

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

Moon Miners’ Manifesto

& The Moon Society Journal

www.MMM–MoonMinersManifesto.com



Living under a blanket of Moon dust? – There are many analogs of “covering up” here on Earth. Read pp. 3–4 below

Feature Articles:

- 2 In Focus: Turning the Annual Shrinkage in NASA’s Budget into “a Good Thing” – by Peter Kokh
- 3 Covering Up Lunar Habitats with Moondust – Precedents here on Earth – by Peter Kokh
- 5 New NASA Composite Cryogenic Fuel Tanks could help open the Moon – by Peter Kokh
- 6 The future of NASA human space flight and space commerce – by Phillip Crume
- 7 International Politics: America’s two–faced Collaboration with China – by Peter Kokh
- 8 How can we Stimulate Greater Use of the International Space Station? – by Peter Kokh



Igloos, sod-covered homes, earth-sheltered homes: many precedents for shielding with moondust – p. 3–4

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About Moon Miners' Manifesto – “*The Moon - it's not Earth, but it's Earth's!*”

- **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.
- **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 23 PDF format volumes, for free downloading from this location: http://www.MoonSociety.org/publications/mmm_classics/
- **MMM THEME Issues:** 14 collections of articles according to themes: [.../publications/mmm_themes/](http://www.moonsociety.org/publications/mmm_themes/)
- **MMM Glossary:** new terms, old terms/new meanings: www.moonsociety.org/publications/m3glossary.html
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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 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 (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 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.n**
- **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 Turning the Annual Shrinkage in NASA's Budget into "a Good Thing"

If there is anything I have learned in my seventy-five years, it is that **anything “bad” can be turned into “something good” with the right attitude.** Year after year for some time now, NASA has seen its budget cut by amounts that “really hurt.” The cuts have been translated into downsized and cancelled missions. That is how those with frozen attitudes and fixed habits react to less money.

Fortunately, there are those in NASA, in aerospace industry, and in academia who have used each such budget shrinkage as an opportunity to think and design “smarter” and “less expensive” equipment, instruments, and methods to achieve the same goals, and sometimes even more! Budget crunches have also meant opportunities for commercial contractors outside the usual NASA Corporate Cabal.

Space scientists have turned their frustration into ingenious designs of smaller, lighter instruments. The Cube Sat movement is showing surprising ingenuity. Piggyback packages are the in vogue. Almost every time a big science mission is cancelled, a re-thought, re-designed, replacement soon emerges that will achieve almost as much, if not even more science.

Less expensive launchers such as Space-X Falcon series are getting more orders.

Easy funding is the death of ingenuity and efficiency. As long as there is a will, we will keep finding ways to do not only what we had wanted, but even more than we had thought possible.

“**Praise the Darkness, and Creation Unfinished**” – Ursula K. LeGuin in “The Left Hand of Darkness.” PK

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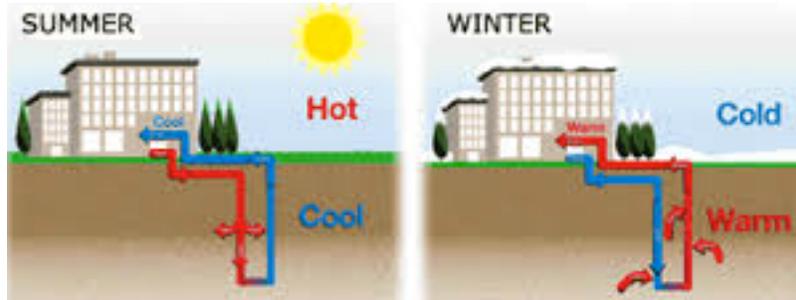
Covering Up Lunar Habitats with Moondust – Precedents here on Earth

By Peter Kokh

On Earth, we don't have to shield our homes and living and working structures with a blanket of "Earth-dust" in order to protect ourselves from cosmic rays. Our atmosphere "blanket" takes care of that need for us. Indeed, if our Nitrogen and Oxygen atmosphere ever got cold enough, it would freeze out to a 15-16 foot 4.5-5 meters of Nitrogen and Oxygen Snow. The need to be met is quite similar.

But shielding is needed on the Moon also to moderate thermal extremes of cold and heat as well. As such, moondust is simply "insulation." And at least in temperate and subpolar areas, we need a blanket of insulation for this use. Five meters of moon dust will not only provide long term protection from cosmic rays, it will allow the use of "geothermal" heating and cooling systems that save excess dayspan heat for nightspan heating, excess nightspan cold for dayspan heating.

Do a **Google/Bing Image** search for "geothermal heating and cooling systems." to get the idea how these systems work.



The balance on the Moon is much more favorable on Mars, where "the hot" season is only "cool" and the cold season is "very cold" plus the seasons are a 26 times longer than the lunar dayspan-nightspan cycle. In this respect, there are many examples of shielding "insulation" on our home world that address this need to moderate seasonal cold in the arctic and both heat and cold in temperate zones..

- Igloos, made of blocks of compressed snow
- Sod-covered houses
- Thatch roofs
- Homes carved into rock
- "Earth-sheltered" and "Hobbit" Homes
- Bermed buildings that insulate the lower parts of a building



Above: Igloo Homes in Arctic North America built with compressed snow blocks



Above: Homes carved out of desert rock, soil – Coober Pedy, Australia & Cappadocia, Turkey



Above: Grassland Homes in tree less areas covered with insulating sod and one in Africa with sand bags



Left: A traditional Earth-sheltered home with exposed south facing window wall

Right: The unique "Terra Lux" home with periscopic picture windows and solar domes



"Hobbit" inspired homes come in amazing varieties.



Bermed buildings: in these two, only the walls below window level are soil-insulated

Heaping up Moon Dust over living spaces isn't such an "alien" idea after all!

(But it were more common, then we'd be cheated out of the thrill of paying high heating and cooling costs!)

No, we can't adorn this moondust covering with living plants. But we can adorn lunar exteriors all the same.

See "Moon Roofs" – MMM #55.

See "Taking Back the Surface: Above Surface Architectures for Moon & Mars Habitats" – MMM #137

Both in the Lunar Construction Theme issue: (free download)

http://www.moonsociety.org/publications/mmm_themes/mmm_t_construction.pdf ##

New NASA Composite Cryogenic Fuel Tanks could help Open the Moon

By Peter Kokh

[In MMM # 209, October 2007 “Thinking Outside the Mass Fraction Box,” Part 1, we talked about the need to design everything landing on the Moon, and not returning to space or back to Earth, of components and/or materials that would be of great use on the Moon. Below is a quote from this article.]

[snip] “Here we are talking about delivery to the lunar surface. In that context, our quest to cheat the “mass fraction” rules drives us to make sure that everything that we have paid precious fuel to land on the Moon, and which will not depart on the ascent vehicle, is something that has more than temporary usefulness: that includes every part of the landing platform mass:

- | | | | |
|-----------------------|------------------------|-------------------|--------------|
| • Fuel tanks | • Descent engine | • Vernier rockets | • Cargo hold |
| • Unloading equipment | • Leg struts & Ladders | • foot pads | • etc. |

There are several approaches and types of solutions for this design challenge:

1. The item can be reused as is. for example, the bulk of the descent platform, minus engines and fuel tanks, might be reused as a platform for a telescope, or for something else.
2. The item's design could be tweaked to enable it to serve some different application, whether similar or quite different, for example, landing struts could be assembled in line to use as an antenna mast, or alternatively to serve as part of a space frame for a canopy shed
3. Perhaps part of the descent stage equipment could be designed as a mobile chassis for the crew cabin, either to taxi the cabin to its installation site, or to turn the cabin into a pressurized lunar surface bus.
4. The item could be forged of a material that would be invaluable on the Moon, such as lead, copper, brass, or stainless steel; some components, for example shipping stuffs, could be made of reusable plastics, or of compressed biodegradables rich in nutrients scarce in lunar regolith” [end snip]

This last point is what we want to address here.

