

“Towards an Earth-Moon Economy – Developing Off-Planet Resources”

Moon Miners’ Manifesto

& The Moon Society Journal

www.MoonMinersManifesto.com



August 5th Mars Science Laboratory “Curiosity” is lowered to Mars surface with minimum disturbance to soil.

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◀ We all breathed a great sigh of relief when the complex landing system safely delivered the Mars Science Laboratory, Curiosity, to the surface of Mars and at the designated location in Gale Crater. Now we wait in suspense to see if it performs as designed. Whether it confirms that life once flourished on Mars and perhaps still does – or not – is to be seen. But if Curiosity performs as designed, we are sure to learn far more about the Red Planet than we have learned to date. NASA and JPL are to be congratulated, along with the congress-people who supported this bold project.

About Moon Miners' Manifesto

- **Moon Miners' Manifesto CLASSICS:** The non-time-sensitive articles and editorials of MMM's first twenty years plus have been re-edited, reillustrated, and republished in 22 PDF format volumes, for free downloading from this location: http://www.MoonSociety.org/publications/mmm_classics/
 - **MMM Glossary:** new terms, old terms with new meanings:
<http://www.moonsociety.org/publications/m3glossary.html>
 - **MMM's VISION:** "expanding the human economy through off-planet resources"; early heavy reliance on Lunar materials; early use of Mars system and asteroid resources; and permanent settlements supporting this economy.
 - **MMM's MISSION:** to encourage "spin-up" entrepreneurial development of the novel technologies needed and promote the economic-environmental rationale of space and lunar settlement.
 - **MMM retains its editorial independence** and serves many groups, each with its own philosophy, agenda, and programs. Sharing MMM may suggest overall satisfaction with themes and treatment, requires no other litmus test.
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 - **The National Space Society** is a grassroots pro-space member-ship organization, with 10,000 members and 50 chapters, dedicated to the creation of a spacefaring civilization.
National Space Society, 1155 15th Street NW, Suite 500
Washington, DC 20005 -- Ph: (202) 429-1600 – <http://www.NSS.org>
 - **The Moon Society** seeks to overcome the business, financial, and technological challenges to the establishment of a permanent, self-sustaining human presence on the Moon." – Contact info p. 9.
 - **NSS chapters** and **Other Societies** with a compatible focus are welcome to join the MMM family. For special chapter/group rates, write the Editor, or call (414)-342-0705.
 - **Publication Deadline:** Final draft is prepared ASAP after the 20th of each month. Articles needing to be keyed in or edited are due on the 15th, Sooner is better! – **No compensation is paid.**
 - **Submissions by email** to KokhMMM@aol.com – Email message body text or MS Word, Text files, and pdf file attachments or mailed CDs, DVDs, or typed hard copy [short pieces only, less than 1,000 words] to:
Moon Miners' Manifesto, c/o Peter Kokh,
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In Focus **Neal Armstrong: ultimately, his legacy of is up to us!**

By Peter Kokh

In the news recently, someone noted that no human being born since 1935 has set foot on another world. We have frozen out generations of young people from following the Apollo Overture. There are many reasons, but the first and most foremost reason is rooted in the very announcement of the Apollo Program way back in 1961. First, as we noted in our In Focus editorial in MMM #238, September 2010: "**In This Decade**" – three little words that won us the Moon Race but that have hamstrung us ever since" – in order to win, we built an unsustainable space architecture, good for a few short sorties, nothing else. We overawed even ourselves. The result is that we have six sites on the Moon at which Apollo mission equipment was left behind, including the LEM landing platforms, flags, footprints and rover tracks, and assorted equipment that was left behind to reduce weight for take-off back to Earth.

We agree with the ideas expressed in the following recent web post:

<http://www.space.com/17330-neil-armstrong-death-moon-landing-site-preservation.html>

For past articles, Visit http://www.moonsociety.org/publications/mmm_classics/

“The passing of famed astronaut Neil Armstrong, the first man to walk on the moon and commander of Apollo 11, may strengthen the **movement to designate the Tranquility Base lunar landing site as a National Historic Landmark**. The field of space heritage preservation is gaining momentum, and a recently authored bill aims protect the Apollo 11’s Eagle lunar lander touchdown site and all the artifacts that astronauts [Neil Armstrong](#) and Buzz Aldrin left behind on the lunar surface.” (Excerpt)

Why would we need to do this? Obviously, because many of us believe that humans will someday go back to the Moon, this time to dig in and stay, as the first “Lunans.” And, there will be tourists, not only from the ranks of the first pioneers and those to follow, but also from Earth on short “bucket list trips of a lifetime.”

The present movement seems to focus on the Apollo 11 site, the very first, but some order of protection should be given to the other five sites. Apollo 15 at scenic Hadley Rille with the very first moon buggy rover still on location, and Apollo 17 in the Taurus-Littrow Valley and the site of the very last mission getting equal billing.

This might involve installation of elevated walkways lest the historic bootprints get ground into the dust, and railing off the various artifacts left behind in a “see but can’t touch” state of preservation. A small museum – tourist center could be within sight, but safely separate. I have seen a small number of proposals for such “National Monument” preservation, but we do not need to go into details here.

Why we should enact such a “treaty” now.

Once it becomes apparent that humans are going back to the Moon, not just for further exploration, but to learn how to use lunar materials to help build structures in Geosynchronous Earth Orbit (solar power satellites and large platforms that each host hundreds or more telecommunications and other satellites) at far less cost than shipping the needed materials up from Earth’s surface, then we are going to hear from well-intentioned environmentalists (among whom I count myself) that we should leave the Moon to itself, “hands off!,” in its pristine state.

If we enact such a historic site preservation and monument measure, that will help those of us who want to see the Moon developed in a way that preserves its beauty, not only from Earth, but from lunar orbit, and indeed on the surface itself. To this end, we have published a proposal for a Lunar National Parks & Monuments Treaty. Our proposal appeared as an article “National Parks on the Moon” in MMM # 176 June, 2004 p 5. reprinted on pp 34–35, MMM Classics #18. You can freely download this issue and article at

http://www.moonsociety.org/publications/mmm_classics/mmmc18_Jan2008.pdf

Eulogies of Neal Armstrong are nice, but I can think of nothing better to honor his memory than a campaign for an Apollo Sites preservation Treaty, as an overture to a broader, more comprehensive treaty on lunar preservation respecting the lunar environment while allowing settlement and thoughtful industrialization. As I have noted before, the precedents set by the current Antarctic Treaty are extreme, and not a model to follow. PK

Moon and Mars Outposts: Building Sheltering Structures First

By Peter Kokh

Apollo left no occupiable structure on the Moon. There is no ‘friendly’ place to return to, no place where we can go and pick up where we left off. We must start over, from scratch, this time with a plan!

We can’t “do the Moon” so long as we fear the Night(span)

All six Apollo Moon landing missions were confined to the early/mid-morning “hours” of lunar dayspans. NASA has never attempted to keep astronauts on the Moon for a full dayspan–nightspan cycle, much less for several of them. Given that deliberate “toe-in-the-water self-limitation, the new rounds of astronauts only being on the Moon for less than two weeks before coming home, there is no urgent need to provide shielding.

However, for longer missions, as essential as shielding is for radiation protection, it will also be essential for thermal management in the month (“sunth”) long temperature cycle from 200° plus above zero to 200° plus below zero. Now, choosing polar sites or sites at high latitudes, north or south, would mitigate the problem. But consider an alien species visiting Earth and choosing a Pacific Island where the temperature varied very little over the year, radioing home, “we have mastered living on Earth.” Yes the polar sites offer access to water ice, yes they are more thermally benign, yes there is less difference between nightspan and dayspan, but the poles are anything but characteristic of the Moon at large, and do not offer critical access to mineral resources found only in the Maria, or along Highland/Mare “coasts” which means limiting ourselves to parts of the Moon we can explore, but more importantly, limiting ourselves to what lunar resources we can develop to fuel the Earth–Moon Cis–Lunar Economy.

The Two Faces of Shelter

The key is providing shelter, not only from cosmic and solar radiation over extended stays, but also to provide thermal moderation at comfortable temperatures. We would want to “shelter” our living spaces to provide moderate temperatures without energy-intensive heating and cooling even if there were no such thing as solar flares, coronal mass ejections, and cosmic radiation!

How to Shield

Considering the source of the author’s original “eureka” moment in May of 1985 (read: http://www.moonsociety.org/chapters/milwaukee/mmm/mmm_1.html) it is natural that I have long visualized an

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ever growing complex of interconnected habitat and activity modules and pressurized hallways, and as whole “neighborhoods” emerged, pressurized streets – all individually covered with shielding as they were added.

Exercising due foresight

But, whether we are talking about a one-nation effort or about an International Lunar Research Park for the first “permanent” outpost, **it is likely that we will want to rearrange modules and hallways etc. as the complex slowly grows** and as experience suggests more favorable layouts. **Watch this time lapse animation video of the construction of the International Space Station, during which several modules were disconnected and repositioned elsewhere.** – <http://www.youtube.com/watch?v=h8kOAroNNAo>

This is the flexibility that we will need in building a full-function lunar outpost as well. The original plan for expansion may end up being scrapped, and probably more than once. The way McMurdo Station in Antarctica grew to its present size is a case in point. Early expansion plans proved quite inadequate to provide needed expansion not only in the physical complex but in the variety of activities supported.

