

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

Moon Miners’ Manifesto

& The Moon Society Journal

www.MMM-MoonMinersManifesto.com

<http://www.extravaganzi.com/wp-content/uploads/2011/05/Space-Adventures-Lunar-Mission-1.jpg>



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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.**
- **Submissions by email** to KokhMMM@aol.com – Email message body text or MS Word, Open Office 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 MMM's Year #30

By Peter Kokh

In the coming year, the last of Moon Miners' Manifesto for which I will remain editor, we are planning a number of summary issues. The list, and its order, may change, but as of this writing, here is what lies ahead:

MMM 291 – **Are we alone in the universe?**

MMM 292 – **Getting “away from Earth,” its civilization, distractions, and problems**

MMM 293 – (annual Mars issue) **What we still need to learn about Mars**

MMM 294 – **Me and Mine “now” > Mother Earth > Mother Earth/Father Sky > Solarians**

MMM 295 – **The Inner Solar System: What we've learned in the past three decades**

MMM 296 – **The Outer Solar System: What we've learned in the past three decades**

MMM 297 – **How our movement into the Solar System could change Civilization down here**

MMM 298 – (open)

MMM 299 – (open)

MMM 300 – (open)

MMM 201 – **If I had the chance to move to the Moon alone, where would I settle, my needs and goals**

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Musings About Lunar Tourism

By Dave Dietzler

Got \$750 million?

Excalibur Almaz and Space Adventures have declared a price of \$150 million per seat for a lunar fly-around. The Golden Spike Company is offering lunar landing adventures at \$750 million per seat. See: https://en.wikipedia.org/wiki/Tourism_on_the_Moon

That's all really exciting but we have yet to see if these companies' plans ever materialize and if they do only the billionaire class will be able to afford the trip. It would be more thrilling if lunar tourism for the masses of individuals willing to take out a huge loan and live in a smaller house could afford to go. We can be rather certain that space travel will always be somewhat expensive. Even so, it should someday be more affordable than this. Many people will seek jobs in space and the company will pay all their travel expenses. Mars colonists might sell everything they own and buy into a community owned company hell bent on taming the red planet. So there will someday be other ways to get into space besides buying a ticket on a commercial spaceship cruise.

Things will progress in steps. First, we need to build a reusable space plane like the British Skylon and build inflatable hotels in Earth orbit launched by commercial rockets.

Building a vehicle to travel around the Moon won't be much more difficult than building an orbital hotel, but providing fuel will be costly. Falcon rocket upper stages with reusable engines could be clustered together and attached to an inflatable module and solar panels along with some other devices. Rocket fuel and oxidizer would have to be shipped up from Earth's surface and that would definitely jack up the price of using this vehicle. It might be cheaper to obtain propellants from the Moon and someday even NEOs. This would require a rocket that can burn lunar sourced propellants and substantial lunar and outer space infrastructure to supply those propellants. That infrastructure would have to last long enough with very low maintenance costs to pay for itself and turn a profit or it just won't happen.

We might land some automated bootstrapping packages on the Moon, actually prepare something there for tourists and provide propellant for landers and orbit-to-orbit ships too, but that will require some real smart machines. Artificial intelligence is not as crucial for Moon mining robots as it is for robotic asteroid mining systems. Teleoperation from Earth is possible for machines on the Moon, an advantage Mars and so called NEOs lack.

The market for lunar propellants would grow beyond the needs of the tourism industry. If we could supply metallic fuel and LUNOX to passenger ships we could supply it to Mars colonists also. Somehow I think the Moon will supply near space before asteroid miners do. I think AI asteroid mining ships will rely partly on lunar materials for their construction and propellants.

It is always possible that SPS becomes the only realistic way to power future civilization on Earth or helium-3 mining for fusion reactors becomes big business and lunar tourism can ride on the coat tails of big industry in outer space and on the Moon.

Mining the Moon

At the heart of a robotic bootstrapping operation on the Moon could be Dr. Peter Schubert's Lunar Dust Roaster and All Isotope Separator to get Al, Fe, Si, Ti, K, Na, P, S and Oxygen. See: <http://nsschapters.org/hub/MoonRockstoSaveEarth.pdf/> Excess silicon not needed for thin solar panels could be smelted with the CaO-MgO slag produced by his machine and magnesium could also be obtained, given the right equipment There would be CaSiO3 slag that could be cast into blocks. If metallic calcium was desired for power cables we could just hit the slag with fluorine gas to evolve SiF4 and oxygen and just decompose the SiF4 with heat to get silicon and recover fluorine. The metals would be powdered and run thru 3D printers to make parts that robots would assemble to make complete machines for mining, smelting, transportation and storage. Some of the powdered metals could serve as rocket fuel when mixed in a slurry with LOX to make a monopropellant pressure fed into rocket motors. See: <http://www.wickmanspacecraft.com/lsp.html>

There's no use fighting City Hall. "They" will go to the polar regions to mine ice for water, LH2 and LOX. These could be the propellants preferred for inter-lunar ships. The big question is: Can that ice really be mined? What if it exists as sheets of ice harder than steel at super cold temperatures? If it exists as crystals mixed with crater floor regolith it could be shoveled up and tossed into an onboard furnace that uses waste heat from a small nuclear reactor to warm the material up and cause the ice to sublimate. The machines will have to carry their loads out of the dark craters thru uneven terrain under super cold conditions that embrittle metal so bad that hitting a rock cracks a wheel. If this can be done then the water could be processed to LH2 and LOX at a robotic base and rocketed up to LLO or EML1 to fuel ships.

It will come down to a race between polar crater miners and miners who base on a mare coast to access both anorthositic highland regolith to get aluminum and oxygen and mare regolith for basalt, magnesium, iron, silicon and perhaps titanium as well as oxygen.

What if it turns out that oxygen and metal powders from regolith are cheap and abundant while polar ice derived hydrogen and oxygen are expensive and less plentiful??? Would we dare to bastardize everything and con-

vert hydrogen to silane by combining it with abundant silicon and use silane as a carrier liquid for powdered metal fuels in bipropellant rockets with liquid oxygen from numerous areas? Bipropellant rockets might be much safer than monopropellant rockets and achieve higher performance, therefore they would use less propellant mass.

Mining in the mare means predictable solar energy from an easy overhead angle. At the poles sunlight is horizontal so we'd need solar panel towers to tap that energy. The mare also offer easy level ground to work and travel on. The temperatures are not that extreme except at night when everything would power down anyway. Near Shackleton there are areas of prolonged sunshine but the northern polar regions are closer to the mare or mare-plex and more hydrogen has been detected there.

So the future is "through a glass, darkly" with competing interests and no way to tell what would be the best strategy for harnessing the resources of the Moon.

Atomic Rockets?

Theoretically, a nuclear thermal rocket could lift off from Earth and reach the Moon with but one single stage!!!! The problem is that keeping the LH2 cold for three days to the Moon would probably be impossible. We'd have to lift off from Earth and reach escape velocity with LH2 propellant and land on the Moon with space storable water. This complicates the vehicle and makes it less attractive to use nuclear power. We could blast off from the Moon with water as propellant in the NTR but LEO re-entry might require aerobraking instead of retro-rocketing.

Using water and NTR is no more powerful than LH2 and LOX and requires just as much propellant mass therefore a large rocket; however, water is much denser than LH2 and LOX so it uses a smaller fuel tank and that means better mass ratios can be obtained and better rocket performance with nuclear.

The problem is, everyone is afraid of a flying nuclear reactor.....

I'm not scared. Anybody close enough to be exposed to radiation from a crashed nuclear rocket would be close enough to be killed outright by the impact. The engine would bury itself deep beneath the dirt or sink to the bottom of the sea, and there are millions or billions of tons of uranium already dissolved in seawater!!!! So nuclear rockets are not that dangerous, but they are no panacea either.

The Moon is a Harsh Mistress

If you dare to be crazy, ask, " Why doesn't the government start up a space tourism enterprise with a set of ships made on assembly lines to reduce costs and take billionaires to the Moon at first and eventually middle class citizens when the price of doing business in space comes down?" Sounds like a way to raise revenue without taxes.

If the idea of a "Space AMTRAK" is too hard to swallow then the US could at least sell LH2 and LOX from lunar polar ices to commercial operators in the future, since NASA seems to be hell bent on challenging the lunar poles. Meanwhile, asteroid miners have "platinum fever" and their AI robotic mining ships will need propellant if they are ever to get out of LEO!!!!

Is it worth going to the Moon and erecting the necessary infrastructure or would it actually be cheaper to use mass produced unmanned cargo rockets and shoot propellant up to LEO???? And cannibalize all the upper stages for scrap metal in space or use as is for fuel tanks and habitation modules....and have a flyback booster that can be reused for the big rockets that we crank out the way we did Liberty ships for the war effort long ago????