All along we were thinking in terms of metals, in particular alloys which would be difficult to produce on the Moon. We did mention that shipping and packaging stuffs, or dunnage, could be produced from a mix of elements in short supply on the Moon, including composite materials which would break down in wet soil to supply plant nutrients not found in raw regolith. [end snip]

Now, NASA is experimenting with “game changing” Composite Cryogenic Fuel Tanks

<http://www.spacedaily.com/reports/prnewswire-space-news.html>

“The almost 2.4m (8 ft) diameter composite tank tested at NASA's Marshall Space Flight Center in Huntsville, Ala., is considered game changing because composite tanks may significantly reduce both the cost and weight for launch vehicles and other space missions, dramatically increasing performance capabilities of future space vehicles through a dramatic reduction in weight.”

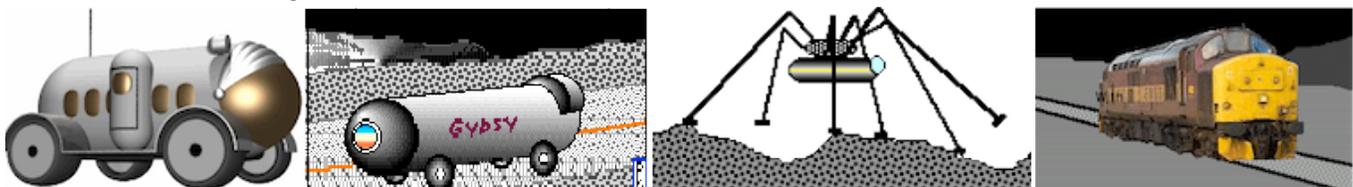
“A potential initial target application for the composite technology is an upgrade to **the upper stage of NASA's Space Launch System heavy-lift rocket.**”

“The tank manufacturing process involve **two industry breakthroughs:**

1. Automated fiber placement of oven-cured materials
2. Fiber placement of all-composite leak-tight tank wall design is a tooling approach that eliminates heavy joints.
 - There is a 40% weight savings in rocket fuel tanks which can be spent in larger tanks or less fuel needed to get to the destination (the lunar surface.)
 - The 5.5 m (18 ft) tank will be one of the largest composite propellant tanks ever built and will incorporate design features and manufacturing processes applicable to an 8.4 meter (27.5 foot) wide tank.

Composite tank joints, especially bolted joints, have been a particularly troubling area prone to leaks in the past. Boeing and partner Janicki Industries developed novel tooling to eliminate the need for heavy joints.

Composite Tank usage on the Moon



Depending on the diameter and length of these fuel tanks, they could be adapted to serve as truck cabs and motor coaches (think lunar “Greyhound”) and lunar railroad coach cars. The advantage is twofold: less cost delivered to the Moon, and **will not create secondary radiation from cosmic rays penetrating the hull as is the case with metal hulls.** This will make overland transportation somewhat safer, and that is welcome news. – PK

The Future of NASA Human Spaceflight and Space Commerce

By Philip Crume (Moon Society Chairman of the Board)

The human space flight program at NASA is understandably going through an existential crisis. If human space flight is treated as a “checklist of places to go” what else is out there for us? If there is no where left to go, why bother spending the money on it and why not just focus our precious resources into robotic exploration? This line of reasoning was proposed by the National Academy of Sciences last summer with an invitation to the general public for comments, which the Moon Society did.

The problem that plagued both the US and Russian space programs from the very beginning is that our leaders have viewed it as a diversion of precious national resources into a delusional fantasy. If you're interested in space, you'd do well to spend an afternoon studying the background history of the space program and learn about Jules Verne, Konstantin Tsiolkovsky, Robert Goddard, Sergei Korolev, and Wernher von Braun. The low point came just before WW II when the Soviet communist party sent Sergei Korolev into a Siberian gulag for advocating for a delusional fantasy that would squander precious resources. He almost died in the gulags were it not for his friends in the science community who convinced the authorities that he could develop missiles in response to Germany which had invaded. On the American side, there were no further champions for space technology after Goddard, and we only got von Braun as a spoil of war, and even then we viewed rocket technology more as a whimsical toy that was far too inaccurate for military weaponry. He was mainly brought to the US to deny him to the Russians. After the war, Von Braun's rocket team would be mothballed until Sputnik.

The main reason we have a space program is because Korolev would manipulate the Soviet military establishment into developing increasingly powerful rockets that could drop increasingly larger bombs until he reached a point where his rockets could obtain orbit. It was a risky endeavor since the political establishment told him throughout this time that he was not to develop space stations or satellites, otherwise he'd end up getting sent back to Siberia. Keep in mind that neither the US nor Russian political establishments wanted a space program. They were manipulated into it. Neither of them ever bought into the dream of space colonization and it's still true to this day. Korolev eventually developed Sputnik, which instilled fear into the American political establishment to respond with equivalent capabilities, and the end result is that both countries developed not only rockets that allowed us to reach space but human space flight programs to make their space programs more digestible for their publics. It's from this backdrop that we get the space race that would culminate in the success of the Apollo program.

NASA would face its first existential crisis after the success of the Apollo program. Since we won the space race what else was there to do? The answer would come in the concept of reusable spacecraft. If we could save money reusing spacecraft and tap into economies of scale, we could enter space at an overall lower cost than we would relying on single-use spacecraft. Perhaps at no other time in history has the US political establishment been as supportive of space colonization as it was prior to the development of the space shuttle program. Shuttles were supposed to be reusable on a weekly if not monthly basis and they were supposed to allow us to enter space at a fairly low cost (in the low hundreds of millions of dollars). Unfortunately the space shuttle program failed to accomplish its original justification. The loss of the space shuttle Challenger showed us that they were far more fragile and that they would need far more extensive and costly refurbishing than we first thought. Instead of giving us a less expensive means of entering space it became the most expensive approach for entering space. Now that the space shuttle program has been canceled, government funded human space flight is back to square one.

The wrong question to ask is “what should we do with our human space flight program?” To get to the right question, we have to consider the larger intellectual framework within which the program exists. We could start by considering three distinct types of activities that can take place in space: exploration, development, and colonization. The Apollo program was a program of pure exploration. All technological advances that took place were oriented to gain new knowledge. The missions were planned to demonstrate that the technologies could work. After the technologies reached sufficient maturity, the mission focus transitioned to more science-oriented research. Most exploration to date revolves around science.

Space development has a different emphasis than exploration. It's goals are economic in nature. It involves the offering of products and/or services to a client that is cheaper, faster, or of better quality (or in some combination) than would be possible to gain elsewhere; or in some cases simply access when it would otherwise not be possible. What makes space development different than other space activities is that it seeks to leverage a physical feature of outer space that confers advantages that give superiority over its Earth-bound equivalent.

Space colonization is also a different category of mission. It's goal revolves around permanent human settlement. It involves building an ecosystem that supports both humans that life forms that sustain us. Its emphasis is resilience and adaptability to the space environment rather than economic efficiency. Should a large economy collapse or trade routes falter for some reason (economic cycles, war, or social collapse), a resilient space colony should be able to survive on its own. Many space advocates support colonization both for expansion of the human economic domain and to give our civilization insurance against the risk of being a species that exists only on a single planet.