In this light, **it would be best not to start with a few modules**, shielding them as added. For when we wanted to rearrange the complex layout, we would have to remove some of that shielding. Even if we had used sandbags, this would be a chore. There is another way: **Build an expandable shielded canopy first, before delivering modules** to park and interconnect in a temporary arrangement underneath.

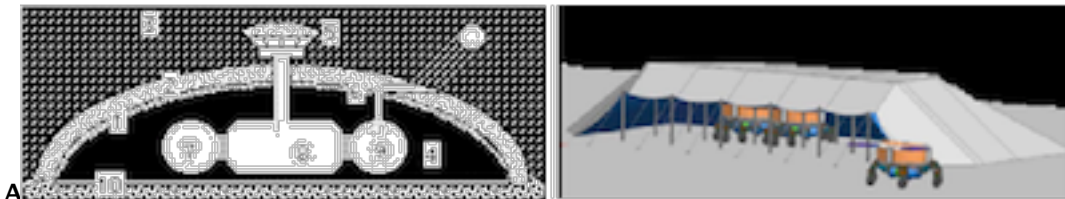
Canopies, Hangers, “Ramadas”

A word frequently found in MMM is “ramada.” I first learned the word driving through the American southwest in 1980, long before the first MMM. At roadsides where tired drivers can pull in and rest, eat a lunch they brought along, and perhaps use the restrooms, there is often a roof supported by four poles at each corner, its main function being to provide shade from the hot unrelenting sun, rather than shelter from infrequent rains. This shelter is called a “ramada” – Spanish for sun shelter.



Above left: a traditional “ramada” sun-shelter in the SW United States – **Right:** a quonset type shelter

On the Moon, we will probably want unpressurized shelters of various types that are shielded from all directions. That does not mean “closed.” Openings through which to bring in modules and other things to be deployed or stored inside can be baffled so that there is no direct path for solar or cosmic radiation to enter.



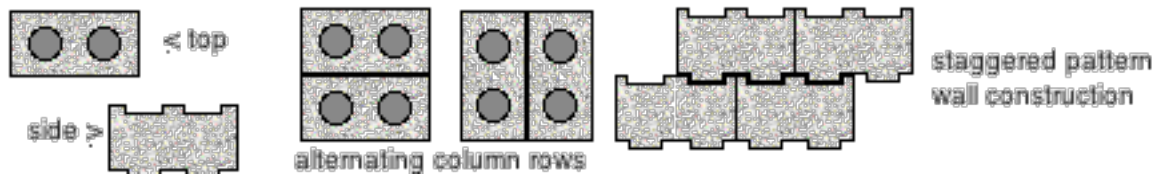
Above left: an illustration from MMM; **Above right:** a similar NASA concept

Above left: KEY: (1) Space Frame Arch, Fabric Cover; (2) 20 cm or more regolith dust shielding; (3) exposed vacuum, radiation, micro-meteorites, UV, solar flares; (4) protected lee vacuum service area; (5) observation cupola with ladder shaft to habitat space below (7, 8, 9)

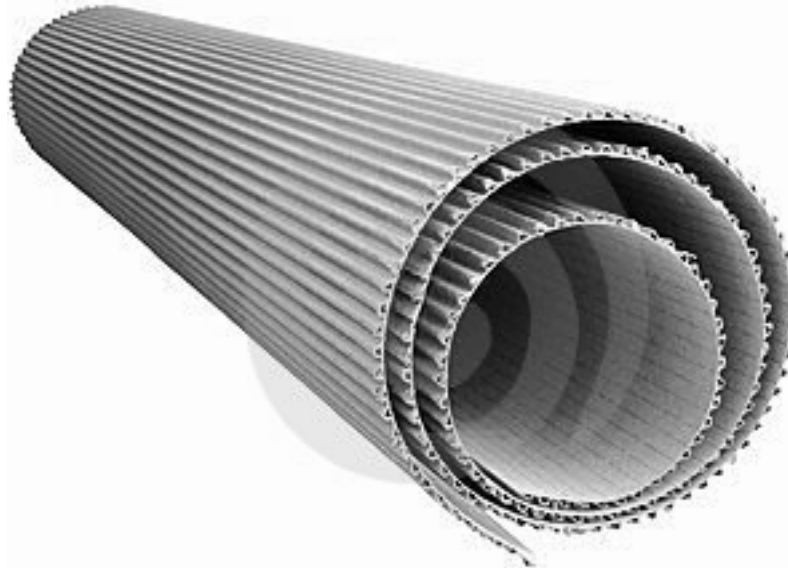
Two ways to deploy such a shelter “first”

1. We can send small crews to the Moon, living inside their lander, and working outside to assemble a suitable shelter. That would take several very expensive missions.
2. Or we can deliver the following package:
 - **teleoperable equipment** to fabricate useful building elements from moondust, and do some pre-assembly chores including producing sintered **building blocks in the “Lego” design** for self stacking without mortar, producing sand bags (basalt fiber fabrics if the site is in a mare area) and filling them

Sintered blocks of compacted moon dust in "Lego" block shapes for mortarless assembly



- **"intelligent" "avatar" robots** operated by "telepresence" from Earth, to handle some of the harder routine tasks, including leveling the area, assembling support walls from sintered blocks, piling up and bags
- **cargo container structures designed to be reusable**, for example with an unrollable wall for "roofing." **Keep in mind that there are at least two ways to reuse a rocket stage:** a) **refuel it** for another trip or b) **reuse the materials** of which it is made to help construct things needed at the landing location.



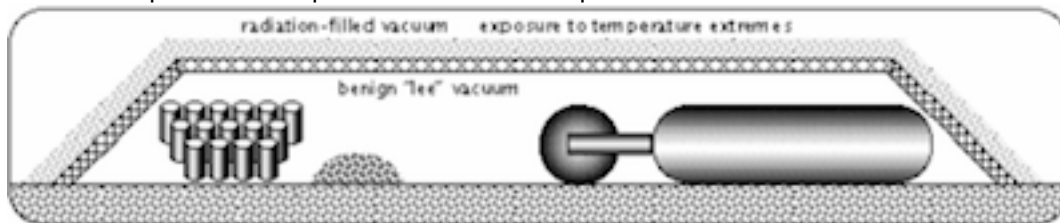
Above: a roll of corrugated cardboard suggests how the **corrugated aluminum skin of a landing cargo stage** (or empty fuel tank) could be reused as a roof to hold blown or bagged moondust, with sintered lego block columns spaced to support the load in 1/6 G. If it proved too difficult to manufacture basalt fiber fabrics for bagging moondust to cover a space frame to create roofing, such fabric could be part of the cargo in this shipment.

The corrugation will strengthen this structure in at least one direction. A 2-layer cross-corrugated sheet could not be rolled. But it could be designed to unroll in an arc, short of flat, to provide strong support, the low ends resting on block walls and/or pillars, providing extra internal height.

An option would be two layers of material, placed so that the corrugation of one is at 90° to the other, making a very strong flat roof. (It is cross-grain plies that give plywood its strength and dimensional stability.)

Question: Could Cargo Hold wall unroll into a stable quonset structure? The arched hold wall roof supported in the middle would be stronger than a flat one, supported at the sides. If the corrugated cargo hold wall was designed so that it could not unroll completely but retained a shallow curve, it might be strong enough to hold considerable shielding mass in light lunar gravity.

This type of pre-made reusable roofing, would seem superior, if practical, to constructing a space frame that would then have to be covered with some sort of sheeting (aluminum? basalt-fiber fabric made on the Moon). Both avenues should be pursued to expose and rank all the options.



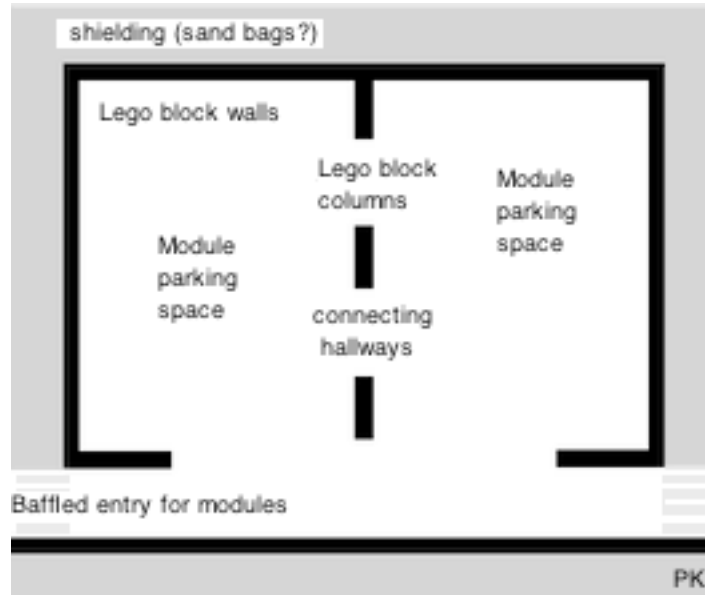
An earlier MMM Illustration: A hangar with "space frame" wall/roof construction requires sheeting to support moondust, Note warehousing area to the right.

