"Towards an Earth-Moon Economy – Developing Off-Planet Resources"

Moon Miners' Manifesto

& The Moon Society Journal www.MMM-MoonMinersManifesto.com

Vostok 1 back home after giving Yuri Gagarin a safe first orbit around our home planet

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Moon Miners Manifesto – *"The Moon - it's not Earth, but it's Earth's!"*

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- **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.
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● **For additional space news** and near-term developments, there is a daily RSS feed space news section on http://www.moonsociety.org. You can also read **Ad Astra** magazine mailed to **National Space Society** members. ● **Milwaukee Lunar Reclamation Society** is an independently incorporated nonprofit membership organization engaged in public outreach, freely associated with the National Space Society, insofar as LRS goals include those in NSS vision statement. MLRS serves as the Milwaukee chapter of both The **National Space Society** and **The Moon Society:** – http://www.moonsociety.org/chapters/milwaukee/

● **The National Space Society** is a grassroots pro-space membership 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 (202) 429-1600 – 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 chapter**s 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, 1630 N. 32nd Street, Milwaukee, WI 53208-2040

In Focus What's Ahead for Moon Miners' Manifesto – Do read!

By MMM Editor Peter Kokh

This issue, #275, marking 2 and 3/4 decades worth of effort, has been a work of love on my part. Chicago's Larry Ahearn, who had a key role in the birth of the Milwaukee chapter – Milwaukee Lunar Reclamation Society, in the fall of 1986, after he had seen MMM #6, asked me, "How many article ideas do you have left?" I answered, "enough for two more years." Since then at intervals, he has asked me the same question, to which I have always given the same answer, "enough for two more years:." For Christians, this should ring a bell – "the parable of the loaves and fishes."

Writing articles for MMM, and editing each issue – two very different things – have both been works of love. But at age 76, I find myself in a position that changes my outlook and my willingness to continue.

I have another "book" in me, something I have been working on far longer, since I was 19. It is difficult to describe. A radical theory of the universe, of the grand epic of the universe (really, of the multiverse, which I had realized must exist when I was 22, way ahead of today's cosmologists). It is a vision that makes sense not only of everything about us, but of human (and other intelligent species) existence, and is deeply spiritual.

This "book" exists in two forms: in my head, and in unorganized notes in paper notebooks and index cards, all before the computer era. That makes it extremely vulnerable. I need to turn my attention to this project.

Yes, I have a "working title", but as that may change, I prefer not to share it publicly. The working title has already changed a few times.

- **The upshot is this: MMM has been a work of love for me. But it is only part of what I have "in me."**
- **So here is the deal. I will continue to write articles for MMM indefinitely, but edit for 2+ more years only.**

MMM # 301, in December, 2016, when I will be turning 79, will be my last as editor. Now, of course, there can be no guarantee that I will still be alive and capable at that time. So my other project to the side, the need to find another/or an assistant editor or editors remains.

History of MMM and Legal Issues

MMM started as the publication of the Milwaukee L5/NSI>NSS chapter in December 1986, but began serving other NSS chapters within six months. MMM began serving members of Artemis Society International also with issue #90 in October 1995, and its successor, The Moon Society, in August 2000.

All these organizations (MLRS, NSS, NSS Chapters, the Moon Society) have an interest in MMM continuing. No editor? No continuation. I cannot produce a successor editor, nor will I spend time and effort searching for one. Whether the Moon Society, or the National Space Society can find an editor is out of my hands.

Without MMM, or an adequate replacement, the Moon Society is likely to fold. If a new editor can be found ahead of time, and eased into the job, and if I am still alive and able, I will continue to contribute articles, perhaps one an issue. But it is not healthy for any organization to have "a single point of failure."

The Moon Society is already a mutual affiliate of the National Space Society, since ISDC 2005. While the overlap of dual membership is small, the goals and interests of both Societies are largely the same.

There is also a contract between the Milwaukee chapter, the publisher, and the Moon Society

This states the conditions under which TMS can take over ownership and publication of MMM should I not be able to continue for any reason. But if TMS cannot continue/resume publication within one year, rights pass to the National Space Society. The Moon Society has already issued requests for interested persons to come aboard as assistant editors. But to date, there has been only one show of interest, and that person quickly disappeared.

In the past, when asked, I had said, with a smile and a wink, that I would retire upon publication of MMM #501 (50 years!) **or upon moving to the Moon**, where I would start putting out the "Mother Moon News" instead. My health is good, and I'd like to go on living "indefinitely," but none of us can guarantee even one more day.

As for producing "**MMM the Book**," making it possible for someone else to put that book together was our motivation in publishing 17 theme issues, reprinting all the non-time sensitive articles from past issues of MMM as **"MMM Theme issues,**" free downloads from: http://www.moonsociety.org/publications/mmm_themes/

And, as I say, I have **"this other book"** in me, which is even more important to me than MMM. So I am giving two and a half year's notice. Meanwhile, I am spending available free time, sorting through all those notes.

It's been a blast, and here's hoping I have enough years left! – PK

Detecting "Adolescent" Civilizations around Other Suns

By Peter Kokh

In examining the data of newly discovered "Exo-Planets, planets around other stars, we are getting better and better at finding interesting details, such as what its atmosphere is composed of. Check these links:

e.g. http://news.sciencemag.org/biology/2014/03/scienceshot-**new-tool-could-help-spot-alien-life**

http://www.space.com/25033-**rocky-planet-atmosphere-models**.html

We will get better and better as exo-planet detectives. If we can now detect elements and molecules in an alien atmosphere that almost certainly are the result of living processes, we may even find molecules in atmospheres that can only be the result of industrial processes, implying current, or recent intelligent – if adolescent – civilizations which are not yet mature stewards of their homeworld.

It seems unlikely, however, that we will be able to detect supra-atmospheric pollution in the form of layers of space debris, i,e. an "obrutosphere**."** [obruto: Latin for "debris"] **If somehow we did detect exo-planets with** obrutospheres, we will have found civilizations at the same "irresponsibly adolescent" stage as our own, – assuming that more advanced and responsible civilizations will be harder to detect, at least by the same means.

We are a long way from finding efficient ways to remediate the debris problem, which is likely to get far worse before the several half-measures, each of which tackles a part of the problem, begin to make a dent. The **unspoken risk is that we** will end up imprisoning ourselves on our home planet, taking chances only with unmanned satellite and probe launches, concentrating on microsats and microlaunches which have a greater chance of getting through the global mine field we are creating.

We won't begin to wake up and smell the stench, until a crew loses their lives in a debris collision.

NSS should take the lead and have a "Debris Remediation" track at future ISDCs or organize separate conferences focused entirely on debris remediation, starting with legal requirements that future satellites must be designed to self-deorbit once non-functional, by "dead mans stick" or other means yet to be identified. PK

Where to start the first Outposts on Mars – a suggestion

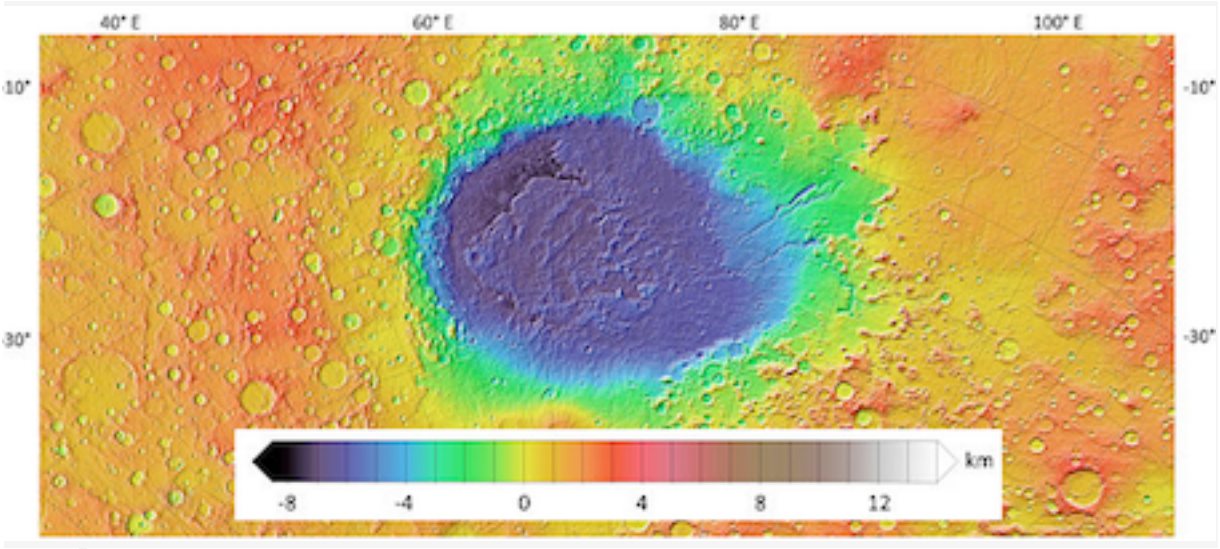
By Peter Kokh

Most writers, even Robert Zubrin, to my recollection, do not address this question. Mars is Mars is Mars. "It's all the same color so therefore it doesn't make a difference." **Nothing could be further from the truth**, but it shows how superficial many writers are: Mars is Mars is Mars. Nope!