I don't have a magic looking glass. I do think that where there is a will there is a way. There could be defense projects on the Moon. Could giant ruby laser rods be grown in the low gravity and pristine vacuum of the lunar surface? This would require aluminum oxide and chromium which are both available on the Moon. Lasers might not just shoot down enemy aircraft and missiles but make fusion reactors possible to. What about a missile base on the Moon that launches tungsten rods amassing about 20 tonnes at 20 kps that impact the Earth with the force of one kiloton of TNT? These could replace nuclear weapons. The great thing is that they would release no radioactive fallout. However, weaponizing the Moon would not only be sacrilegious to many people, it could also mean an arms race in outer space. The Pentagon would not be interested in taking tourists to the Moon. So this is no path to lunar tourism, Mars colonization and asteroid mining. **DD**

Up West on the High Frontier

By David Dietzler

Have Spacesuit Will Travel

Eventually there will be solar farms and power grids and electric railways on the Moon and Mars. There will be stage coaches that travel between rail stops and out of the way places off the RR lines. Space cowboys and miners will have their own open cockpit and pressurized cabin vehicles. Perhaps these will be one man vehicles. Instead of horses they will ride their personal rovers out into the wilds with nothing but a spacesuit, a radio, some dried corn, salt and beef jerky. In real rough terrain there will be walking vehicles or mecahanical horses and donkeys with robotic legs.. Bush pilots will operate suborbital rockets across the Moon and Mars.

Entrepreneurs will go up to the Moon and Mars to make spacesuits, vehicles, machinery, instruments, produce food and booze, etc. The way to get rich is not to mine the gold or other precious metals but to mine the

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miners for their money and sell them all the stuff they need. Everything in the saloon will be made of metals, glass and basalt. There won't be any cheap wood or paper but there could still be plenty of beer and whiskey. Poker chips could be made of metal or basalt, and playing cards made of real paper or cardstock from various fiber sources will be pricy commodities. What the women who hang out in saloons will be wearing is anyone's guess. We can only be sure that clothing will be at a premium depending on how much fiber production is possible in growing chambers. Martians will have access to synthetic fibers given the comparative abundance of carbon, hydrogen and nitrogen on Mars. Lunans might import clothes from Mars for a lot less than what it costs to buy them from Earth or produce them on the Moon!

This will be a job for hundreds of different companies. No centrally planned socialist program could ever open up outer space the way free entrepreneurs opened up the old western frontier. There might be government cooperation between the big RRs and whoever is in control of various territories up there as there was out west....but it is also likely that space colonists will declare their independence and establish their own nations!!!! What a dream!!!! Towns will need a martial, deputies, territorial judges, jail house, courtrooms, crime labs and even zero pressure execution chambers for the meanest of criminals.

Night and Day

Nightspan would be no problem for any base on the Moon anywhere that has access to the circum-lunar solar power grid. Mining might shut down at night because the super cold makes metals brittle and machines might hit rocks and crack....but LSS and farm illumination would be no problem and indoor and lee-vac manufacturing could continue throughout the night. Mass drivers could still be operated. Some smelting could still be done. It makes sense then that building the circum-lunar power grid is one of the first big projects to tackle on the Moon once a substantial foot hold is established there. After the grid comes the railways. Then it will be possible to trade all over the Moon for various resources and it will be possible for tourists to really do some sight seeing. Off the beaten path of the railways could be resorts in real scenic badlands that are accessed by lunar "stage coaches" that travel between rail stops and out of the way places. The mare or mare-plex would be the territory to build the railways on. I am not so sure about the feasibility of railways in the highlands at least not for some time to come. This increases the value of the mare and coastal locations. There would also be suborbital rocket travel but that might cost more than going by train and certainly trains would be the way to convey heavy cargoes.

On Mars the circadian cycle is 24.5 hours long. It will be possible to store energy for nightspan power when it becomes super cold on Mars so there could be power even without access to a globe circling power grid that taps power from the dayside. Solar powerplants might use sheet magnesium troughs and metal boiler tubes to drive AC turbogenerators. Heat could be stored for night in cheap tanks of molten salt or even simple concrete blocks. This would cost less than batteries, fuel cells or flywheels that store electrical energy from silicon photovoltaic panels.

The Calcium Connection

Calcium cables have less resistance than aluminum cables like the ones used for long distance power transmission on Earth, so metallic calcium is desirable but not a lot is known about its metallurgy. How do we draw fibers to twist into cables?? Calcium like GGCs (glass fiber reinforced glass matrix composites) and basalt fiber reinforced cast basalt composites are all lunar materials that demand more research. They might be useful on Mars to. Cable resistance depends on material, length, temperature and width of cable. A wider cable offers less resistance than a narrow one, but then it is heavier. On the Moon weight is not so critical and there will never be storms that knock down cables or towers....so big fat calcium cables might be just the ticket for long distance power transmission on the Moon. Calcium could sublimate in the vacuum so we'd jacket the cables with aluminum and that would reflect heat off the cables to and keep them cool. That's good because resistance increases with temperature. There can be no doubt that the circum-lunar solar power grid can be built and the Mars colonials might want one to.

Bootstrapping

Dr. Schubert's Lunar Dust Roaster and All Isotope Separator could probably be modified to work on Mars to. Most of the device can be made of glass, basalt and metals like steel produced on the Moon and Mars. The platinum bushings and thorium oxide free-fall tube present a problem. Importing these would be expensive. Mining millions of tons of KREEP for thorium present at just 10 to 50 ppm might be difficult. It might be possible to substitute aluminum or titanium oxides for thorium oxide. To survive the heat of the machine they could have cooling passages drilled in them attached to pumps and space radiators. We don't need to heat the free fall tube with RF. We just need to heat the molten streams of material in it until they dissociate into atoms of metal and oxygen. Platinum is out there in asteroids and it is also present on the Moon. Regolith contains a few tenths of a percent of meteoric iron-nickel particles that can be harvested in large quantities with straightforward magnetic separator equipped mining rovers. This material could be processed in Dr. Schubert's device to get iron, nickel, cobalt, germanium and platinum group metals. Platinum bushings would also be useful for drawing basalt fibers. Could they be needed to draw calcium fibers to? Platinum is also used for hydrogen/oxygen fuel cells. Lunar platinum mining could take off before asteroid platinum mining especially if we locate a metallic asteroid impact site that is particularly rich in iron particles. The key to success in space is using on-site materials and wasting nothing. ##

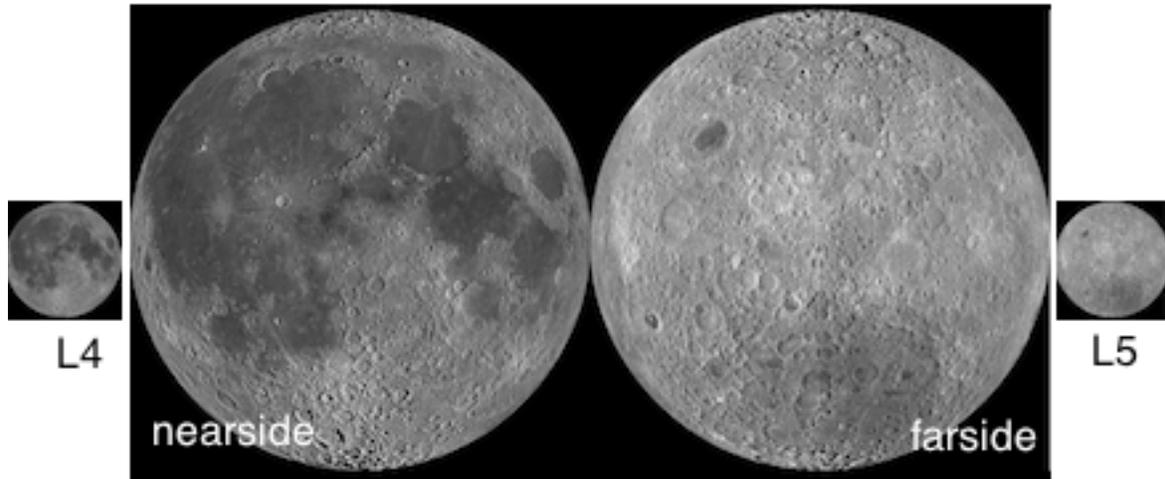
Opening the Lunar Frontier: The Role “Working Tele-Tourists” can play

By Peter Kokh

The MMM “Tourism” Theme issue – http://www.moonsociety.org/publications/mmm_themes/mmm_tourism.pdf has many articles on the rise and role of Tourists In opening the Moon, boosting its economy, and developing its culture. We encourage you to scan through these articles selected from MMM issues 1–250;