The Advantages of pre-constructing a shielded hangar or ramada before first human crews arrive are clear: Each crew could simply park the modules brought along on its mission and connect them. The assembly area would be shielded, and the construction crew could wear lighter "pressure suits." If a following crew brought more

modules that required rearrangement of what was already in place, this would be easy, with no contact shielding materials to be removed and then repositioned.

Of course, sintered moondust lego blocks, basalt-fiber sandbags, sandbag filling equipment, and the ramada/hangar itself are not the only job that can be done beforehand. Teleoperable equipment can grade a landing site “spaceport” and compact and sinter the soil, and build berms around the site to contain rocket exhaust-blown moondust, which can be quite abrasive. And of course, the could level the area in which the hangar/ramada is to be built, and build some peripheral roads.

Open warehousing areas can also be pre-constructed, the ground leveled and sintered, the perimeter baffled by berms, sand bag walls, or lego-block walls, for items that can be stored unsheltered. The hangar/ramada should offer a limited amount of sheltered space for storing items best not exposed to extremes of heat and cold, as well as those that needed to be accessed frequently.



Floorplan Illustration of the shielded ramada/hangar concept: constructive criticism welcome!

ISRU (on location resource use) items that need research now:

- basalt-fiber technology is advancing quickly: can we make sand bags from such a material? What about sheeting strong enough to hold several feet (minimum 2 meters) of blown moondust?
- automated sandbag manufacturing
- automated production of sintered regolith lego blocks of standard size
- automated or teleoperated lego block wall stacking/construction
- compacting roller wheels (think steam roller size) shipped hollow, filled with compacted regolith

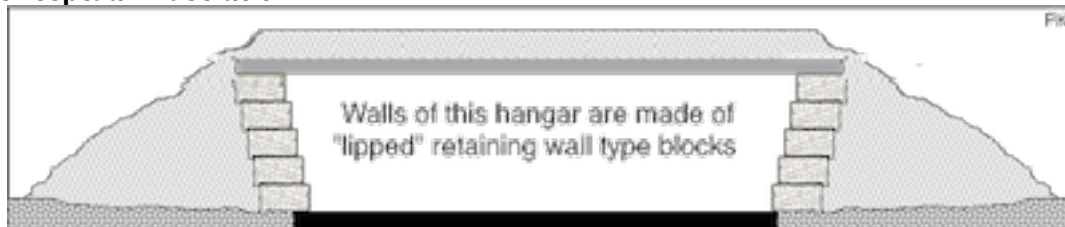
You can help!

Perhaps you can help fill in what we have missed or not thought of! Why not conduct local, regional, national, international engineering design contests to develop the ideas above.

The Good and the Bad of the above scenario for outpost establishment

On the one hand, **very expensive on-location manpower** is reserved only for those things that cannot be done by teleoperated equipment or by telepresence-operated avatar robots. This also decreases the chances of serious injuries. Further, when the first crew arrives, and parks the modules they brought along or which have been pre-landed within the hangar/ramada structures, they will be ready to stay several lunar cycles, i.e. in ISS type length crew stints, for which 2 meters of pre-provided shielding will be ample.

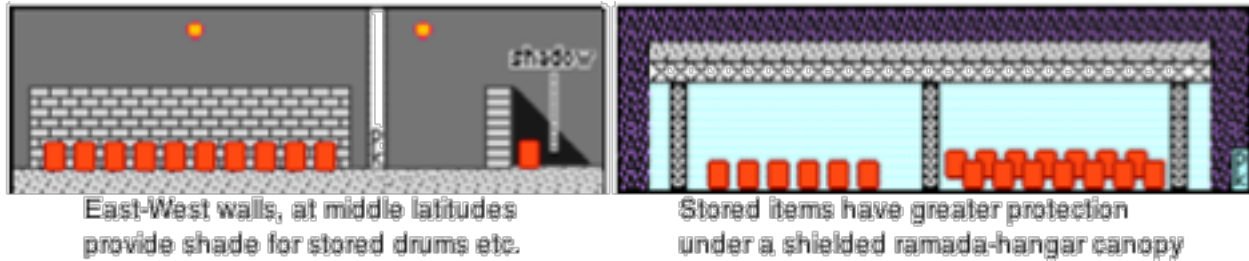
Another conceptual illustration:



Beyond bricks: pavers and panels

Closely related to bricks are “pavers” which can be brick like in size and thickness up to much bigger slabs. These would have a use as well, for example serving as pavement for rocket landing/launch pads to cut down on

the spray of sandblasting moondust driven by rocket exhaust. Such pads would be bermed as well to present a horizontal barrier; and these berms could well be confined between retaining walls.



Panels, whether of concrete or made in the same moondust sintering fashion as bricks and blocks, could be held in place by Lego type blocks with forked ends. Panels, whether of concrete or made in the same moondust sintering fashion as bricks and blocks, could be held in place by Lego type blocks with forked ends.

The hangar interior can be **naturally lit**, during dayspan, by providing intermittent broken-path sun-wells or direct path “sundows” made of bundled optic fibers that double as shielding. Electric lighting for nightspan can be separately suspended from the ceiling or placed above the exterior surface, to use the in-place sun-well or sundow light delivery system. A light pipe network suspended from the ceiling could be fed by sulfur lamps.

Visual access can be accommodated by broken-path (radiation-proofed) mirrored shafts from the habitat modules underneath through the hangar roof. With proper planning, such ready-access observation ports can be provided ahead of time as the hangar is expanded section by section. Alternately, a pressurized vertical ladder-shaft can lead from habitat below to pressurized observation dome on the hangar roof.

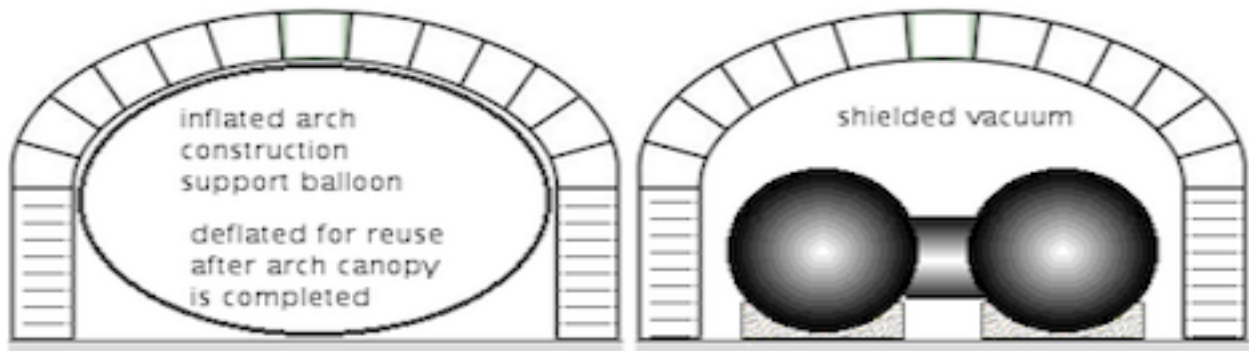
Who gets to teleoperate the brick making and deployment controls?

Such a project, coordinated with NASA or any other contracting tenant, would be an early indication that a base was about to become real. Indeed, we think that we can make this proposal even more interesting by expanding on the teleoperation angle. Finding ways to select individuals from the public at large by lottery of other means and give them a turn behind the brick/block manufacture and deployment teleoperation controls, would give this project significant public attention. The use of supervised students selected by lottery would be even better.

We’d have to train the lottery winners, and they would only get a chance to do actual work on the Moon remotely, if they demonstrated a required level of expertise. But to win and then be approved for this privilege and then actually get to do some of the work on the Moon would be a lifetime feat, something to tell the grandchildren.

Afterthoughts: Blocks designed for arches:

There is another way to create a brick/block shelter before any pressurized modules arrive from Earth. That would be to use blocks designed for arches. You could build interlocking rows of arches over a temporary supporting inflatable structure.



This slip-form sintered arch-block approach is well-developed in the paper “Lunar Base Design” by Peter Land of the Illinois Institute of Technology, pages 363–73, in “Lunar Bases and Space Activities of the 21st Century”, Ed. W.W. Mendel, Lunar and Planetary Institute, Houston, 1984.

The ‘**ground**’ under the arch (the floor of the hangar) can be graded smooth, compacted and sintered to provide a relatively dust-free apron for the sheltered outpost. As we will see in a later article, “site management”, dust control, and good housekeeping habits must be in place from the gitgo if our attempt to establish an interface beachhead is not to fall flat on its face. (Inner and Outer “Yard” Managers or yardmasters will be critical job slots.) The hangar approach favors the early adoption and rigorous pursuit of good homesteading habits.

Conclusion: There would seem to be many options to providing ready to use shelter for the first crews before they arrive. We need to further brainstorm and pre-engineer each line to see which is the most problem free not only architecturally but with a view to teleoperated pre-construction, and to utility and versatility of use.

