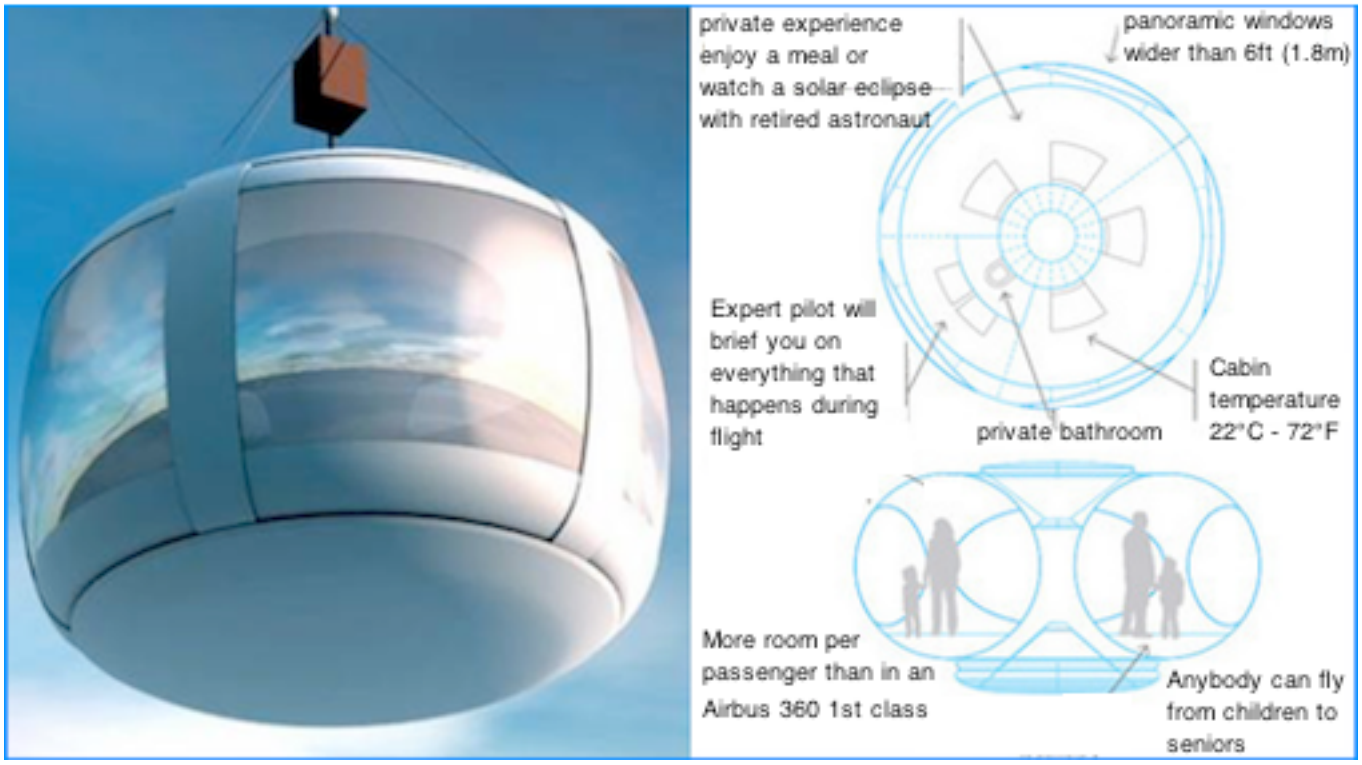
"Towards an Earth-Moon Economy – Developing Off-Planet Resources"

Moon Miners' Manifesto

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



This "**Bloon**" at 30 miles up could give you a better, and longer experience than **Space Ship 2** or **Lynx** – see article

Feature Articles:

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

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/**
- **MMM Glossary:** new terms, old terms/new meanings: **www.moonsociety.org/publications/m3glossary.html**

● **MMM retains its editorial independence** and serves many groups, each with its own philosophy, agenda, and programs. Sharing MMM may suggest overall satisfaction with themes and treatment, requires no other litmus test.

Opinions expressed herein, including editorials, are those of individual writers and may not reflect positions or policies of the **National Space Society**, **Milwaukee Lunar Reclamation Society**, or **The Moon Society**. **Copyrights** remain with the individual writers. Reproduction rights, with credit, are granted to NSS & TMS chapter newsletters.

● **MMM color online downloadable PDF file version option for Moon Society Members** using their username and password – do write secretary@moonsociety.org if you need help with your password.

● **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 chapter**s and **Other Societies** with a compatible focus are welcome to join the MMM family. For special chapter/group rates, write the Editor, or call (414)-342-0705.

● **Publication Deadline:** Final draft is prepared ASAP after the 20th of each month. Articles needing to be keyed in or edited are due on the 15th, Sooner is better! – **No compensation is paid.**

● **Submissions by email** to KokhMMM@aol.com – Email message body text or MS Word, Text files, and pdf file attachments or mailed CDs, DVDs, or typed hard copy [short pieces only, less than 1,000 words] to:
Moon Miners' Manifesto, c/o Peter Kokh, 1630 N. 32nd Street, Milwaukee, WI 53208-2040

In Focus Changing the "bias" of Earth Day - "Mother Earth" implies "Father Sky"!

By Peter Kokh

I plan to take in an Earthday celebration here in Milwaukee on Saturday, April 26th. It will be held at the city's famed Mitchell Park Domes: three geodesic domes featuring (a) temperate zone, (b) tropical/rain forest zone, and (3) arid/desert zone plants. The theme of the 9am-3 pm event is a "Green Living Festival." There won't be much chance to do more than be a passive participant, looking for opportunities to exploit next year. ##

Had I the time, I would like to make a bunch of T-shirts or regular shirts with the YinYang Mother Earth/Father Sky symbol at left above with those words underneath and a URL – www.MotherEarth-FatherSky.org that the curious could jot down and check out later, plus business cards and flyers for those who showed some curiosity.

I don't know what custom shirts/T-shirts/baseball caps/buttons cost these days. But while there may not be enough time, and there certainly is not enough money in my near term budget, this seems like a plan, with a full year's lead time to accomplish for next year. And we will have plenty of literature already ready for the curious.

There seems to be considerable mutual animosity and/or disrespect between the Environmental and Pro-Space communities. That is sad, because there are many grounds for mutual cooperation. It's time to change.

We'll be taking a roll call of Moon Society and National Space Society chapters to see if any would want to participate in this effort to "redefine" and "complete" Earth Day come next year. kokhmmm@aol.com

A Tribute to Mercury Astronaut/Seabed Pioneer Scott Carpenter on his Passing

By Peter Kokh

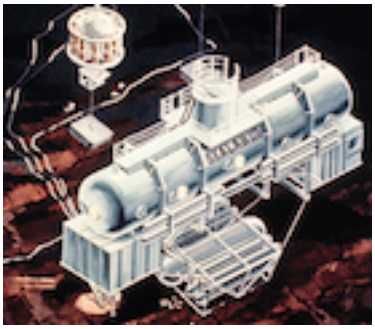
"**Malcolm Scott Carpenter** (May 1, 1925 – October 10, 2013) was an American test pilot, astronaut, and aquanaut. He was one of the original seven astronauts selected for NASA's Project Mercury in **April 1959**. Carpenter was the second American (after John Glenn) to orbit the Earth and the fourth American in space, following Alan Shepard, Gus Grissom, and John Glenn. – http://en.wikipedia.org/wiki/**Scott_Carpenter**

http://www.space.com/24502-**scott-carpenter**.html

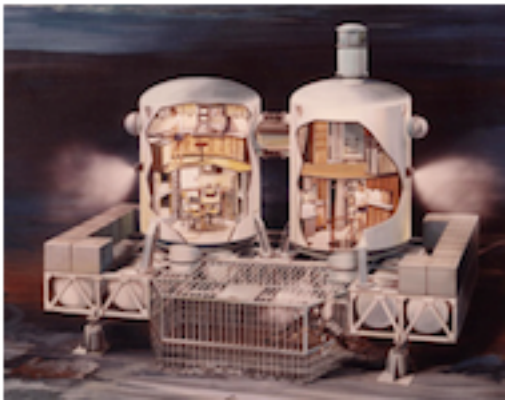
It was only natural that Scott Carpenter, a navy officer, realizing that he had little chance of flying in space again for NASA, would return to the US Navy to pioneer research on another frontier that has certain challenges in common. You can't breath space, you can't breath water. In both environments you need to live in pressurized, sealed tight modules, with sealed connections between them and with an airlock into the exterior environment, the unbreathable water of the ocean, and the unbreathable vacuum or the token atmosphere of the Moon or Mars.