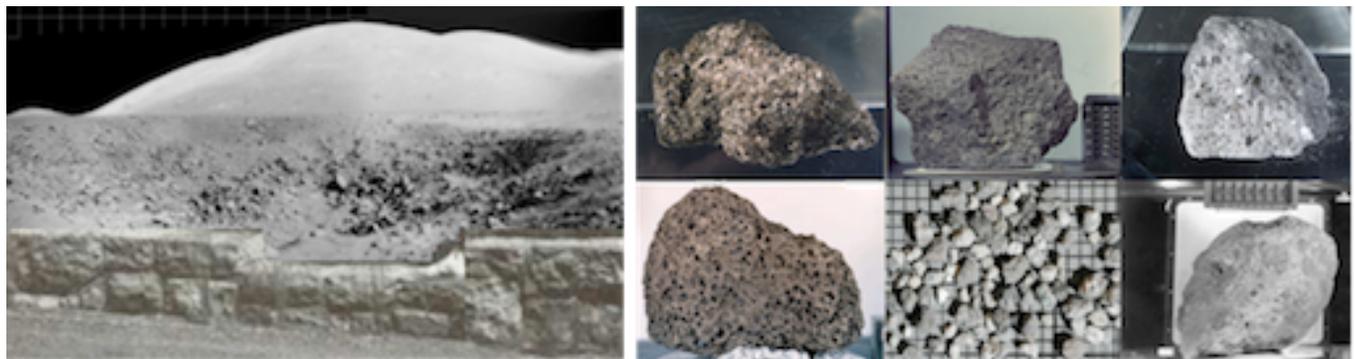
But even before the first paying tourist sets foot on the Moon, tourists might have a significant role in paving the way, by various things achieved on the Moon through teleoperation, without the costly steps of landing them on the Moon itself, and then bringing them back into free space.

Of particular assistance will be **Teleoperation of jobs that are too time consuming for paid personnel or that can be accomplished by robots on the Moon, teleoperated from areas in space that have an advantage over teleoperation from Earth’s surface either in cutting the delay time, or in reaching areas of the farside not in direct line of sight from Earth.**



Nearside/Faride Teleoperation from 100,000 Km/62,000 mi above central nearside with 2/3 second time delay
Earth–Moon L4 and L5 locations Teleoperation from 383,00 Km/238,000 mi above the left & right flanks of the Moon only marginally visible from L1 or L2 – but from the same distance as from Earth (3 second time delay)

Kinds of Jobs and tasks achieved by robots controlled from space by paying tourist workers



Left: Creating trails, overlooks, cuts through ridges **Right:** Collecting needed rocks of specific types for arts & crafts, science or various other purposes

Other tasks performed by tourists from key spots above the Moon.

- Operating equipment to create landing pads, assemble modules to make an outpost
- Constructing rocket land and launch pads
- Scouting trails
- Operate equipment to cover modules with needed shielding
- Assemble anything shipped as parts (to occupy less space in cargo holds, for example).

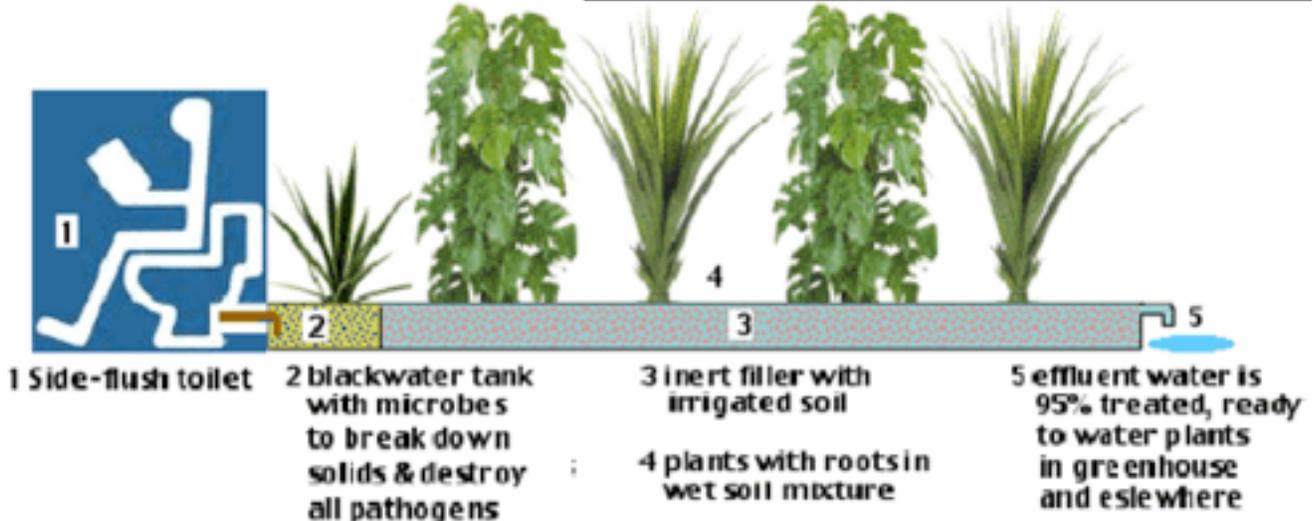
The potential opportunities for paying tele-tourists to pave the way for actual human crews to do what only humans on location can do is significant. And it will save considerable money. PK

“Cleaning up” the Wolverton Black Water Treatment System

By David Dietzler

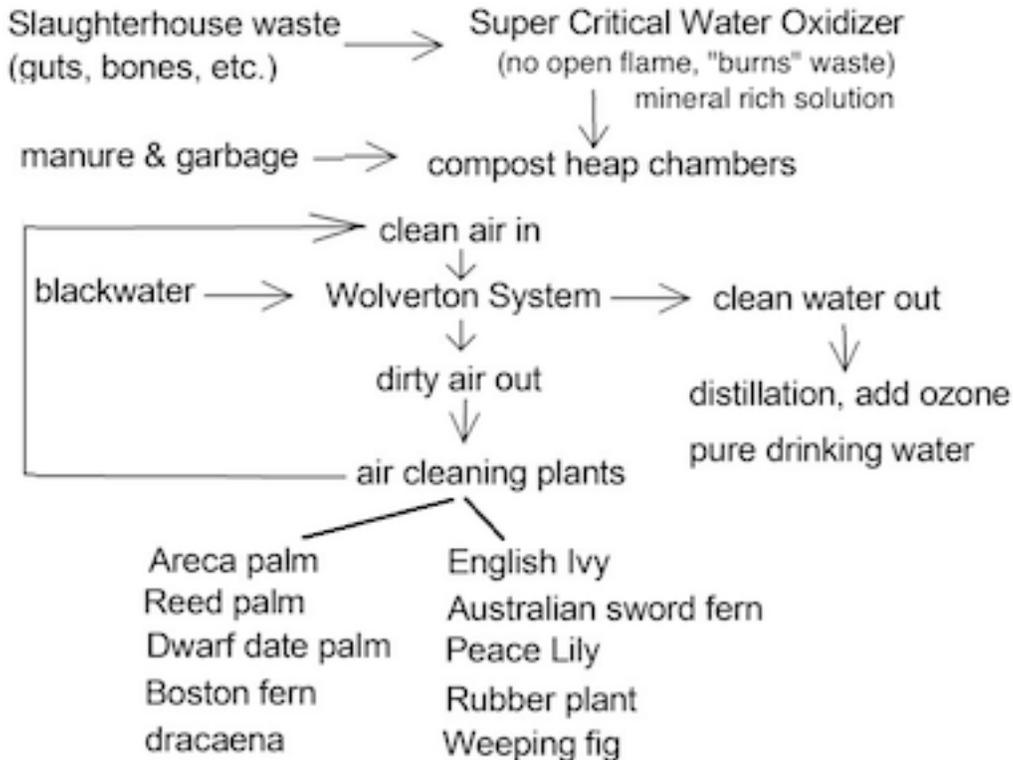
In previous articles about waste water treatment in modular outposts and/or homesteads. Peter Kokh has suggested the Wolverton System designed by a retired NASA environmental systems specialist and installed in his private Houston area home (and tolerated by his wife “if it stinks, I’m leaving.” – She stayed long term.). Kokh suggested every “Habitat” and “Activity Module” be so equipped, greatly reducing need for central systems.

Each Habitat or Activity Module would have a **Wolverton Black to Gray Water Treatment System**



Odorless system fills each module with sweet fresh air and lush greenery

Below is my attempt to improve this system, tackling its weak points



You may ask, “why, after Wolverton treatment do you want to distill and add ozone to the water?” simple, I don’t want any spores or viruses in the water....it has to be 110% pure....ozone kills more viruses and pathogens than chlorine, an element we have little of on the Moon. ##

Bad attitudes can torpedo Our Space Dreams	Right attitudes lead to success
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Bits of wisdom collected from various sources (some unknown) by Peter Kokh

Is the Moon a wasteland? "There is no such thing as waste, there are only resources we are too stupid to know how to use." – Arthur C. Clarke – to Walter Cronkite during launch of Apollo 13

We must develop the habit of dealing with anything and everything lunar/Martian in such a way that the Moon/Mars becomes a place where we will have learned to become truly native.