We have hardly begun to explore Mars, yet we do know enough about Mars to pick out two areas on the planet that offer considerable advantages, and perhaps not coincidentally, these two areas are almost antipodal to each other, about 180° apart in longitude, and one about as far north of the equator as the other is south of the equator. One the highest area on Mars, the other the deepest. It might even be the case that what caused one set in motion the forces that caused the other.

1. Hellas Planitia

Hellas "Planitia" is a misleading name. It is the deepest impact basin known in the solar system, deeper than the "South Pole Aitken Basin" (SPA) on the Moon, and visually far more impressive than the SPA, as the later has suffered many disguising impacts since its formation. "Planitia" does not refer to the basin itself but to the plain like surface of the basin's floor.



The color band shows depths below mean surface level and heights above it, in kilometers

Source article with parent image in full color: http://en.wikipedia.org/wiki/**Hellas_Planitia**

The basin's rim is 7,152 m (23,465 ft) above the floor, and extends about 2,300 km (1,400 mi) east to west) is thought to have been formed during the Late Heavy Bombardment period of the Solar System, approximately 4.1 to 3.8 billion years ago, when a large asteroid hit the surface.

The depth of the crater (7,152 m (23,465 ft) 7,000 m (23,000 ft)) below the standard topographic datum of Mars) explains the atmospheric pressure at the bottom: 1,155 Pa (11.55 mbar, 0.17 psi, or 0.01 atm). This is 89% higher than the pressure at the topographical datum (610 Pa, or 6.1 mbar or 0.09 psi) and **above the triple point of water**, suggesting that the liquid phase of water could be present under certain conditions of temperature, pressure, and dissolved salt content.

Some of the low elevation outflow channels extend into Hellas from the volcanic Hadriacus Mons complex to the northeast, two of which Mars Orbiter Camera images show contain gullies: Dao Vallis and Reull Vallis. These gullies are also low enough for liquid water to be transient around Martian noon, if and when the temperature rise above 0° Celsius.

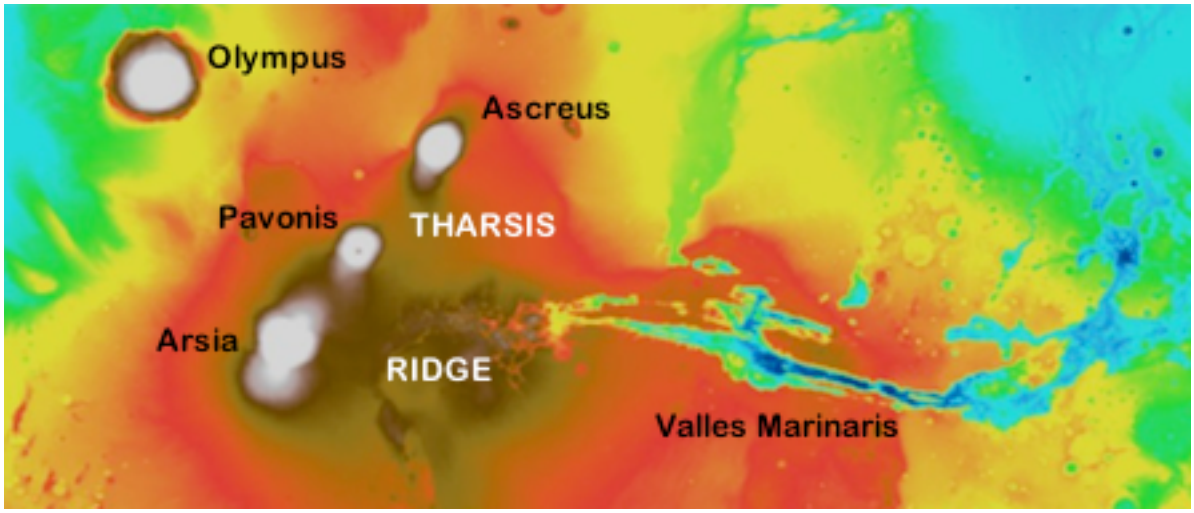
Possible Dust Covered (protected) Glaciers

Radar images by the Mars Reconnaissance Orbiter (MRO) spacecraft's SHARAD radar sounder suggest that features called "lobate debris aprons" in three craters in the eastern region of Hellas Planitia are actually glaciers of water ice lying buried beneath layers of dirt and rock. **The buried ice in these craters as measured by SHARAD is about 250 m (820 ft) thick on the upper crater and about 300 m (980 ft) and 450 m (1,480 ft) on the middle and lower levels respectively.** Scientists believe that snow and ice accumulated on higher topography, flowed downhill, and is now protected from sublimation by a layer of rock debris and dust. Furrows and ridges on the surface were caused by deforming ice. END OF QUOTATIONS FROM THE WIKIPEDIA SOURCE QUOTED ABOVE.

The Bottom Line: The basin has abundant water, and given its relatively high atmospheric pressure, will be **the first region on Mars in which we will be able to fly from point to point**, and **the best place on the planet for agriculture.** If we choose to "**rejuvenate**" Mars (the word "terraforming" is inappropriate in our opinion) this basin will be the focus of that effort.

2. Tharsis Ridge

The other place that offers perks attractive to would be settlers is half way around the world of Mars from the Hellas Basin, "possibly" upthrust by the impact on the other side of the planet that created the Hellas Basin – but we do not "know" that. The Tharsis Ridge if very high and is crowned by the three great shield volcanoes, **Ascreus Mons**, **Pavonis Mons** and **Arsia Mons**. And northwest of the ridge lies **Olympus Mons**, the highest of all. Shield volcanoes like the ones that built the Hawaiian Islands, rising layer upon layer of runny lava, forming sheets in a process that results in **a multi-level matrix of lava tubes**. The habitable volume of intact lava tubes on the slopes of these great volcanoes and throughout the Tharsis Ridge itself must be enormous.



On the negative side, here on the ridge, Mars atmosphere is much thinner, and the climate, even so close to the equator, significantly colder. Yet the flanks of the shield volcanoes have collapse zones that apparently protect buried glaciers. So here too we have abundant water reserves.

The lavatubes will be intermediate in size between those on Earth, the smallest in cross section, and those on the Moon, the largest in cross section – apparently in some inverse relationship to the gravity level. The upshot is that Martian tubes will be easier to pressurize than their much larger cousins on the Moon.

Basalt based industries (hewn, cast, fiber, fiber composites) will be among the first.

Pavonis Mons lies astride the equator. Its gentle west slope being perhaps the **best place in the Solar System for a launch track** serving as the virtual first stage of rockets bound inward to Earth, Venus, and Mercury or outward to the asteroid belt, Jupiter's great moons, Saturn's Titan etc. Launches would be towards the east, as on Earth, to gain a 872 kph (543mph) boost from the planet's eastward rotation. As such, Pavonis Mons, launch track and lavatube network, is possibly **the most special piece of real estate in the Solar System** besides Earth.

http://en.wikipedia.org/wiki/**Rocket_sled_launch** – http://en.wikipedia.org/wiki/File:**Maglifter.jpg**

Depictions of mountains slope launch tracks inspired by Science-fiction story "When Worlds Collide"

Just northwest of the Ridge is Olympus Mons, highest of all, its flanks laced with lavatubes as well, and rubble covered glaciers.