Sealab I 1964

Sealab II (1965)



Sealab !!! (1969)



2 proposed sea bed station designs

The above "starter" Bigelow Inflatable base looks equally at home in a Mars setting as on the ocean floor
But on the ocean floor, anything holding air must be weighted down or it will float to the surface.

The key differences for Carpenter, was that the seabed is handy, the surfaces of the Moon and Mars are far off, requiring very expensive journeys. But Carpenter's research increased our knowledge and technological know-how applicable to both environments. He was 88 when he passed this last October

Facilities on the seabed, in many ways are more challenging "analogs" than are the deserts of Utah or the barren crater-lands of Devon Island, His contributions have been helpful in pushing forward our preparations to establish permanent footholds on both worlds in the decades to come. PK

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

Tourist Flights to the Edge of Space – A New Option: "Bloons"

By Peter Kokh

www.theverge.com/2013/10/22/4866026/**paragon-world-view-space-tourism-balloon-trip**-announced
http://news.discovery.com/space/**private-spaceflight/company-to-balloon-tourists-to-the-edge-of-space-**131022.htm **(with must watch video)**
http://www.cnn.com/2013/10/24/**travel/space-balloon-30km/**
http://www.gizmag.com/**space-tourism-balloon-world-view**/29510/
http://www.space.com/16122-**space-tourism-balloon-test**.html

A **less expensive** way to get into space is in the design stage, with trips beginning in 2016. A new space tourism venture plans to bring visitors 30 km (19 mi ~ 100,000 ft) into the stratosphere in what is essentially a space-ready air balloon for $75,000.

Another Design Study: www.designboom.com/technology/**bloon-balloon-for-near-space-travel**/

The capsule won't technically be in space — nor high enough to enter orbit and achieve the sensation of true "weightlessness" — but there will be **a wonderful view of the curvature of the Earth, the blue atmosphere around it, and the dark void beyond.** One **won't have to undergo training**, and they'll spend **two hours up at that height, where they'll be free to stand and walk about the cabin.** The new project comes from World View, a subsidiary of Paragon, which makes equipment for the International Space Station and other space applications. Paragon is also the company behind The Inspiration Mars Foundation project to send a man and woman on a flyby of Mars in 2018l

A helium-filled, high altitude balloon will carry the capsule to its maximum height. Few details are available, as World View has to go through plenty of regulatory and testing hurdles before becoming a reality, but the project is not so different from Felix Baumgartner's trip in the Red Bull Stratos last year, which took the skydiver to a height of 39 km (128,000 ft.)

The "World View passenger module" isn't a rocket — but a pressurized, 4-ton capsule or gondola with **large windows**, **spacious** enough to hold up to eight passengers. But a trip can be reserved for the private experience of two persons, for example, at a proportionately higher ticket price for each.

Morning or Night Terminator passages, or all daylight or all night flights

The sky will be dark blue, almost black at that height, even though it may be daylight on the surface below. Passengers can choose the time of day, If they are over the night terminator (which moves westward about 1,000 miles an hour) they will see part of the world in daylight, and city lights in the portion where the sun has already set or begin in daylight and watch night set (over the two hours) or vice versa watching the morning terminator pass below. The time at maximum altitude – 2 hours – will much longer than that afforded by SpaceShipTwo or Lynx.

It gets better – To get back to Earth, the **passengers can choose from three options, each minutes-long,**

- Slowest descent at **3/8th G = 2 min. of Mars level gravity**,
- Medium descent **1/6th G = Moon level gravity**,
- Fastest **free fall zero-G** – controlled by the amount of helium allowed to remain in the balloon above.
- You can **choose what part of Earth your flight will be over!**

Editor: If I had the money, I would choose a "Bloon" flight over SpaceShipTwo or Lynx flight, "hands down" with no hesitation. On the rockets, you may go a little higher and the sky might be a little darker, but you won't be up long enough to experience the terminator transitions, or to experience different G levels, that of Mars of the Moon. If this project is realized, it could well be the most popular, by far. ##

Alternative designs: http://www.cutedecision.com/wp-content/uploads/2011/08/**bloon**-5.jpg
http://www.designboom.com/technology/**bloon-balloon-for-near-space-travel**/

A Preview of the Evolution of Earth Orbiting Hotels

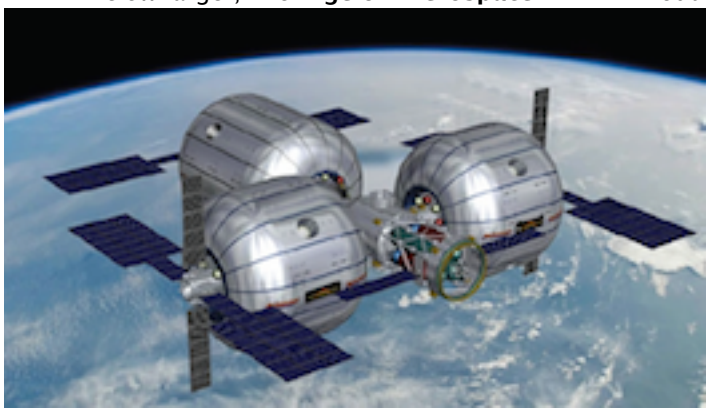
By Peter Kokh

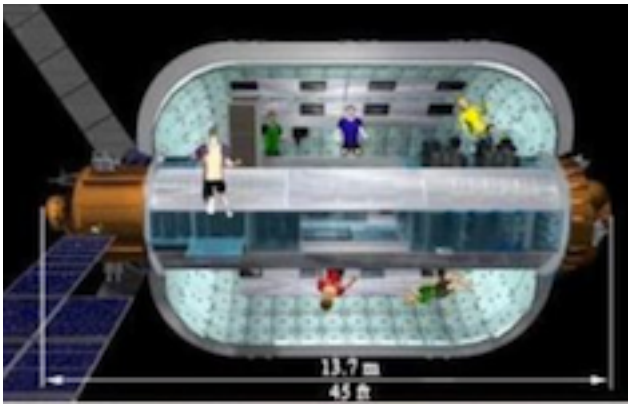
Early Orbiting Hotels will differ on facilities offered, as well as on the views of Earth below

Facilities: from basic Spartan to elaborate and luxurious

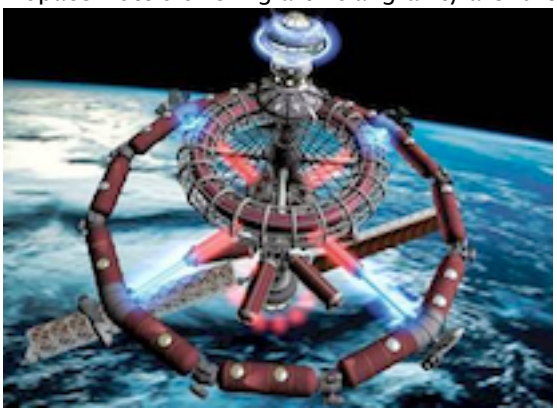
Examples of proposed early orbiting hotels, designed for short stays, are the **Excalibur Almaz** below

Below larger, 2-3 **Bigelow Aerospace BA 300** modules.





