

The ELASCA Project: A Proposed Lunar Analog Construction Simulation. J. J. Estrada, elasca.project@gmail.com

Introduction: The ELASCA project will be a space simulation set in a lunar analog in order to test, research, and raise awareness for construction on the moon. It is in keeping with, and continues in, the tradition of previous analog missions, including HI-SEAS, NEEMO, the Haughten Mars project, and others.[1] The ELASCA project takes these simulations one step further by subjecting the construction of the analog habitat to a second analog: A carefully regulated process that mirrors the supply chain logistics of space construction.

The ELASCA Mission: To build a functional model moon base in arctic Alaska using only materials and labor transported from Virginia in a simulator vehicle sized to mimic the payload capacity of current production spacecraft.

The ELASCA Objective: To simulate the logistical challenges of transportation, weight and space limitations, lack of onsite support, and long travel times that will face construction teams on the moon or beyond. To raise awareness for, research, document, and ultimately overcome these challenges as a “dress rehearsal” for future lunar or planetary settlements.

The ELASCA Location: The time it takes to drive from Virginia to Alaska (3 days) is roughly the same amount of time it takes to fly to the moon. The extreme cold, seasons of darkness, and isolation of Northern Alaska will create similar challenges to those faced by lunar colonists. The arctic has long been considered a convincing analog for extraterrestrial environments.

The ELASCA Value: Previous analog habitats and Martian/lunar bases have been constructed by on-site teams using standard supply chains, commercial-grade equipment, and earth-normal support infrastructures. The ELASCA project will be the first space colonization simulation that also models the space supply chain. It will be executed under a series of constraints designed to enhance realism. The project will recreate the lunar construction challenges of limited resources, lack of infrastructure support, and long travel times with painstaking plausibility, all in a hostile environment that is considered a convincing analog for the lunar surface. This simulation team will have the same resources as future lunar colonists: themselves, and what they brought in a tiny craft. Expectations for what a realistic lunar mission would entail will guide and govern the entire process.

Components of the ELASCA Project:

- A location in arctic Alaska where the model base will be constructed
- A support, outfitting, and mission control office in Virginia
- The mission team
- A truck or bus sized simulator vehicle to be driven from Virginia to Alaska on the simulated missions, modified to the same payload capacity as current production spacecraft capable of traveling to the moon
- A human-habitable model moon base to be transported in pieces by the simulator vehicle and assembled on site in Alaska
- 17 or fewer scheduled missions in which to complete the project (An arbitrary number matching the 17 Apollo missions putting man on the moon)
- A timeframe of several years in which to outfit, execute, and document the project

Simulation Constraints for Realism:

1. All materials and labor for base construction will be transported in the simulator vehicle.
2. All food, water, provisions, and fuel for the team to use at the base will be transported in the simulator vehicle.
3. Construction of the base will be under rigorous time constraints that match the time that could be expected during a lunar mission.
4. The payload of the simulator vehicle will match the payload capacity of current production spacecraft capable of traveling to the moon.
5. Most missions will be carried out during the Alaskan winter, when the environment will be at its coldest/darkest.
6. The team will not use any water, organic material, or resources from the Alaskan property on which the base is situated except for rocks and dirt to simulate lunar regolith.
7. Once the simulator vehicle leaves the Virginia “launch point”, the crew will not procure any supplies or outside assistance for the mission.
8. If an emergency forces the crew to seek outside assistance or resources, the base

and the project will be reset to their status prior to the outside intervention.

9. The project will be completed in 17 or less missions – matching the number of Apollo missions

Status: The ELASCA project is currently under peer review, seeking input from the scientific/space exploration community before commencing fundraising and execution.

References: [1] “Analog Missions and Field Tests,” NASA.gov