Hellas and Tharsis: a match made in heaven

The very different and distinctive assets of these two locations should lead to different and complimentary industrial products and trade. So, sorry, no future wars in the making. Together, these two areas will become the foundation of a prosperous Mars frontier. Separately, they would be less likely to survive. And the Mars settlement effort would collapse.

The two areas are different enough in many ways to generate **a strong cross-visiting tourist industry** which will underpin **trade and cooperation on projects of mutual interest** elsewhere on the planet.

Competition can lead to suspicion and war. **Complementarity leads to prosperous partnership**, as well as more diverse trade with Earth and the Moon. It will also accelerate industrialization to the point that dependence on ultra-expensive imports from Earth is steadily reduced, and both economic and political dependence lessened.

Other areas on Mars of Note

The great **Valles Marineris canyon complex**, lies just south of the equator and just east of the three great ridge volcanoes will certainly be a major tourist destination, as well as the Hellas Basin, where tourists will first be able to fly leisurely over the marsscapes.

The northern low elevation **"ocean-basin sized" Vastitas Borealis** is noteworthy. Is it the largest impact basin in the solar system? Or an ocean basin? Obviously, that is not an "either/or" question. **Oceans do not "form" basins, they form "in" basins.** We do not have elevation data in high enough resolution to trace possible "shore-lines" and if there was once an ocean that gradually sublimated and dried up, there may be stretches of succes-sively lower shorelines if we can find any at all. Our satellites have yet to find any, and we have not targeted our rovers to shed light on the question. Air pressure will be considerably higher in the basin than on the Ridge, and up the volcanoes, but still notably less than within the Hellas Basin.

The polar ice caps

Unlike Earth's ice caps, those on Mars are two-layered: a smaller but thicker water-ice cap, and a larger but thinner and seasonal carbon dioxide ice cap. During winter and summer at either pole, the freezing out of as much as a quarter of Mars CO2 atmosphere could present problems. **If we could somehow raise overall temperatures on Mars enough so that atmospheric CO2 does not freeze out over the North and South poles as their re-spective fall seasons advanced towards winter, we will have taken the first step in "rejuvenating" Mars,** and having year around access to polar ice reserves if needed. How do we do this? There are many ideas out there and they need to be looked at carefully to determine which one will require the least import tonnage from Earth and the least human resources to put into place. Undoubtedly, a project like this will take time.

Recommendations

We suggest that Martian settlements start in these two places concurrently:

- The **lavatube-riddled flanks of Pavonis Mons** and
- Along **the northern "shores" of the Hellas basin**. (The "New Aanthor" Project?)

The plusses and minuses of these two very different locations offer distinct advantages over all other areas.

What about Exploring Mars First

Those impatient to explore Mars thoroughly before settling it, have their priorities backwards. Mars will be much more exhaustively explored by **resident settlers who arrive there "for keeps**," than by a few **hit and run exploratory expeditions**. **Why? Ample precedents.** Some **99.99%** of what we know about North and South Amer-ica's and Australia's geology, vegetation, and animal life has to be credited to people who took the settlement plunge. We have to realize that explorers and settlers may work together our of "convenience" but in reqlity have very different goals. We see this in the lunar community as well, where the great majority of lunar scientists could care less if people ever settle on the Moon. Again, **we will find out much more about the Moon and Mars through settlers than through hit and run explorers**. Yes, what scientists learn will help explorers. But that is not there goal. In between there are those who would establish rocket fuel processing outposts at the lunar poles, but only to enable cheaper exploration. We do need to work with them, "to a point."

Explorers and settlers have different motives, and different goals. If we really want to know Mars (or the Moon, or any other world) **thoroughly, the priority should go to settlement, once the basics have been un-covered by scouting expeditions**. Settlers and explorers have different motives. In a few cases they merge, there are exceptions to most "rules."

On Mars we will do well not to pick between the Hellas Basin and the Tharsis Ridge, but rather tackle them both. They have **complementary assets**. Developing both concurrently will be **the surest bet for long term survival, growth and development of this new world.**

It is time to recognize one cautious timid step at a time plans for what they are: the seeds of failure.

That said, opening Mars faces enormous obstacles, among them: resupplies only every 25-26 months, minimum solar power (worse in months-long dust storms), no geothermal power options, and much more. PK

Settlements "Standing Proud" on the Monochromatic Moon and Mars

By Peter Kokh

On Earth, towns in barren lands, in the arctic especially, houses stand proud with deliberately chosen bright colors.

Left: Longyearbyen on Spitsbergen Island, Svalbard **Right: Nuuk**, Capital of Greenland

Nuuk: http://www.islands-tours.com/wp-content/uploads/2013/05/capital-of-greenland.jpg

Qaanaaq: http://thomaspickard.com/blog/wp-content/uploads/2009/09/21021.jpg

Reykjavik – http://media-1.web.britannica.com/eb-media/71/73371-004-1687AFCB.jpg

Grytviken in winter http://www.sgisland.gs/images/main/news_5_04/grytview.jpg

In places like the arctic where there is little or no vegetation to color contrast with rock and bare rock powder soils, homeowners find ways to inject "here I am" color in their roof and home siding materials. The two photos above and the additional images for which we have given a web address, are boosting proof of that.

They could have chosen to "blend in" picking paint, stain, or materials colors in the same color range as their surroundings. But "hiding" through background colors– a trick that many predator-threatened animal species have selected, through generations of "selection by survival" is not what the inhabitants of these challenging locations want. They are proud of their ability to survive and thrive in settings most peoples from friendlier climes would never consider as places to relocate.

We think that this will be the case for settlers on Moon and Mars as well. Both worlds are barren, devoid of vegetation. The Moon has a palette of light to dark grays. Mars has one of warmer tans to rust. On both worlds, there are rare locations where other shades can be spotted: " rare pockets of orange soil" on the Moon, bluish rocks on Mars. We have not explored either world to have a feel for how common or rare these "out of pallet" rocks are.

Both the Moon and Mars are largely monochromatic worlds

- **The Moon – light to dark gray tones against a black sky – except** during a nearside total eclipse when the moonscapes take on the hues of marsscapes during twilight because the only sunlight will be filtered through Earth's "sunrise-sunset ring" Those eclipses will be "big" events on the nearside and definite tourist draw.
- **Mars** – the "red" planet is a blend or ruddy shades, with salmon skies and some bluish rocks which will be highly prized – (we have no idea as to how widespread those "blue" rocks are.)

Preferences

If settlers want their habitats to "blend in" with the landscapes, they are all set. But if they wish to tint or color their façades with contrasting or complementary hues, they face some challenges.

- Importing paints or stains will be prohibitively expensive.
- Paints and stains of any color will be low on the priority list for manufacturing,

On the Moon

The simplest way for settlers on the Moon to finish the exteriors of their homes so that they stand proud against the setting is (a) in light gray highland areas, to use "topping" layers of darker basaltic maria dust, and (b) in darker mare settings, to top of regolith shielding mounds with a layer of lighter highland regolith.

- In both areas, retaining walls blocks could follow the above suggestions
- And in both areas, blackish cast basalt products (door casings, entryway sculptures etc. would give "class"

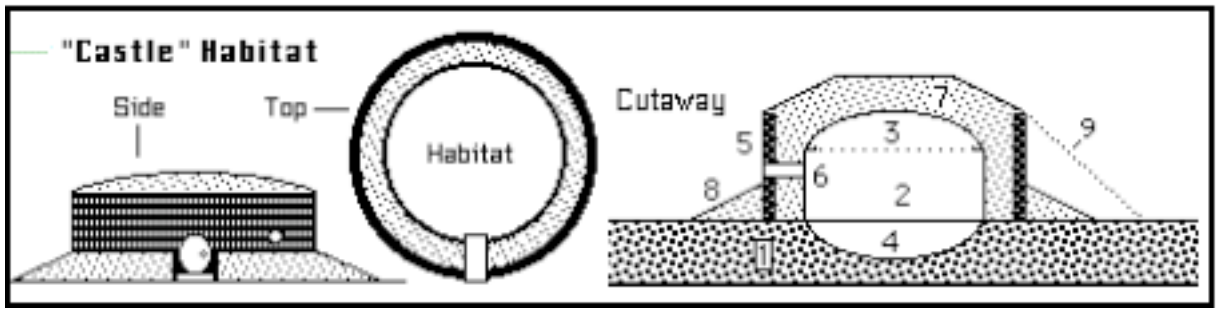
Another option, is to "**steam-rust" shielding mound dust to give it a rusty hue**. This could be done with soils and with compacted and sintered blocks from both areas.