Space Hotels offering artificial gravity are further off, and will appear as demand increases



Space hotels with 3 rotating rings could offer lunar, Martian, and Earth gravity levels, prefiguring space settlements.

Special Orbits: 12 hour High Apogee low perigee orbits

An "orbitel" in a highly eccentric 12-hour orbit spends most of its time high above one hemisphere at a time, as high as 40,000 km ~ 25,000 mi. (=3 Earth diameters) at alternating longitudes 180° apart, e.g. 75° W for best view of North and South America, alternating with 75° E for best views of Asia (between India and China) – Launch time and location will determine high point locations. From so high up (1/10th as far. as the Moon), you will see Earth as a planet. At the low point, you will skim fast over any urban nightime lights below. The "Molniya" orbits chosen for many early Russian satellites are a special example. http://en.wikipedia.org/wiki/**Molniya_orbit**.

Special Orbits: High inclination orbits

Orbits highly inclined to the equator, for example between 70°N to 70°S will showcase all parts of Earth from just above the Arctic circle to just below the Antarctic circle (skimming over the North shore of Alaska and the North shores of Antarctica. Such orbits could be at any altitude above the surface, but the higher the altitude, the longer the orbit time, and the superior views.

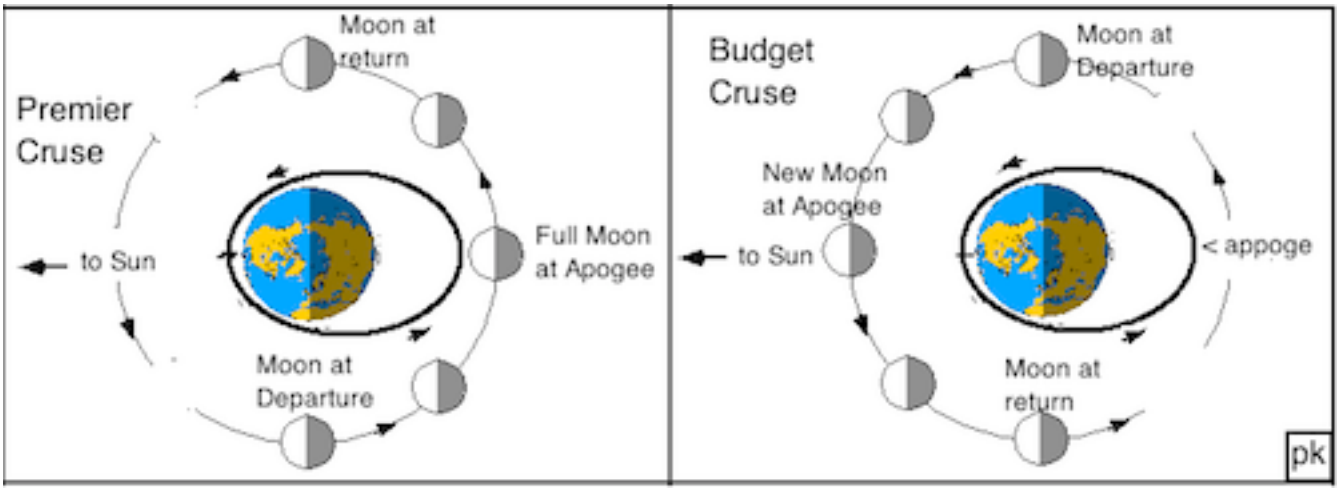
For past articles, Visit **http://www.moonsociety.org/publications/mmm_classics/ or /mmm_themes/**

Competition as a driver

As prices come down and more and more people can afford to visit space, including lottery winners, competition will introduce ever more elaborate hotels offering more and more features such as multi-g, gyms, free fall sports, and space dancing and ballet etc. etc. That most of the early clients will be relatively wealthy (add in lower income winners of lotteries, etc.) will accelerate the appearance of ever more activity-supporting features, and other luxuries.

Next: Space Hotel "Cruise Ships"

These could vary from Spartan to Luxurious and cycle in 2-week long eccentric orbits, rendezvousing with transfer ships in low Earth orbit, and skimming close to the Moon on alternate orbits, timed to approach the Moon either when it was "full" (the Earth-facing side being fully sunlit or the "farside") or at some phase where, being partially lit, Lunar mountains would appear in high shadow relief. In every other orbit, the Moon would be on the opposite side of Earth, so such cruises, while offering a view of Earth from afar, but not approaching the Moon, would be lower priced, perhaps considerably cheaper, whatever it takes to fill the cabins and make "some" money.



The earliest such vehicles could be quite spartan and small. But they would evolve to the point where they introduced some of the features predicted for "Space Settlements." Cruise ships on Earth's oceans have come a long way in recent decades. We are a long, long way from the "ultimate" Titanic, even from the Queen Elizabeth II. Today's cruise ships are gigantic and offer ever more features.

Not so fast!

Now, let's be honest! The above sketch is a bit idealistic in that the Moon does not orbit Earth at always the same distance. The average distance between them is 384,400 km (238,900 mi.) But on every orbit, it gets as close as 363,104 km (225,622 mi) at "perigee" and as far as 405,696 km (252,088 mi) at apogee, resulting in a differential range of 42,592 km (26,465 mi).

Either we play it safe and keep within the perigee (nearest Earth) limit, or we can schedule some trips to loop behind the Moon's farside, never visible from Earth. Such cruses might well be in most demand and thus commanding the highest price tickets.

But again, its not so simple. Without tweaking the ship's orbit there might be a time when the Moon will be **in the way - oops!** The cruise ship would hardly win in a game of billiards. We are just talking about the general possibilities and leave these embarrassing "details" to someone far more skilled in orbital mechanics and in how to tweak an orbit with the minimum of fuel expenditure!

Earth<->Moon "Cruise Ships" will precede and pave the way for space settlements

- Smaller, less expensive, payoff guaranteed
- They will develop the amenities tested and approved by tourists
- They will test artificial G levels and set the standards
- They will develop much of the technologies needed
- Cruise ship customers may be among the first to buy in as Space Settlement's retired classes
- Space Settlements may be cruise ship upgrades and become retirement communities rather than housing for workers making solar power satellites
- Cruise Ships to Mars - significantly longer journeys, will need to provide even more diversions for travelers and they will "ratchet up" amenities and facilities that preview Space Settlements.

Our 1992 illustrated study of a "barbell" type Earth-Moon Cruise Ship with artificial gravity:

http://www.moonsociety.org/publications/mmm_papers/**transitel**.htm and ---/**transitel_2**.htm

While many are skeptical about the idea of people choosing to live permanently in a space settlement, it will be early cycling space hotels offering lunar skim-by cruises that will pre-develop and test out many of the features foreseen for Space Settlements, starting small and simple, and getting ever more elaborate to meet customer demand and to better the competition.

Without such precursors as Lunar skim-by cruisers, the jump to space settlements would be too gigantic. I would suspect that the first such cruisers to preview features expected on space settlements might be the be of the barbell type with torus type ships being a major step up, both offering gravity levels between lunar and terrestrial. Such feature as gardens, "parks," circulating streams and other water features, etc. would be introduced in the jump to the torus type. They would be smaller than space settlements, designed for permanent residence and complete with farms, etc. at least at first. Ever larger and more luxurious ones would appear as demand increases. This jump might not occur until cycling cruisers were introduced on the "Mars run.

Without the "preview era" of cycling cruisers that visited the periphery of the Moon, and then Mars, we might never see the era when people would choose to live in space (space itself) permanently.