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Last but not least, there's the largest issue of them all, how should we best maximize the social value of a good or service? Are we best served by managing goods or services through the public or private interests? Since the start of the industrial revolution, private interests have developed technologies by spending their own resources and then enjoying short-term monopolies on their technologies in the form of patents. The public at large benefits through innovation while private individuals or groups gain wealth. Publicly-funded research can and has been used to spur development of new industries.

So now we can start asking the right question of what to do with NASA's human space flight program. What would be the most appropriate way use to government-funded research as it relates to human beings in space? Answering this question will depend on how human beings function in different mission categories.

When it comes to exploration, there is still a large gaping hole in scientific knowledge when it comes to how the human body functions over a long-period of time in different levels of artificial gravity. We know that in zero-g, bones begin to demineralize and that they become weak and brittle. But how does this happen in other levels of artificial gravity? Will this happen on the Moon or on Mars? We also need to explore how to adapt manufacturing processes for the space environment. The entire industrial revolution involved adaptations to manufacturing processes in our planet's environment. But we already know that not all of these processes translates into space. For example, in a vacuum, oil becomes a vapor; which will be a problem for lubricants. In micro-gravity, the surface tension of liquids holds gases (or air) in, which is a serious problem when melting metal (including welding). Even though we've been in space for over 40 years, we still have yet to fully explore the effects of the space environment on the human body. There are still many large scientific questions yet to be answered.

NASA's human space flight program would be better suited to explore gaps in knowledge related to space development rather than engaging in actual space development activities. However an important component to this type of research is to hand-off the knowledge to academic institutions and private enterprise so they can utilize it. This isn't a simple process because the US government has an economic interest to make sure that only US private interests have access to this knowledge.

A human space flight program could be useful for a space colony that focuses on exploring the right balance needed to achieve ecological sustainability. However the visibility of government-funded research could make it risk averse in ways that private research would not be. It will be necessary to find an appropriate balance.

NASA's human space flight program can make a meaningful contribution to our space civilization for many years to come. If it needs any focus in this post-shuttle era, it should focus on facilitating space development and colonization. It needs to find a balance between keeping its research confidential for the purpose of excluding other nations from benefiting from it, and sharing its knowledge with American citizens. I will conclude that it needs to make sure that it develops the appropriate facilities where it does research whether it takes place on the ground or in orbit. The Moon Society supports NASA's human space flight program and we hope to see it continued for another 40 years.

Occasion of this paper: The **National Research Council** (NRC) of the National Academy of Sciences conducted a **congressionally-requested study** to examine the **goals, core capabilities, and direction of human space flight**. For more on this opportunity, see <http://blog.nss.org/?p=4149> on the NSS Blog site.

International Politics: America's two-faced Collaboration with China

Opinion Piece by Peter Kokh

We all know about the ITAR regulations which prohibit sharing technologies with certain nations. Many defend this policy, but it has unintended effects that undercut its intended results, substantially. Nations black-listed go ahead and develop these technologies on their own, sometimes coming up with ways to "do it better."

October 3, 2013 "Nasa officials rejected applications from Chinese nationals who hoped to attend the meeting at the agency's Ames research centre in California next month citing a law, passed in March, which prohibits anyone from [China](#) setting foot in a NASA building."

<http://www.theguardian.com/science/2013/oct/05/us-scientists-boycott-nasa-china-ban>

"The law is part of a broad and aggressive move initiated by congressman Frank Wolf, chair of the House appropriations committee, which has jurisdiction over NASA." [snip] "But the ban has angered many US scientists who say Chinese students and researchers in their labs are being discriminated against. A growing number of US scientists have now decided to boycott the meeting in protest, with senior academics withdrawing individually, or pulling out their entire research groups."

Its time to end the Cold War. Those who cling to it, like a child clings to its blanket, need to grow up! When Ronald Reagan helped end the Cold War with the Soviet Union, everyone benefited. But evidently some people in Congress haven't gotten the hint. The best way to defuse enmity is to engage the suspect nation in trade so comprehensively that the thought of war between the two sides becomes unthinkable to either party. Reagan proved this. Let's throw out the Cold War regressives in Congress! Letter writing is in order. PK

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How can we Stimulate Greater Use of the International Space Station?



By Peter Kokh

“Stimulating Greater Use of the ISS” is the title of a recent article by Jeff Foust in Space Review. Here the short introductory blurb reads: “As researchers meet this week to discuss research on the International Space Station, NASA and the organization that manages ISS research are being pressed to make greater use of the station's facilities. Jeff Foust reviews those challenges and the efforts of one startup company that believes its research could have a significant commercial payoff.

<http://www.thespacereview.com/article/2328/1>

This is a very important issue. NASA had wanted to cease support for ISS and “deorbit” it as early as 2016. However the International Partners protested loudly, and now the Station will remain in orbit and continue to be staffed until some time in 2020. For NASA, this is a budget question as well as a focus question. The agency has many other goals in space: the Moon, Mars, Asteroids and other interplanetary missions as well as astronomical projects.

But the Station is the far and away the most concrete evidence of human presence in space beyond our atmosphere. It is a source of inspiration to students and young people world wide. It makes us aware of our planet as one shared world whose future is in doubt as human presence on our planet has extended to a point where many ecosystems, those still surviving and holding on, are in danger.

Here are some suggestions we have thought of that would allow us to keep the station in orbit, and indeed to grow it into something ever larger, and more productive scientifically.

Basic starter ideas

- An architectural plan for orderly expansion of existing architecture, and beyond
- A plan to put it into a higher orbit, as a compromise between more expensive access, and less expense and much lower frequency of “reboosting.”
- A plan to find new partners, national or corporate, for national portions of the station that the owner wishes to sell or transfer
- A plan for more affordable access (commercial)
- A plan for more affordable additions
- A plan for expansion of research directions
- Partnering with research facilities on Earth

Capacity for a larger crew

- Inflatable modules: cheaper with more volume for living and for activities of any kind
- More recreational and meeting space: an inflatable gym, a conference room
- Inflatable Sky Motel for vetted VIP Visitors, and for critical negotiations (can't leave until a settlement is reached. The view of Earth below will promote “internationally” acceptable solutions.

Expansion of special Experiment Areas/modules

- A dedicated “food growth chamber like the one built by CEAC (Controlled Environment Agricultural Center) for the Amundsen–Scott South Pole Station.
http://www.ferrarochoi.com/casestudies/southpole/southpole6_foodgrowth.html

Variable artificial g facility dorm and research pods testing moon and mars gravities in sequence

- A “dumbbell” type rotating annex, with a larger–heavier module closer to the hub rotationally balanced with a smaller–lighter one further from the hub to provide lunar 1/6th G at one end, and Mars 3/8ths G at the other – for long term experiments to determine how these gravity levels affect astronaut physical status in comparison with Zero G (or microgravity) of ISS proper
- More biospheric research on plant growth at these gravity levels

Expansion of ISS Partners List & Extending ISS Commitment through 2028 at least

- If an ISS partner wants out, its facilities should go up for sale to other existing partners, new national partners, commercial firms. Holder can refuse “insufficient” offers for up to one year.

<http://spaceports.blogspot.com/2012/03/international-space-station-partners.html> (Brazil?, India? South Korea? China nixed by NASA) ##

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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

Our Mission is 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 continue to 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

October is here, and the weather is starting to change. Kids are back in school, and as usual, in their preparations for standardized tests they aren't learning much about non-test topics. Such as space. That's where The Moon Society can make a difference.

Coming up on October 12th is International Observe the Moon Night. This annual celebration offers us an opportunity to engage our local communities and educate our fellow citizens as to the wonder and value of our Moon. If you can, grab your telescope, check with your local astronomical society to see if they're having an event, and head out to share your Moon knowledge with your community.