Humans have a vital role in space exploration and exploitation. Consider these headlines: "Mars Rover Finds Interesting Rock" and "Mars Astronaut Picks up Rock, Discovers Critter."

Which one would create a storm in the world's media? – Bob Clarebrough

Be a Doer, not a Watcher. The watcher is likely to be disappointed. The doer has the comfort of knowing that he has tried, and perhaps laid foundations, for others who follow, and may reach the goal.

If the forces of creation deserve our worship, they do so from every corner of the universe, not just from this nest-world we call Earth. This we cannot do by staying home.
Go and fill ye the empty cosmic spaces and let your soul sing in praise in endless new ways

A reasonable man adapts himself to the conditions that surround him.
An unreasonable man adapts the surrounding conditions to himself.
All progress depends on the unreasonable man. – George Bernard Shaw

"The Best Way to Predict the Future is to Invent It!"

A project that isn't difficult, is probably not worth doing!

No grimmer fate can be imagined than that of humans, possessed of godlike powers, confined to one single fragile world. -- Kraft Ehricke

The successful pioneer is one who, coming upon a roadblock, looks at it from different perspectives, until he/she sees it as a great opportunity. – Simon Cook

It is those of us who are "unrealistic" who will create the future.– Simon Cook

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

"Do not go where the path may lead. Go instead where there is no path, and leave a trail." – Mongolian proverb

The cure for boredom is curiosity. There is no cure for curiosity.

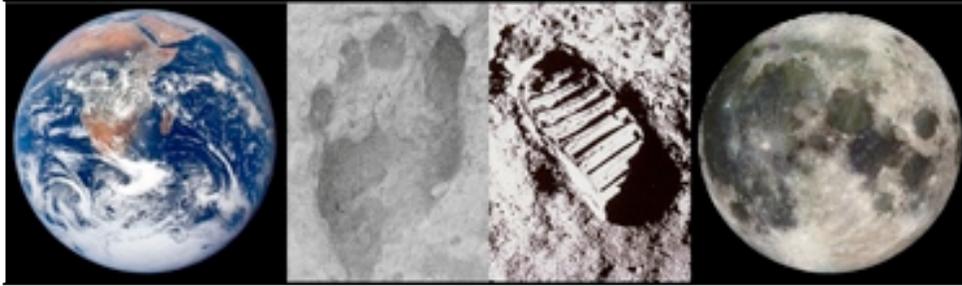
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"The Best Way to Predict the Future is to Invent It!"

To build a bridge one must have knowledge,
To know where to build it one must have wisdom.
– Charles V. De Vet

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



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

The Moon Society Journal Section (pages 9–12)

About the Moon Society

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

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

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

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

Moon Society Mission: to inspire and involve people everywhere, from all walks of life, to create an expanded Earth–Moon economy that 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

State of the Moon Society

Very soon now I'll have the State of The Moon Society finished and distributed to members. The main gist of it is that members need to be involved in spreading information about our Moon, and we need interesting projects to help get us moving forward towards a human future on the Moon.

There is no question that there is increasing interest in our Moon on a global scale. The new head of ESA has publically discussed the possibility of a Lunar village that would support a variety of science, including radio astronomy. The Russians are interested in developing Lunar capabilities, and the Chinese have expressed interest in developing Lunar resources. The only outlier seems to be NASA in the U.S., which is monomaniacally focused on the #Journey2Mars. The roots of this focus may be generational, with the increasing stridency reflecting the fact that the younger generations have not been groomed or cultivated to succeed the generation in power.

Younger audiences are interested in our Moon. They never experienced Apollo, and it has attained almost mythical status, as it is something we clearly cannot do now. They hear these stories about how awesome it was in the past, but there is little that can be pointed to now that matches that awesomeness. The kids also have little investment in the Mars obsession, making it easier for them to consider other options on how to move forward into the Solar System.

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

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

What has to be understood is that we are on the cusp of change. There are now more voting age Gen Xers and Millennials than there are Baby Boomers, who have been monopolizing their power since the 1980s. The recent election results in Canada are one example, where there are now very few people in major positions of power over the age of 45. That same shift will occur in the U.S. over the next decade, though it will be fought tooth and nail, and the Baby Boomer generation has way more resources at their disposal. Just look at the salaries over at CASIS as highlighted at NASAWatch (<http://nasawatch.com/archives/2015/10/examining-staff.html>); Look at the salary levels for the few positions posted at NASAJobs (<http://nasajobs.nasa.gov/default.htm>) – sorry kids, those jobs aren't for you. More than 50% of NASA are over the age of 50, meaning they're in the latter stages of their careers. I shudder to think what the payroll looks like...

In the space industry, the various space conferences reflect the status quo. Few speakers or panelists are under the age of 50. Those who are tend to be the 'go to' for speakers, and so you see the same few faces over and over. This has to change for the space industry to be seen as a vital one and important to the future. We've spent decades collecting data (what some call 'exploring'), now it's time to make use of it and figure out how to use space to our advantage. It's time for younger voices; the torch must be passed, and will be.

That's where the Moon comes in, because that's where we will learn how to live and work off-Earth. More of the rest of the Solar System is like our Moon than either Earth or Mars, and so assuming that the Solar System, and not just Mars, is the goal, it just makes sense to practice in a sandbox close by. The Moon is our 'Sandbox Mode' for the rest of the Solar System. It's where we will prove out the equipment and procedures and policies before heading further out. It's increasingly recognized that our Moon offers resource and energy opportunities, both of which are critical, if not fundamental, to a sound and prosperous economy.

That's why the message of The Moon Society, "That one day, humans will live and work on the Moon" is so important and relevant right now. We need you, the membership, to help spread that message. Be it through supporting local community events, or writing editorials for the local paper, or wasting your time writing Congress, or helping to support Lunar initiatives (do your research first!), even going to conferences and helping to pad out the audience in the Lunar talks. These are all ways that the membership can help spread the word that a new Moon is waxing, one that can change all of our futures for the better.

As always, feel free to drop me a line at president@moonsociety.org if you have any questions, comments, or TMS projects you'd like to head up. These are exciting times; let's dial that excitement up to 11!

How Well are “Joint” National Space Society/Moon Society Chapters working?

By Peter Kokh

According to an agreement signed by both The National Space Society and The Moon Society at the 2005 International Space Development Conference in Washington, DC, the two organizations will work together on many fronts. One of these is approval of “Joint Chapters.” – www.moonsociety.org/reports/affiliation_report.html

2005.05.22 – On the final day of the 24th Annual International Space Development Conference of the National Space Society, held at the Sheraton National Hotel in Arlington, Virginia just across the Potomac River from Washington, DC, Moon Society President, Peter Kokh, and Chairman of the Moon Society Board of Directors, Randall Severy, signed a simple document by which the two organizations recognized a new status of close collaboration. The Moon Society will remain independently incorporated, and be listed, not as an “at large special interest group” or as an “at large chapter” but simply as an “**affiliate**” organization. Signing for the National Space Society was Gary Barnhard, chair of the NSS Executive Committee.

Part of this agreement was the recognition of “Joint Chapters” in which an existing chapter of either organization that has at least two members of the other organization will be considered “Joint Chapters.”

Currently, the five (5) chapters listed on page 12 of this issue are NSS chapters that also serve as chapters of the National Space Society: **Milwaukee, St. Louis, Phoenix, Tucson, and Clear Lake (Houston)**. All Moon Society chapters are now fully merged chapters. This brings more talent and member support to both organizations.

No “Moon Society only” chapters have survived.

Members of these merged or joint chapters share **Moon Miners’ Manifesto**

We will be sending to the leaders of each of these, a list of current Moon Society members within 50 miles of the center of the chapter area. They will be encouraged to reach out to each of these potential members. Now not all members of either organization wish to take part in activities at the local level. Only some will take up the offer. But hopefully one or more of the above organizations will earn the title “Officially merged.”

MMM Readers will note that MMM has two “Chapters” sections. The one on page 12 includes Moon Society only (none, currently) and “merged chapters.” The other “Chapters Section” towards the end of the publication list National Space Society only chapters whose members receive Moon Miners’ Manifesto.

These five (currently) are our “joint inclusion” targets, listed above. Stay tuned. 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 – Lunar Frontier Settlement – www.moonsociety.org p.3



20 years ago, November 1995. Moon Miners' Manifesto #90 began serving the Artemis Society, whose members transferred to the Moon Society August 2000.