This evolutionary path is something not foreseen by early L5 Society advocates of space settlements (with ever new and more elaborate designs being put forth by students entering the National Space Society's annual Space Settlement Competition in conjunction with NASA. The function of these permanent cities in space was to house workers who were building Solar Power Satellites from lunar material. The unproven rationale being that workers would be much healthier in artificial gravity at the full "1G" Earth level than at 1/6th G on the Moon. Many still believe this. And indeed, we expect some physical muscular and circulatory "degeneration" after long exposure to the Moon's lighter gravity. But that this "degeneration" would not level off over time at an acceptable level, aided by proper exercise, is an assertion that has yet to be demonstrated. We won't know until individuals have been on the Moon for much longer periods. And it will make a difference if they expect to return back to Earth and need to maintain higher muscular tone or if they came to stay, and adapt, for the rest of their lives.

http://www.nss.org/settlement/nasa/**StudentDesignContest**.html

Tourism rather than Mining the Moon to build Solar Power Satellites may evolve designs.

Our Constructive Criticisms of classical Space Settlement designs:

http://www.moonsociety.org/publications/mmm_papers/**reinv_so**.htm

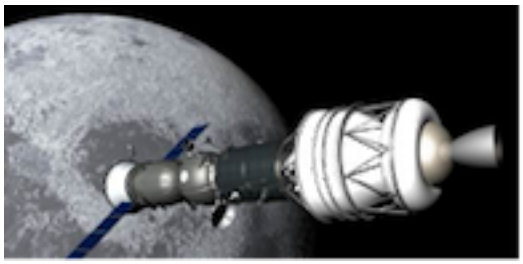
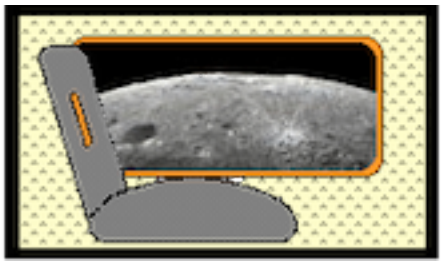
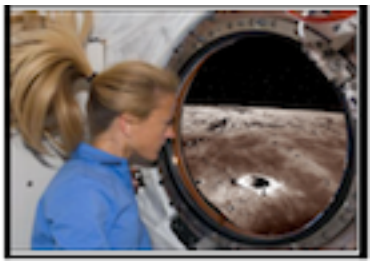
How tourism will advance the rate of innovation in Lunar Architecture and Comfortable Living

This is a topic for a whole new article. In short, lunar architects will introduce more features for comfortable living. Lunar artists will be motivated to produce ever better art and newer art forms. Sales and rentals to tourists will become a major driver of the lunar economy and lunar residents will reap a significant benefit from this in terms of creature comfort, and life styles, as well as tourism for Lunar residents as well. Everyone benefits. And all of this will increase exports to the Earthbound as well. **PK**

Complementary Reading from the MMM Tourism Theme Issue: [a free download]

http://www.moonsociety.org/publications/**mmm_themes**/**mmmt_Tourism**.pdf

- MMM # 21 **Lunar Overflight Tours** (including fiction: **My Flight on the Jules Verne**
- **MMM # 60 1st Moon Tours – the Farside "Loop"**
- **MMM # 69 Tourist Earnings**
- MMM # 80 **An Expandable Luxury Earth Orbit Hotel-Resort** [reprint of the "Transitel" article above]
- **MMM # 135 First Moon Tours – the Farside "Loop"**
- **MMM # 164 Eclipses – the Lunar Experience** – Note; a non-landing cruise timed to pass the Moon while it was in the mid of a total eclipse sporting all the hues of Mars, might be an extra expense tour, as such an event does not occur that often
- MMM #244 **Could "Paying Working Tourists" Open the Moon Faster, at less cost? (Extreme tourism?** The paradigm exists: People pay good money to "help out" on paleontological and archeological "digs!")

SOIL- REGOLITH COVERED HOMES
• on Earth (Iceland)
• on the Moon
• on Mars

The idea is the same: Insulation against thermal extremes

But also, on Moon and Mars, against cosmic radiation.

Here we have taken a photo from iceland and using image and paint programs to transport the scene to the Moon, and Mars.

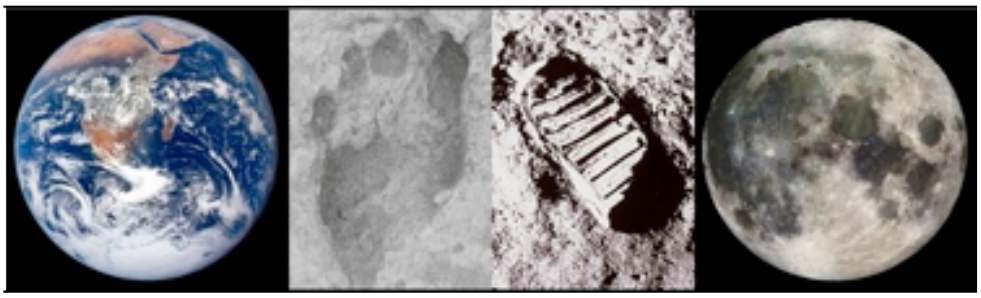
In Iceland the thermal cycle is a 12 months.
• On the Moon the thermal cycle is 29.53 days and a good balance between hot and cold extremes, ideal for geothermal systems.
• On Mars, the thermal cycle is 25+ months and from cool to very cold, requiring near full time heating.

The exposure to cosmic rays is similar on the Moon and on Mars: 5 meters (16 feet) of soil should do, much more than that used in Iceland. PK

View in color: http://www.moonsociety.org/publications/images/soil-covered-homes.jpg

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

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



Our Goal is Communities on the Moon involving large scale industrialization and private enterprise.

The Moon Society Journal Section (pages 9-12) About the Moon Society

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

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

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

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

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

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

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

From Moon Society President Ken Murphy

This is a year of definition for The Moon Society. As a global group of individuals committed to the advancement of our understanding, exploration, development and even settlement of the Moon, we occupy a unique position and should be the globally recognized experts on Moon questions.

This is not the case, and this is the year we start making that happen.

1) **We need to finish the migration and restructuring of the website.** This has bogged down with the transfer of material from the old website into the new structure. We Need Help! Members who want to help with this process should contact the project lead, Philip, at moonsociety.philipcrume.com to help us finish up the new website. We are considering using a commercial service to finish up the migration, so to the extent that members can help with this process we can save our treasury for other projects.
2) **We will have a Moon track at the ISDC this year.** Members are encouraged to help spread the word about the Moon content that we bring to the conference. The subject of this year's conference is Space Renaissance, and it can certainly be said that the Moon is undergoing a renaissance in its exploration and understanding of the many benefits it brings to space development on a larger scale. If you have questions about our track, contact the track chair, David, at dunlop.david@gmail.com

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

3) Each year I challenge the Moon Society leadership to each have an article of some sort published as a way of getting The Moon Society name out there with regard to smart writing about the Moon. I'm expanding that challenge to our membership at large to write a blog article, letter to the editor, essay, or what have you and get it published with a byline as a member of The Moon Society. This will help raise our visibility as an organization. If you do have something published, be sure to let our MMM editor, Peter, know at kokhmmm@aol.com

4) I've begun preliminary planning for my local Moon Day event in July. This event serves as a means to transmit space knowledge and excitement to a general public audience, broadening the base of support for space activities. More locales besides Dallas/Fort Worth are having Moon Day events, and it's a great activity for our chapters which helps to build links with other space groups. It's not too late to start thinking about putting something together in your community...