In MMM # #55 May 1992 **p 7.** "**MOON ROOFS**" we listed a number of creative ways shielding mounds could be "personalize." In the same issue, an article with the title "**Shantytown**" suggested that items salvaged from ships and cargo holds and shipping dunnage, might be reworked into adornments for a "front yard,"

In MMM # 122 Shielding Accessories: the "B" Options, gives more suggestions

Middle ages: **rust hued** roof tiles characterized many towns

In MMM # 137 **Taking Back the Surface: Above Surface Architectures for Moon Habitats**, suggests shielding retaining walls thatshout "human made" – these ideas would work on Mars as well.



KEY: (1) surface, minimally excavated to nest the rounded bottom of habitat hull; (2) Habitat Hull, in this case a squat vertical cylinder with round end caps; (3) vaulted, cove-lit ceiling; (4) "basement" area for utilities and systems and extra storage; (5) the "castle" rampart retaining wall; (6)shaft for "window"; (7) regolith shielding and (8) berm slope of shielding without a retaining wall

Color Choices

Beyond steam-rusting grayish moondust and items made from it, there would seem to be few color choices. But these should prove enough.

Where we don't want our structures to "stand proud" against the natural background

Warehouse areas and surface protruding manufacturing installations, salvage yards etc. the necessary "guts" of any human settlement are things we'd prefer to fade into the background.

Vehicles and Road signs

For safety and rescue needs, we want such objects to shout "here I am!" At the Mars Desert Research Station, we tried to see what colors stood out best from the background and caught the searching eye fastest. To our surprise, color hue was not as important as solid shades and regular shapes: rectangular, oval, etc. These made objects stand out from the "pixelated" mixed shades of natural lunar and Martian backgrounds.Read: "MMM #183 "Testing Colors for Survival on Mars" in

www.moonsociety.org/publications/mmm_themes/mmmt_Mars.pdf

Other Suggestions

√ **Colored lights** (**neon family gasses** are available by harvesting the regolith for "volatiles")

√ **Sulfur Yellow**, Orange volcanic soils – The Apollo crew found some – The "Marius Hills" are would be a good place to look

√ **Textural contrasts** can demand as much attention as color variation

√ **Outdoor sculptures**, in carved basalt or of scavenged metal items

√ Sculptures made of scavenged import container materials, etc.

v Large quarried and perhaps sculpted basalt blocks

"Outdoors" vs. "Middoors"

√ Keep in mind that internal settlement passageways and roadways wil also be shielded: Colors in Middoor settings will be one thing, Color along surface roads will be another thing.

√ Keep in mind that internal settlement rads will also be shielded. They can be lined with trees and flowers. In this article we are talking about how settlements can use color as seen from the outside. Entrance gates to the Midoors Complex may be fewer and stand proud architecturally as seen from above by spacecraft

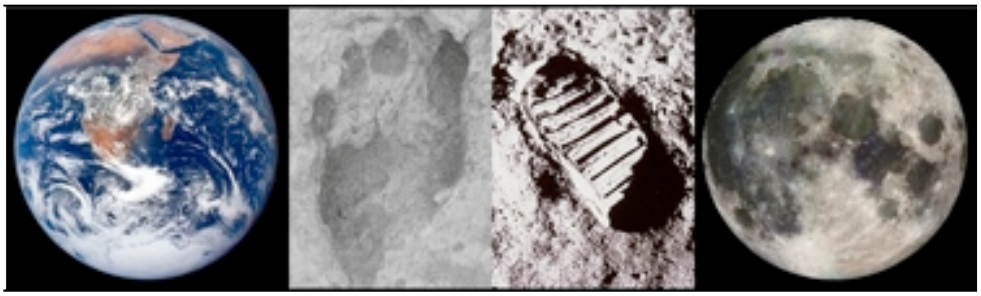
√ It is Moon "Roofs" – "adorned" tops of shielding mounds, that will draw attention.

Conclusion

Just as in our "monochromatic" Arctic settings, settlement dwellers want their homes to stand out proud, and be as visually interesting as the host landscapes are monotonous, so it will be on the Moon and Mars. But, from high above, those details will be lost. To approaching or departing spacecraft, the Moon will still look like it always did, and the same will be true of Mars. On Earth it is vast forests, grasslands, deserts, and ice that catch the eye. ##

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 industrialization 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 contributes 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 Moon Society President  Ken Murphy

2014 continues to be a year of transition for The Moon Society as we seek to grow into the 21st Century. Our latest transition is going to be in our newsletter – the **Moon Miners' Manifesto** (MMM). Longtime editor Peter Kokh would like to focus on writing a book, and that means we need new blood to gradually take over the editing of MMM. Peter would continue to contribute some articles.

To that end, The Moon Society is putting out a call to its membership to assemble an editorial team to undertake the changes necessary to keep it relevant for the new audiences we are trying to cultivate. This may involve a complete re-envisioning of how we deliver MMM content.

- Perhaps we 'tweet' snippets of upcoming articles.
- Perhaps we piggyback on an 'app' for reading online content.
- Perhaps we prepare short videos to highlight the articles in each issue.
- Perhaps a Moon-set RPG module. Definitely more focus on successful chapter projects.

The Moon Society – Lunar Frontier Settlement – www.moonsociety.org p.2

Fundamentally, this is an opportunity to take The Moon Society's message of people living and working on the Moon for the benefit of Earth to a whole new generation of potential lunar and space enthusiasts.

A chance to create something new for the space community, while capturing all of the exciting activities going on with regards to lunar science and exploration.

If you want to be a leader in this initiative, drop me a line at president@moonsociety.org. This is your opportunity to put your mark on the Moon community, just as Peter Kokh has done for over two decades.

In the realm of lunar science and exploration, we've seen the end of LADEE, and LRO may be entering its final phases. There are occasional reports trickling out about China's lunar rover, Yutu, but overall the establishment science community seems to be struggling in the current environment to connect with broader audiences. This is largely because they're relying on old messages and tired tropes.

Here are the kinds of things the man on the street has expressed interest in:

1) **EMP – Extraterrestrial Materials Procurement.** Using the resources of space so that we don't tear up our own planet. We are not going to be giving up our technology, and things like smartphones still require things like Rare Earth Elements as doping materials. We can tear up our own planet to provide those things or, in the context of a larger space-faring capability, we can think about harvesting KREEP on the Moon to supply those needed materials. This makes us a natural ally with the environmental movements, but there seems to be a misperception that space people are running away from the problems of Earth, instead of the truth that space people are thinking larger about how we can address the preservation of our ecosystem.

2) **Spaceguard** – People heard about Chelyabinsk. They know there are rocks out there, and that some will hit Earth. That's about all they know, which is why folks like Ed Lu at B612 Foundation are trying to educate people about what's really going on. Using asteroids as resources allows us to chip away at the problem of impactors in a beneficial way.

3) **Global competitiveness** – no one can do what the U.S. can do in space, but physics is physics, and anyone can figure out its secrets with some effort. Or as I point out in my presentations, there is no Chinese Physics, or Russian Physics, or Nigerian Physics. Physics is, and it is nowhere writ that only the U.S. can do this stuff. The space industry is important to our nation's position as a strong competitor in the global marketplace.