By Peter Kokh

How Moon Miners' Manifesto came to be – on Saturday, August 23rd, 1986, representatives of the L5 Society chapters in Chicago and Minneapolis–St. Paul met with L5 Society members in the Milwaukee area at the Red Carpet Hotel during the Triangulum Science Fiction Convention. Among our “colonizers” several are still active. From Chicago, Larry Ahearn. From Minneapolis–St. Paul Dave Stuart (now in Seattle), Ben Huset, and Scott Shjefte. Myles Mullikin agreed to chair follow-on meetings. Fifteen of us attended the first follow-on meeting. When it came to picking officers, Peter Kokh’s work schedule was too chaotic to guarantee meeting attendance, so he volunteered to put out a newsletter instead. We all seemed to be focused on the Moon. The chapter would be called the Milwaukee Lunar Reclamation Society L5 and Moon Miners’ Manifesto would be the name of the newsletter, ten issues a year.

How MMM came to serve several National Space Society chapters

Copies of the first few issues were sent to a number of L5 Society chapters, and Seattle L5 decided to come aboard, with one of their members contributing. Over time, several other Chapters of the National Space Society (which had merged with the L5 Society at the 1987 International Space Development Conference in Pittsburgh) came aboard.

How MMM came to serve the Artemis Society and then the Moon Society

In early 1994 I had heard about Artemis Society International, sent some issues, and met its leader, Greg Bennett, in Huntsville, AL where ASI was headquartered, and joined. Meanwhile, back in Milwaukee, after the folding of the Triangulum Science Fiction Convention in 1993, Milwaukee Science Fiction fandom had accepted my bid to launch a new hybrid convention, to be called “First Contact” – a “science/science-fiction” convention, with a Science Track and Science Guest of Honor to be added, starting fall 1994. For First Contact II, October 6–8, 1995, I invited Gregg Bennet to be our “Science Guest of Honor” and to cohost a 3 hour brainstorming workshop on the “Design Requirements for a Commercial Moon Base” to “identify things a first lunar outpost could do to make money.” We broke up into two brainstorming groups one led by Greg Bennett.

A month later, starting with MMM #90 November 1995, MMM was became the Artemis Society’s new publication, with a 4 page centerfold dubbed “Pleiades” carrying ASI news .

Three years later, after having a full track to showcase the Artemis Project at the 1998 International Space Development Conference in Milwaukee (of which I was chair), it became apparent that despite a lot of hard work brainstorming the Artemis Project, ASI was not going anywhere, and Greg decided to “move the membership” to a new broader organization, to be known as the Moon Society. Gregg remained president for the next four years, then stepped down in 2004. Someone put my name in nomination, and I served as both MMM editor and Moon Society president until 2011. When, with Ken Murphy’s show of interest in succeeding me, I stepped down – being editor of MMM was/is enough!

The agreement signed by LRS/TMS/NSS: Two Options per standing agreement

1. A successor editor steps forward from the Moon Society membership and MMM continues to serve Moon Society members and members of participating NSS chapters.
2. This does not happen and the rights to “MMM” pass to the National Space Society, with a willing new editor, Fred Becker, looking forward to taking it over and keep the MMM spirit, inspirations, and goals. Again, my plan is to stay at the helm through the MMM #301, December 2016 30th anniversary edition.

if someone reading this is interested in taking over as editor, he or she should email or call me.

Kokhmmm@aol.com – 414-342-0705

The **MMM Theme Issues** will acquaint you with the MMM heritage, inspirations, goals, etc.

www.moonsociety.org/publications/mmm_themes/

Traditionally, MMM is available both in B/W hardcopy by mail, and color pdf files by download.

It is possible that a successor publication will only be in pdf format.

If not, perhaps it can continue to serve Moon Society members. PK

Last minute news: We do have an interested editor from the National Space Society

The Moon Society need only furnish someone to edit the Moon Society News Section – PK

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


 March **Chapters & Outposts** 2015
ORGANIZED CHAPTERS

Milwaukee Lunar Reclamation Society – <http://www.moonsociety.org/chapters/milwaukee/>

<http://www.meetup.com/Milwaukee-Space-Exploration-Meetup/> – <http://www.space-Milwaukee.com>

Contact: Peter Kokh – kokhmmm@aol.com – MEETINGS, 2nd Sat 1–4 pm monthly except July, August,

At Mayfair Mall lower level Community room G150 for all meetings except December, in G110:

Upcoming Meetings: NOV 14, DEC 10, JAN 9, FEB 13, MAR 12, APR 9, MAY 14, JUN 11, SEP 10, OCT 8, NOV 12

October 10th Meeting Report: We planned our December 10th Anniversary Banquet (#29).

The DEC 10th feature film will be “Guardians of the Galaxy” <http://www.imdb.com/title/tt2015381/> –

https://en.wikipedia.org/wiki/Guardians_of_the_Galaxy_film <https://www.youtube.com/watch?v=B16Bo47KS2g>

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

<http://www.meetup.com/Saint-Louis-Space-Frontier-Meetup/>

Contact: Robert Perry surfer_bob@charter.net – Meetings 4th Saturday of the month in room 162 of McDonnell Hall of Washington Univ. NOV 29, DEC 24 (2016) JAN 23, FEB 27, MAR 26, APR 23, MAY 28, JUN 25, JUL 23

Gateway to Space 2015 was a highly successful day and a half event at Boeing St. Louis was highly successful.

Participants gave the conference an overall rating of 4.66 stars out of 5 stars! Billed as a one-day seminar, connected events extended Gateway to Space into a weekend event. Some 69 people attended the sessions. Watch for Gateway to Space 2016 announcements! These one plus day annual events are leading up to the International Space Development Conference 2017, here in St. Louis.

NSS/Moon Society Phoenix Chapter – <http://nssphoenix.wordpress.com/> – c/o Mike Mackowski,

<http://www.meetup.com/NSSPhoenix/events/161939572/>

Meeting 3rd Saturdays monthly at Humanist Community Center, Mesa, 627 W. Rio Salado Parkway.

NEXT MEETINGS NOV 21, DEC 25, (2016) JAN 16, FEB 20, MAR 20, APR 16, MAY 20, JUN 18, AUG 20, SEP 17

Phoenix Chapter Supports Local Library Sci Fi Event on October 10, 2015

Our chapter was invited to participate in “LibraryCon Strikes Back”, a free, four-hour local science fiction convention at the Maricopa County Southeast Regional Library branch. Glen Gassaway and I staffed a table with Chuck Leshner’s poster on cis-lunar resources, the gravity bottles, a space colony model, copies of Ad Astra, a moon globe, and several informational flyers. We took some names and emails, handed out info on the chapter, and talked to dozens of people. I gave an updated version of my “Road to Mars” talk to a small group in one of their breakout sessions. Overall we had a fun time and got some good exposure for the club.

October 17th meeting report: Dennis Bonilla discussed his work with the NASA Office of the Chief Technologist, NASA Open Innovation Team, and NASA Office of Human Capital. Dennis currently supports the Asteroid Grand Challenge in the NASA Office of the Chief Technologist. The Asteroid Grand Challenge is focused on finding all asteroid threats to human populations and knowing what to do about them. Estimates suggest less than 10% of objects smaller than 300 m in diameter and less than 1% of objects smaller than 100 m in diameter have been discovered, and it will take a global effort with innovative solutions to accelerate the completion of the survey of potentially hazardous asteroids. Mr. Bonilla is employed by Valador, Inc., and is a Digital Strategist doing work for the NASA Office of the Chief Technologist. We had about a dozen attendees, and also discussed upcoming meeting and outreach plans. Our recent events included a fun group outing to see “The Martian” in Tempe and a display at the Southeast Regional Library Science Fiction “LibraryCon”. We had not done a display in a while and, with member Glen Gassaway’s help, this went very well.

Tucson L5 Space Society – Now serving Moon Society Members www.tucsonspacesociety.org/ (not updated)

– www.meetup.com/NSSPhoenix/events/161939572/ (not updated) Contact: Al Anzaldúa – Meets monthly, every 2nd Saturday, 6:30 PM – NOV 14, DEC 10 (2016) JAN 9, FEB 13, MAR 12, APR 9, MAY 14, JUN 11, SEP 10

Clear Lake NSS/Moon Society Chapter (Houston) – <http://www.moonsociety.org/chapters/houston/>

Contact: Eric Bowen eric@streamlinerschedules.com – Meeting 7 pm 3rd Mondays of even # months in the conference room of the Bay Area Community Center at Clear Lake Park: DEC 21 (2016) FEB 18, APR 18, JUN 20

At the Monday, October 19th meeting we held our annual business meeting and election of officers

