Artemis Moonbase Simulation One
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Projects of Peter Kokh, Crew #45 Commander

Setting a Moonlike Atmosphere in a very Marslike Setting

We have little control over the Marslike geology of the MDRS surroundings - sedimentary and water-carved. However, in a test performed in a brief visit on December 8, 2005, we found that wraparound green tint sunglasses worn inside the EVA Suit helmets do a lot to neutralize the orange hues, and to notably gray and whiten the landscape. We will also apply, in a clean-remove fashion, green auto window tint to the interior of the Hab upper deck portholes.

Another trick will be to suspend an Earth globe at the right distance outside one of the Hab portholes to show the apparent size and phase of Earth as it would appear suspended over the lunar horizon.

Inside the Hab, the table will be set with dishes that look like they might have been made on the early lunar frontier.

For recreation, there will be Moon-theme films, games that could be manufactured on the frontier, "made-on-Luna"musical instruments, and Moon-"filk": lunar words set to well-known melodies.

Our diet and menu selections, chosen by Executive Officer Laurel Ladd, will attempt to model what will be available on the early frontier.

Lunar Analog EVA Outings Design

It will be a bigger challenge to conduct EVA, space-suited excursions, into the areas surrounding the Mars Hab, that maintain a "we're on the Moon!" illusion. Two particularly moonlike areas have been identified and will be visited during regular EVA excursions.

Nighttime EVA activities are traditionally discouraged for safety reasons. However, we will conduct several of these, all of short duration, and all strictly within sight of the Hab. We will try to simulate three situations.

1. The black sky, sunlit moonscape, with the sun at low angles as would be the case soon after sunrise, not long before sunset, or at any time near the poles.
2. A Nightspan outing on the Moon, the surface illuminated by Earthlight.
3. A Nightspan outing on the Moon when the Earth is 'new' or unseen, or as it would be on the lunar farside.

Sims-Lite Definition

Building on the work of Crew #41 which identified areas outside the Hab that, on Mars, might be linked by lightly pressurized tunnels, we will adapt their map and ribbon-marked tunnel route system. On the Moon, some outlying pressurized areas (the GreenHab/Greenhouse, etc.) would be linked to the habitat areas by fully pressurized tunnels or shielded connector tubes. Other areas for placement of utilities, fuel, and stored items that need to be accessed on a regular basis would be under a shielded canopy, but otherwise open to the vacuum. This would allow use of lighter weight pressure suits that would be more comfortable to wear and less cumbersome to work in, promoting productivity and morale. We will work in these areas using our own trial Sims Lite Suits. The experience will suggest improvements both to the shielded canopy concept and to the Sims Lite suit idea.

Pressurized Tunnel Simulation Project

One of the sections identified by Crew #41 as a lightly pressurized tunnel, we see as a fully pressurized one. This is the route connecting the Hab with the GreenHab, where some plants are grown, but whose main function to date has been to treat graywater from sinks and showers so that it can be reused for flushing toilets. As a part of our simulation effort, we proposed to build a simulated "tunnel framework" out of 1 inch PVC elements. The upper half of this frame would be covered with green plastic snow fencing, a fabric with more holes than material, designed to let the wind through and to be UV-resistant. This fabric will create a visual barrier and envelope to help crew members using the "tunnel" to go to and from the GreenHab in civilian clothes without spacesuits, to imagine how it would really be on the Moon, or on Mars, for that matter. Our proposal has been accepted by the MDRS Engineering Team in charge of all modifications to the MDRS Hab or adjacent facilities. An excellent 3D rendering of the framing design by member Mary Cooper is at: http://members.aol.com/kokhmmm/walkwayframeworkpng.gif

Dust Control Study

The MDRS Hab is a dusty place. Gaps have appeared between some segments, holes made for utility entrances but no longer used remain open. The airlock doors do not close tight. We will inventory and catalog all the places and ways dust, mud, and vermin get into the Hab and make recommendations to the Mars Society for improvements that would allow cleaner simulations in the future.

Ergonomics Study

MDRS and the FMARS Hab on Canada's arctic north Devon Island have similar layouts. The shell is taken as a given, constrained by the way it will be transported from Earth, and the various needed functions crammed into it. We will attempt to study which functions need relatively more, or relatively less space, which functions now juxtaposed, would benefit from mutual isolation, and which functions needed on a Moon or Mars base are not modeled. The goal will be a design that starts with the definition of functions, and concludes with implications for a clean slate design in which form follows function, not vice versa, probably with a modular design. We expect that this study may conclude with recommendations and a list of options for a future MDRS Hab ANNEX module.

Makeover Project Definition

Future pioneers will live in spartan conditions. But lean design need not be unpleasant. MDRS was of necessity assembled in a "time is of the essence" manner, with attention to details taking back seat. Under the circumstances, it could not have been otherwise. But after the fifth successful field season concludes, it will be time for a "makeover" of the crew quarters and ward room. We will endeavor to define what needs to be done, take measurements for materials and for items that can be pre-assembled, and prepare a tools and materials list for such a mission.

EVA Space Suit Modification Study

The current MDRS EVA spacesuits are marvels of design. They are meant to mimic the cumbersomeness, the weight (on Mars) and the difficulty of putting on and taking off. The functional details other than communications and ventilation are not modeled. We will be on the lookout for further spacesuit improvements looking especially at dexterity and safety identification from a distance.

Logging Sims Breaks, Diet Breaks, Food Use

We will keep a number of log books so that what we learn can be passed on to future crews.

Lunar Dayspan-Nightspan Cycle Modeling Study

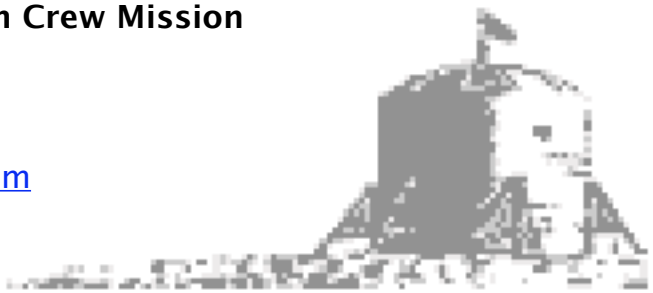
A spare time project is to brainstorm how we might model the 29.5 day Lunar dayspan-nightspan cycle, foreshortened to two weeks, on a future sequel mission, in order to study power management and human resource utilization issues associated with this cycle.

Lunar Analog EVA Design Improvements Study

We will also attempt to brainstorm the engineering and financing of improved Lunar EVA simulations as outlined above for a proposed 2007 sequel "Artemis Moonbase Sim 2" mission..

Input on Project Ideas for a Sequel Moon Crew Mission

Input will be sought from all crew members for more ambitious projects in a future mission.



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