4) **Science that matters – the impact history of Earth is mirrored in the Moon.** The Sun's output over aeons is captured in the dust of the Moon. Both of which are crucial if we want to understand Earth's place in space. Is there a 3-35 million year cycle in the impact history of Earth? Hard to tell from the data here on the ground, but were we to study the cratering record on the Moon that cycle would stick out in the data. Are there longer cycles in the Sun's output than just the 11-year sunspot cycle of which we know? Hard to know as we haven't been studying the Sun well enough long enough to really know. That record is writ in the Solar Wind Implanted Elements (SWIEs) found in every layer of regolith. We've opened the door to a vast library of Earth's history in space, now we need to start reading.

These are themes that have resonated with audience after audience when I give my presentations.

- **The Moon is our sandbox mode for the rest of the Solar System.**
- **The Moon is the anchor tenant for a cislunar economy.**

We know this, but the rest of the world needs to know if it is to benefit. **KM**

Website "Migration" proceeding too s l o w l y

From President Ken Murphy

We need to finish the migration and restructuring of the website. This has bogged down with the transfer of material from the old "legacy" website into the new structure.

We Need Help! Members who want to help with this process should contact the project lead, Philip Crume, at **pcrume.moonsociety@gmail.com** to help us finish up the new website.

We are considering using a commercial service to finish up the migration, so to the extent that members can help with this process we can save our treasury for other projects.

Currently, many pages of our website **can't be found** from links in the new site; "**under construction**" for some two years now. That has been very frustrating for members and visitors alike, but also for leaders.

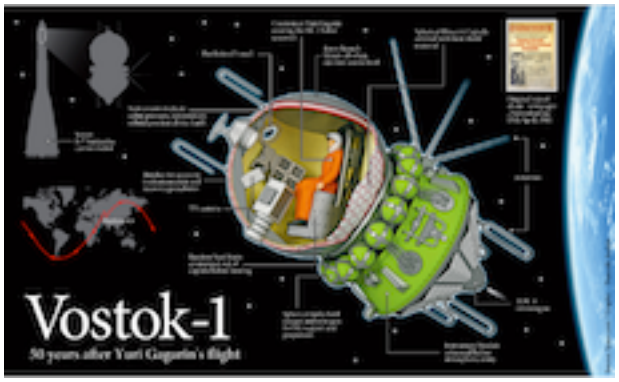
So we have created a workaround for accessing pages on the "legacy site" that have not yet been migrated to the new site.

http://www.moonsociety.org/index-legacy.html

Thank you for your patience. If you have web skills, please consider joining our web team. **KM**

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

YURI'S NIGHT 2014 in Retrospect – Chapter Observances & Reports




"Celebrating Humanity's Past, Present, and Future in Space"

This year **three Moon Society – National Space Society "Joint Chapters"** observed this 53rd anniversary of the first human in space, and his first orbit of our home planet, Yuri Gagarin, a Russian of the Soviet Union.

Chapters in **Milwaukee**, **St. Louis**, and **Phoenix** took advantage of the anniversary. to put on special events that attracted new people to their meetings. All three chapters registered their parties on the official Yuri's Night website. http://yurisnight.net/find-a-party/

In Milwaukee – Report by Peter Kokh

This year, the event always observed on April 12th, our chapters had the advantage of the date falling on a Saturday. For the Milwaukee Lunar Reclamation Society, it fell on the same Saturday as its regular meeting, so finding a special place to hold the observance was not necessary.

In anticipation of this opportunity, the chapter established **a Meetup website** and several new people found us this way. http://www.meetup.com/Milwaukee-Space-Exploration-Meetup/ They also put up a webpage – www.space.milwaukee.com – that connects to all the space related activities in town – space society chapters, astronomy clubs, amateur rocket clubs, university research, observatories and planetariums, etc. the purpose being to help people find one another. The chapter brought displays and models, magazines, and a pot-luck luncheon. Other than the chapter's annual anniversary banquet each December, this Yuri's Night party was its most successful outreach event in many years.

In Phoenix – Report by Mike Mackowski

The Phoenix, Arizona space advocacy societies held a joint Yuri's Night event on Sat. April 12, 2014 on the campus of Arizona State University (ASU). The event was hosted by the ASU chapter of the Student for the Exploration and Development of Space (SEDS). Besides SEDS members, attendees included members of the local NSS and Moon Society chapters as well as others brought in via **Meetup** – http://www.meetup.com/NSSPhoenix/ There were over 30 people in attendance. The local AIAA Section provided financial support for the refreshments.

The evening started off with pizza, wings, and soft drinks set up in a well-equipped conference room in the space science building. A Mars landing video game kept folks entertained, and foam rockets that Mike Mackowski brought from Orbital Sciences proved to be a hit, as missile battles ensued all across the room. There was much socializing and networking amonst the students, educators, and professionals in attendance. To cap it off, there was a showing of the original Star Wars movie (episode 4, if you must) in the building's main auditorium.

This was a great evening of celebrating Earth's first venture into manned spaceflight.

In St. Louis

On Saturday, April 12, at the Chesterfiel Mall, members of the St. Louis Chapter of the Moon Society and the NSS Chapter, the St. Louis Space Frontier, jointly displayed information about the first man in orbit, Yuri Gregarin, 53 years ago and, additionally, about space in general. Jim Merriman brought the NSS Chapter logo plackard, models of several launch systems, and a yellowing copy of the L A Times printed on the day of Yuri's return to Earth detailing his flight. Amy White brought handouts about an upcoming ISS flyover and pictures about the ISS and Mars and space in general. She also had her laptop cycling through space photos and had a spread of legos with photos of lunar and Mars proposed habitats for children to model. She even had a giant poster of an astronaut with a hole in the faceplate for people to be photographed in a spacesuit. Bob brought the gravity bricks and the framework and posters that make great conversation starters. Judy Tippet and Pal Baldwin helped with the meet and greet with passing shoppers.– **Meetup** helped: http://www.meetup.com/Saint-Louis-Space-Frontier-Meetup/

MAY Chapters & Outposts 2014

OUTPOSTS (2 or more local members in search of more)

Bay Area Moon Society, CA Outpost – **South San Francisco Bay** – http://www.moonsociety.org/chapters/bams/
Contact: Henry Cates hcate2@pacbell.net Meeting the 1st Tuesday of the Month at Henry's home

Moon Society Nashville Outpost – Contact: Chuck Schlemm – cschlemm@comcast.net

ORGANIZED CHAPTERS

Milwaukee Lunar Reclamation Society (NSS/Moon Society) – SEE Yuri's Night Report above

Moon Society St. Louis Chapter - http://www.moonsociety.org/chapters/stlouis/
Contact: Robert Perry surfer_bob@charter.net – **Meetings 2nd Wed** monthly at Buder Branch Library, 4401 S. Hampton, in the basement conference room – **Next meetings – SEP 11 – OCT 9 – NOV 13**
SEE Yuri's Night Report above

NSS/Moon Society Phoenix Chapter - http://nssphoenix.wordpress.com/ – c/o Mike Mackowski.
Meeting **3rd Saturdays monthly at HSGP Community Center, Mesa**, 627 W. Rio Salado Parkway.– Mike Mackowski
SEE Yuri's Night Report above

Tucson L5 Space Society – http://www.tucsonspacesociety.org/ Now serving Moon Society Members
Contact: Al Anzaldua – Meets monthly, every 2nd Saturday, 6:30 PM

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: **FEB ? – APR ? – Jun ?**

Greater Fort Worth Space Chapter c/o Patricia Ferguson tricia3718@gmail.com

Want to start a Moon Society Chapter in your Community?