Your leadership team is evaluating many different forms of engagement with the public. Most recently, we supported a Kickstarter campaign to fund the production of a comic book entitled “Last Breath”. It tells the story of an astronaut stranded on the Moon, and running out of air... As a result of our support, we will have an advertisement for The Moon Society on the inside back cover, putting our name in front of a well-targeted audience, with the potential for a much broader distribution if the comic is well-received.

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

We've also considered videos on YouTube. A well-made video could attract a lot of attention. However, video production is expensive and a hit-or-miss prospect. It also relies heavily on good story-telling, and unfortunately space folks tend to go back to the same stories over and over (q.v. Apollo) long after those wells have run dry. New stories are needed, of what the Moon can do for us, how we can best start tapping the resources there, and of the triumphs and tragedies that await the humans who will go there to make it happen.

Our track at the annual International Space Development Conference (ISDC) is a great way to get our ideas into the space community, but those ideas also need to reach a much wider audience and the ISDC is not the mechanism for that. One great avenue for doing so is your local science fiction conferences. The first weekend in October your president will be at FenCon on a panel entitled "The Moon be Domed!" about Lunar settlement and the forms it may take. Other members of your leadership team also participate in local conferences. Take the initiative yourself to contact a local science fiction conference and offer to speak in a non-fiction way about our Moon. Writers in the science fiction genre are always happy to learn more space facts that they can incorporate into their stories.

And if the members of The Moon Society make a concerted effort, we could end up with a generation of sci-fi writers who are well-versed in Lunar topics, and comfortable with writing speculative stories set there. You might even get an acknowledgement in the final publication!

How about a Lunar-based adventure module for science fiction role playing games? Perhaps a trumps card game with rocket motors or craters instead of motorcycles or race cars.

We've considered a professional recruitment campaign to provide a surge in memberships. Such a surge could provide us with the resources, member-wise, to undertake more ambitious projects such as high-quality video production. This would also be a large allocation of The Moon Society's treasury, and so the leadership team is thoroughly vetting the value to be received therefrom to ensure it merits the cost.

These are exciting times in Lunar exploration, and thanks to The Moon Society and others the message of the Moon as a place for resources and opportunity is receiving wider play. People are starting to realize that the Moon is more than just a light in the sky, or a place some guys went to many decades ago, or a playground for scientists and their robots. It is also a place for human activity, and one that will return far more value in the long term than the cost of getting started. There are resources and energy available, and they can be used to benefit Earth. This is a potent message in these tough economic times, and why The Moon Society and its members need to vocally support both private and public sector space efforts. Neither one is the "true" answer, and we need both to leverage the competitive advantage the U.S. has in the space industry to sooner benefit everyone on Earth, as we've done in so many other industries here on terra firma. That's a message worth spreading. Ken Murphy

Facing the Problem of Failure to Connect with Younger Generations

By Peter Kokh

This is not a proposal that will eradicate the apparent "disconnect" with younger generations that currently plagues ALL space-focused organizations including the largest two, The Planetary Society and the National Space Society, but also the Mars Society and the Moon Society. Before we can come up with remedies that work, we need to understand the root causes for the disconnect.

I confess that my own analysis of the root problem may be too severe and too pessimistic. But I have to be honest and state my judgment openly. We are talking about those in their late teens to late thirties. I call this the "**Ritalin Generation**" – "short attention span" – admittedly with some scorn. Too many people in this age group seem to me to be "about nothing" or about "everything, but one thing at a time, for one brief period after another,"

But I do not blame this on them. I see it as the result of the fantastically fast pace of technology development. Take cell phones for example. While us "old timers" witnessed the development of the telephone from the old crank ups, and operator assisted ("number please") phones to those with dials, and then keypads.

Then suddenly, the first cell phones, very large and heavy, to be followed by ever smaller ones, skipping right past the Dick Tracy generation to "smart phones" that can do just about everything. (I have a suspicion, however, that "we ain't seen nothing yet!") The current generation lives on their cell phones. And their attention span has shrunk down to the present moment and perhaps the upcoming hour or two. This is not meant to dismiss younger people. If I had been born along with them, I would probably be one of them.

We learned from books. Books? What does that word mean? Oh yes, those things old people buy!

Can we find a way to get younger persons, those who are on their way to taking over the world, interested in space? They not only do not read books, but they avoid magazines, and newsletters. We've suggested development of a Moon Society "app" for cell phones and online "flip" magazines. We've suggested design and engineering competitions aimed at younger generations. All these ideas have been dismissed by those who have no ideas of their own. One thing is clear. We need to listen to young people and have them tell us what they need. PK

For past articles, Visit http://www.moonsociety.org/publications/mmm_classics/ or [/mmm_themes/](http://www.moonsociety.org/publications/mmm_themes/)

The Moon Society Vision & Mission – www.moonsociety.org/about/vision_mission.html**The Moon Society – Who We Are & What We Do**

The Moon Society, founded in 2000 by Gregory R. Bennett, seeks to inspire and involve people all over the world in the continued study and exploration of the Moon with the goal of accelerating the day when there will be civilian settlements on the Moon, making use of local resources through private enterprise both to support the pioneers themselves and to help alleviate Earth's stubborn energy and environmental problems.

What we are not

We are not designers, builders, or purchasers of rockets, habitat modules, or other hardware which will be involved in this effort. (Some of our members may be employed or involved with such efforts individually.)

Rather, our purpose as a society is both to help remove obstacles and to help lay foundations. We seek by all legitimate means available to us to promote developments that will aid those pioneers will go to the Moon to succeed in their ventures, and to advance the day when they will do so.

Our Vision says Who We Are

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.

Our Mission

Our Mission is to inspire and involve people everywhere, and from all walks of life, in the effort to create an expanded Earth-Moon economy that will contribute solutions to the major problems that continue to challenge our home world. Briefly, we seek to address these goals through education, outreach to young people and to people in general, contests and competitions, workshops, ground level research and technology experiments, private entrepreneurial ventures, moonbase simulation exercises, tourist centers, and other legitimate means.

Our Strategy and Game Plan

Our strategy and game plan are guided by the "Lunar Frontier Enabling Test" which paraphrases the "Space Frontier Enabling Test" formulated by the Space Frontier Foundation.

A "lunar frontier enabling" project, technology, or policy is one which has as its effect the acceleration of the creation of low cost access to the lunar frontier, and to the space frontier in general, for private citizens and companies, and/or which enables or accelerates our use of space resources, and/or accelerates the rate at which wealth can be generated on the Moon and in space. In other words, we ask this question: is the project or policy going to provide a return on our investment of time, energy, and money, if we define "return" to be the economically sustainable human habitation of the Moon and of space in general?

Any project, competition, paper, technology demonstration or other activity which does not meet this clear standard, no matter how well designed and energetically pursued, is simply a waste of time and resources and energies -- a detour or diversion. Promotion of public and entrepreneurial interest in the exploration, research, development, and habitation of the Moon. Stimulation of the advancement and development of applications of space and related technologies and encouragement of entrepreneurial development thereof. Collaboration between various societies and groups interested in developing and utilizing the resources of the Moon. The Society has limited resources. We must use them to best effect. The "Lunar Frontier Enabling Test" helps assure that we do just that.

Challenges to our Mission – the vagaries of National Politics and Annual Budgets

Despite our best efforts, announced scientific or manned exploration lunar missions can be delayed, trimmed, emasculated, even canceled. In such situations, we need to maintain our determination, continue planning, and look for research and development opportunities that are not at the mercy of national budgets and the policies of changing administrations.

