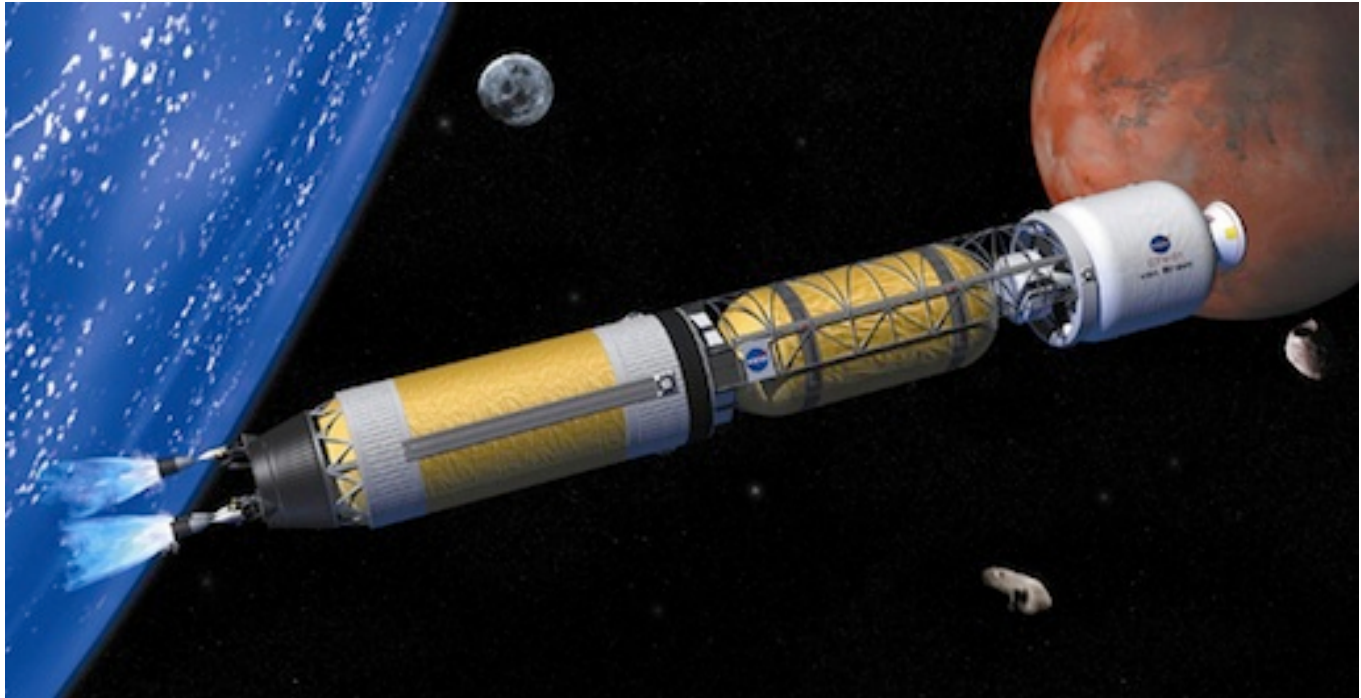


“Towards an Earth-Moon Economy – Developing Off-Planet Resources”

# Moon Miners’ Manifesto

& The Moon Society Journal

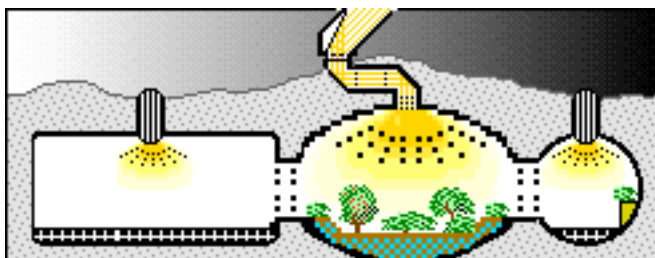
www.MMM-MoonMinersManifesto.com



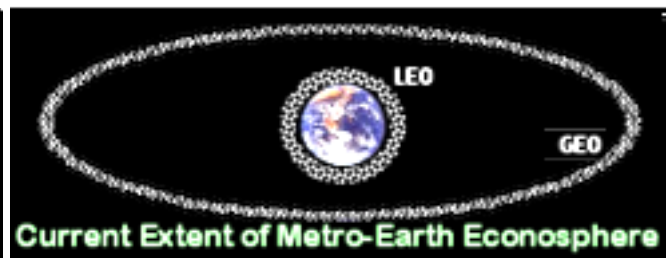
ABOVE: Facing the reality of debilitating exposure to cosmic radiation as well as long periods without gravity, NASA has come to realize that we need to start over, significantly reducing flight times between Earth and Mars and back.

