

Space Horizons 2024: Sustainability in Space, the Moon, and on Earth.
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Sustainability on the Moon and Mars:

Personal Perspectives from the Scientific Exploration of the Antarctic, Arctic, Active Volcanoes (Mount St. Helens, Hawaii), the Earth's Seafloor, and Participation in Apollo Lunar Exploration Mission Operations and Artemis Exploration Site Research (Moon and Mars).

Scientific Exploration:

-How does scientific exploration differ from normal life, and how can this help us improve sustainability in normal life?

-Transportation:

-Support Infrastructure:

-Environmental Protection: Need a habitat of some kind, depending on environment and duration.

-Protection of the Environment: Mediating biological, waste and atmospheric pollution.

-Life Support Systems: Oxygen, food, water.

-Upmass Reduction: How to reduce the amount of mass transport required.

-In Situ Resource Utilization/Mycostructure:

-Surface Mobility: Human, robotic.

-Scientific Equipment: Very wide range, diverse energy requirements.

-Sample/Data Return: How to return the legacy?

-Waste Management: What is it and where does it go?

-Psychology and Social Fabric: How do extreme environments affect these?

-Communications: Local, regional, global.

-What are some potential lessons for life on Earth?

1. Utilizing the 'Systems Engineering' Approach.
2. Identify the artificial mass, waste and pollution 'black holes'.
3. Identification of key promising psychological and technological "frontiers".
4. In situ resource utilization (ISRU) optimization.
5. The promise of "island economies and social environments".
6. Discriminating 'want' from 'need'.
7. Education at all scales.
8. Community buy-in and engagement.
9. Appropriate and consistent investment in science and technology research and development.
10. Deconstructing the conflation of "democracy" and "capitalism". The tyranny of 'artificial need'.