

The Use of Lunar Resources for the Construction and Operation of a Lunar Radio Observatory on the Moon

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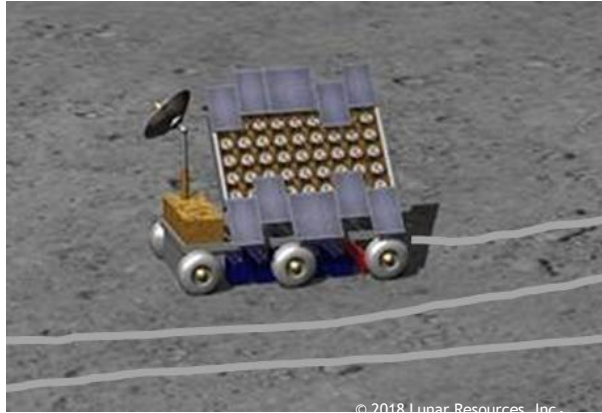


Figure 1, Lunar Resources Solar Cell Paver concept surface vehicle

Introduction: The indigenous resources of the Moon can be used to develop a Radio Astrophysical Observatory on the far side of the Moon. Based on available lunar resources a Radio Observatory located on the far side of the moon can be founded on the fabrication of a strip wire antenna or a dipole antenna array by thin film growth technology in the vacuum environment of the Moon. This can be accomplished by the deployment of a moderately-sized (~200kg) crawler/rover on the surface of the Moon with the capabilities of preparation of the lunar regolith for use as a substrate, evaporation of the conductive metals to fabricate dipole antenna arrays directly on the regolith surface of the Moon, or deposit strip wire antennas inside a lunar crater to simulate a parabolic focusing antenna. Further, a power generation and transmission system can be fabricated by the same crawler/rover to supply the antenna system with the required energy for operation. The raw materials for the lunar fabrication process would be extracted from the lunar regolith by molten oxide electrolysis and supplied to the crawler/rover for deposition. The direct fabrication of a Lunar Radio Observatory on the Moon would result in the transportation of a much smaller mass of equipment to the Moon than would otherwise be required for the transport and installation of a terrestrially fabricated microwave antenna system including a power system. The fabrication of a microwave antenna system on the Moon from lunar resources would also result in a radio observatory architecture that was repaira-

ble/replaceable through the simple fabrication of more additional dipole antennas or wire, and that would yield various spin-off applications to foster an cis-lunar economy.

References:

- [1] A. Cohen "Report of the 90-Day Study on Human Exploration of the Moon and Mars", NASA, Nov. 1989
- [2] A. Freunlich, T. Kubricht, and A. Ignatiev: "Lunar Regolith Thin Films: Vacuum Evaporation and Properties," AP Conf. Proc., Vol 420, (1998) p. 660
- [3] Sadoway, D.R.: "Electrolytic Production of Metals Using Consumable Anodes," US Patent No. 5,185,068, February 9, 1993
- [4] Duke, M.B.; Blair, B.: and J. Diaz: "Lunar Resource Utilization," Advanced Space Research, Vol. 31(2002) p.2413.
- [5] A. Ignatiev, A. Freundlich.: "The Use of Lunar Resources for Energy Generation on the Moon,"