LUNAR CONCRETE - Using Analogue Test Sites on the Big Island of Hawai'i for "Dust-to-Bricks": demonstration of technologies associated with basalt/regolith material processing/fabrication/construction.

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Introduction: The Big Island of Hawai'i is perhaps the premier site in theworld to test Lunar and Martian surface systems (robot rovers, human transport and habitation).

The Big Island's volcanic terrain and basaltic geology are nearly identical in many aspects to the Moon and Mars. The Pacific International Space Center for Exploration Systems (PISCES) facility will allow onsite development of multiple technologies (many not traditionally associated with space…such as construction, clean energy, recyling). These advancements can then be rapidly tested in the field at many of the analog sites around the island.

PISCES and the State of Hawai'i are in the process of establishing a new analogue research park for collaborative/partnership work in analogue testing of robotic systems and resource utilization technologies that have both 'beyond-LEO' and earth-based applications. A key piece of this effort is toward the investigation and demonstration of technologies associated with basalt / regolith material processing, fabrication, and construction. We intend to demonstrate these technologies for both lunar surface stabilization and preparation of landing pad surfaces by first testing these technologies on the volcano of the Big Island of Hawai'i. Further, the State of Hawai'i has parallel interest in using similar processes for basalt construction materials (ala 'lunar bricks') from the volcanic basalt located on the Big Island for bricks, slabs/foundations, roads and houses.

This paper/presentation will brief the latest updates in Hawaii's efforts to revamp PISCES and establish these world class analogue test sites for lunar testing. Further, this presentation will outline upcoming efforts within PISCES in the area of "lunar concrete"on the Big Island through technology demonstration and the establishment of a pilot plan for industrial construction using basalt materials from the volcanoes.