Reelected were: Chapter President, Eric Bowen

Chapter Vice President, Doug Hall

Chapter Treasurer, Jay Lewchanin

Chapter Secretary – Vacant

Board of Directors. Marianne Dyson; two seats remain vacant

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

OCTOBER 2015 SPACE NEWS BROWSTING LINKS

SPACE STATIONS + ROCKETS + COMMERCIAL SPACE

www.space.com/30221-plasma-rocket-technology-nasa-funding.html
www.space.com/30782-dream-chaser-space-plane-2016-tests.html
<http://news.sciencemag.org/physics/2015/10/feature-bizarre-reactor-might-save-nuclear-fusion>
www.spacedaily.com/reports/prnewswire-space-news.html?rkey=20151005LA16865&filter=1639
www.nasa.gov/press-release/cubesat-to-demonstrate-miniature-laser-communications-in-orbit
www.space.com/30943-tiny-thumbsats-bring-space-all.html
www.space.com/30824-china-space-station-international-cooperation.html
www.space.com/30910-us-military-spy-space-station-declassified.html
www.spacedaily.com/reports/Magnetic_Sail_Technology_Intriguing_Alternative_to_Rocket_Powered_Space_Travel_999.html

EARTH + NEAR SPACE

www.nasa.gov/press-release/daily-views-of-earth-available-on-new-nasa-website
www.space.com/30911-comet-lovejoy-organic-molecules-earth-life.html
www.space.com/30850-spaceshiptwo-back-rubber-fuel.html
www.space.com/30950-world-view-balloon-epic-test-flight-video.html

MOON

www.space-travel.com/reports/China_to_rehearse_new_carrier_rocket_for_lunar_mission_999.html
www.space.com/30904-awesome-moon-maps-nasa-usgs.html
www.space-travel.com/reports/Asteroids_found_to_be_the_moons_main_water_supply_999.html
www.space.com/30795-earth-gravitational-pull-cracks-moon.html
www.spacedaily.com/reports/prnewswire-space-news.html?rkey=20151001SF17717&filter=1639
www.space-travel.com/reports/Space_startup_confirms_plans_for_robotic_moon_landings_999.html
www.spacedaily.com/reports/prnewswire-space-news.html
www.space-travel.com/reports/Russian_scientist_hope_to_get_rocket_fuel_water_oxygen_from_Lunar_ice_999.html
www.space.com/30791-nasa-apollo-moon-photos-online.html

MARS

www.space.com/30618-mars-water-streaks-rsl-mystery.html
www.space.com/30633-india-mars-orbiter-mission-anniversary.html
www.space.com/30676-streaks-on-mars-reveal-salty-water-orbiter-imagery-+-animation.html
www.nasa.gov/press-release/nasa-confirms-evidence-that-liquid-water-flows-on-today-s-mars
www.space.com/30681-mars-water-discovery-life-chances.html
www.marsdaily.com/reports/Opportunity_Continues_Search_for_Clay_Minerals_On_Mars_999.html
www.space.com/30778-ancient-mars-lakes-curiosity-rover.html
www.space.com/30815-mars-pebbles-ancient-rivers-curiosity-rover.html
www.marsdaily.com/reports/Climate_models_used_to_explain_formation_of_Mars_valley_networks_999.html
www.space.com/30709-space-noise-sensor-alien-life.html
www.space.com/30789-nasa-sample-return-capability-mars-orbiter.html
www.space.com/30840-mars-water-life-search-debate.html
www.marsdaily.com/reports/Landing_site_recommended_for_ExoMars_2018_999.html
www.space.com/30788-nasa-astronauts-on-mars-plan.html
www.marsdaily.com/reports/NASA_Challenge_Seeks_Ways_to_Use_Mars_Natural_Resources_for_Astronauts_999.html
www.marsdaily.com/reports/The_Journey_to_Mars_Bridging_the_Technology_Gap_999.html
www.marsdaily.com/reports/To_save_on_weight_a_detour_to_the_moon_is_the_best_route_to_Mars_999.html
www.marsdaily.com/reports/The_Journey_to_Mars_Bridging_the_Technology_Gap_999.html

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

ASTEROIDS + COMETS

www.esa.int/Our_Activities/Space_Science/Rosetta/How_Rosetta_s_comet_got_its_shape

<http://news.sciencemag.org/space/2015/10/asteroid-s-rolling-stones-were-once-powered-sun>

www.nasa.gov/press-release/nasa-calls-for-american-industry-ideas-on-arm-spacecraft-development

www.space.com/30960-dawn-spacecraft-ceres-final-orbit.html

www.space.com/30961-modern-mystery-ancient-comet-spewing-oxygen.html

OTHER PLANETS + MOONS

www.space.com/30608-mysterious-saturn-hexagon-explained.html

www.space.com/30665-unraveling-saturn-ring-mystery.html

www.space.com/30658-pluto-mystery-tour-snakeskin-landscape.html

www.esa.int/spaceinimages/Images/2015/10/BepiColombo_in_the_spotlight

http://news.sciencemag.org/space/2015/09/mission-bizarre-metal-asteroid-among-winners-nasa-discovery-competition?utm_campaign=email-news-weekly

www.space.com/30823-comets-spark-alien-life-europa-oceans.html

www.space.com/30868-jupiter-moon-europa-comet-crashes.html

www.space.com/30665-unraveling-saturn-ring-mystery.html

www.spacedaily.com/reports/Closest_ever_views_of_Saturns_Moon_Enceladus_999.html

www.space.com/30944-nasa-cassini-saturn-moon-enceladus-flyby.html

<http://news.sciencemag.org/sifter/2015/10/pluto-s-moon-charon-is-cracked-like-an-ice-cube>

www.spacedaily.com/reports/Plutos_Small_Moons_Nix_and_Hydra_999.html

www.space.com/30914-new-horizons-engine-burn-second-flyby.html

ASTRONOMY + ASTROBIOLOGICS

www.space.com/30689-india-first-astronomy-satellite-launch.html

<http://news.sciencemag.org/sifter/2015/10/galaxy-s-strangest-star-could-be-the-product-of-a-stellar-fly-by-or-aliens?>

www.space.com/30832-kepler-telescope-alien-megastructure.html

www.space.com/30941-alien-civilization-megastructure-kepler.html

www.space.com/20155-hunting-intelligent-aliens-extreme-seti.html

www.space.com/30948-dimming-star-alien-megastructure-mystery.html

www.space.com/30889-earth-bloomed-early-fermi-paradox-solution.htm

EDUCATION + OUTREACH + MEDIA

www.space.com/30953-science-cruises-offer-pristine-cosmic-views.html

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

www.spacedaily.com/reports/prnewswire-space-news.html?rkey=20150924PH09950&filter=1639

www.marsdaily.com/reports/NASA_Challenge_Seeks_Ways_to_Use_Mars_Natural_Resources_for_Astronauts_999.html

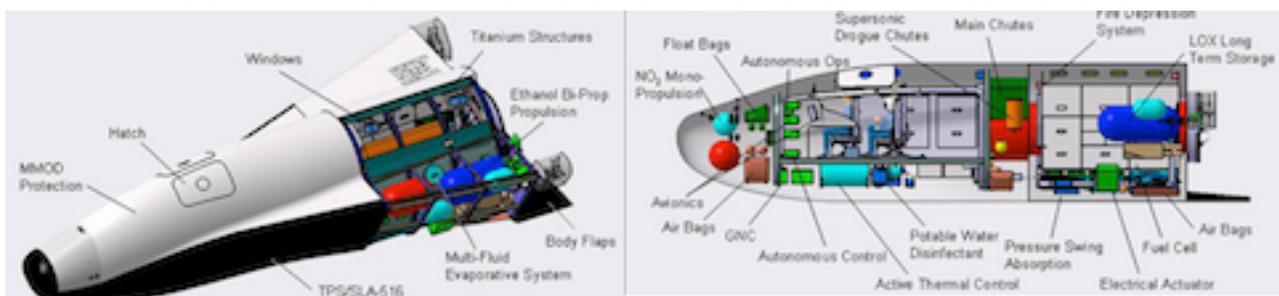
www.nasa.gov/press-release/nasa-seeks-student-experiments-for-edge-of-space-balloon-flight

