LUNAR LANDING SITES FOR ASTRONAUTS & CHROMEHOUND. S. A. Daire[1] H. Hammerstein, A. A. Tannir, J. Clark, K. Metzgar, and M. Adsul [1]Affiliation for author (126 West 9th Street Bayonne, NJ sdaire1@jhu.edu)

Introduction:

The lunar landings are based on thermal design of lunar landers, crater elevation, and previous confirmation of ice on the South Pole of Moon. The lunar landing sites are calculated based on the thermal threshold a lunar lander can operate at the maximum temperature near craters in the South Pole. In addition, the landing sites are on a flat surface to prevent the tipping of the lunar lander, image 1.

Currently, lunar surface science is being hindered by the lack of a state-of-the-art system of systems (SoS) for conducting planetary research. Details required for Artemis Missions are not available for planning and preparation [2, 3, 4, 5, 6, 7, 8]. A robust mobile Chromehound SoS is needed to facilitate and conduct exploration, science sampling, package return, and mission enhancement for Commercial Lunar Payload Services, image 2. Planetary rovers, satellites, and landers designed for one mission, goal, or function are limiting factors. Chromehound™ aims to resolve these issues as a SoS modular platform to diversify mission capabilities with evolvability. Modular design robotics development effectively facilitates uniform standards for space architecture, provide higher dimensionality in system design, increase degrees of freedom for potential interfacing, and amplifies versatility. Modularity's benefits contend with form, cost, and operation.

Incorporating a modular chassis for robotic systems stands to jettison the new space economy into another dimension of capabilities and capacities [9, 10, 11, 12, 13, 14, 15]. Space exploration innovation depends on new SoS for testing out new toolkits and platforms for safe, economic, responsive, and versatile mission architectures. Chromehound™ SoS can positively impact NASA's goals and objectives towards its historic purpose of returning to the Moon, to stay [2, 3, 4]. Chromehound stands to expand knowledge through scientific exploration, sustainable utilization, address standardization, and catalyze economic growth. As an evolvable modular satellite, rover, and exploration EVA suits integrated system Chromehound™ present continuous, ubiquitous operation through autonomous, semi-autonomous, and teleoperated modes for all mission phases, table 1.

One of the missions for the surface science should include a Lunar laser interferometer gravitational-wave observatory (L-LIGO) [1]. The system can be deployed as an autonomous system of robotic arms. These arms can be calibrated with laser, mirror, and position, navigation, and timing (PNT) sensors. This system can be organized on locations near the area of operation for a baseline observatory to compare measurements taken on Earth. The system can be arranged across any area of the Lunar surface with clear lines of sight for the lasers to reach the sensors, image 3.

Acknowledgments: Near-Surface Temperatures Modeled for the Moon's South. https://www.lpi.usra.edu/lunar/lunar-south-pole-atlas/maps/SPole_85S_DLREallT_v20190829.pdf.

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