Many of the technologies needed to advance our goals are at a low "readiness state."

While NASA does involve commercial industries in efforts to advance the readiness state of some of these needed technologies, there is another path, not directed or incentivized by NASA at all, a road where the primary incentive is commercial profit: the route of "Spin-up rather than "Spin-off." For an explanation of how this works, taking a specific research item, read this paper: ["Spinning Up" Glass-Glass Composites Technology](#)

The result is rather than spending federal mega dollars, and getting and maintaining approval for that, a private enterprise pre-develops an analog of the needed technology, specifically for profitable applications here on Earth, with the effect that a much higher technology level of a technology needed in space or on the Moon is put "on the shelf." If we do so for as many needed technologies as possible, the time from a "Go Decision" to Mission Accomplished is shortened as well as becoming much more affordable. This pathway could work for many of the technologies needed. And while there may be reluctance and outright opposition to government expenditures, no one can interfere with commercial enterprise – unless the technology area involved is judged to be of military significance. The list of such technology development opportunities that would advance our mission to see lunar settlement and industrial development for the benefit of our home planet is limited only by the imagination. ###

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MOON SOCIETY - ORGANIZED CHAPTERS

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 – OCT 9 – NOV 13 – DEC 14

September 11th meeting notes: Present: Dietzler, Jim Merriman, Bob Perry, Rufus Anderson and Karl Strassman attending. Bob asked for help with our participation at the upcoming Archon science fiction convention, Archon 37, where Bob will make two real science track presentations and have a display, what the Archon people call a "fan table". Apparently Bob and Rufus are the science fiction readers but all of us like science fiction TV and movies. A lively discussion followed on the subject. Rufus said George Lucas's early work, "THX 1138" lent its name to the sound system. Bob mentioned that predicting the future is tricky. For example, no one predicted that the Moon landing was to be watched live by anyone with a TV, worldwide. There will be more paradigm shifts, like the transistor, alkaline batteries, integrated circuits, the PC and the internet. The future will be different.

Jim reminded has called for a meeting to organize a St. Louis chapter of the National Space Society, with the first meeting to be at the Moonrise Hotel, 6177 Delmar Blvd, at their Rooftop Terrace Bar on Monday, September 23 at 6 PM. The previous St.Louis Space Frontier chapter disbanded in the early 80's after four of the most active members took jobs out of town. Jim also informed us that the Space Museum has opened in Branson, Missouri, the tourist town in the Ozarks. Bob said he visited the Smithsonian in D.C. the year before the nation's bicentennial and especially enjoyed the Air and Space Museum. Rufus said that the Smithsonian now has the X-Prize winning Space Ship One on display and Jim said that Earl Mullins of the Bon Terre and Branson Space Museums is trying to get the full size mockup of Space Ship One that was briefly on display at the St. Louis Science Center. – Bob Perry

News about reborn St. Louis Space Frontier Society. SLSFS will meet on Wednesday October 16 at Fallon's Pub and Grill at 6:30 p.m. You can order dinner if you wish or just something to drink. Paul Baldwin "will be giving a presentation called "What is up in Space" which gives a modern easy to understand the view of the new worlds discovered in space, space exploration, world space exploration, Curiosity Rover on Mars, views of the Earth from space and more." Chapter business after the presentation. Information about location, www.fallonpub.com/

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

Sept 21 meeting notes: Mike Mackowski led a lively discussion on why and how humans may go to Mars.

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 3rd Mondays Odd # months in the conference room of the Bay Area Community Center at Clear Lake Park – Next meetings NOV 18 – JAN 20th

September 16th meeting Report: Larry J. Friesen, who attended the World Science Fiction Convention (LoneStar-Con) in San Antonio recently, shared some of his experiences participating in space exploration and commercialization panels there. We also mentioned the upcoming 100 Year Starship Symposium in downtown Houston this coming weekend (<http://symposium.100yss.org/> for info) and the Golden Spike workshop to be held at the Lunar & Planetary Institute this coming October 3rd and 4th.

The end of the year is approaching, so we officially opened nominations for our Chapter officers and directors for the coming year. There are four officer positions (President, Vice President, Treasurer, and Secretary) and three director positions. The election of officers will take place at our next meeting on Monday, November 18 at 7:00 p.m. at the Bay Area Community Center in Clear Lake Park. At the meeting on Monday, Eric Bowen and Jay Lewchanin were nominated for re-election as Chapter president and treasurer respectively, and Marianne Dyson was nominated for election as Vice-President. **Nominations are being accepted by email** up until one week before the next meeting. Nominations may only be made by those who are currently members in good standing of either the National Space Society or the Moon Society, and all nominations must have a second. Address email nominations and seconds to Eric Bowen at eric at streamlinerschedules dot com. Those who are nominated as officers or directors must be, or must be willing to become, members in good standing of **both** the Moon Society and the National Space Society. Candidates who are elected at the November meeting will take office effective with the January meeting. Nominations **by email** will close at 11:59 p.m. Central time on Sunday, November 10; however, nominations **in person** will be accepted at the November meeting up until the actual elections.

We have had light snacks and refreshments at our last two meetings, and we plan to do so again at the November meeting. Contact Eric if you are willing and able to contribute some munchies. As always, guests are welcome at any of our functions. Save the date and plan to stop on by!

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

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GREAT BROWSTING LINKS

SPACE STATIONS + COMMERCIAL SPACE

<http://www.space.com/15735-top-private-spaceships-countdown.html>
<http://www.space.com/11348-spaceships-human-spaceflight-50th-anniversary-infographic.html>
www.esa.int/Our_Activities/Human_Spaceflight/Human_Spaceflight_Research/Changing_environments
http://www.reactionengines.co.uk/news_updates.html – [http://en.wikipedia.org/wiki/Skylon_\(spacecraft\)](http://en.wikipedia.org/wiki/Skylon_(spacecraft))
<http://www.space.com/22119-3d-printed-rocket-part-test.html>
<http://www.space.com/22125-canada-new-robotic-space-arm.html>
<http://www.space.com/22622-planet-labs-dove-satellite-photos.html>

MOON

<http://www.space.com/12030-moon-photos-nasa-lunar-reconnaissance-orbiter.html>
<http://www.space.com/22609-moons-strange-atmosphere-nasa-to-probe-video.html>
<http://www.space.com/22639-moon-dust-mystery-nasa-spacecraft.html>
www.space-travel.com/reports/NASA_Funded_Scientists_Detect_Water_on_Moons_Surface_that_Hints_at_Water_Below_999.html
<http://www.space.com/21921-moon-bill-protects-apollo-lunar-landings.html>
www.space-travel.com/reports/Zero_Point_Frontiers_Delivers_Favorable_Architecture_Assessment_to_Golden_Spike_Company_999.html
www.forbes.com/sites/brucedorminey/2013/04/21/rare-earth-revisited-anomalously-large-moon-remains-key-to-our-existence/
www.lpi.usra.edu/nlsi/education/hsResearch/presentations/2011_2012/research/CamdenFairview.pdf (lavatubes)

MARS

<http://www.space.com/22618-mars-life-ingredient-plentiful.html>
<http://www.space.com/21984-mars-ocean-ancient-river-delta.html>
http://www.marsdaily.com/reports/UH_Astrobiologists_Find_Martian_Clay_Contains_Chemical_Implicated_in_the_Origin_of_Life_999.html
<http://www.space.com/22618-mars-life-ingredient-plentiful.html>
http://www.marsdaily.com/reports/We_may_all_be_Martians_999.htm
<http://www.nasa.gov/press/2013/august/nasa-begins-launch-preparations-for-next-mars-mission/>
<http://www.nasa.gov/maven>
http://www.marsdaily.com/reports/India_prepares_to_launch_countrys_maiden_mission_to_Mars_999.html
The Path to Mars (Mike Mackowski) – <http://nssphoenix.files.wordpress.com/2013/09/mars2.jpg>