Which options could be further shielded to provide adequate protection for crews staying up to a year or more? If several sites are to be developed, and that is likely, then the most promising technologies should all be tested and tried, first on Earth if possible, then on the Moon. In time, a truly indigenous lunar-appropriate architecture will be developed and continue to be elaborated and refined.

The bottom line is the need to reserve expensively-supported crew hours on the Moon to those things that only crew on location can do. In time, the total pioneer population will grow more quickly, not less so, **because we have taken the time to do it right.**

We admit that the above ideas may not be appropriate for polar areas because basalt which we expect to play a crucial role in lunar industrialization is nowhere to be found. But it is time to get off “the Poles Only band-wagon.” We do need polar ice for water and fuel. But one of the most fundamental enabling technologies, cast basalt and basalt-fiber products require mare or highland/mare coastal siting that provides access to both major suites of moondust materials. Those who are only interested in accessing the Moon for ice-derived fuels should keep developing their plans and scenarios. That said, the rest of us need to realize that water alone cannot help us transform the Moon into a new human pioneer world. The author’s recommendation? A site on the “northern shore” of Mare Frigoris, the Sea of Cold. Why?

- This places the outpost only about 200 mi (320 km) from the nearest ice-bearing craters to the North. The pole itself is some 600 mi (960 km) north. The nearest “shore” to the south pole is double that distance.
- This site has easy connections to the rest of the near side “mare-plex.”
- The Sinus Roris – Mare Frigoris plain stretches 150 degrees E-W. A power grid with solar stations along the route, would provide power for some 83% of the local nightspan, equalling the power coverage at the poles.
- Thorium-rich (nuclear power) and KREEP-rich (potassium, rare Earth elements, phosphorus) are to be found just to the South in Mare Imbrium.
- The Mare Frigoris area, at 60°+/- North, experiences substantially moderated dayspan temperatures.

Indirect Shielding Methods: Summing up

Building a dust-shielded “hangar” that provides large unstructured “lee vacuum” space in which pressurized modules can be “parked” in various forms of interconnection, offers a much faster, and easier way to set up an open-ended expanding modular outpost. There is no shielding to remove when adding additional modules, nor any directly applied shielding to interfere with servicing and repair of system components on modules a.

As a bonus, there is extra radiation-free, UV-free, micrometeorite-free, and flare-proof unpressurized “lee” service space for storing tankage and other routinely needed, frequently tended equipment that does not need to be exposed to the sky. This allows wearing light-weight pressure suits for some exterior housekeeping chores.

The hangar shed makes sense if there is firm, review-proof **commitment to phased expansion** of the base beyond the original bare minimum habitat structure. For while its construction adds an original base-deployment “delaying” mission or two, the time-saving and effort-saving dividends down the road are considerable. If our commitment is scaled back to putting a toe in the water, rather than to “getting thoroughly wet” with a wholesale plunge, then, of course, the hangar will be seen as unnecessary. But then we have an Apollo “Flags & Footprints” “Kilroy was here” repeat, and for what? Anything that is worth doing is worth doing well, and doing right, so that it becomes the foundation of something greater and not a just a stunt that leads nowhere.

Providing ready to use shelter will be even more essential for Mars explorers

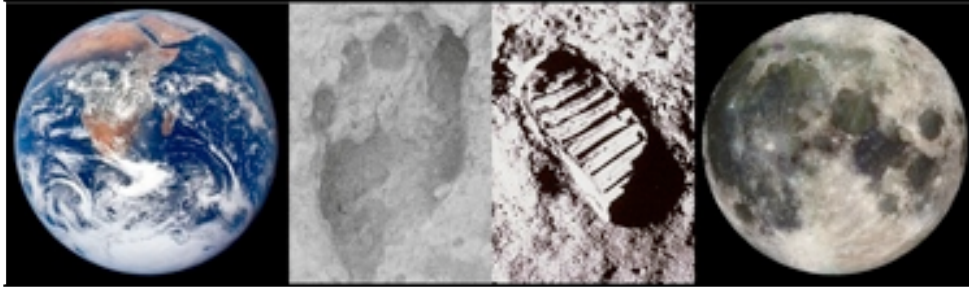
Staying a year in orbit “within the van Allen Belts” is not the same risk-wise as staying a year on the Moon, where radiation shielding is strongly recommended. It will be even more so for Mars outposts which include travel time to and fro at risk. Crews arriving on Mars will already have been exposed to maximum acceptable limits of radiation. They need to have usable shelter immediately upon landing., not months later! This will minimize the chances of serious construction accidents in a place where getting to a hospital can be months, even years away.

Teleoperation and telepresence operation of equipment and robot avatars on distant Mars will be exceedingly tedious because of the 6–40 minute time delays strictly enforced by the speed of light. It would be helpful first to create shelter under the surface of Phobos or Deimos for teleoperators and telepresence operators who could then direct construction of surface shelters almost anywhere on Mars other than at the poles, in near real time. Those whose impatience demands that they bypass the “PhD” accelerator, will hopefully give way to those of us, who like the tortoise, realize that the fastest way in the end, is the most deliberate and carefully thought out, and patient way to do anything. Below is a well-intended but dangerously unshielded concept from **MarsOne.org** – <http://www.space.com/16300-mars-one-reality-show-colony.html> (video) PK



THE MOON SOCIETY – LUNAR FRONTIER SETTLEMENT – WWW.MOONSOCIETY.ORG

From Africa
to the Moon,
the Human
Epic, told in
footprints,
Continues
to the Stars!



Our Goal is
Communities
on the Moon
involving
large scale
industrializa-
tion and
private
enterprise.

The Moon Society Journal Section (pages 9–12)

About the Moon Society

Objectives of the Moon Society include, but are not limited to:

- **Creation** of a spacefaring civilization, which will establish communities on the Moon involving large-scale industrialization and private enterprise.
- **Promotion** of interest in the exploration, research, development, and habitation of the Moon, through the media of conferences, the press, library and museum exhibits, and other literary and educational means
- **Support** by funding or otherwise, of scholarships, libraries, museums and other means of encouraging the study of the Moon and related technologies
- **Stimulation** of the advancement and development of applications of space and related technologies and encouragement their entrepreneurial development
- **Bringing together** persons from government, industry, educational institutions, the press, and other walks of life for the exchange of information about the Moon
- **Promoting** collaboration between various societies and groups interested in developing and utilizing the Moon.
- **Informing** the public on matters related to the Moon
- **Provision** of suitable recognition and honor to individuals and organizations that have contributed to the advancement of the exploration, research, development, and habitation of the Moon, as well as scientific and technological developments related thereto.

Our Vision says it all – “Who We Are and What We Do” – www.moonsociety.org/spreadtheword/whowhat.html

We envision a future in which the free enterprise human economy has expanded to include settlements on the Moon and elsewhere, contributing products and services that will foster a better life for all humanity on Earth and beyond, inspiring our youth, and fostering hope in an open-ended positive future for humankind.

Moon Society Mission: to inspire and involve people everywhere, from all walks of life, to create an expanded Earth–Moon economy that will contribute solutions to the major problems that challenge our home world.

Moon Society Strategy

We seek to address these goals through education, outreach to young people and to people in general, competitions & contests, workshops, ground level research and technology experiments, private entrepreneurial ventures, moonbase simulation exercises, tourist centers, and other means.

Interested in having input? Any member may ask to join the Leadership Committee and attend our Management Committee meetings held twice monthly. You may even express opinions. Decisions are often made by consensus, so this input has value. Write president@moonsociety.org

From the Desk of Moon Society President Ken Murphy

Our Website: At our recent Town Hall meeting, it was decided that The Moon Society should focus on updating our website. While there is an enormous amount of valuable content found at our website, it is in desperate need of a revamp to accommodate the current ways that people are accessing internet information. **Our website needs to work with smartphones, tablets, netbooks, and other tools.** The information needs to be reorganized and consolidated into sensible categories for ease of finding. There is much work to be done, and it's going to need a team of members to get it done. This is not a task that can be achieved by the Leadership team alone, as we have a lot of other responsibilities and challenges as well, and the scope of these changes is significant.

One thing for the members to consider is that if we cannot put together an adequate team from our membership then we will have to spend money on doing so. Some portion of our assets may be needed to address the fact that our website is our public face to the world, and it is not currently winning us more adherents. We have assembled a team to take this on. The timetable for this project is approximately one year, or a mid-2013 launch of the revamped website.

The Moon Society – Lunar Frontier Settlement – www.moonsociety.org p. 3

International Observe the Moon Night (InOMN) is on Saturday, September 22nd this year. All members, outposts and chapters are encouraged to go out into their communities and share the beauty of seeing the Moon up close. You can check at the InOMN website for locations near you. Over the next year, TMS will be looking into how we can become more formally associated with the event, perhaps in conjunction somehow with our Lunar Observing Certificate program.

Autumn is usually the busy season for **science fiction conferences**, and these are great places to present a talk or be on a space panel. This is a great opportunity to share your vision for the Moon, as well as information about The Moon Society.

If you do have a **speaking engagement**, let us know! Drop a line to president@moonsociety.org and secretary@moonsociety.org, and with enough advance notice we can be sure to get a TMS lapel pin to you to wear during your talk.

We are a growing organization; let's keep up the good work!