www.collectspace.com/news/news-102615a-tim-peake-spacerocks-contest.html

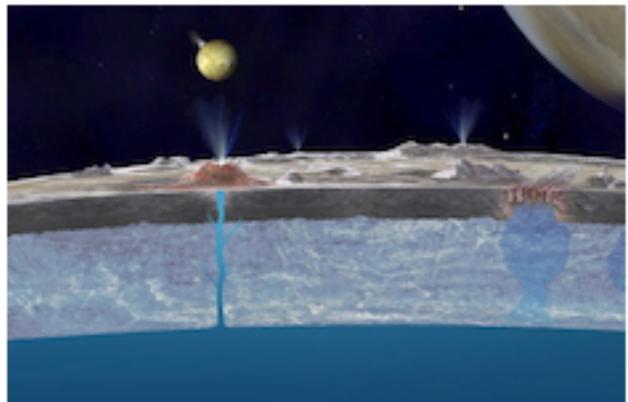
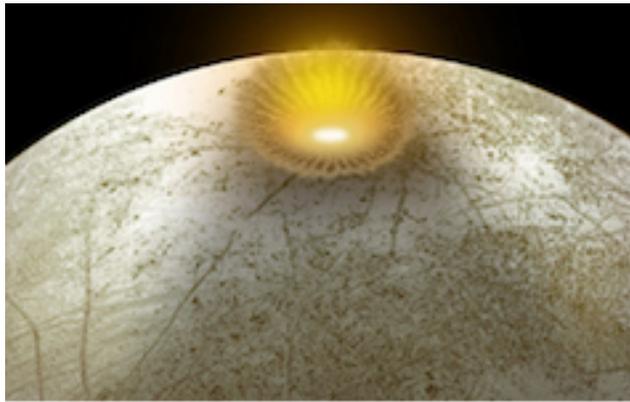
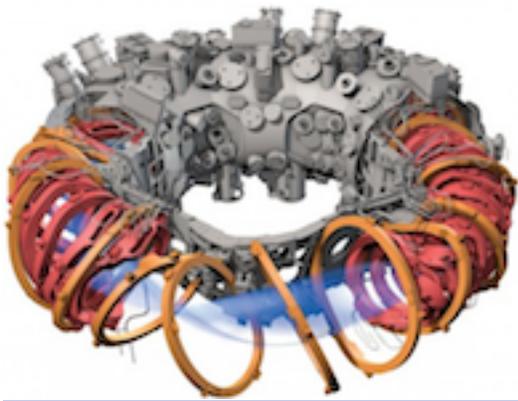
www.scientificsonline.com/shop/robotics?Page=1&Sort=featured

www.space.com/30885-telling-star-types-apart-infographic.html

Teaser Photos for some of the News Items listed above

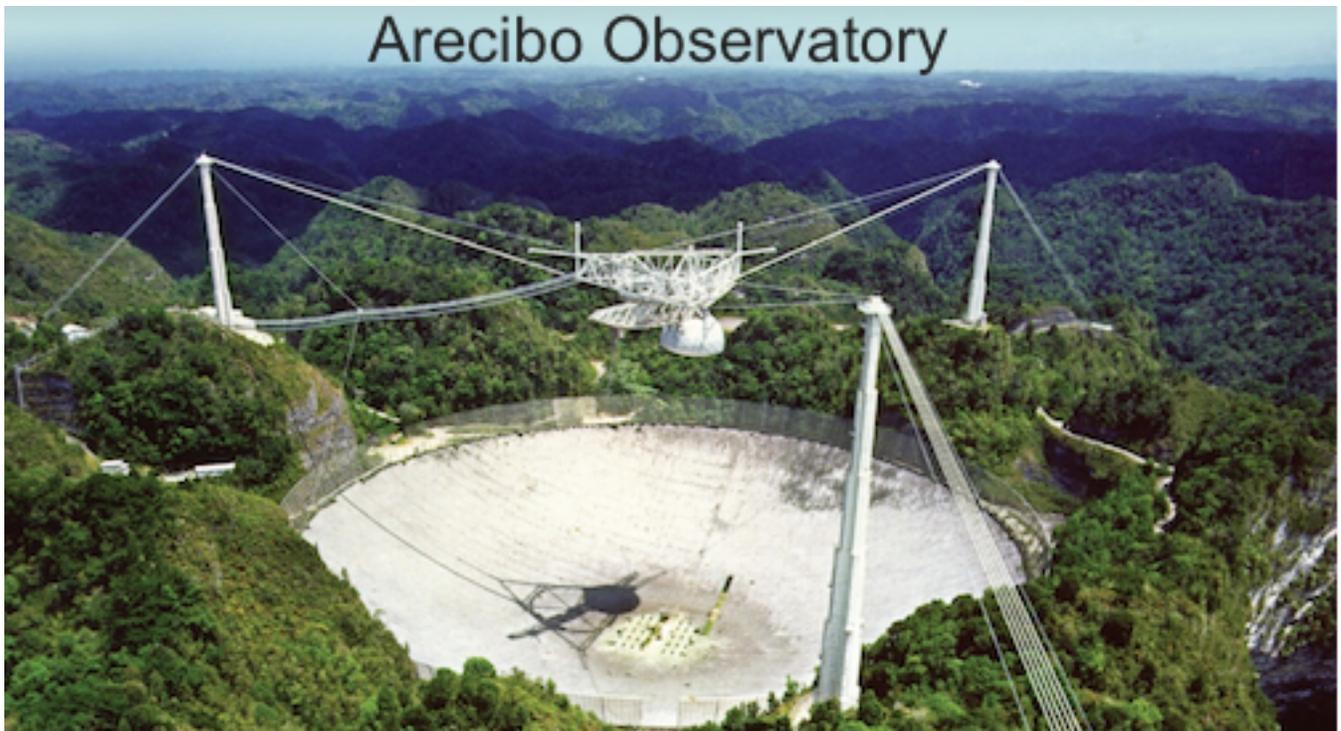
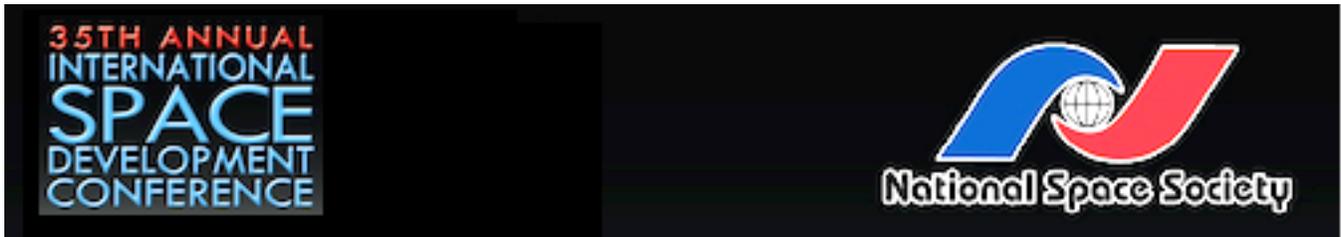


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Next month, the theme of our 29th Anniversary Issue, #291, will be

Are We Alone?



**A Bridge to Commercial Space – May 18–22, 2016
 Sheraton Puerto Rico Hotel & Casino
 San Juan, Puerto Rico**

If you have never been to Puerto Rico, this is your chance to see an island of legendary beauty, history, scenery, and rich culture – including a visit to the famous Arecibo Radio Telescope. This is a temptation not to resist!

You deserve it! Plan now! -- <http://isdcs.nss.org/2016>

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Selections from the



GLOSSARY

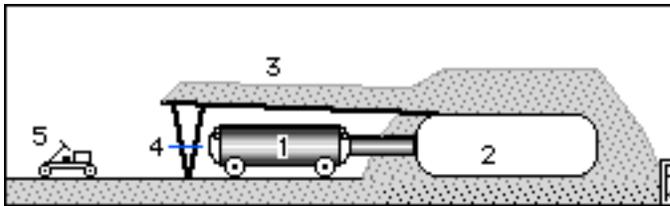
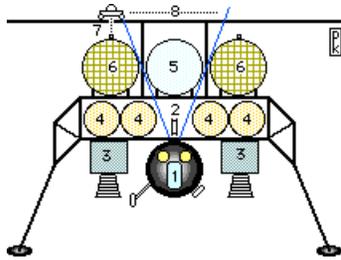
"MMM Speak" – New Words & Old Words with New Meanings
<http://www.moonsociety.org/publications/m3glossary.html>

"Amphibious" Space/Surface Vehicles

In ordinary usage, an animal that is at home both in the sea and on the land. An Amphibious Vehicle on Earth means a craft that can ply the seas as well as land like the "Duck" of World War II familiarity. Here we apply it to a **space craft that has an extendable chassis that allows it to drive on the lunar surface after landing.**

See "[The Lunar Hostel](#)" and the term "[Hostel](#)"

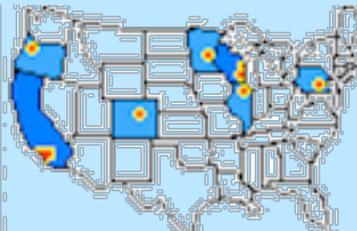
The **Frog** version is one designed for repeated use both in space and on the lunar surface where its use would be confined to trips between the landing–launch site and a lunar surface habitat with which it would dock, sharing systems aboard the craft with which the waiting habitat had not been provided.



"Cheshirecasting" – sending messages that tell us nothing about the sender (The "Prime Directive" of the Star Trek TV Science Fiction Series rules!) but could tell us something about ourselves, specifically about our past, as interstellar messages take years, if not thousands, millions, and billions of years to reach us from other parts of the galaxy and of the universe.

The word comes from the Smile of the Cheshire Cat, of course. Many people hope to detect SETI messages that might help us leap forward technologically without earning it by doing it ourselves. Not what we need, and fortunately, unlikely to happen.