ASTERIODS

<http://www.space.com/22722-dwarf-planet-ceres-water-life.html>
<http://www.astrobio.net/pressrelease/5427/dawn-is-in-silent-pursuit-of-ceres>
<http://www.space.com/22764-nasa-asteroid-capture-mission-candidates.html>

OTHER PLANETS + MOONS

http://www.spacedaily.com/reports/Tiny_Submersible_Could_Search_for_Life_in_Europas_Ocean_999.html
<http://www.space.com/22146-robotic-exploration-europa-incredible-tech.html>
http://www.spacedaily.com/reports/Mystery_of_the_Missing_Waves_on_Titan_999.html
<http://www.space.com/22570-titan-ice-shell-bizarre-interior.html>
http://www.spacedaily.com/reports/A_Giant_Moon_for_the_Ninth_Planet_999.html

ASTRONOMY + ASTROBOTICS

<http://www.space.com/22505-worlds-largest-telescopes-explained-infographic.html>
<http://www.space.com/21827-seti-extraterrestrial-intelligence-search-evolution.html>

EDUCATION + OUTREACH + MEDIA

<http://www.space.com/20772-nasa-phonesats-smartphone-satellites.html>
<http://www.space.com/20917-tiny-satellites-space-sails.html>
<http://www.space.com/20947-nasa-moonbuggy-race-winners.html>
<http://www.nasa.gov/sites/default/files/files/Benefits-Stemming-from-Space-Exploration-2013-TAGGED.pdf>

GREAT SPACE VIDEOS

<http://www.space.com/22609-moons-strange-atmosphere-nasa-to-probe-video.html>
<http://www.space.com/22598-greenland-s-grand-canyon-revealed-by-ice-penetrating-radar-video>
http://www.esa.int/Our_Activities/Space_Science/Fly_through_a_canyon_on_Mars

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National Space Society Salutes Lori Garver's Service at NASA

Personal Tribute by Peter Kokh

The National Space Society (NSS) would like to congratulate Lori Garver for the tremendous contributions she has made to NASA and America's space program during her four years as Deputy NASA Administrator.

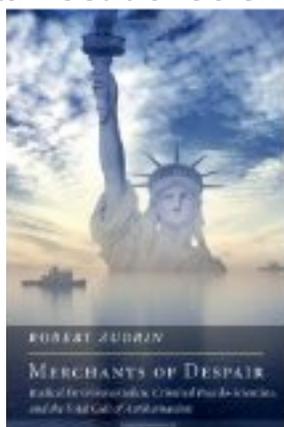
"She was a staunch supporter of commercial space and using public/private partnerships to leverage private investment using fewer taxpayer dollars," stated Mark Hopkins, chairman of the NSS Executive Committee. "Lori's calm leadership and grace under pressure will be missed by all of us in the space community and we wish her all the best in the next phase of her career."

Lori was the Executive Director of NSS for nine years until she left for her first tour with NASA in 1998. She was a key player in the building of the new organization that came into existence after the merger of National Space Institute and the L5 Society in 1987. – <http://blog.nss.org/?p=4187>

I first met Lori by mail in late 1986, shortly after we launched the Milwaukee Lunar Reclamation Society L5, a chapter of the L5 Society. The merger between the L5 Society and the National Space Institute was in the works. Lori was Executive Director of NSI, and I wrote her asking for the contact information of NSI members in SE Wisconsin, so that we could form the first merged chapter in advance of the merger. Lori happily sent me the list. And our membership more than doubled. Going into ISDC 1987 held in Pittsburgh that year, MLRS was the first and only merged chapter. I met Lori in person at the conference. I met her again at later conferences and as the regional director from Region 6 (WI, IL, IN, MI, OH) at the 1990 fall board meeting in Washington, at which time Lori and husband David Brandt hosted us all at a social event in her home. She was of great help also in helping us at the Lunar Polar Orbiter Conference in Houston that launched the Lunar Prospector mission effort.

As to Lori's service at NASA, Mark Hopkins has said it well, above. Lori is a wonderful person to work for, eminently capable as a leader, and we wish her the best in her new career. She has our most profound respect. She is a wonderful person to work with and makes everyone instantly at ease.

BOOK REVIEW Merchants of Despair: Radical Environmentalists, Criminal Pseudo-Scientists and the Fatal Cult of Antihumanism



Robert Zubrin, copyright 2012
ISBN 978-1-59403-476-3
Encounter Books, an activity of
Encounter for Culture and Education

Review by David Dunlop

Merchants of Despair: Radical Environmentalists, Criminal Pseudo Scientists, and the Fatal Cult of Antihumanism by Dr. Robert Zubrin might be surprising to find in a publication devoted to space such as Moon Miners' Manifesto. Its author, Bob Zubrin, is famous for his paper **Mars Direct**, as the **founder of the Mars Society**, and as an informative and engaging speaker. Zubrin is "no shrinking violet" and plunges into the fray in talking about issues pertaining to human rights, environmentalism, political movements and the scientific "spin" placed on public policies.

I highly recommend this book. In this book Zubrin might be described as a master curmudgeon, taking on policies and practices that are often considered mainstream. He skillfully demonstrates both why and how scientific skepticism is practiced. I will not so much discuss or summarize his arguments or review his topics as I encourage people to read for themselves. His challenges those who embrace the pessimism of Malthusian economic ideology, projections of over population and scarcity, and global calamity as a logical and inevitable consequence of too much humanity.

I think those who purchase this book will be richly rewarded by Zubrin's grasp of both the facts and the issues, his command of history, and his clear voice as both a scientific and political skeptic of what is uncritically accepted as "conventional wisdom" in public policies on population control, energy policy, and environmental "reform." For someone who is so identified and prolific in his vision for the expansion of humanity to Mars and other destinations beyond the Earth there is scarcely a word about that planet. DD



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–X (1–10):

<http://www.moonsociety.org/publications/fiction/MMMSSS.pdf>

Chapter XI:

Mike shuddered at the words of the madman before him. He had no doubt the man actually believed he could take over the Moon and Solar System, and the more he thought about it, the more Mike could see the guy's point.

Earth had come to depend a great deal on the Moon as part of its economic system. As more infrastructure was developed on the Moon, the more value-added goods it could contribute. The solar power arrays in GEO had been built mostly with Lunar materials. Automated factories produced vast quantities of solar cells that were used not just on the Moon but also in GEO orbit. Lunar foundries crafted the aluminum and titanium in the soil into structural members for the solar power satellites, as well as spaceship components to be shipped to L-1 for assembly. Lunar water fueled cislunar space, literally, although that era was coming to an end as increasing numbers of asteroids were being harvested. Fruits and vegetables from the Lunar farms were treasured throughout cislunar space, and were even starting to be exported to Earth, which was already receiving wheat from the 24/7/365 growing capabilities of the farms. Even the use of Helium-3 for fusion power looked like it might be less than ten years away, though there were certainly plenty of other markets for He-3.

However, one thing the major Lunar facilities lacked was any kind of real defensive system. The Moon belonged to everyone, and citizens from most of the nations of Earth had emigrated to the Moon over the years. Unburdened by the ancestral "-isms" that had plagued so many societies on Earth, the Moon was able to develop an extremely egalitarian society. Lunar traders were known for their scrupulous fair-dealing...with everyone. The Selenians couldn't be bothered with enforcing terrestrial prejudices, and so became the marketplace where everyone could trade.