Ken Murphy

International Observe the Moon Night – 22 September 2012

International Observe the Moon Night “Under the Same Moon” – 22 September 2012 (Saturday)

<http://observethemoonnight.org>

The MMM Editor was caught sleeping again! This year caught us unprepared. **Two useful things we can still do:** 1) **Contact local astronomy clubs** to see if they are doing something for this day, and if so, try to get as many chapter/outpost members as you can to participate as observers this year. The Moon will be nearing first quarter (first half) <http://lunaf.com/english/moon-phases/lunar-calendar-2012/09/22/>

2) **Start planning ahead for next year and years to come**

One idea is to **put together a “Sidewalk Astronomy Kit”** that can be used for Observe the Moon Night, any good waxing moon nights (before the Moon is full, in early evening when the terminator the day/night line on the Moon throws long shadows and reveals so much detail. You can also use the kit for observing Mars when it is near, Jupiter and its moons, etc. Prepare a Moon Observation Presentation to show should bad weather intervene.

Check out Moon Society Milwaukee plans for such a kit, not yet realized:

http://www.moonsociety.org/chapters/milwaukee/msmo_currentproj.htm#sidewalk

More Information: <http://www.sidewalkastronomers.us/> – <http://www.sidewalkastronomers.us/id143.html>
http://en.wikipedia.org/wiki/Sidewalk_astronomy

The “State of MMM” Report

From Peter Kokh, Editor for the first 25 years and counting

We still have the energy and enthusiasm to continue production of 10 20–page issues a year (along with quarterly production of much longer issues of the MMM–India Quarterly). We are also well along in production of a number of “Theme” issues for Kindle access. Even if sales on Kindle are minimal, this Theme Issue project helps organize material for the long-planned “MMM the Book” with the provisional title, “A Pioneer’s Guide to the Moon.” Should something happen to me, another writer should be able to produce such a book from these theme issues.

Energy and enthusiasm are not the problem. I will turn 75 this coming December, and while I feel decades younger and am in good health, we all know that could change in an instant.

The Moon Society needs to have an “MMM Insurance Policy.”

In MMM #252, February 2012 issue, page 10, per President Ken Murphy’s request, I gave a **MMM Editor Job Description** which describes how I put each issue together. And I suggested ways others could start to relieve me of some of these tasks. Finding an editor for 2 issues a year out of 10 (suggested April and October) would be good experience in case I needed to be replaced whether on a temporary or permanent basis. Here it is September, and we don’t have an assistant lined up for next month. That’s not a problem for me at all. But it could become an issue at any time, despite my hope to still be around another 25 years. That said, I am giving notice that with completion of issue #500 in November 2036, I will definitely retire, another editor in the wings or not. LOL!

So dig out that February issue, or download it from www.moonsociety.org/members/mmm/ and give it some thought. Any organization that has all its eggs in one basket is playing a game of Russian Roulette!

Meanwhile, our membership is growing, and the Society’s influence and role is increasing as well!

If you can help in any way, please reply to president@moonsociety.org and/or to mmm@moonsociety.org

For past articles, Visit http://www.moonsociety.org/publications/mmm_classics/

An Exciting Chapter Project: MS-Phoenix' Lunar Rover Challenge

On Saturday morning April 7, 2012, Wiz Kidz, International and the Phoenix Moon Society presented Tele-Operation Lunar Rover Challenge (TOLRC) for kids at the convention.

Research and Development: Over the prior 2 years, Wiz Kidz, had developed a basic proof of concept model of Tele-Operation RC Cars by acquiring an R/C car at Walmart, and a color wireless camera with sound off the internet. The camera was taped to the top of the car and immediately put to work.

In initial trials, the experience of operating the 27 MHz car using only the image from the camera was difficult to say the least. The inexpensive car was designed for speed, not discrete control, and it was far too easy to end up caught in a corner. On one such occasion, I stepped away from the monitor to determine what the car had run up against and found that the tall, long, huge grey wall in front of the car was ... the curb of the sidewalk. The perspective of the camera on the car was very different from the typical view I had assumed of holding a similarity to driving a full size vehicle. This single aspect made learning to drive the car difficult because in addition to learning how to control it, I had to re-learn how to recognize common objects from the reduced perspective.

As the trial progressed, I found that there was a marked limitation in range for the cars transceiver. We found that as the distance increased, even in line of sight, control diminished very quickly.

While the cost of the prototype was small (\$40 for 2 cars, \$40 for a single camera and transceiver, and \$12 for B/W battery TV) we were able to successfully demonstrate Proof-of-Concept for off the shelf teleoperation.

The Operational Kit: In research we realized a more robust car was needed, with an enhanced range of transceiver and more discrete control. Ultimately we settled on an (AMix) R/C car purchased at a local Hobby Town for \$100. As our upcoming project was geared around racing, we acquired 2 vehicles. These cars were chosen because their controllers afforded far more discrete control over a far greater range. The extended range was accomplished because the car used 2.4 G.

The camera was retained from the prototype, and a second was acquired for the additional car. We upgraded to a 19" flat TV with audio-video inputs to improve reception of the TV signal, and incorporate the sound output from the camera.

In testing, our new configuration, we made an error that proved embarrassing. Each of the individual components was briefly tested, R/C control/range, camera and monitor ... separately. As such, integration tests were NOT performed and we discovered that the car's generated interference in the TV signal rendering it unusable for our purposes.

Our Event: Our first Tele-Operation Lunar Rover Challenge (TOLRC) event was intended to demonstrate the challenges of navigating the grey lunar landscape. To facilitate the simulation we placed three medium grey canvas tarps on the ground, and scattered beneath it a handful of plastic cups to simulate obstacles in the terrain.

The monitor was placed behind a trifold presentation board, and the operator was seated before the monitor and handed the controls. During our setup and preliminary testing, we discovered interference between the car's controller and the TV transceiver.

Rather than accept defeat and cancel, we worked with the kids beside the track to practice the discrete control to go slowly, and stay ON the small "Moon". They embraced the challenge with vigor and gradually were able to navigate smoothly about the terrain successfully.

Evaluation: In the future I think it will be advantageous for participants to work with the vehicles in view to learn the discrete control, and after demonstrating proficiency, then getting behind the barrier to attempt Tele-operation. The kids, and a few adults embraced the rules of the challenge and found themselves giggling, laughing, and cheering each other on.



The Future: First defining the event in two states for each operator: First, qualification in line-of-sight; Then, seating at the monitor for actual Tele-Operation of the rover.

We will next address the interference issues. Initial testing has shown that there are settings on the camera and transceiver to allow shifting the transmit channels. This resolves the interference problems. **MS-Phoenix**

March 2012

Chapters & Outposts Map (North America) - www.moonsociety.org/chapters/chapter_outpost_map.html

Moon Society St. Louis Chapter - <http://www.moonsociety.org/chapters/stlouis/>

Contact: Robert Perry surfer_bob@charter.net – Meetings 3rd Wed monthly at Buder Branch Library, 4401 S. Hampton, in the basement conference room – **Next meetings – MAR 14 – APR 18 – MAY 16**

August 18th meeting notes: Mark Rode, Dave Dietzler, Karl Strassman, Dabney Tolsen, and Rufus Anderson attending. Jim Merriman and Bob Perry reported by email that on August 5th they had helped Dale Iffrig and Kathleen O'Neil at the Space Museum's booth at the St. Louis Science Center's celebration of the Mars Science Lab Curiosity's impending landing. Jim announced an event at the Space Museum in Bon Terre, MO, on September 15th, "the Space Shuttle Main Engine Un-Crating Social with Astronaut Charlie Walker". For more information go to: <http://www.space-mo.org/home/node/56>

Several topics were discussed at the meeting:

- Werner van Braun was probably the first to propose a moon base as an aid in going to Mars.
- As chemical rockets require massive amounts of fuel, a better way to get out of the "gravity trap" must be found. Thorium or plutonium plasma "batteries" might power future spaceships. Radioisotope thermal electric generators are used for space probes that go where solar panels would be inadequate. Note that Curiosity uses a 110 watt RTG and its waste heat helps critical components through the night.
- Tiny Nano batteries with 1,000 times the energy density of Lithium ion batteries can be used to power "micro labs" on a chip, and will eventually be used in extraterrestrial analysis applications such as Mars missions. In email followup Bob referenced the X-Prize medical tricorder contest and other medical sensor suite projects. <http://www.xprize.org/prize-development/life-sciences>
- Rufus explained that the van Allen belts exist because of the Earth's magnetic field. He had read that the Solar System has the overall resources and capacity to support 1,000,000 times our present population. We should watch NOVA's "Fabric of the Cosmos" and "Elegant Universe". We talked about String Theory and the "12 Dimensions" of space i.e. the different ways the strings can occupy, vibrate, and dissipate in space, through 6 degrees of freedom and other modes that theorists are considering.
- Mark introduced several topics – Ablation of the heat shields on the space shuttle, ceramic engines, homogeneous charge combustion ignition (HCCI) engines (not really diesel), full adiabatic, complete burn. Sterling Motor, and Ammonia Fuel cells. Dave pointed out that it takes a lot of energy to synthesize ammonia, and therefore that is not now a viable idea. That led to bacterial batteries and that the answer to increased CO2 levels is more plants and Algae fields. CO2 sequestration in the ocean led to Dabney, Mark, Dave, and Rufus talking about making submarines more stealthy, reducing cavitation at the screws, reducing the noisy collapse of vacuum bubbles that occur when moving or pushing the water
- Karl brought in a map of Mars from 1998 National Geographic article on the Sojourner mission and will find where Curiosity landed by next meeting, with full details. ✓Check http://en.wikipedia.org/wiki/Gale_crater
- In follow up emails, Karl and Bob proposed an internet search for information on the Huygens probe that landed on Saturn's moon, Titan, sending back pictures from the surface. It was the first spacecraft to land on one of the Outer Planet moons, a 7 year multinational collaborative effort. Also, are there plan for a probe to pass through the atmosphere of Saturn, collect data and transmit that data to Earth and possibly land on a solid surface if there is one? It is estimated that Saturn has a solid core about 10 earth masses.
- Since closed cycle biosystems will be needed in space, we should look into the published research on desalinating sea water. A while back, Karl visited the Southwest US, and at one of the rest areas in NM that used the Clevis/Moltrum method for its commodes to compost and dispose of solid waste. At Walnut Canyon, he learned more water conservative methods to grow crops – prehistoric Indians of the SW US used "the three sisters" – on one mound was placed a corn seed, a bean seed, and a squash seed, as they grew together, less water was needed for their (intertangled) roots in order for them to mature – something to think about in drought conditions. Bill Gates recently put forth a million dollar prize to develop better human solid waste disposal in third world nations. It is noted that in these places the water is often contaminated from solid waste.
- Bob passed on a Public Radio International web-article about electrification of Sri Lanka and India using simple primary cells with zinc and copper electrodes and the mildly acidic pulp of their native plantain trees as the electrolyte. The trees have a short lifetime, are prized for their fruit, and become waste once the fruit is harvested. Several cells stacked will drive the new extra bright LEDs and can replace the current kerosene lanterns. One tree could power such a lantern for one year. There is a question of "total greenness", balancing the production of the zinc and copper electrodes and the LEDs against the production and burning of kerosene. <http://www.theworld.org/2012/08/how-plantain-trees-could-become-an-energy-source/>

-- Bob Perry from Karl Strassman's notes

Moon Society Phoenix Chapter - <http://www.msphx.org> – Contacts: Craig Porter portercd@msn.com Meeting the 3rd Saturdays of the month at Denny's, 4403 South Rural Road, Tempe
Next meetings – SEP 15 – OCT 20 – NOV 17 – DEC 15

August 18 Meeting Minutes: The August meeting was a short meeting, where we discussed the September Meeting and filling the President's Office, and the Vice President's Office. Michael cited the bylaws saying we could not hold elections at that time. Because he and I are the only national members in elective office, pointed out to him that if we didn't hold elections then he would also be holding down all of the offices until the next election cycle.

The next subject was the "Lunar Rover Racing", Don appears to have come up with a workable solution for the interference problem and will be validating the solution over the next couple of months.

The third item covered was CopperCon32, it was decided that I would set up the Fan Table and man it for the weekend, Aug 31 through Sept. 3.
From Craig Porter



The Moon Society Phoenix table at CopperCon 32

Clear Lake NSS/Moon Society Chapter (Houston) – <http://www.moonsociety.org/chapters/houston/>
Contact: Eric Bowen eric@streamlinerschedules.com – Meeting 7 pm in the conference room of the Bay Area Community Center at Clear Lake Park – Even # months: SEP 17 – NOV 19 (subject to change)



Marshall Mike Moondust and the Sinister Selenian Subterfuge

[MMM Fiction by George von Mond]

Chapter I

"Marshall, welcome to our humble facility. To what do we owe the pleasure?"

"Thank you Mr. DeGlacis. Just a courtesy call, mainly as an excuse to come out and see this part of the Moon."

The director of the "mining" project gave Marshall Mike Moondust of the Lunar Guard a curious look. "Magnificent desolation, eh?"

"If I only had a gold Lunar for every time I've heard that..." muttered Mike.

"You should deliver the bill to Buzz himself down in Armalcolopolis. I hear he's still kicking around down there somewhere," replied the director.

"Geriatric facilities are still one of the main attractions up here on the Moon. The low gravity does wonders, and thankfully they don't get into near the trouble that the youngsters do."

"Yeah, but we need those youngsters for the tough work out here," countered the director. "So what can we do for the Lunar Guard today?"

"Just a routine inspection. Making sure your emergency shelters are adequate for the size of your operations. Checking the suit maintenance logs. Storage of dangerous materials. The usual stuff. I know you've filed reports with your HQ, but the Lunar Guard likes to operate under the principle of "Trust, but verify. And we have noticed an above average amount of equipment being requisitioned out this way."

"This is old dirt," replied the Director. "The whole reason we're out here is that through some freak of circumstance this area of regolith has been exposed for much, much longer than usual. The SWIEs we're pulling out of this stuff are tremendous. That's why we're out here in the middle of nowhere. And the fact is it's harder on the equipment than the usual brutal Lunar environment."

"Copy that," replied Mike. "Now, shall we start the tour, or is there some place I can access your computers to review the logs?"

"Let's go see the surface operations first. Space weather says we've got clear sun for the next few hours, and as the French say "Il faut profiter."

"Let's go," replied Mike eagerly.

The two men suited up and took one of the SOBs (Surface Operations Buggy, pronounced Saab) out to the slusher bucket fields where the mining operations were gathering up their "old dirt" using a tried and true method from Earth – scooping it up with a bucket. While the director regaled Mike with the details of the operation, the Marshall's eyes were scanning the layout and equipment, apprising routes and distances to safety shelters, the condition of the workers' suits, number and location of comm repeaters, and myriad other little details that help keep humans alive on the Moon.

The mandate of the Lunar Guard was an annoyance to the corporations, but much appreciated by the citizenry of the Moon: Ensure that every human operation on the Moon meets minimum safety requirements appropriate to the Moon. The Lunar Guard worked for each and every human being on the Moon, but none of the corporations. After the attempts at corporate hegemony on Earth over the turn of the millennium, the citizenry of Luna made it clear that on the Moon corporations have 'corporeal' status as a courtesy so that they can have standing in the courts of Luna. On the Moon corporations are not 'people'. They're legal fictions to allow for the collectivization of capital to achieve larger projects. Once the project is complete, the corporate charter ends, and in any event must do so within the average lifetime of a human being. Marshall Moondust was working for Mr. DeGlacis, but not his company.

They pulled up to one of the older and deeper pits, and climbed out as the Director continued his monologue, "...and so this one is almost played out as we're approaching the underlying bedrock. You can see the many thresher 'bots prepping the soil for the big bucket slowly moving back and forth in the giant delta. Equipment at the 'base' of the triangle pulled the large bucket back to the edge of the pit, while equipment at the apex pulled the bucket in and dumped the contents into the processing equipment. All the while, robots with rotating wire whisks wandered back and forth across the pit to loosen up the tightly compacted regolith.

"Hey, check that tension on #3 guide wire, Jones!" crackled over the common frequency.

"Crap, she's fraying! WTF? Watch out!" screamed the worker.

Mike turned his gaze to the pylon at the end of the pit closest to where he and the director stood, just in time to see the flash of the guide wire whipping toward him through the void.

Grabbing the director, Mike quickly...

**Tune in next month for the next exciting installment of
Marshall Mike Moon Dust and the Sinister Selenian Subterfuge!**

Chapter II Teaser. Last time: Marshall Mike Moondust is conducting an inspection of an Archaea Mines facility on the Moon. While visiting one of the slusher bucket pits, a desperate cry comes over the common frequency: "Watch out!" screamed a worker.

Mike turned his gaze to the pylon at the end of the pit closest to where he and the director stood, just in time to see the flash of the guide wire whipping toward him through the void.

Grabbing the director, Mike quickly puts the SOB between them and the errant whip of death. Just in time as the guide wire smashes into buggy, which sacrifices itself to absorb much of the energy in the snaking wire. As the dust settled, Mike and the director stood up to check each other's suits over for leaks, and then to survey the damage. While the chassis survived, most of the buggy was a write-off. The director makes everyone on the crew sound off to check for casualties, and then they both start trudging towards the main center of operations while the crew at the pit scurried to clean up the mess and get the bucket moving again.

