

Introduction: Lunar Mining trade routes will include the launch to Earth orbit, travel to lunar orbit, decent, and surface logistics to support various surface activities. This paper focuses on the cost reduction possible, because remote commercial operations on Earth is a still risky business and based on the economics of resource and the sale of the recovered material. The commercial recovery of materials from off planet has never been attempted beyond the Apollo Samples. How do we then bring Earth based industries into an expensive Lunar venture? The paper suggests methods of cost reduction that can help accelerate this off planet resource opportunity.

Space Transportation: LTS proposes excepts from a 7 minute color video animating a two directional transportation system from Earth to the Moon's surface and return. It is initially unmanned, until proven reliable.

Lunar Surface Transportation: Human transportation on the surface is likely to be with "Jumpers" capable of short hops using propulsion using propellants derive from surface materials. These vehicles are already starting to show up in early forms from Armadillo and others. In Earth remote resource recovery sites, experience indicates human transportation is ~ 1% of the mass moved. The real surface workhorse is likely to be the surface tractor again using surface energy sources and capable of affordable movement of mass. An early version is depicted and salvage of space transportation hardware contributes to cost reduction.

Lunar Resource Recovery: Earth resource recovery based companies spend the majority of their total investment in this area and delay their investment in other areas, until profitable operations are achieved and these investments can be made from profits. Figure 1 depicts LTS attempts to assist Bucket Wheel excavators in cost reduction efforts. Once space transportation hardware is transported to a site, this mass is more likely to be used at the site than to be transported back thru the trade route to be reused. The salvage of space transportation hardware can be modified for surface use, if the original design is innovative and produces hardware capable of transition and evolution.

Permanent Surface Logistics Bases: The base location will be where the work is to be done. Affordable energy and transportation support facilities will be earl requirements. Figure 2 depicts cost reduction in these areas. Shown is a base located at a valuable resource location. It uses space transportation hardware a

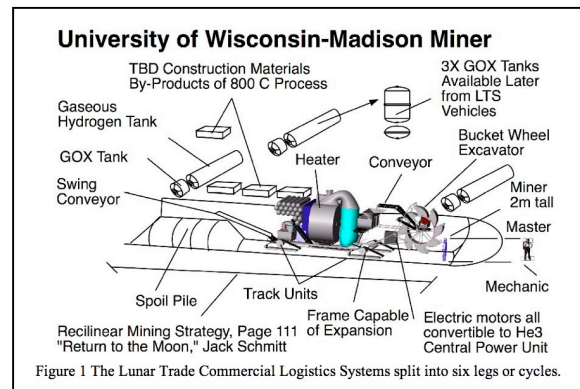


Figure 1 The Lunar Trade Commercial Logistics Systems split into six legs or cycles.

second time to reduce costs and has options from deep drilling to regolith processing to include emerging surface based markets making use of regolith heated in recovery process for lunar surface markets. as a framework on the surface.

Two Direction Trade Routes: A one directional trade route is actually space exploration. A successful sustainable trade route on Earth has had a strong commercial economic basis. In throwing away our existing NSTS hardware we close an opportunity to evolve and develop a future heavy lift vehicle for the re-entry of valuable materials from the moon to be delivered to Earth thru the Earth's atmosphere. Commercial mining companies would suggest a Heavy Lift vehicle that could later with upgrades become that future re-entry hardware with the ability to enter the Earth's atmosphere and return valuable lunar cargo to complete the economic aspects of a truly affordable trade route. Most aerospace people don't like talking about cost reduction, but in the resource recovery world , it is all about economics.

[1] Taylor, T.C. Kistler, W. P., Citron, B., Lunar Transportation Systems, Inc. "To the Moon: Commercially" Society of Logistics Engineers (SOLE) magazine "LOGISTICS SPECTRUM," Condensed version of paper at Dallas Conference, Discussed future Lunar logistics concepts and possible mining of regolith using the University of Wisc. Excavator.. [2] Taylor, T.C. Kistler, W. P., Citron, B., Lunar Transportation Systems, Inc., Lunar Exploration Analysis Group Conference 1-5 Oct 2007, Houston Hobby Hilton, Session: Commerce: Incremental Steps from Earth to Lunar Enterprise, Paper Title: "Commercial Transportation and Lunar Mining." Discussed LTS concept and support of Lunar Resource Recovery with Logistics Transportation including on the surface in support of mining operations.. [3] Taylor, T., LTS Inc., "Lunar Surface Logistics Focused on Living off the Land," AIAA Space 2009, AIAA-2009-6426, Session: SL-1, Pasadena, CA, 14 Sep 09, 22p.

Additional Information: If you have any questions or need additional information regarding the preparation of your abstract, call Tom Taylor at (575) 644 6099. Figure 1 depicts some ideas and included in LTS funding of Jack Schmitt's work at the Univ. of Wisc-Madison.