5) The idea of an international conference that refocuses attention on the Moon is a compelling one. Your president favors one that focuses on the Earth & Moon as a system, which ties into the concept of a cislunar economy. It's a terrific project for The Moon Society as an organization and a way to further establish our relevance in lunar matters. We can do it, but we'll need all hands on deck from the membership to make it happen. Content to arrange, publicity to undertake, logistics to nail down, it's a big project. But an exciting one! I do want to hear from the membership about this, so contact me at president@moonsociety.org

We should view this year as one of building for The Moon Society. Building our membership, building out our website, building our presence as the go-to organization for things lunar. How do you want to make that happen? **KM**

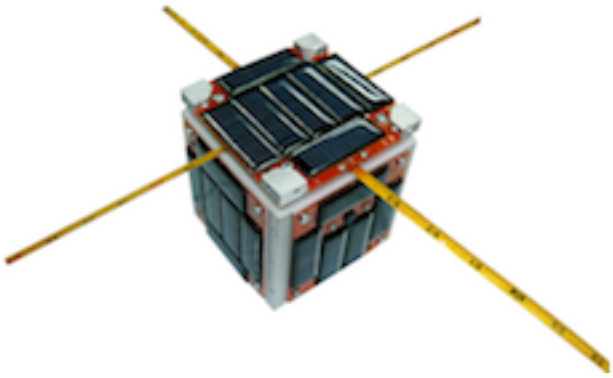
Looking Ahead to Space Week – Anniversary of Sputnik1, the 1st Satellite

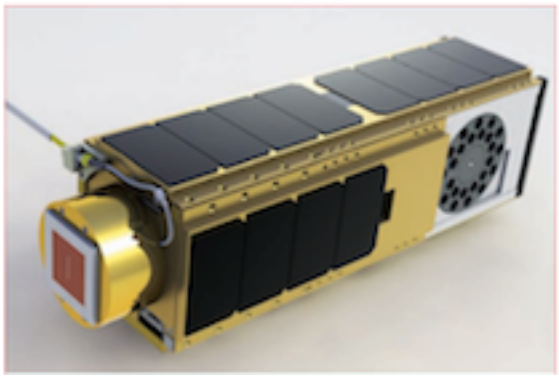
By Peter Kokh

http://en.wikipedia.org/wiki/Sputnik_1

The launch of mankind's first Satellite, the Soviet Union's Sputnik 1 on October 4, 1957, opened Mankind's door to the Space Frontier. Now, 57 years later, we could celebrate by showcasing some of the amazing monster satellites in orbit, including the Hubble Space Telescope and the upcoming James Webb, plus satellites in orbit around other planets like Cassini, Messenger and several in Mars orbit.

But while satellites are getting ever bigger, more complex, and amazingly more capable, we are now entering a period when we have found a way to miniaturize to the extent that universities, and even some individuals, are building Cubesats. By definition, the first one was 10 cm (4") on a side, but now we see cubesats 2, 3, 4, or more such cubes in a row, weighing about 1 kg (2+ lbs) per unit.





If your local chapter is looking for a theme for this year's Space Week outreach opportunity, **showcasing Cubesats** could be a winner, especially for young people attending your event and seeing your displays. And this should be priority #1 for grass roots space organizations whose member age medium is getting older and older, year by year. And the needed software is Open Source!

Cubesats, first introduced in 1999, are small enough and light enough to hitchhike free to ISS where they can be put out the airlock, or with various satellite launches. They will soon be hitchhiking a ride to the Moon or Mars. Think of the pride the young people involved would feel.

Science Fiction, prior to the launch of Sputnik 1, included stories of one-person space efforts. And that is fitting. After all, Robert Goddard in 1928 launched a rocket by himself, and in fiction, H. G. Wells 1905 yarn about The first Men on the Moon, was a story about a perceived crackpot who invented a way to counter gravity and send the first pioneers to the Moon. But in the interim, Space ventures have become exorbitantly more expensive as they get ever more complex and capable.

Yet here we are with cubesats. Students at Marquette University (my Alma Mater) in Milwaukee, are designing and building one, Golden Eagle 1 (named after MU's sports teams) in contract with NASA.
https://news.marquette.edu/news-releases/nasa-selects-marquette-satellite-to-launch-into-space/

It is one thing to awe adults with descriptions of satellites so complex as to be beyond their comprehension. It is another to capture the imagination of young people by showing them what they might be able to contribute, if they exercised their talents.

A Cubesat display could be the ultimate STEM lure. If your chapter wants to promote **STEM** Education (**S**cience, **T**echnology, Electronics, **M**athematics) what better way to celebrate the doors to the universe opened up by Sputnik 1 with such an exhibit or program? ##

Some Cubesat links:

http://www.**cubesat.org** – http://en.wikipedia.org/wiki/**CubeSat**
http://www.nasa.gov/directorates/heo/home/**CubeSats_initiative**.html
http://www.diyspaceexploration.com/**what-are-cubesats/** – includes explanatory Video
http://www.**cubesatkit**.com – you can buy the cube frames ready made
http://www.space.com/24546-**cubesat-record-space-station-launch**.html
A chat with Bob Twigs, father of the cubesat –
http://www.spaceflightnow.com/news/n1403/08**cubesats**/#.UxyUXRbF_ww

APRIL Chapters & Outposts 2014

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

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

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

MOON SOCIETY CHAPTERS

Moon Society St. Louis Chapter – http://www.moonsociety.org/chapters/stlouis/
Contact: Robert Perry surfer_bob@charter.net – Meetings 3rd Wed monthly at Buder Branch Library, 4401 S. Hampton, in the basement conference room – Next meetings – **APR 19 – MAY 17 – JUN 21**

March 8th Report joint meeting: St. Louis Space Frontier, NSS, and **the Moon Society St. Louis Chapter**

The meeting was called to order by Jim Merriman, vice president of NSS StLSF, at Fallon's Bar and Grill, #116 Price Crossing mini mall, 9200 Olive Blvd, Olivette, MO, at noon, with Dabney Tolson, Dave Dietzler, Larry Krupp, Stephen Block, Barry Branham, Philip Newell, and Bob Perry. Pres. Paul Baldwin, phoned in a request to start without him, he was having problems cleaning his hacked computer.

Jim handed out hard copies of "What is a National Space Society Chapter," "What does a chapter do?," "NSS Statement of Philosophy," "Milestones to Space Settlement: An NSS Roadmap/About the Roadmap," a brief bio of Elon Musk, and "Gateway to the West / Gateway to Space," an ad from the '60s by McDonnell Astronautics. He had already emailed them to several members as DOCs and will email them to the rest of the membership on request. After a brief discussion about the handouts he called for a treasurer's report from Philip Newell.

- The chapter now has a physical mailbox: NSS Saint Louis Space Frontier, P.O. Box 1813, Saint Peters, Missouri 63376. Philip has the first key and gave the second to Jim, who also lives in St. Peters
- Philip asked who should be authorized to write checks in addition to himself once he establishes a checking account. This was tabled until he actually gets an account.
- In order to establish an account, the preferred credit union requires the name the chapter uses on all its legal documents be the same. It was moved and seconded that we update the Bylaws filed with the NSS to use the name the chapter registered with the IRS, "NSS Saint Louis Space Frontier" and that we use that name with the NSS. After a brief discussion the motion passed unanimously.
- Philip received dues from Dave Dietzler and Dabney Tolson directly and from Judy Tippet with Stephen Block paying in her stead with the request that she be added to the chapter mailing list.

The floor was then opened to general discussion. Jim passed around a paper copy of the logo our chapter uses when we have a display and credited Mike Mackowski with producing it. Mike moved from St. Louis to Phoenix back in the '80s and is now the president of the NSS chapter in Phoenix. We have a large solid version that we use when we have a display. Here is a photo of Bob, Jim, Amy White, and Chris Nobbe at our display at the 10th anniversary for the Challenger Learning Center a few months ago.