To be continued in the next issue of MMM

GREAT BROWSING LINKS

COMMERCIAL SPACE

<http://www.space.com/16507-private-spacesuits-final-frontier-design-photos.html>
<http://www.space.com/16512-fly-dna-moon.html>
<http://www.space.com/16631-private-liberty-rocket-space-capsule-milestone.html>
<http://www.space.com/15625-liberty-rocket-private-space-taxi-atk.html>
<http://www.space.com/16621-skylon-space-plane-europe-heavy-lift-rocket.html>
<http://www.space.com/16619-inflatable-heat-shield-concepts-pictures.html>
<http://www.space.com/16817-space-startup-prize-inflatable-satellite-parts.html>
<http://www.space.com/16906-private-space-taxis-nasa-spaceflight-reaction.html>

ASTRONAUTS + ANALOGS + SPACE TECHNOLOGY

<http://www.space.com/17105-space-jump-red-bull-stratos-delayed.html>
<http://www.space.com/17219-nasa-rats-mock-asteroid-mission.html>

EARTH

<http://www.space.com/16629-earth-dry-formation-snow-line.html>

MOON

<http://www.space.com/17138-helium-moon-atmosphere-lunar-discovery.html>
<http://www.space.com/17290-space-elevator-moon-project.html>

Magnetic Fields Explain Lunar Surface Features – <http://physics.aps.org/articles/v5/92>

Astrobotic NASA Contract to Explore Martian and Lunar Caves <http://astrobotic.net/2011/11/29/astro>

MARS

<http://www.space.com/16503-photos-mars-science-laboratory-curiosity-landing-guide.html>
<http://www.usnews.com/opinion/articles/2012/07/09/put-humans-on-mars-by-2030>
http://www.mercurynews.com/opinion/ci_20976582/chris-carberry-economics-mars-its-time-be-bold
<http://www.space.com/13681-mars-biggest-mysteries-water-life.html>
<http://www.space.com/16630-mars-odyssey-orbiter-glitch-recovery.html>
<http://www.space.com/16801-mars-rover-curiosity-science-instruments-infographic.html>
<http://www.space.com/17087-mars-surface-marsquakes-plate-tectonics.html>
http://www.marsdaily.com/reports/Mars_rover_takes_cool_detour_NASA_999.html
http://www.marsdaily.com/reports/How_a_Mars_Sample_Return_Mission_Can_Go_Electric_999.html
<http://www.space.com/17220-mars-rover-curiosity-martian-driving.html>
<http://www.space.com/17360-private-mars-one-mission-sponsors.html>

ASTEROIDS

<http://www.space.com/16515-space-mining-asteroid-legal-issues.html>
<http://www.space.com/16501-private-space-telescope-asteroid-mining.html>

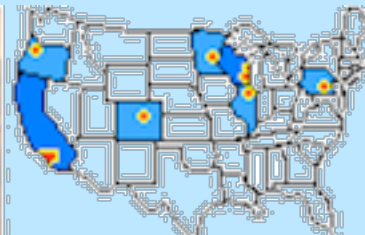
OTHER PLANETS + MOONS

<http://www.physorg.com/news>
<http://www.space.com/16547-pluto-fifth-moon-planet-status.html>
<http://www.space.com/16533-pluto-new-horizons-spacecraft-pictures.html>
<http://www.space.com/16539-pluto-fifth-moon-five-facts.html>
<http://www.space.com/16538-pluto-moons-explained-infographic.html>

GREAT SPACE VIDEOS

<http://www.space.com/16520-saturn-s-moon-titan-sports-polar-vortex-video.html>
<http://www.space.com/16570-new-water-searching-moon-rover-begins-testing-video.html>
<http://www.space.com/16626-mars-scientist-urges-brave-exploration-video.html>
<http://www.space.com/16622-inflatable-heat-shield-set-for-test-flight-video.html>
<http://www.space.com/16757-supersonic-skydive-from-edge-of-space-animated.html>
<http://www.space.com/16823-wesley-crusher-and-curiosity-s-red-planet-landing-video.html>
www.space.com/16899-start-up-hopes-to-raise-millions-for-space-research-and-education-video.html
<http://www.space.com/17212-curiosity-wiggles-wheels-and-stretches-arm-video.html>
<http://www.space.com/17208-what-s-inside-mars-nasa-s-insight-mission-will-probe-deep-video.html>
Evolution of the Moon (Goddard) – <http://www.youtube.com/watch?v=UIKmSQqp8wY&feature=related>

NSS Chapters that share Moon Miners' Manifesto



Space Chapter HUB Webiste: <http://nsschapters.org/hub/>
Feature Page: Project Menus Unlimited <http://nsschapters.org/hub/projects.htm>

WISCONSIN



MLRS – Milwaukee Lunar Reclamation Society
PO Box 2101, Milwaukee, WI 53201 – www.moonsociety.org/chapters/milwaukee/

Ad Astra per Ardua Nostra = To the Stars through our own hard work!

2012 LRS OFFICERS & • BOARD Contact Information

PRESIDENT / MMM EDITOR - • Peter Kokh NSS 414-342-0705 - kokhmmm@aol.com

VICE-PRESIDENT Doug Armstrong NSS (414) 273-1126

SECRETARY – • James Schroeter NSS (414) 333-3679 – James_Schroeter@excite.com

TREASURER/Database – • Robert Bialecki (414) 372-9613 – bobriverwest@yahoo.com

✓ We will start planning for our December anniversary/holiday party Saturday December 8th.

✓ Let's discuss how we can prepare for International Observing the Moon Night 2013 (Sat. Sept. 14th?)

For some ideas, Visit Peter's Sidewalk Astronomy Page:

http://www.moonsociety.org/chapters/milwaukee/msmo_currentproj.htm#sidewalk

<http://www.sidewalkastronomers.us/> – http://en.wikipedia.org/wiki/Sidewalk_astronomy

WISCONSIN



SSS – Sheboygan Space Society
728 Center St. Kiel, WI 54042-1034 – www.sheboyganspacesociety.org

c/o Will Foerster 920-894-2376 (h) – astrowill@charter.net

SSS Sec. Harald Schenk hschenk@charter.net

DUES: "SSS" c/o B. P. Knier, 22608 County Line Rd, Elkhart Lake WI 53020

Meetings are at The Stoelting House, 309 Indian Hill, Kiel WI 53042 - 3rd Thurs even # months

NEXT MEETINGS: OCT 19 - DEC 8 (SAT in Milwaukee)

COLORADO



DSS: Denver Space Society fka Front Range L5
1 Cerry Hills Farm Drive, Englewood, CO 80133
<http://www.angelfire.com/space/frl5/>

Eric Boethin 303-781-0800 eric@boethin.com – Monthly Meetings 6:00 PM on 1st Thursdays
Englewood Public Library, Englewood, CO 80110 – 1000 Englewood Parkway, First Floor Civic Center

NEXT MEETINGS – SEP 6 – OCT 4 – NOV 1 – DEC 6

ILLINOIS

For past articles, Visit http://www.moonsociety.org/publications/mmm_classics/



CSFL5: Chicago Space Frontier L5 – 610 West 47th Place, Chicago, IL 60609

CALIFORNIA



SSDS – San Diego Space Society

8690 Aero Drive, Suite 115, #77, San Diego, CA 92123 – <http://sandiegospace.org>

The chapter is asking members and those interested to fill out a survey.

<http://sandiegospace.org/member-survey/>

The chapter is busy preparing for next year's ISDC which San Diego will host, May 23–27

See: ISDC Registration: [https://www.nss.org/cgi-bin/register/tdregister?\\$Origin=ISDC13./](https://www.nss.org/cgi-bin/register/tdregister?$Origin=ISDC13./)

See Last month's issue, #257, August, page 12 for more information

CALIFORNIA



OASIS: Organization for the Advancement of Space Industrialization & Settlement
Greater Los Angeles Chapter of the National Space Society
PO Box 1231, Redondo Beach, CA 90278

Events Hotline/Answering Machine: 310–364–2290 – Odyssey Ed: Kat Tanaka odyssey_editor@yahoo.com
<http://www.oasis-nss.org/wordpress/> - oasis@oasis-nss.org – Odyssey Newsletter www.oasis-nss.org/articles.html

Regular Meeting 3 pm 3rd SAT monthly – SEP 15 – OCT 20 – NOV 17 – DEC 15

Sat., Oct. 20, 3 pm OASIS Board Meeting Home of Steve Bartlett and Tina Beychok 7108 East Peabody, Long Beach

Sat., Oct. 20 –OASIS Lecture Series: Space Tourism – further information not yet available

Sat., Nov. 17 OASIS Board Meeting, Home of Steve Bartlett and Tina Beychok , 7108 East Peabody, Long Beach

Fri.–Sun., Nov. 23–25 **LosCon Science Fiction Convention** LAX Marriott Hotel: OASIS will have a fan table, run programming (incl. Build a Spaceship for the kids), and host a room party, You must have a paid membership.