Here are some helpful suggestions – chapters-coordinator@moonsociety.org

1. **If there already is a National Space Society chapter in your area (write for list)** consider approaching its members for possible joint membership leading to a possible "joint Chapter." We already have four joint chapters (**Houston**, **Milwaukee**, **Phoenix**, and **St. Louis.)** Joint chapters were approved by both organization in a mutual affiliation agreement signed at the 2005 International Space Development Conference, Washington DC
   > If there is a nearby chapter of TMS or NSS, see if they can come and help host your startup meeting
2. **Email us** for a membership list in zip code areas you want to serve
3. **Establish a Meet-up site** – **http://www.meetup.com/yourtown-space-exploration** that may find you new members that would otherwise never have heard about you**.** There is a fee. **Email** for suggestions to minimize.
4. **Make a list** of other space-related groups, and activities in your area and put it online
   e.g. www.Space-Milwaukee.com (write us for tips on how to get the page online, "free")
   > **a Mars Society chapter?**
   > **a SEDS chapter" (S**tudents for the **E**xploration and **D**evelopment of **S**pace)
   > an amateur rocket club (Tripoli?)
   > astronomy clubs
   > planetariums and observatories
   > **local** space and/or astronomy publications
   > science museums
   > speakers bureau
6. **Secure a free, centrally-located meeting place and send out invitations (a** library, mall meeting room, etc
   > bring any displays, magazines, or other space related materials you may have
   > show videos or a movie
   > identify others with leadership talents

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

> plan follow-up meetings Good Luck

GREAT BROWSING LINKS

SPACE STATIONS + COMMERCIAL SPACE

http://www.space.com/25323-**china-new-spaceport-rocket-launches**.html
http://www.space.com/25562-**spacex-falcon-9-reusable-rocket-test**.html
http://www.space.com/25626-**bitcoins-satellites-deep-space-industries**.html
www.nasa.gov/press/2014/april/**nasa-looks-to-go-beyond-batteries-for-space-exploratio**n/
http://www.space.com/25566-**spacex-dragon-easter-delivery-space-station**.html
www.nasa.gov/press/2014/april/**nasas-orion-spacecraft-powers-through-first-integrated-system-testing/#**
http://www.space.com/25373-**india-navigation-satellite-launch**.html
http://www.asianscientist.com/tech-pharma/**vietnams-optical-satellite-reports-success**-2014/
http://www.space.com/25354-**nasa-ladee-spacecraft-moon-cra**sh.html
www.nasa.gov/press/2014/april/**nasa-seeks-to-evolve-space-station-for-new-commercial-opportunities**/

EARTH

www.space.com/25357-**satellite-images-could-predict-volcanic-eruptions**.html

MOON

www.space-travel.com/reports/**Misleading_mineral_may_have_resulted_in_overestimate_of_water_in_moon_999**.html
http://www.space.com/25529-**nasa-moon-dust-probe-death-science**.html
www.space-travel.com/reports/**Scientists_date_Moon_at_4470_billion_years_999.html**
http://www.space.com/25613-**moon-far-side-nasa-spacecraft-crash**.html
http://www.space.com/25383-**back-to-the-moon-for-good-x-prize-planetarium-show-trailer**.html
http://www.space.com/25356-**private-moon-race-televised-live.**html
http://www.ecns.cn/cns-wire/2014/04-10/108851.shtml (China manned moon rover)
www.spacenews.com/article/civil-space/40176**human-lunar-missions-subject-of-debate-at-exploration-workshop**
http://www.space-travel.com/reports/**Russia_plans_to_get_a_foothold_in_the_Moon**_999.html

MARS

www.marsdaily.com/reports/**Mars_on_Earth_vacuum_chambers_mimic_the_Red_Planet**_999.html
http://www.space.com/25312-**nasa-mars-moons-phobos-deimos**.html
www.marsdaily.com/reports/**Health_risks_of_Mars_mission_would_exceed_NASA_limits**_999.htm
http://www.space.com/25352-**nasa-long-duration-spaceflight-ethical-risks**.html
http://www.space.com/25587-**manned-mars-missions-conference-webcasts**.html
http://www.space.com/25374-**mars-grasshopper-cuisine**.html
http://www.space.com/25490-**mars-landing-inflatable-saucers-incredible-technology**.html
http://www.space.com/25638-**mars-time-capsule-student-mission**.html

ASTEROIDS

http://www.space.com/25321-**minimoons-asteroids-human-spaceflight**.html
http://www.space.com/25559-**asteroid-monitoring-nasa-military-red-tape.**htm

OTHER PLANETS + THIER MOONS

http://www.space.com/25501-**mercury-volcanoes-nasa-messenger-spacecraft**.html
www.nasa.gov/press/2014/april/**nasa-space-assets-detect-ocean-inside-saturn-moon**/index.html
http://www.nasa.gov/press/2014/april/**nasa-cassini-images-may-reveal-birth-of-new-saturn-moon/**
http://news.discovery.com/space/**saturn-moon-iapetus-ridge-mystery**-120404.htm
http://www.space.com/25500-**dwarf-planet-solar-system-life**.html

ASTRONOMY

http://www.space.com/25530-**earthsize-exoplanet-kepler-186f-habitable-discovery**.html
http://www.space.com/25645-**move-over-exoplanets-exomoons-may-harbour-life-too**.html
www.nasa.gov/press/2014/april/**nasas-kepler-telescope-discovers-first-earth-size-planet-in-habitable-zone/**
http://www.space.com/25673-**universe-expansion-real-time-cosmology**.html

VIDEOS

http://www.space.com/25343-**morpheus-lander-flies-again-on-green-fuel-video**.html
www.space.com/25557-**re-usable-rocket-spacex-prototype-launches-to-space-station-video**.html
http://www.space.com/25574-**huntington-disease-to-be-studied-on-space-station-video**.html

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

http://www.huffingtonpost.com/2014/04/15/**nasa-germs-dinosaur-space-video**_n_5147601.html
http://www.space.com/25547-**death-spiral-doomed-orbiter-sends-close-surface-video**.html
http://www.space.com/21365-**will-radiation-kill-mars-astronauts-video**.html
http://www.space.com/25590-**asteroid-impacts-earth-day-b612-video**.html
www.space.com/25328-**ocean-on-saturn-moon-enceladus-suspected-beneath-ice-video**.html
http://www.space.com/25583-**losing-the-dark-video-skywatching**.html
http://www.space.com/25531-**new-earth-size-planet-could-have-water-video**.html

Marshall Mike Moondust and the Sinister Selenian Subterfuge

[MMM Fiction by George von Mond]

MISSED PREVIOUS INSTALLMENTS? The whole series is now online, Chapters I-XV (1-15):
http://www.moonsociety.org/publications/fiction/MMMSSS.pdf

Chapter XVI

Marshall Moondust stared at the holographic display, his mind racing. Scores of new vehicles were appearing on the instruments, and Tychoville was nearly out of options. Most all of the women and children had fled north towards the tourist facilities at Rupes Recta, whilst the men were combing the city for anything that might serve as a weapon.

Outside the base, Captain Max Min of the Earth Primacy forces was issuing orders to rally the remaining troops from the first assault, and to bring down the reinforcements along a safe path from the crater rim. His men naturally understood their priorities, and were scavenging oxygen supplies from the wrecked vehicles and corpses of their mercenary compatriots. Slowly, the forces were building up for the taking of Tychoville.

Tychoville served a number of functions on the Moon. Its earliest was as a tourist destination after an enterprising speculator constructed a monolith in the crater, and even had a special Lunar Bus designed to fly groups down from Armalcolopolis. Scientific teams quickly followed to study the central peaks of the crater and mount expeditions to the many ejecta rays. It just kept growing from there, and now housed several thousand citizens. Currently the city was best known for its glassworks, with a steady stream of optical and other glass products heading up to EML-1 for distribution throughout the solar system. Most of the city was buried underneath the central peaks of Tycho crater, protected from radiation and meteorites. It was at these central peaks that the final battle for this part of the Moon would be decided.

Primary access to Tychoville was on the north side of the central peaks, where a natural delta was formed by the central peak and secondary peaks to the north and east. Eventually, those secondary peaks would house luxury condos with stunning Earth views, but for the moment they were temporary homes for hastily erected parabolic mirrors with a view down into the central valley. From the holographic display, Mike noted that the mercenaries were moving around the eastern side of the central peaks, but the rough terrain made it slow going. All of Tychoville's exits to the south had been destroyed, leaving only the large openings on the northern side available for use by the marauders, and those were quickly being turned into death traps by the remaining citizenry.

Mike had hastily briefed the leaders on old school guerrilla tactics from Earth, an offshoot of his fascination with pre-space Terran texts. Barricades were hastily erected, traps were laid, everyday objects became instruments of defense. Word had quickly spread of the Icehole fight, and the newly deputized militia was going to make the taking of their city as painful for the marauders as possible. Hatches were being sealed around the city in random patterns of vacuum and pressure, with the sensors reprogrammed to randomly display a status for the other side that may or may not be accurate in any particular instance. Barricades were hastily erected at key intersections, and snippets of old songs from Les Miserables could be heard amongst the busy workers. A sense of grim purpose settled over besieged town.