Larry brought up the subject of SETI and that led to an interesting series of speculations including discussing whether ET really would beam broadcasts at us. Barry pointed out that we've been sending out radio signals for just over 100 years and that out at 100 light years you would need a focusing antenna about the size of a solar system to concentrate the signal from the background noise. Bob concluded with the two leading explanations for the great silence – either we are the elder race for our galaxy or Roddenberry's Prime Directive is in effect. Bob then used his laptop and the pub's wifi to show the YouTube video "The Market Problem and Radical Solution" from Planetary Resources, Inc. http://www.youtube.com/watch?v=VLouRKHknOU which illustrates the problem caused by the rocket equation and presents their solution – get water from NEO stony asteroids having ice or hydrated minerals, bring it to filling stations at LEO and electrolyze it into fuel and oxidizer. When you are at LEO, and have as much energy available as what it took you to get there, you can go anywhere in the solar system. Dave recommended the book by G. Harry Stein, "Halfway to Anywhere."

Dabney brought up the subject of nuclear energy – which everyone fears – and Dave told us about the University of Florida's "Innovative Nuclear Space Power and Propulsion Institute http://ufdc.ufl.edu/UF00091281/00001/1x where they designed a system that should produce 1kw/kg.. Getting to orbit will be easier, soon – there are people and businesses in the news – Space X, Virgin Galactic, and StratoLaunch. Larry, from Collinsville, mentioned that his wife is involved with STEM and they might consider having speakers from our group. We need to check with Chris, she has had some involvement with STEM in St. Louis. Jim is trying to arrange a display in Chesterfield Mall for Yuri's Night sometime around April 12th, he will email everyone the details.

Phil announced his new email, spaceadvocatephil at gmail, and was asked about his old one, speliophil. He talked about spelunking and cave diving and that he had gone diving in cenotes – water filled sinkholes in the limestone associated with the Chicxulub Crater in the Yucatan. He found shatter cones at Steelville/Crooked Creek, MO and looked for indications for the crater at Decaterville, MO. Bob read about them at the Terrestrial Impact Database posted by PASSC, and would check for craters in Illinois. [found: Des Plains and Glasford]. Phil might organize an excursion to such sites. Adjourned.

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

JOINT MOON SOCIETY-NSS CHAPTERS

Phoenix NSS-TMS Joint Chapter – **http://nssphoenix.wordpress.com**/ – c/o Mike Mackowski.
Meeting 3rd Saturdays monthly at **HSGP Community Center, Mesa**, 627 W. Rio Salado Parkway.
March 15th Meeting: Nine people attended. The speaker was Jimmy Lin, a recent graduate from the University of Florida with an MS in Aerospace Engineering. Jimmy talked about cubesats, which are small satellites with standard dimensions of 10 cm on each side. The University of Florida developed a tiny control moment gyroscope, which enables a satellite to maintain pointing control while in orbit. The cubesat community has developed to the point where there are commercial suppliers of standard components, so researchers and students do not have to start from scratch, and can concentrate on their mission and payload. It was a very interesting presentation.

We are still trying to come up with a program for Yuri's Night. Our attempt to invite "younger" groups like the local SEDS chapter and another group of young engineers has not worked due to schedule conflicts with other events. Meanwhile, our May meeting will be a joint meeting with the Tucson chapter in their community. Our chapter plans to have a handful of members attending the ISDC in May in Los Angeles.##

Tucson L5 Space Society – http://www.tucsonspacesociety.org/ Now serving Moon Society Members
Contact: Al Anzaldua – Meets monthly, every 2nd Saturday, 6:30 PM **MAR 8, APR 12, MAY 10, JUN 14**

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

Milwaukee Lunar Reclamation Society (NSS/Moon Society) – (Publishers of Moon Miners' Manifesto)
http://www.**Milwaukee-Lunar-Reclamation.org** [new] Contact: Peter Kokh kokhmmm@aol.com
http://www.**Space-Milwaukee.com** – http://www.**meetup.com/Milwaukee-Space-Exploration-Meetup/**
Now meeting jointly with Milwaukee Space Exploration Meetup, Mayfair Mall lower level Garden Suites East Room G110 – 2nd Saturdays 1-4m **APR 12 – MAY 10 – JUN 14** – At our March 8 first joint meeting with Milwaukee Space Exploration Meet-up (wow!), we planned our **Yuri's Night Party for April 12th** (room G150) 1-8 pm) We also started discussing a joint summer Field Trip
NEWS: https://news.**marquette.edu/news-releases/nasa-selects-marquette-satellite-to-launch-into-space/**
Perhaps we can get an involved student to make a presentation on "Golden Eagle One" at our Yuri's Night event, or at the 58th Anniversary of the first satellite, Sputnik 1, on Sat. October 4, 2014, in Space Week.

Members who live in other areas can check if there is an NSS chapter nearby. If 2 or more Moon Society members join an NSS Chapter, that Chapter could be listed as a joint chapter **http://chapters.nss.org/a/lists/#US_Chapters**

AFD NEWS WORLD WATCH SERVICE

Shanghai, China: Volvo will pioneer autonomous vehicles for Earth, Moon, and elsewhere, starting with Mars. The idea was inspired by the two serendipitously similar logos, Volvo™ and Mars - shown overlapping in a new logo that suggests where its products will be used.

Encouraged by CSNA, the China National Space Agency, "**Volvo-Mars™** will develop and manufacture autonomous and semi-autonomous family of rovers and other mobile equipment for Mars, and other worlds, for both national space agencies and commercial firms. This fits China's desire to be at the forefront of opening the Mars frontier.

But this initiative is also profit-motivated by **terrestrial applications** in caves, mines, and Antarctica, in extreme situations and conditions.

Equipment sizes will range from "cube sat" and "insect sizes" on up. The new product lines will include **organized "social insect-like" teams with a hierarchy of command**, including lateral as in early communist party "cells" - for exploring and mapping lavatubes and other subsurface caves, as well as for complex construction projects: such as erecting a complex operational Moon and Mars bases ready to occupy and use by humans.

Here on Earth they will see service in mines and caves in China and other locations including Antarctica and on the sea-bottom, world wide. CNSA will be involved in their use on the Moon, Mars, Europa, Mercury, etc. **AFD**

Los Angeles, California: Dancing With the Stars™ [http://beta.abc.go.com/shows/dancing-with-the-stars] seems to have been caught up by all the videos of robots dancing "Gangnam Style" http://en.wikipedia.org/wiki/**Gangnam_Style**

http://www.youtube.com/watch?v=kmeJvkN4ntI http://www.youtube.com/watch?v=ml9WORziVsI
http://www.youtube.com/watch?v=3X5YUzSOsCI http://www.youtube.com/watch?v=pkL8xyUK4LY

The show has put out feelers to a number of robotic companies, about the feasibility of producing "trainable" rather than programmable robots. They must be in the 160-180 cm (5'3" - 5'9") height range. The idea would be to get two identical robots from each of five companies to pair off with the program's ten professional dance instructors.

After the first 3 shows, one of each pair of professional and robot partner would be out of competition. This would put the burden on both instructor and robot. That would leave the five most successful professional instructors with one of each kind of robot. In the second half of the competition, one team would be eliminated each show.