Sat., Dec. 8, 3 pm OASIS Board Meeting Followed by Holiday Party, Home of Bob Gounley and Paula DeFosse

MINNESOTA



MSFS: Minnesota Space Frontier Society – <http://www.mnsfs.org>
c/o Dave Buth, 433 South 7th St. #1808, Minneapolis, MN 55415
<http://www.mnsfs.org/2011-Review/>

MNSFS Offers Space Education Resources for Teachers; <http://www.mnsfs.org/education/>

This includes **Stand Alone Slide programs** <http://www.mnsfs.org/education/slide.html>

and **Person tended programs** <http://www.mnsfs.org/education/slide2.html>

MNSFS Studies / R&D <http://www.mnsfs.org/studies/>

MNSFS is affiliated with the National Space Society, The Mars Society, and The Moon Society

OREGON



ORL5 – Oregon L5 Society – <http://www.OregonL5.org>

PO Box 86, Oregon City, OR 97045

(LBRT – Oregon Moonbase) moonbase@comcast.net

Meetings 3rd Sat. each month at 2 p.m. - Bourne Plaza, 1441 SE 122nd, Portland, downstairs

Regular Meeting 3 pm 3rd SAT monthly – SEP 15 – OCT 20 – NOV 17 – DEC 15

For past articles, Visit http://www.moonsociety.org/publications/mmm_classics/

PENNSYLVANIA



NSS-PASA: NSS Philadelphia Area Space Alliance – 928 Clinton Street, Philadelphia, PA, 19107

c/o Earl Bennett, Earlisat@verizon.net - 856/261-8032 (h), 215/698-2600 (w)

<http://pasa01.tripod.com/> - <http://phillypasa.blogspot.com>

Meeting Locations and Times: Our normal location is the Liberty One Food Court. We meet from 1 to 3 p.m. Our meeting in September will be on the 15th, and, in October, we may be a part of The Franklin Institutes Space Week activity (October 4–10) on the 6th and 7th. Then, in November, we will be part of Philcon which runs from the 9th to the 11th. We have not set up December yet, but we may have a member talk on space exploration in a one on one interview for half an hour or more! (no, not me).

August 18th Meeting notes: We had great attendance and participation with members commenting on how much they enjoyed the gathering. This included Michael Stewart who is working towards his appearance on “Coffee and Conversation” on WTMR in Philadelphia. He has appeared once already, and, was invited back. Go Michael! And the good news keeps coming. Dennis Pearson brought a telescope in to be given to someone who would use it for public education. Michael already does this, and, Earl plans to refurbish one he has. Mitch Gordon asked for it and will now be able to do this activity (he was very impressed with Astronomy Day activities and said he would like to perform this kind of outreach next year). Go, Mitch! And thank you on behalf of the NSSPASA group Dennis.

We also talked about the asteroid mining company that includes Peter Diamandis as a founder. You may know Peter as a visionary in a general way, but, there was a recent article in Wired that really shows how long he has been working on expanding humanities habitat. Among other things: he founded S.E.Ds. while going to M.I.T., created a very successful computer services company, and recently has published his thoughts on what, and who, is creating the future of Abundance (title) for “the rest of us”. The asteroid project is another example of his working on the long term future. Rich Bowers talked at length about the new venture and we had much discussion “on topic”.

Larry reported that he has been using a visit tracking system for our website and brought statistics on what gets viewed and how often. Content is king! He also reminded us that our material is mirrored on the N.S.S. chapter site (with visit data also showing up for his analysis) and he handed around a copy of our sited content. With his interest in Space Weather we were given the most recent lunar close approach info and sunspot activities. And: mars.jpl.nasa.gov/msl for the Curious among us!

Dorothy brought material on “Space Age Propaganda” with some neat images of space age type material “we” grew up with: furniture, clothing (ala 2001) computers, and comments (from Dorothy’s Facebook page). She pointed out that Goddard has a visitors center open to the public and that Smithsonian’s Udvar Hazy branch will have Working and Living in Space on September eighth (check Smithsonian site) and much more (Saturday events). Also: Maryland Science Center has “Sungazing Saturdays.” For November Dorothy and Larry are working on our participation at Philcon and has contact information so that Mitch and I could ask to be on panels. Google the various places for much more info.

Hank is trying to work with the Philcon committee but may not be available for some activities until the event itself. He explained that the hotel contract is for this year only. Hank is also concerned about financing of P.S.F.S.: he thinks that the group that ran the WorldCon in 2001 (The Millennium event), and which has the profits from it, should help support P.S.F.S..

Dennis brought us more than the telescope: he reports that, due to the expenses (and overruns) of the Webb Telescope, that no new rover work until at least 2015. This is pretty serious delay for some projects. We have known someone who lost the opportunity to do his experiment in space due to the Challenger disaster in 1986. The delay caused his sponsors project to be shelved. On to fun things.

Mitch gave us the news about Space Week in October, and, his plans to ask Derrick Pitts of the Franklin Institute to be a part of it. He could bring his new telescope for this!(See worldspaceweek.org). Also presented: from The Futurist for Sept/Oct.: “The NewAge of Space Business” which was mostly about private business operations. Also in the issue: “Regulating the Final Frontier”. And he also brought the Fall Ad Astra with much material on the I.S.D.C. including a report on chapter prize winners(ahem), and, the updated “Roadmap to Space Settlement” and a report on the BoeingX37B which is still going for the Air Force. It looks like a mini shuttle.

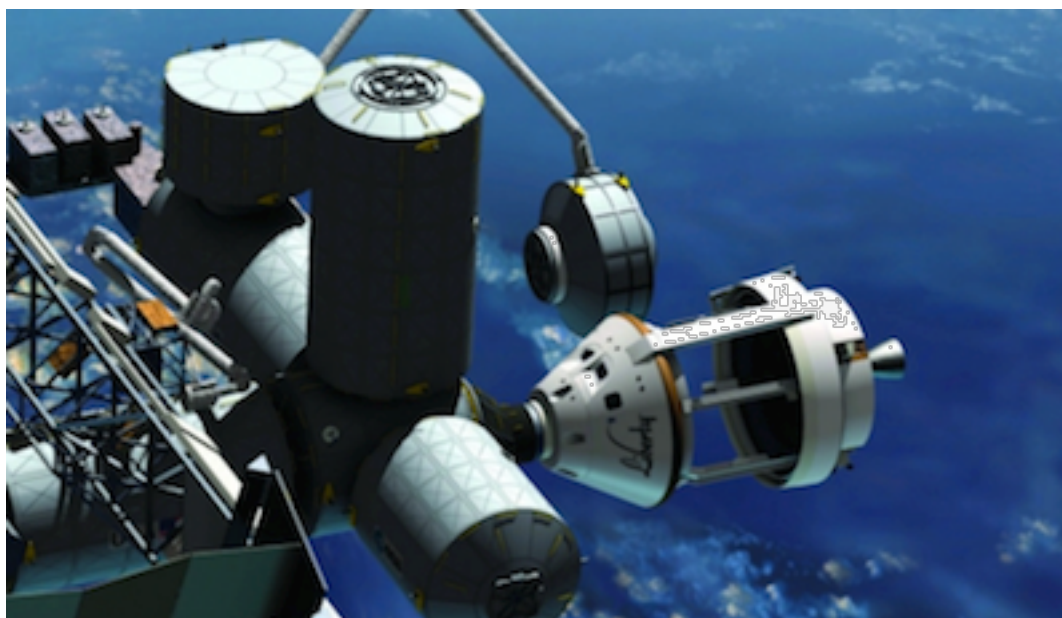
Earl brought in a quick report on Mars Crossing by Geoffrey Landis, N.A.S.A. scientist, on what could happen to a crew that reaches Mars, and, A Travelers Guide to Mars (which was in the travel section of the library!) from a principal scientist on the Mars Reconnaissance Orbiter. Past ideas and the reality that we found (up to2003). And from Analog for October 2012: “Atlas’ Apprentices: Amateur Contributions in Astronomy and Astrophysics” by Alan Plummer whose day job is classical musician. He has published several papers in the field of variable stars and is a visual (no computer etc) observer from Australia.

Then there is Tech Briefs with “ Electrospun Nanofiber Coating of Fiber Materials...” on increasing the strength (“toughening”) of various structures by applying the fibers to the surfaces by electro deposition (electro spinning). The article points out that the technique maintains the properties of the material being coated. Textile composites are mentioned at the start. Space suit surfaces?. See page 44 of the publication (work done by Lee W. Kohlman and Gary D. Roberts of the John Glenn Research Center). And for those long duration voyages: “ Printing Dentures” on page 44 of “Today’s Medical Developments” for July. The report is about using a laser based process for building up dentures invented in Germany. The laser melts a metallic powder on a substrate that is gradually moved to allow the build up of an object from a C.A.D. file (sound familiar?). The result is a major reduction in the need for handling of the made to order dentures. The company that developed the technique has worked its name into the the description of the process: LaserCUSING which is created from C (from Concept Laser) and FUSING being fused. The main theme of the article is the dental components that can be created with the equipment, but there is mention of other medical and non medical elements with the technique. Pieces up to300x350x300 m.m. can be produced in metals and metal compounds. Not quite a “Santa Claus Machine” but pretty impressive. See tmd.com for this and other interesting technologies. Note that Andreas Laufer is noted as a user of these advanced production systems.

And Steven, a theologian who is a member, brought: “ X Events: The Collapse of Everything” by John Costi. This work is on possible civilization destroying events that could reduce us back to a lower quality society. Not extinction, but, more like what is sometimes found in sci-fi stories. Think Black Plague or comet dimming temporarily disrupting agriculture (or a super volcano). The author is an analyst who has worked in Chaos and Complexity Theory.

I would also like to acknowledge a guest: Dominick is a long term friend of Dotty and Larry who joined us and contributed to our talks. Thanks for coming, Dom!
Earl Bennett.

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ATK, (Utah-based Alliant Techsystems) the company that made the Shuttle solid rocket boosters goes commercial

<http://www.space.com/15625-liberty-rocket-private-space-taxi-atk.html>
<http://www.space.com/16631-private-liberty-rocket-space-capsule-milestone.html>

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