its forms	On the Surface
Search for Lunar Samples	Earth's meteorite effect on the moon
Evidence of sun's history and its effect on earth through time	Regolith and rocks
History of asteroid and comet collision on earth	Local cratering record
Bulk properties and internal structures of NEO	NEO
Utility of resource production	On the moon
In-situ resource production	On the moon
Geological and climatological histories	On the moon
Search for past and current Life	On the surface of the moon
Search for evidence of life in the observational properties of extra solar planets	With a telescope on the lunar surface

Human Mission: If humans are to accomplish exploration objectives to other planetary bodies it requires crew members to survive for long periods of independence from earth. Plants have had and still have a key role in the history of life on Earth. They are responsible for the presence of oxygen, a gas needed for most organisms that currently inhabit our planet and need it to breathe. Plants and plant communities are very important to humans and their environment. Plants can provide food and serve as life support system. There is a significant reduction in equivalent system mass cost concerning storing necessary food and life support apparatus when those resources are supplemented by plant based provisions. These functions highlight the importance of plant growth module design especially those that incorporate the use of ambient light in lunar environment.

Resources: For a sustainable human existence on the lunar surface we have to create certain artificial facilities like our earth.

- Determination of radiation tolerance
- Designing lunar plant growth facility
- To grow vitamins & minerals
- Testing of ISRU for crop culture
- Better sun sensor positioning
- Increased drought tolerance
- Drilling on the moon- Apollo 16 and decode sample into regolith

Conclusion: Life sustainability on the moon requires the support of plants and robots. With the help of plants which requires less water and produce more oxygen and improved bionics robots can make our establishment highly successful. By performing the test in earth by creating an artificial atmosphere like our moon, we can reduce our cost, chances of failure and assure a high possibility of sustainable life on the lunar soil.

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Reference:

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 [2] Astrophysics by K.D.Abhyankar
 [3] The next steps in exploring deep space by Wes Huntress