Depending upon the response from the various robotics company, the first such "Human-Robot dance competition" could air in 2015 or 2016. **AFD**

MMM's 26th Happy April Fool's Day News

GREAT BROWSING LINKS

SPACE STATIONS + COMMERCIAL SPACE

http://www.scientificcomputing.com/news/2014/03/**galactic-gas-station-mit-team-proposes-storing-rocket-fuel-space**

ASTRONAUTS + SPACE TECHNOLOGY

http://www.space.com/24985-**nasa-identical-astronaut-twins-science**.html
http://www.space.com/25276-**joystick-technology-space-station**.html

EARTH , ANALOG EXERCISES

http://www.spacecalendar.com/march-24-30-2014-vol-33-no-12-**hawaii-island-usa/**

MOON

http://www.nature.com/news/**china-s-moon-rover-awake-but-immobile**-1.14906
http://www.nasa.gov/press/2014/march/nasa-releases-**first-interactive-mosaic-of-lunar-north-pole**/#.UzqgFxbF_ww
http://lroc.sese.asu.edu/news/uploads/GigapanScale_small_flat.png
http://www.space-travel.com/reports/**Study_on_lunar_crater_counting_shows_crowdsourcing_effective_accurate_tool**_999.html
http://www.space.com/24905-**moon-elevator-lunar-exploration-liftport**.html
http://www.space-travel.com/reports/**A_Wet_Moon**_999.html

MARS

http://www.space.com/25147-**new-mars-gully-nasa-photo**.html
http://www.space.com/24923-**faxing-life-from-mars-craig-venter**.html
http://www.space.com/24962-**mars-meteorites-single-impact**.html
http://www.space.com/24860-**private-mars-flyby-2021-congress-nasa**.html
http://www.space.com/25207-**mars-rover-curiosity-science-target**.html

ASTEROIDS

http://www.space.com/25175-**nasa-asteroid-capture-plan-ideas**.html
http://www.space.com/25225-**asteroid-rings-discovery-video-images.html**

OTHER PLANETS + MOONS

http://www.astrobio.net/pressrelease/6078/**mercury**
http://www.space.com/24847-**venus-exploration-vamp-inflatable-aircraft**.html
http://www.space.com/25106-**venus-volcanoes-active**.html
http://www.space.com/24926-**nasa-europa-mission-2015-budget**.html
http://www.space.com/24910-**usain-bolt-could-fly-on-moon-titan**.html
http://www.space.com/24989-**planet-x-search-nasa-telescope**.html

ASTRONOMY + ASTROBIOTICS

http://www.space.com/25172-**starshade-alien-earth-exoplanets-incredible-tech**.html
http://news.sciencemag.org/biology/2014/03/scienceshot-**new-tool-could-help-spot-alien-life**
http://www.space.com/25033-**rocky-planet-atmosphere-models**.html
http://www.ras.org.uk/news-and-press/news-archive/254-news-2014/2419-**milky-way-amidst-a-council-of-giants**

VIDEOS

http://www.space.com/25193-**astrobotic-tests-robots-under-different-gravity-video**.html
www.space.com/24990-**one-twin-in-space-one-on-the-ground-boon-for-science-video.**html
www.space.com/24396-**spacecraft-hull-crawling-robots-are-these-their-ancestors-video**.html
http://www.space.com/18952-**humans-on-iss-to-control-robots-on-earth-video**.html
http://www.space.com/24788-**moon-blast-boulder-sized-meteor-creates-131-foot-wide-crater-video**.html
http://www.space.com/24919-**lagrangian-elevator-to-the-moon-is-it-possible-video.**html

The Moon Society moonsociety.org

Moonscapes fiction

Marshall Mike Moondust and the Sinister Selenian Subterfuge

MISSED PREVIOUS INSTALLMENTS? The whole series is now online, Chapters I–XIV (1–14):
http://www.moonsociety.org/publications/fiction/MMMSSS.pdf

Chapter XV is next but the writer is on vacation this month, so we will have to wait in suspense until next month!

"ISDC 2014 – "A Space Renaissance" Los Angeles, CA – May 14–19, 2014

http://isdc.nss.org/2014/

Sheraton Gateway Hotel at LAX Airport

http://www.starwoodhotels.com/sheraton/property/overview/index.html?propertyID=344 **Visitor's Guide to Los Angeles** – http://lacity.org/visitors/index.htm

http://isdc.nss.org/2014/**speakers**-all.html – http://isdc.nss.org/2014/**schedule**.html [tracks]

http://nssdocs.xisp.net/**nsswiki**1/Isdc2014

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

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

Are(o)zoogenic Preserves – (1) areas on Mars where it is suspected that native microbial life forms may still subsist; (2) areas on a rejuvenated Mars with a more favorable climate, in which Mars-hardened life forms form Earth might first take hold

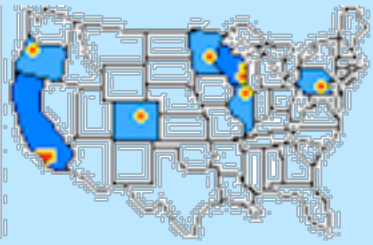
Biodynamic Design – Using architectural plans from nature – An example is the design of a triple helix toroidal space settlement, the inspiration being the double helix design of DNA fame and the basis of all life as we know it.

Coastal sites – Areas along the Highland–Mare coasts provide good access to both suites of regolith compositions. Highland regolith is richer in Aluminum, Magnesium, and Calcium. Mare regolith is richer in Iron and Titanium. Coastal sites around Mare Imbrium are also enriched with KREEP deposits consisting of Potassium, Rare Earth Elements, and Phosphorus.

- Industrial complexes in "coastal areas" will have an edge of both those in mid–mare and in mid–highlands
- The total of nearside coastal millage is many times longer than that on farside.
- Both poles are deep in highland territory. However the distance from the North Pole to the nearest "coast" along the north shore of Mare Frigoris is only some 600 miles, less than half the distance from the South Pole to the nearest coastal area in southern Mare Humorum.

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

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

MLRS – Milwaukee Lunar Reclamation Society

PO Box 2101, Milwaukee, WI 53201 – www.moonsociety.org/chapters/milwaukee/
www.Space-Milwaukee.com – http://www.meetup.com/Milwaukee-Space-Exploration-Meetup/

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

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• 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)

Our **April 12th Meeting will be our Yuri's Night celebration** and will extend extra hours, 1-8pm and be held in Room G150 we expect a crowd: displays, spare magazines to take home, videos, films, and pot-luck food and drinks. Our May 10th and June 14th meetings will be in G110 as usual. No meetings in July and August.

Saturday, July 19th Felld Trip to Bong Recreational area in Kenosha County to watch the Tripoli Rocket Club launch some of their biggest rockets – and potluck picnic.

WISCONSIN

SSS – Sheboygan Space Society

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

c/o Will Foerster 920-894-1344 (h) astrowill@frontier.com
SSS Sec./Tres. c/o B.Pat Knier dcnpatknier@gmail.org
DUES: "SSS" c/o B. P. Knier, 22608 County Line Rd, Elkhart Lake WI 53020
Meetings are at The Stoelting House, 309 Indian Hill, Kiel WI 53042 - 3rd Thurs even # months
NEXT MEETINGS: APR 18 - JUN 20 - AUG 15 - OCT 17 - DEC 14 (SAT in Milwaukee)

COLORADO

DSS: Denver Space Society fka Front Range L5

1 Cherry Hills Farm Drive, Englewood, CO 80133

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

CALIFORNIA

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

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 – APR 20 – MAY 18 – JUN 15 – JUL 20

OASIS NEWS AND EVENTS

Saturday, April 19, 2013, 3 pm OASIS Board Meeting at Home of Gareth Powell and Lisa Kaspin-Powell
3206 Summertime Lane, Culver City, CA
May 14-19 International Space Development Conference Sheraton LAX Gateway Hotel, Los Angeles, CA
Saturday, June 21, 3 pm OASIS Board Meeting at Home of Phil Turek, 7611 Alhambra,Huntington Beach, CA

ILLINOIS

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

MNSFS NEWS – All

OREGON

ORL5 – Oregon L5 Society – http://www.OregonL5.org
PO Box 86, Oregon City, OR 97045
(LBRT – Oregon Moonbase) moonbase@comcast.net – Charles Radley: cfrjlr@gmail.com

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

Public Presentation Monday, April 14th 6:00 – 7.45 pm – Big Drops, Big bubbles, Small Gravity – Fluids Handling without Gravity. Prof Mark Weislogel from Portland State U.
At North Portland Library, 512 N Killingsworth St, Portland

Monday May 12th – 6:00 pm to 7:45 pm Building a Commercial Moonbase By Mr. Dan Dolan, President of Moonbase Builders Location: upstairs room at the North Portland Library, 512 N Killingsworth St, Portland

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

PENNSYLVANIA

NSS-PASA: NSS Philadelphia Area Space Alliance – 928 Clinton Street, Philadelphia, PA, 19107
c/o Earl Bennett, - earlisnowat@outlook.com - 856/261-8032 (h), 215/698-2600 (w)
http://pasa01.tripod.com/ - http://phillypasa.blogspot.com

The NSSPASA Report for March 2014 1618 words

Meeting Times and Locations: Our April and May meetings will be at the Liberty One Food Court at the sixteenth and Market Street location on the second floor. Look for us toward the seventeenth Street side of the building and look for a space related table identifier. April and May meeting s: on the twelfth and tenth respectively. Our event dates are May third. Both events we are part of happen on the same day! The Science Festival will be in Philadelphia on the Parkway, while the Super Science event will be at The New Jersey State Museum in Trenton (near the state Capitol building. Other events may be added (see Mitch's report).