His troops arrayed, Captain Max Min began his final assault. Scouts had placed mining charges around the main garage/airlock, and the explosion was felt deep in the city. Immediately afterwards, large earthmoving machines started cycling in to haul away the debris. Captain Min intended to bludgeon them into submission as painfully as possi-

ble. The explosion and subsequent vent of pressurized areas had kicked a large volume of dust into the sky, which conveniently muted the effectiveness of the parabolic mirrors he had noted earlier on some of the northeastern peaks. He dispatched a team and told them to have fun with what they found.

Another explosion rumbled through Max's boots. He smiled to himself at the thought of the resisters inside being crushed under tons of falling rubble. Another rumble in short order told him that they had begun opening a second route into the heart of the mountain that towered above them. These Moon-grubbers were such easy prey, with no real defenses to speak of. Once Tychoville was stormed, he would regroup his forces and push north towards Armalcolopolis, where he would take control of the Moon, cislunar space, and ultimately the Solar System.

He surveyed the vehicles criss-crossing the space in front of what used to be the main entrance, efficiently clearing debris as his men penetrated further and further into the mountain. Teams were scouring the area for any kind of vent, opening or other hidden way into the facility. Any found were quickly and thoroughly sealed with mining charges. There would be no escape for the fools who stood in his way.

Next month: The conclusion of the Battle of Tycho Crater!

Selections from the Moon Miners' Manifesto **GLOSSARY** "MMM Speak"- New Words & Old Words with New Meanings
http://www.moonsociety.org/publications/m3glossary.html

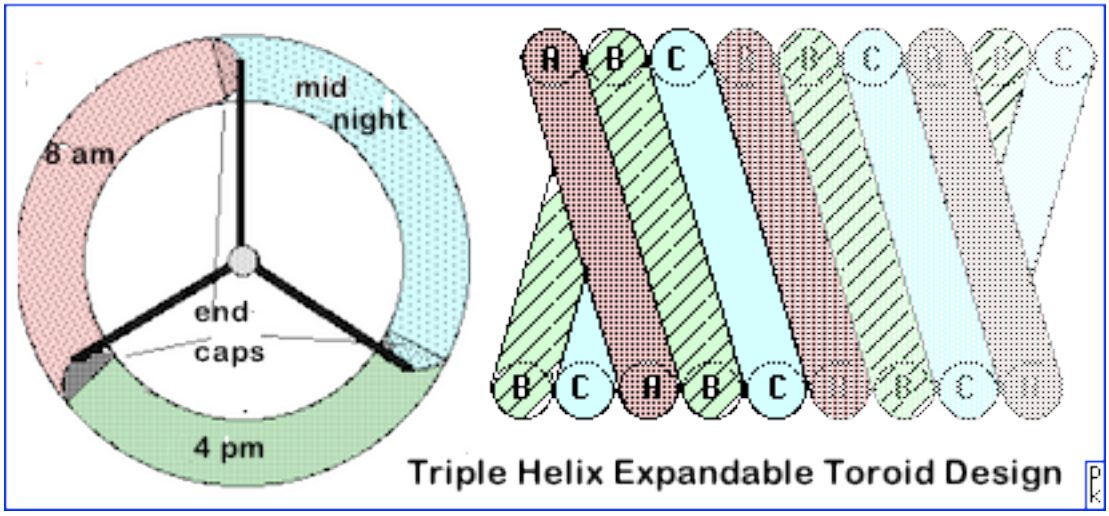
http://www.moonsociety.org/publications/m3glossary.html

Biodynamic Design – Using architectural plans from nature – An example is the design of a triple helix toroidal space settlement, the inspiration being the double helix design of DNA fame and the basis of all life as we know it.

Triple Helix – a variant of the torus or banded torus space settlement design in which three interwoven helical toroidal valleys, each of which is on its own time cycle staggered 8-hours apart.

According to ivory tower geometricians, there are only three possible generic space habitat architectures: the barbell/torus (i.e. the torus is a fully rotated barbell), the cylinder, and the sphere are the only possible three dimensional balanced forms allowed by rotation of the appropriate subset of Cassini curves.

Balderdash! That ignores rotation combined with motion along the axis. Do that with a sphere and you get a cylinder, with a torus you get a double walled dewar cylinder, with a cylinder you get a longer cylinder. But far more interestingly, do that with a barbell, and you get a double helix, a trick learned by nature eons ago and without which none of us would be here. So much for the ivory tower guys. We just extend the idea to a triple helix.



The advantages are twofold

(1) Twenty-four hour equipment and facilities are manned around the clock with residents of valleys A, B, and C taking turns, **each on it own "day shift"**

(2) This design is capable of indefinite growth. In contrast, all other space settlement designs are at first too big i.e. sparsely populated, briefly populated "just right", and forever after having to send extra population elsewhere. There are, to be sure, engineering challenges. The design complicates direct channeling sunshine to the interior of each valley. Using sunlight to generate power for artificial daylight might be a solution. – **MMM [More:** http://www.moonsociety.org/publications/mmm_papers/**reinv_so**.htm]

(3) This biodynamic concept should be the inspiration of the annual NASA/NSS Space Settlements design contests.

Soon, we hope to offer MMM in a 3rd mode – "E-pub" to read on Android Tablets & Smart Phones

Test sample: http://www/moonsociety.org/publications/paper/mmmt_LunarEconomy.epub

HISTORY OF MMM PUBLICATION MODES

1. **December 1986:** Beginning with **MMM #1**: **Black & White Hardcopy**
   sent to member/subscriber home or postal mailbox
2. **May 2001**: Beginning with **MMM #145**: **Color PDF file**
   downloaded from www.moonsociety.org/members/mmm/ (members only)
3. **May 2014** Beginning with**MMM #275** (this issue)**: Color "e-pub" file that you can read on an Android Tablet or Smart Phone – Readers** would **need an e-pub reader app available free from Google Play store or I-market depending on the device** – Sample downloading sites:
   http://www.moonsociety.org/publications/e-themes/mmmt_LunarEconomy.epub

Moon Society members who elect to download the MMM pdf file will also be able to download the e-pub version at no extra cost, in both cases using their Moon Society username and password.

Moon Society members who elect to get MMM as hardcopy, can also download the PDF and/or e-pub versions at no extra cost, again using their Moon Society username and password.

NOTE: The original goal of the "E-pub Project" was to republish all the MMM Theme Issues (currently 17) in this format, to be available on Kindle readers, at a price to be determined, **an income source for the Society**.

If it turns out that the Kindle market is just not there, these e-pub versions of MMM Theme issues could be available as free downloads as are the pdf versions.

Your feedback on the e-pub issues is most welcome.

Note: Not having access to a Mac I-pad, I have no way to check to see if an I-pad can run these e-pub files as well. If you have an I-pad try uploading

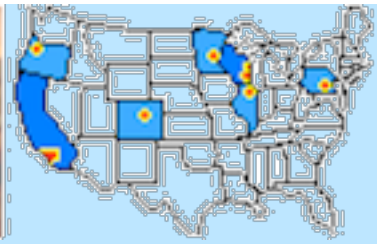
Reaching out to more potential readers: e-pubs and "Flip Magazines"

All Space-theme membership Societies are losing members, as older members pass away, and potential younger members take a pass. As a consequence, society memberships is "graying." By not adapting to the times, established space societies run a very high risk of becoming "irrelevant" with "extinction" lurking in the future.

In collaboration with the National Space Society, we have already added a new **free pdf file publication – To The Stars International Quarterly** – www.moonsociety.org/international/ttsiq/ & www.nxx.org/tothestars/

Another new publication mode we are looking at is that of online "Flip Magazines." You can google that for current samples. This means "learning new tricks" – something not yet beyond this old geezer. Stay tuned:

NSS Chapters that share Moon Miners' Manifesto



Space Chapter HUB Websißte: 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/
www.Space-Milwaukee.com – http://www.meetup.com/Milwaukee-Space-Exploration-Meetup/

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

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TREASURER/Database – • **Robert Bialecki** (414) 372-9613 – bobriverwest@yahoo.com
(• Current Members of the MLRS Board of Directors)

Our **April 12th Meeting doubled as our Yuri's Night celebration** and had extended extra hours, 1–6pm in Room G150. We had displays, magazines, models, pot luck refreshments. Four new people attended and it was enjoyable!