NSS Chapters that share Moon Miners' Manifesto



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

WISCONSIN



MLRS – Milwaukee Lunar Reclamation Society

PO Box 2101, Milwaukee, WI 53201 – www.moonsociety.org/chapters/milwaukee/
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!

- PRESIDENT/MMM EDITOR • [Peter Kokh](#) NSS 414-342-0705 - kokhmmm@aol.com VICE-PRESIDENT Doug Armstrong NSS (414) 273-1126 – SECRETARY – Charlotte Dupree NSS (262) 675-0941 grdupree@charter.net
- [James Schroeter](#) (414) 333-3679 – james_schroeter@yahoo.com TREASURER/Database • [Robert Bialecki](#) (414) 372-9613 – bobriverwest@yahoo.com (• Current Members of the MLRS Board of Directors)

Meetings: Mayfair Mall lower level room G150 for all meetings except December, in G110:

DEC 12 – **2016 Schedule** JAN 9 – FEB 13 – MAR 12 – APR 9 – MAY14 – JUN 11 – SEP 10 – OCT 8 – NOV 12

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

WISCONSIN



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SSS Sec./Tres. c/o B.Pat Knier dcnpatknier@gmail.com

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

2015 MEETINGS: Meetings are held – **3rd Thur even # months:** Dec 17th Call for location (920) 894–1344

"

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 902

Events Hotline/Answering Machine: 310–364–2290 – Odyssey Ed: Kat Tanaka odyssey_editor@yahoo.com

oasis@oasis-nss.org – Odyssey Newsletter www.oasis-nss.org/articles.html

Regular Meeting **3 pm 3rd SAT monthly – 2015 Schedule;** DEC 19

2016 Schedule Jan 16 – Feb 20 – Mar 19 – Apr 16 – May 20 – Jun 18 – Sep 17 – Oct 15 – Nov 19 – Dec 17

COLORADO



DSS: Denver Space Society fka Front Range L5
1 Cherry Hills Farm Drive, Englewood, CO 80133
<http://www.denverspacesociety.blogspot.com/>

James W. Barnard 303–781–0800 trailrdr@central.com – Monthly Meetings every **3rd Thursdays, 7 pm**
Englewood Public Library, Englewood, CO 80110 – 1000 Englewood Parkway, 1st Flr Civic Center **2015** Dec 17
2016: Jan 21, Feb 18, Mar 17, Apr 21, May 19, Jun 16, Jul 21, Aug 18, Sep 15, Oct 20, Nov 17, Dec 15

ILLINOIS



LDAhean@aol.com

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

MINNESOTA



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

MNSFS monthly meetings are held on the **first Thursday of each month** at the Fairview Community Center (Great Room), 1910 County Road B West, in Roseville, MN 55113 Meetings usually start at 7:00 p.m, **Next Dec 3, 2015**

2016 Schedule Jan 7 – Feb 4 – Mar 3 – Apr 7 – May 5 – Jun 2 – Jul 7 – Aug 4 – Sep 1 – Oct 7 – Nov 4 – Dec 1

OREGON



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

We meet the **3rd Saturday** of the Month at 2:00 PM – **2015 Schedule;** DEC 19

2016 Schedule Jan 16 – Feb 20 – Mar 19 – Apr 16 – May 20 – Jun 18 – Sep 17 – Oct 15 – Nov 19 – Dec 17

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

PENNSYLVANIA



NSS–PASA: NSS Philadelphia Area Space Alliance

928 Clinton Street, Philadelphia, PA, 19107 <http://pasa01.tripod.com/> - <http://phillypasa.blogspot.com>c/o Earl Bennett, Earlisat@verizon.net – 856/261–8032 (h), 215/698–26**Meetings 3rd Thursday monthly;** DEC 19, Jan 16, Feb 20, Mar 19, Apr 16, May 20, Jun 18, Sep 17, Oct 15

Meeting times and locations: we will meet at the restaurant in The Cherry Hill Crowne Plaza on Saturday, November 21st around 6 p.m. (depending on the talk schedules). Our December meeting will be at the regular location in the Liberty One Food Court (second floor, toward the west side of the court. Look for Mitch's flag display). Date: December 19th with the 27th as the snow date.

Meeting notes: due to traffic here I arrived late and the reports had started with Hank Smith talking about the upcoming Philcon event. Parenthetically Mitch has received his invitation as a panelist and has chosen several. Hank gave the information for us to volunteer for panels and other activities. He also brought the latest revisions of the Principal Speaker and Artist Guest of Honor: Wen Spencer and Richard Hescox respectively. Lots more at this venue. He also reported that the 2017 World Science Fiction Convention will be held in Finland, the country that brought us neat cell phones, Linux, and the CERN guy that created the makes me think that should be great to attend.

Dorothy brought material from several sources including a response letter from Representative Donald Norcross on the fight for NASA funding and his support keeping it as is or increasing it. The letter described that the representative regretted that the funding was cut. The other representatives contacted did not respond. Dorothy also brought material on The Franklin Institutes film schedules and a report on "Capclave" a science fiction convention that she, and Larry, attended in October. She attended several panels, as indicated in the events schedule, and noted that a former member and regular science fact panel member, John Ashmead (Dr.?) was on "Building a Spacefaring Civilization". John also presented on "Just How Many Universes are There Anyway?" And there were a number of other science fact based presentations. Check there website: capclave.org.

Larry brought a multi-month visit summary for our site and registered our site with Google. See Philadelphia–NSS Chapters (chapters.nss.org/pa/Philadelphia). Larry also noted that our card has a "QR" code on it that can be scanned by a smart phone. This is card with his new design.

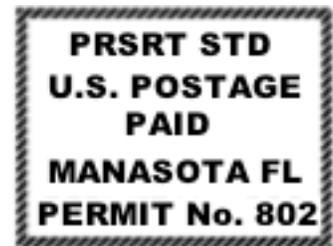
Mitch brought the Time Magazine photo of water on Mars! (Time for 10/12/15). The title is "Flowing Water Means New Hope for the Search for Life". He also noted that the Free Library had Lisa Randall presenting "Dark Matter and the Dinosaurs" on Nov. 9th. And then there is "The Martian". Most of our members have seen it at least once, with Frank O'Brien having watched 4 times (or more now?) and strongly urges our members not only to see the film, but in addition, to buy the d.v.d when it comes out. The film, starring Matt Damon in a great "man against the natural world" performance, was written by Andy Weir. Mitch says "it is an Oscar worthy performance. He rates it as four out of four stars. On other topics: Mitch has a standing invitation to do outreach on the University of Pennsylvania campus and is planning an event in the next few weeks. He has ongoing contacts with Drexel University and is arranging an event for that location as well. His main information was from "All About Space" magazine: there was a number of good articles and a "Top Ten" list of things about Space and pictures of Pluto. And from "Earth in Space" magazine an article on the Bernal Sphere and its designer who was an engineer. How old is the design? I was surprised to learn that the work was done in the late 1920s! There are a number of great ideas that we think are recent and some that we know of as "older than the hills": the Space Elevator is from the late 19th century. The first semiconductor device that we now call an "fet" was patented in the 1920s, and, LASER action may have been observed in the 1920s as well. And Mitch recommends both of the publications. See him at Philcon!

Earl brought a number of things about recent events: The Makefaire in New York was Fantastic! Michelle and I went on the 29th and had a great time at the various events: NASA was there and so was a number of speakers on space related topics. Besides talking to the people at the several NASA booths there was a talk on the Makers Stage by Sandy Antunes on small satellites and being part of the D.I.Y. space effort. He has written several books on the various steps required to "do" space exploration. The book I bought was on the communications aspect and recommends getting a ham license among many other steps. I have to get the other three! And NASA had the finalists in the "3D Printed Habitat Challenge". There were entries ranging from students to architectural firms. The competition: to design a habitat on Mars using mostly indigenous materials. Go to americamakes.us/challenge for more and images. As someone who believes that using indigenous materials, includes Lava Tubes as a main component, I liked a few of the displays but think that this emphasis on outside construction. I think that tools that seal and clean up the insides of the Tube and pressurize it. But: Go D.I.Y. and Grand Challenges!

And two more things, one from hams and the other Make: Earl attended the Mt. Airy VHF Society conference in Philadelphia in early October. Many of the topics were on sending signals through space and bouncing signals off the Moon. A number of talks were on low level signal reception and the problem(s) of Doppler shift and it's effect on transmissions. And from Make: The Space Special Issue! See Adam Savage interview And Weir! Read "Astronaut Survival Tips" by four time trip Astronaut Leroy Chiao! Your Own Mars Mission (including building an Ion Engine)! And many other great space D.I.Y. articles. Get this issue as soon as you can. – Earl, Pres NSS PASA

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Moon Miners' MANIFESTO
 Milwaukee Lunar Reclamation Society, Inc.
 PO Box 2102, Milwaukee, WI 53201-2102



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