Its protection came from the fact that no one wanted to risk their access to those markets.

Now, a madman was threatening to destroy all of that, and Mike was not going to let him do that. He addressed the lunatic in front of him.

"So what are you going to do? Just bulldoze all of the domes? In spite of all the machinery I saw out there, I didn't see a whole lot of attack capability."

Andrew Cantor looked disparagingly at his prisoner. "You Loonies are so trusting. That's your weakness. You think that since you play fair everyone does. Fools. You'll grant free access to our vehicles because you won't suspect that we're not there to trade. Your unexpected ability to survive our efforts to neutralize you have accelerated our plans, but in a matter of hours that won't matter. Already vehicles full of heavily armed mercenaries are rolling to Ar-malcolopolis and other major facilities. Once those are secure we can mop up outlying installations and establish my rule. Without Lunar propellant, cislunar activity will grind to a halt, while my forces can move at will. Without any space assets, the nations of Earth will be forced to capitulate. With terrestrial production capabilities in my grasp, I can rule the Solar System, and bring humanity to a future it could only dream of in its chaotic efforts to advance. Within a generation humanity could be travelling to the stars, and I will make it happen."

"You're a madman", replied Mike. "Somehow, somewhere, somewhen...someone will stop you. You can't dictate your totalitarian vision of the future to the rest of humanity."

"Marshall, I was considering letting you live long enough to watch your beloved Moon fall before me like a house of cards. However my generals have convinced me that something called the "Austin Powers Effect" is too great a risk. This conversation is at an end. Guards! Escort the Marshall to the surface airlock and throw him out. Without his helmet, and leave his hands tied. Yes Marshall, I know about the emergency inflatable helmet in your neck ring. Too bad you won't be able to reach it. I'm going to go watch your rather satisfying death on the main screen In the control center."

For past articles, Visit http://www.moonsociety.org/publications/mmm_classics/ or [/mmm_themes/](http://www.moonsociety.org/publications/mmm_themes/)

Two heavily muscled thugs grabbed Mike by the arms and dragged him to his feet and out the door. Proceeding down the corridor, they returned to the large cavern full of equipment and headed to a freight elevator that rose up through the cavern and passed into the ceiling high overhead. On the far side of the cavern, Mike could see heavy equipment being moved into a large cargo airlock, with a seemingly endless stream of vehicles lining up for their turn. Mike had slackened his pace to take it all in, and the guards strong armed him forward toward the elevator.

The prospect of death didn't scare Mike that much. Every resident of the Moon knew that death was just a punctured wall, window or faceplate away on the harsh Moon. But...all of those innocents. He couldn't let that happen. How?

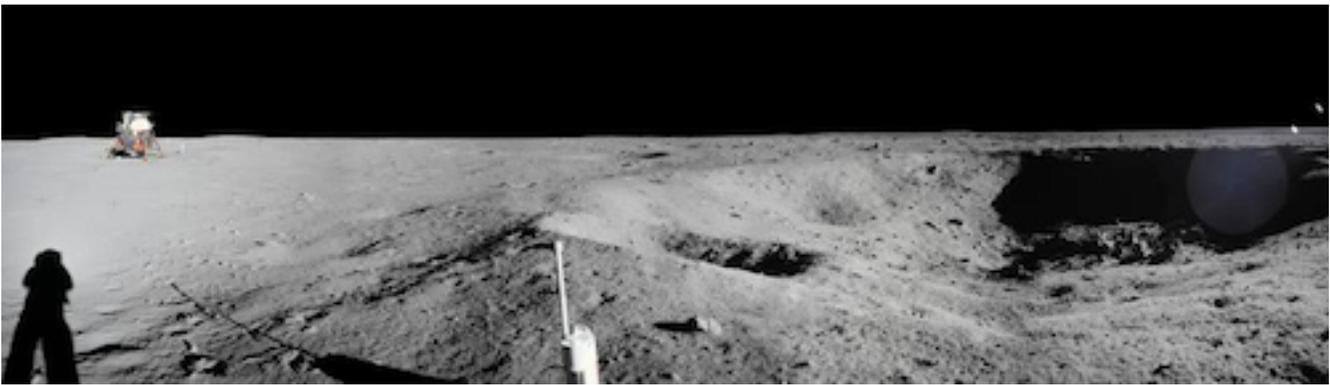
With each forced step, Mike knew their doom was ever more certain. An unfathomable genocide of everyone he knew, and their families, and their friends. And Marshall Mike Moondust was powerless to stop it.

Will Marshall Moondust die gasping on the surface of the Moon? Will countless others soon join him? Will the Earth suffer the cruel depredations of a tyrannical madman?

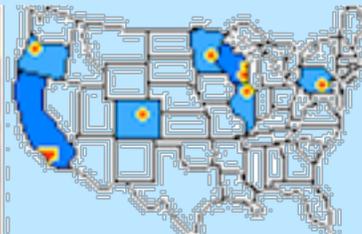
Tune in next month for the next month for the next thrilling chapter of Marshall Mike Moondust and the Sinister Selenian Subterfuge!

MISSED PREVIOUS INSTALLMENTS? The whole series is now online, Chapters I–X (1–10):

<http://www.moonsociety.org/publications/fiction/MMSSS.pdf>



NSS Chapters that share Moon Miners' Manifesto



Space Chapter HUB Website: <http://nsschapters.org/hub/>

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

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 Secretary–Treasurer 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: DEC 14 (SAT in Milwaukee, 1-4 pm)

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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!

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Meeting place changes for some dates: On October 12, and November 9 we will meet down the hall in room G150. The December 14th meeting, our annual Anniversary/Holiday special, will be in room G110 as usual

CALIFORNIA

**SSDS – San Diego Space Society**

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

<http://sandiegospace.org/projects/> – <http://sandiegospace.org/events/> – <http://sandiegospace.org/blog/>

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 – OCT 19 – NOV 18 – DEC 21

Oct. 19, 3 pm OASIS Board Meeting, Home of Phil Turek, 7611 Alhambra Drive, Huntington Beach, CA 92647

Nov. 16, 3 pm OASIS Board Meeting, Home of Steve Bartlett & Tina Beychok, 7108 East Peabody, Long Beach,

Dec. 14, 3 pm OASIS Board Meeting Home of Bob Gounley and Paula Del Fosse, 1738 La Paz Road Altadena, CA

COLORADO



DSS: Denver Space Society fka Front Range L5

1 Cerry Hills Farm Drive, Englewood, CO 80133

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: OCT 3 – NOV 7 – DEC 5

ILLINOIS



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

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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

Meetings 3rd Sat. each month at 2 p.m. - Bourne Plaza, 1441 SE 122nd, Portland, downstairs
Regular Meeting 3 pm 3rd SAT monthly – OCT 19 – NOV 18 – DEC 21

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 meeting location is the Liberty One Food Court at 16th and Market Streets from 1 to 3 p.m. We may meet at the Franklin Institute during Space Week or, possibly, in University City (per Mitch). The November meeting will be held at the Cherry Hill Royal Crowne Plaza Hotel, on Route 70, in New Jersey, on November the ninth (a Saturday), at the restaurant in the hotel. This is the PhilCon site.