Next meetings Saturdays MAY 10, JUN 14 – then our summer break. resuming meetings **AUG 9, SEP 12, OCT 11**

Saturday, July 19th Field Trip to Bong Recreational area along the Racine-Kenosha County Line to watch the Tripoli Rocket Club launch some of their biggest rockets – while we enjoy a potluck picnic.

WISCONSIN

SSS – Sheboygan Space Society

728 Center St. Kiel, WI 54042-1034 – www.sheboyganspacesociety.org

c/o Will Foerster 920-894-1344 (h) astrowill@frontier.com
SSS Sec./Tres. c/o B.Pat Knier dcnpatknier@gmail.org
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: JUN 20 - AUG 15 - OCT 17 - DEC 14 (SAT in Milwaukee)

CALIFORNIA

SSDS – San Diego Space Society

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

LINOIS

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

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

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 – JUN 15 – JUL 20 – AUG – SEP – OCT
May 14-19 OASIS Sponsors NSS 2014 International Space Development Conference. LAX Sheraton Gateway
Thurs/Fri May 22/23 7 pm – "Putting the P in JPL: "The **P**ast, **P**resent and Future of **P**ropulsion" –

- The 22nd: Von Karmen Auditorium, JPL, 4800 Oak Grove Drive, Pasadena
- the 23rd: The Vostk Forum, Pasadena City College, 1570 E. Colorado Blvd, Pasadena

COLORADO

DSS: Denver Space Society fka Front Range L5
1 Cherry Hills Farm Drive, Englewood, CO 80133

Eric Boethin 303-781-0800 eric@boethin.com – **Monthly Meetings 6:00 PM on 3rd Thursdays, 7 pm**
Englewood Public Library, Englewood, CO 80110 – 1000 Englewood Parkway, First Floor Civic Center
NEXT MEETINGS: JUN 19 – JUL 17 – AUG 21 – SEP 18 – OCT 16 – NOV 20 – DEC 18

MINNESOTA

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

OREGON

ORL5 – Oregon L5 Society – http://www.OregonL5.org
PO Box 86, Oregon City, OR 97045

(LBRT – Oregon Moonbase) moonbase@comcast.net – Charles Radley: cfrjlr@gmail.com

Shari's in Oregon City on 99E (sharis.com) 1926 SE McLoughlin Blvd Oregon City, OR
The Third Saturday of the Month at 2:00 PM – **MAY 17 – JUN 21 – JUL 19 – AUG 16 – SEP 20 – OCT 16**

PENNSYLVANIA

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

The NSSPASA Report for April 2014
Some short notes on NSSPASA meeting times and upcoming activity:

We are participating in two events simultaneously **in early May**.

The **Science Festival** will start off on **April 26** in association with Astronomy Night. Two of our members, at least, will be part of this: Frank O'Brien will have a telescope in a neighborhood location in Philadelphia, and, Mitch Gordon will help at another location. Another member, Michael Stewart, will also do sidewalk astronomy.

Many other events worth attending throughout the following week culminating in **the Carnival on the Parkway**. NSSPASA will be on the Parkway, in the Educational Non Profits area I believe, with Frank and Mitch leading our group there.

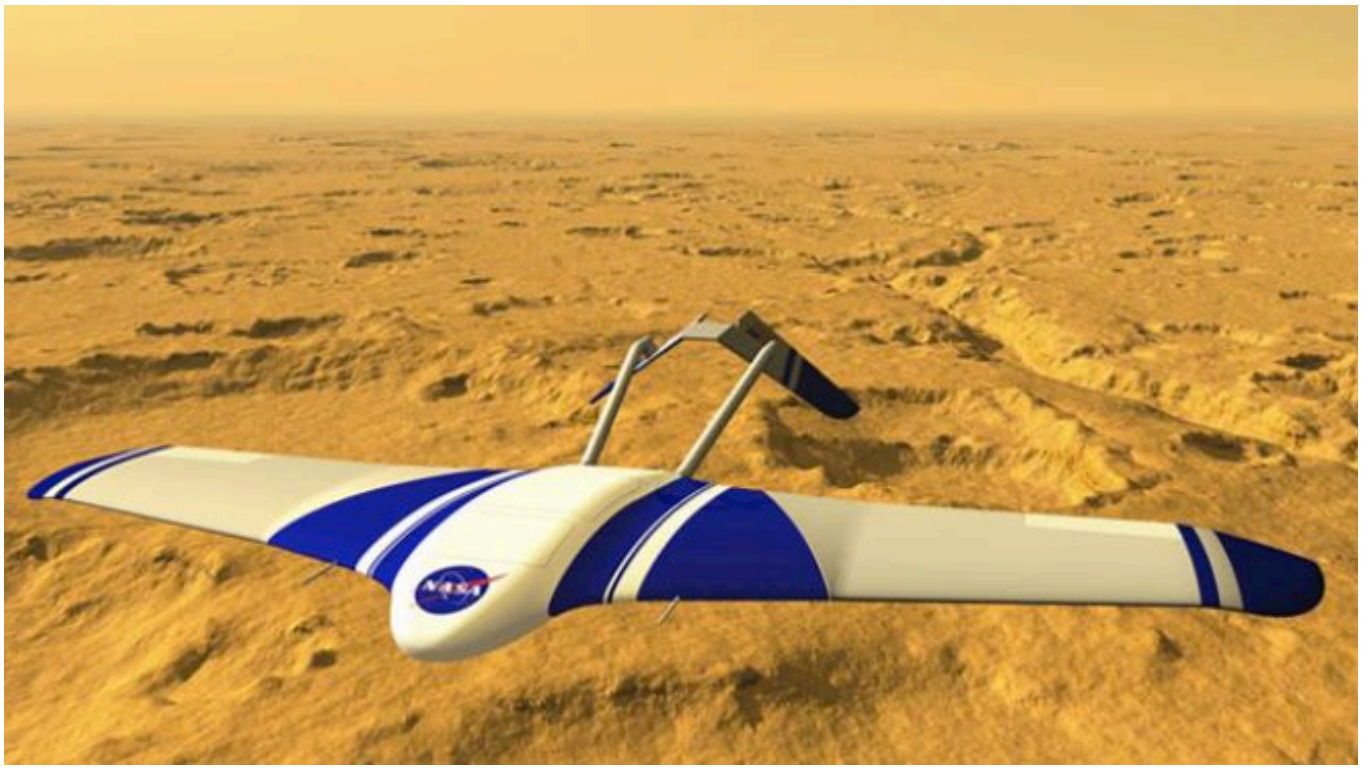
At the New Jersey State Museum on the same day another group, including Earl Dennis, Dorothy and Larry, will discuss space exploration and human habitation at the Museums invitation. I am currently working on several new displays for this event (the original Lunar Lava Tube and several other exhibits will be with the Philadelphia group.

We will have a May meeting after the events, on May 10th. In June we will meet on the 14th.

Quick notes: Dennis Pearson noted that the Lehigh Valley Mountain Observatory will be open when weather allows starting in May.

Dorothy reported that The Franklin Institute will have the exhibit "**101 Inventions that Changed the World**" starting June 14 till October 26.

Although I have more material most of it will be delayed. There will be material on Jade Rabbit and some new Cubesat material. All for now Earl Bennett



Summer tourist flight over the floor of Mars' vast Hellas Basin where air pressure on Mars is at its highest Granted, Mars airliners might not look like this, but we make no predictions. **How about a design contest?**

It is not too early to start planning to attend
the International Space Development Conference
in Toronto, Canada, North America's 5th largest Metropolis
and a World Class City.

But remember you will need
a passport, not to enter Canada, but to re-enter the USA

Moon Miners' MANIFESTO
Milwaukee Lunar Reclamation Society, Inc.
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- Annual dues with MMM $25, due March or $6 per quarter before the next March

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