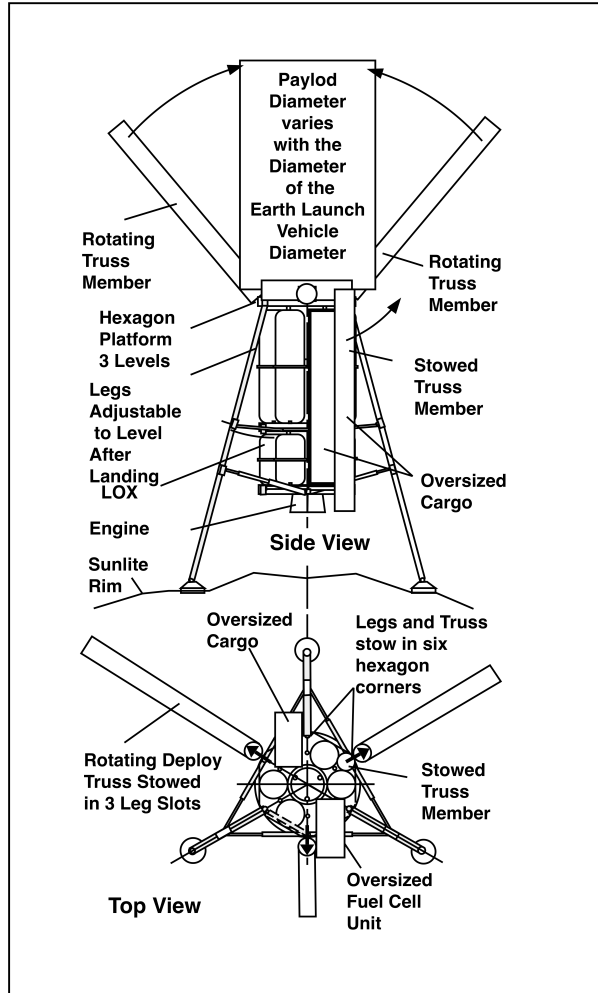


Figure 2 depicts Lunar Energy Tower Concept Assembly from previous space transport hardware.

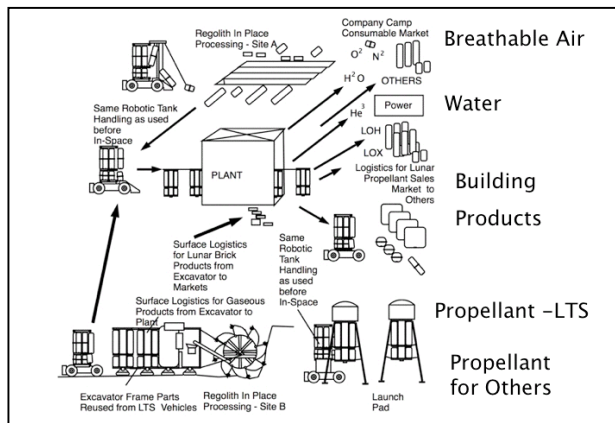


Figure 3 depicts early Nearer term markets that will accelerate commercial financing techniques.

Figure 4 depicts early Transitional Regolith Processing Lab/Factory for the development of Lunar products for early markets.

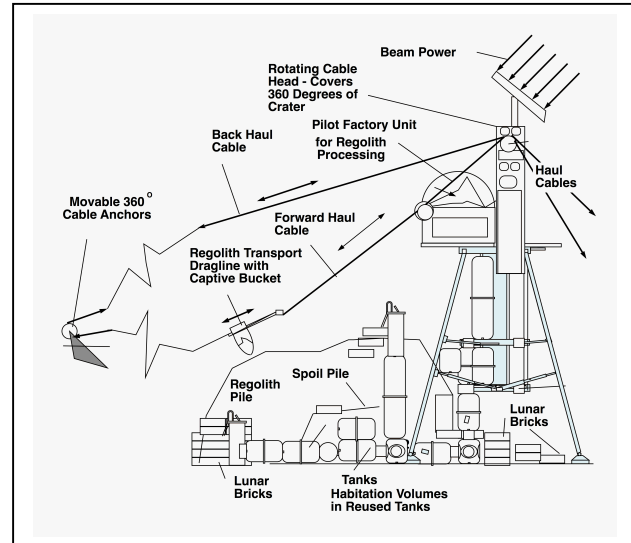


Figure 5 Energy Tower for early Power using transport frame a second time.

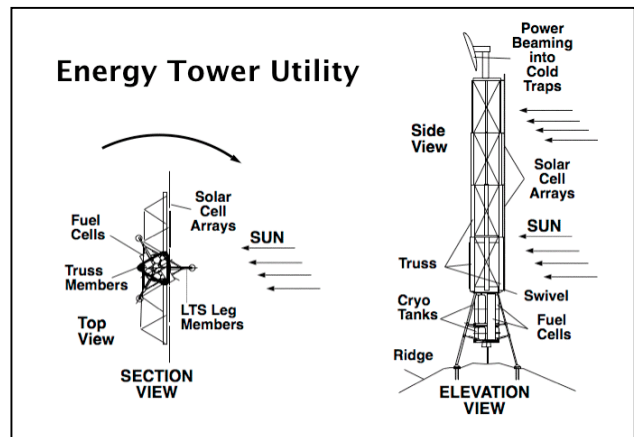


Figure 6 LTS transportable Habitat capable of expansion and later covered with Regolith.