September 21, 2013 Meeting Report:

Larry gave our first report on web visits, about average, and the ongoing interest in our activities on Facebook. Our discussion turned to the desirability of buying a Meet-Up space on Google to attract new members, or, continue going to other groups with sites that have space exploration or science fiction themes. With our treasurer present we talked about the cost (about \$140 per year) and the possibility of needing the money in our account for other costs (like paying for Moon Miners!). The upshot of our talks is that our members who are going to Meet-Up sites will invite people to our PASA site and Facebook page. If some of them join us we will revisit the paid for site idea. Larry informed us of several additions to our blog area: Janice has created a posting on G.M.Os (not space material) and Michael Stewart posted “Steel Astronauts and Space Progress” (title help from Larry). Mitch also has sent material for the blog and this should appear soon. Larry has been waiting for contact from Charity Blossom and they have not updated him for more than a month. Nobody can donate to us via that service.

Dorothy highlighted activities on the Intrepid first with several demos running to the end of the year including “Poof! Life in a Vacuum” about the effects of vacuum on someone’s body, “Launching into History: Project Mercury” through October 27. There is also ongoing work on the Enterprise Pavilion and there are films. Dotty’s information notes that the interior of the Intrepid is off limits. Her report also included material on the A.M.N.H. and the ongoing showing of “Journey to the Stars” and the museums Space Tour. There are many great individual exhibits as well. And then there is the New York Hall of Science in Queens (more on that location later!) with some interesting material that may be available on the museums website: Spaceship Earth: Visions, Forecasts and the Future That Never Was. This presentation happens on October 13 from 7 to 11 p.m.. Check at the site: info@nysci.org. She also brought a lot of material that she and Larry have donated to our group including an interesting presentation at the 1980 Philcon, by the then editor of Omni magazine, Ben Bova. And Isaac Asimov’s predictions for the future made in 1964! More on this “in the future”.

Mitch brought the September/October issue of the Futurist with “Mind Control of a Quad Copter” done by several college students. See the publication. We talked about this applied to spacecraft control during flight maneuvers. Mitch has a letter requesting time at the Center City Septa Concourse and may get approval at any time. This will be between 2:45 and 7:15 p.m.. His other continuing effort is to get us a space in the University City cam-

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pus complex to speak to the students to bring some members in from that population. And: Dotty and Larry and Mitch have all tried to contact the PhilCon committee about a table at the upcoming Con and have not, at this time, had a response. On the other hand: Mitch asked Dennis Pearson, region 7 Chapters Organizer, if we could get material support from N.S.S.. For most things: no, but, we, as a chapter in good standing, can have Ad Astras free for distribution at public events. Brochures must be downloaded from the N.S.S. site at this time (no more multicolor brochures from headquarters). All of this is separate from the habitat project possibilities (see below).

Rich Bowers is continuing being the lead on the Habitat display project and brought several components from the Home Depot: the “Homer” bucket and a Styrofoam beverage container that happens to nest inside the bucket. This generated considerable talk about how to populate the inside of this hab structure and the educational uses that this idea, the hab, might be good for. We continued considering possible miniature models and how to incorporate them into a viewable interior assemblage. “Forced Perspective” was brought up and we came up with the idea of a deliberately channeled viewing system to allow an individual to look down into “the deep view of the interior”. Dennis and I had talked briefly about using a 3D printer for some display elements, but, it is possible that someone we know could build part of the display using his “printer”! I will report more on this if it pans out: the idea is to taper the insert, and shrink the interior building elements etc., to give the “forced perspective” that would make the viewer feel that the model looked like it could become real with their help. If you want to look at our starting component you can find it at The Home Depot for \$2.50 (“Homer”) and \$2.00 for the Styrofoam cooler we tried initially.

Hank Smith brought more flyers about the PhilCon between November 8 to 10 and we are waiting for word from the event coordinators. The meetings conflict and the Philcon group meets outside of the city. This is a bit frustrating, but, as with other volunteer organizations, they tend to come through in a pinch.

Dennis is considering running for Region Seven Director when his term as Chapters Coordinator is ended. Our members will support him when he runs. Go, Dennis! (did I mention his educational outreach ideas?). On space flights: he noted that in early September two spacecraft, including a lunar probe, were launched from Wallops Island. This is the first time a probe to another body has been launched from there, and, there are likely to be more. He reported that NASA has selected a company, Craig Technologies, to do long term storage of Shuttle era technology (so we don’t lose things like we did with Apollo). He has also pointed out that NASA is going to make seats available commercially on a new transport system it will develop. Pardon my cynicism but I will believe it when I see the committed, non-divertible, funded manufacturing system in place.

Earl, your correspondent, brought a number of articles and reports, including a new nanotube brain probe, but I will instead talk about another fun event; The 2013 East Coast Maker Faire! As reported before Michelle and I are interested in new technologies that allow us to do interesting and fun things. The Maker Faire, on September 21 and 22 at the Hall of Science in Queens New York, looked like we could see the tools to do those fun and interesting things. And about 15,000 other people came to have a look too! Many of the exhibits were about the use of 3D printers, or, offered the use of that technology to build things you have created “C.A.D.” files to describe. The files tell the tool, a device that lays down fine strips of plastic in a rigorously controlled manner, how to do this. There are a number of these devices being brought to market to serve the diverse D.I.Y. movement. The Faire had tutorials, alternative lifestyle displays (think Steam Punk and Manga) educational outreach for children, parents and teachers, and lots of booths selling parts, kits, and assembled systems for the printers and other neat things. What does this have to do with space exploration and habitation? A number of objects being offered were from science fiction and fantasy, true, but there was quite a few “builds” of real looking space hardware. Some of it was real: N.A.S.A. had several displays that included models of both the spacecraft that had reached them, and, the objects that they have explored. And a number of people doing outreach on future explorations.

And for next January: one of the people, Zack, noticed me picking up what looked like a small circuit board with some small wires sticking out from it. He explained that this was a complete satellite that will be launched (with a number of others) in four months! The site I was told of is: kicksart.net. Zack had heard of the N-Prize as well as the X-Prizes, but, this is not being done to participate in those challenges. He said the devices will operate in the 70 cm ham band, and, that there is a cheap (\$25!) dongle that can be used to pick up the telemetry from these satellites.

I was not entirely accurate about what the printers can do above: there are a number of services, with much more capable (and expensive) machines that can make your ideas in Silver, Gold, Titanium, Stainless Steel. You get the idea. You may create several iterations (insert your number here) using the tabletop unit you, or your local hackerspace.org has available, then, working with the specialty materials company, your finalized product, gift, or satellite mechanical element, can be produced. The key to doing this is the combination of very easy to use, and often free, C.A.D. software that allows “the rest of us” to make what we are creating in our minds into a tangible object via the printing technologies. Those who have read this column in the past have seen comments I have posted from many publications that include using the printers on the I.S.S. and onward and outward. If you can: go to the Faire here or in California and enjoy yourself! Bring the kids and grandkids!

Earl Bennett, KD2CYA, President, NSS=PASA

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INDEX to MMM #269 OCTOBER 2013

- 2 In Focus: Turning the Annual Shrinkage in NASA's Budget into "a Good Thing" – by Peter Kokh
- 3 Covering Up Lunar Habitats with Moondust – Precedents here on Earth – by Peter Kokh
- 5 New NASA Composite Cryogenic Fuel Tanks could help open the Moon – by Peter Kokh
- 6 The future of NASA human space flight and space commerce – by Phillip Crume
- 7 International Politics: America's two-faced Collaboration with China – by Peter Kokh
- 8 How can we Stimulate Greater Use of the International Space Station? – by Peter Kokh

Moon Society Journal Section

- | | |
|---------------------------------------|--|
| 9. The President's Report | 10. The Problem of Failure to Connect with Younger Generations |
| 11. Moon Society's Vision and Mission | 12. Chapter & Outpost News |
| ----- | |
| 13. Browsing Links | 14. Salute to Lori Garver: Book Review |
| 15. Moonscapes Fiction | 16. NSS-MMM Chapter News |

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