Meeting notes: We had a well attended meeting including a guest, Eric Hammil, who came after attending another public event one of our members met him at. Personal requests can help bring prospective members. This outreach method was also suggested in the Jan./Feb. issue of the AMSAT Journal

Dorothy gave our first report on Museum and conventions in our region. There was also a space exhibit at "The New Museum of Contemporary Art" in New York City. This exhibit features a Space Module taking up the entire fifth floor. The Module will be on display till April 13. It is described as a "retro-futuristic spaceship interior" (does it have fins?). She also brought material on : Super Science Saturdays at the Udvar- Hazy Center in Virginia. These events are held on the second Saturday of each month. There are also star lectures at the Smithsonian (for ages 13 and up).On April 12, as part of the Heritage Festival events, there will be a family day: "Explore the Universe day :Everyone Looks Up" from 10 a.m. till 3p.m.throughout the Museum in Washington D.C..And: The Goddard Spaceflight Center in has new exhibits including a full size Lunar Reconnaissance Orbiter, the first part of a James Webb exhibit and several high energy sensing craft we have used. See the respective websites for more on these events. Thank you Dorothy!

Larry the webmaster gave the next report that included a number of items: these included the number of hits on our website, about average, where from (around the world, including New Zealand), and a report on solar activity. We are nearing a sunspot maximum this spring and will have a minimum in 2021. The level of sunspots is important due to the associated intense radiation levels associated with sunspots (and coronal mass ejections also).Larry and Dorothy will be going to the LunaCon Science Fiction convention. And report on that in April. Larry also confirmed that we have a spot at The New Jersey State Museum.

Mitch reports that Astronomy Night, a part of The Science Festival, will be on April 25 ahead of the main Festival events in center city. Frank O'Brien will do the honors again at a site he will select.Philadelphia has a program to bring astronomy to inner city and immigrants communities. Mitch is working on the Science Carnival spot for our Philadelphia contingent and is planning to do a public outreach prior to the Festival. He plans to work with Steven on this. He also brought a number of issues of the Spring 2014 **Ad Astra Magazine** from The National Space Society. This special issue includes Milestones to Space Settlement: Progress Toward Our Vision as a special insert. If you would like to see the scale of our plans just look at the cover of this publication: it is an internal view of a space settlement, I believe of the Kampala design, with people in the foreground (and trees and buildings….). Find this Ad Astra at your better bookstores or order it from NSS. Mitch pointed out that this issue also has a report on **Inspiration Mar**s and the plans of Dennis Tito, among others, to finance a Mars flyby of two people very soon (n years, not decades).Readers of Moon Miners may be among those who have entered the contest to be the first interplanetary voyagers in 2018.Mitch calls this the best issue of Ad Astra he has ever read. He will work out how we can copy the Roadmap for hand outs at the May events

Dennis is continuing to work on his Habitat module and will bring it to the New Jersey location. He came in and helped judge at the George Washington Carver Science fair where we chose a young women, Grace, as the winner of the Oscar H. Harris Award (for her research project titled "Bending Light" on propagation through different media).

Hank Smith brought news on the ratification of Garry Feldbaum as Chairman of this years Philcon convention. Hank will again be Assistant for publicity and Space Science Liason. We again had lots of talk on the location of the event.

Rich Bowers responded to a question about the model he instigated and what he has done since this happened in July of 2013. All materials have been turned over to Dennis so that he can create the display model Rich decided that continuing to attend the model making group he found to ask for opinions and help initially with the habitat was redundant. We then went on to talk about what scale of common modeling elements (houses etc) might be usable for what Dennis is constructing and what others may attempt later on.This may include Lego™ pieces for habitat displays for the May events.

Janice pointed out that many people are not comfortable with the idea of space habitats: they fear that the location may be turned into a place for criminals and undesirables (Australia and Robert Heinliens Moon colony come to mind as reasons for this worry).The recent movie Eliseum also plays on this dystopian fear.

And Earl brought material from a number of sources including: Analog for May,2014 on "Lockstep: A Possible Galactic Empire" in the Science Facts column.by Karl Schroeder. The science fiction novel that he wrote based on this idea appeared in the magazine recently (in four parts). The idea is based on advanced medical technology and an agreed upon set of social rules that members of a group of people, up to, and including civilizations, follow on when they will resume normal time living and for how long. This version of the future assumes no hyper drives, no f.t.l, no wormhole transit system, etc. The result is a civilization that can colonize objects out through interstellar space, including infra stellar space (between the stars). An interesting concept.

From Medical Design Briefs for March is a number of research reports , in the Design Briefs section, that report work on various medical applications of additive manufacturing. This includes bioabsorbable metallic alloys and the background work on techniques used to make a number of components and the techniques used on specific materials. Many summaries starting on page 32. Aerospace applications are part of the group. There is also an announcement of the "Create the Future Contest" that the public can be part of. The 2014 contest has started and you may enter, as an individual or as part of a team, now. This is an international competition. Go to www,CreatetheFuturecontest.org.

On the NASA tech Briefs side: "Probabilistic Guidance for Swarms of Autonomous Agents. From the March issue, this report is on getting a group of various kinds of independent systems, from small robots to convoys of spacecraft, to move/deploy in the most effective and efficient manner. Above a certain quantity of elements, which can vary depending on the activity I believe, statistical methods can be applied to create an optimum solution quicker than other mathematical techniques. See the magazine. This work was done for J.P.L. at Caltech byDavid S. Bayard and Behcet Acikmese. See the article. There is also a special section showing recent content put on Techbrief.tv including a thin film foldable mirror and several other interesting presentations. Sponsored by Edmud Optics (Edmuds is still around!). Wired for March has a nice write up on the new Cosmos with Neil Degrasse Tyson as the host. A good show and this interview here is worth looking for.

In the AMSAT Journal for Jan/Feb in the Apogee View section, there are a number of reports on events and the upcoming launch, scheduled for December, of the Fox Cubesat. Lots of housekeeping as well: amateur satellites are built by a number of people that can include participants from other countries and technologies that may be considered "sensitive" and subject to government agencies restrictions (including the Pentagon). More in this column. On page 21 of this issue appears a short report: ARRL Posts Resources for Using Satellites in the Classroom for hams to do space and communication related outreach.

ARRL Education and Technology Education Director Mark Spencer, W8SME, has released "The Pragmatic Guide for Using the FUNCube Materials Science Experiment in the Classroom" on how to access and use the Materials Science Experiment on the satellite. There are six chapters of information in this package for hams and teachers to use. The ARRL has a number of documents in its library for teachers to use in the classroom. See the ARRL site to see if you can access this material. And lastly :As mentioned previously we gave a young women, Grace, a seventh grade in the Philadelphia school system, the Oscar H. Harris Award for her " Bending Light" research report. We gave her: A book on 3D printers and Scanners, a gift certificate of $50 to use at Shapeways (where you can have things made or submit your own designs),a project kit: Everything That Flies, and, a $50.00 bill. Earl Bennett

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