## Feature Articles

- 2 In Focus: Beachheads on Moon & Mars for a fraction of the cost and time
3. NASA’s new plans for higher speed, shorter trip, more frequent transportation between Earth and Mars
4. Economic Assessment and Systems Analysis of an Evolvable Lunar Architecture that Leverages Commercial Space Capabilities and Public-Private-Partnerships.
5. MMM Suggestions: of strategically thrifty ways to open the Moon
6. MMM’s List of High Priority Planetary Science Missions
7. Alan Bean: astronaut/artist
8. Former President of India and Solar Power Satellite Advocate, Dr. Kalam Dies



Comfortable housing for permanent stays



Playing to the “Metro-Earth” Econosphere

For past articles, Visit [http://www.moonsociety.org/publications/mmm\\_classics/](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/](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](http://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](mailto: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](http://www.NSS.org)

• **The Moon Society** seeks to overcome the business, financial, and technological challenges to the establishment of a permanent, self-sustaining human presence on the Moon.” – Contact info p. 9.

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

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

• **Submissions by email** to [KokhMMM@aol.com](mailto: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 Kok h, 1630 N. 32nd Street, Milwaukee, WI 53208-2040

## In Focus Beacheads on Moon & Mars for a fraction of the cost and time

By Peter Kokh

Most of us space exploration and development disciples have found the pace of progress, step by step, discouragingly slow. Economics and Politics have been the favorite excuses and culprits. But the real roots of the entrenched snail pace have been

### Flawed designs and assumptions vs, common sense frugality

✓ Everything should be designed to be used but once then thrown away – contractors just love this setup! – it makes transportation and shipment to the Moon an order of magnitude higher than it could be.

– **But if** everything is designed to be reused over and over with extended lifetimes, the cost becomes a fraction

✓ The Moon is too hot or too cold for most of the time – **But if** a 5–10 meter-yard regolith powder blanket provides enough thermal protection, especially when combined with geothermal heating and cooling systems, then crew stay times – and their accomplishments and productivity – will be extended significantly, reducing labor costs by more than an order of magnitude.

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



✓ Astronauts should have short terms of duty – greatly multiplying the cost of manpower supply to Moon sites – **But if crews stayed a lunar month or two, and were free to “re-up,” costs of manpower would fall enormously.**

✓ Everything needed on the Moon should be made on Earth and shipped at great cost. – **But if we started the simpler lunar industries, for example, carved and cast basalt products, followed by others, the costs of supplies needed for outpost expansion would begin to drop. And if “everything” – and we mean “everything” – shipped to the Moon, including containers, packaging etc. Were designed for reuse in the outpost, expansion costs would drop dramatically.**

✓ The traditional way is NOT the best way – nor is making terrestrial corporations rich the goal!

✓ Every thing must be on the table for challenge and rethinking. Let's purge NASA's Homer Simpson mentality. Innovation minded contractors are only too anxious and willing to shove established contractors to the side.

## NASA's new plans for “Higher Speed, Shorter Journey,” more frequent transportation between Earth and Mars

**“NASA-Funded Study Reduces Cost of Human Missions to Moon and Mars by Factor of Ten”**

20 July, 2015 – [www.spaceref.com/news/viewpr.html?pid=46392](http://www.spaceref.com/news/viewpr.html?pid=46392)

Press Release From: [National Space Society www.nss.org](http://www.nss.org)

The **National Space Society (NSS)** and **Space Frontier Foundation (SFF)** today announced their support for NASA's funding of the newly released **NexGen Space study**, illustrating how to cut the cost of human space exploration by a factor of 10. The study, "Economic Assessment and Systems Analysis of an Evolvable Lunar Architecture that Leverages Commercial Space Capabilities and Public – Private – Partnerships," finds

**“Public-private partnerships are able to return humans to the Moon for approximately 90% less than the previously estimated \$100 billion, allowing the United States to ensure national security in a new space age.**

"The Space Frontier Foundation supports and recommends

**public-private partnerships in all proposed human spaceflight programs in order to reduce costs and enable these missions that were previously unaffordable,"**

Said the Space Frontier Foundation's Chairman of the Board, Jeff Feige.

**"This is the way that America will settle the final frontier, save taxpayers money and usher in a new era of economic growth and STEM innovation."**

- **Enabled by public-private partnerships**, NASA's current human spaceflight budget is sufficient to return humans to the surface of the Moon and develop a permanent lunar base.
- **Mining fuel from lunar poles and transporting it to lunar orbit** for use by other spacecraft **reduces the cost of sending humans to Mars** and other locations beyond low Earth orbit.
- **These commercial fuel depots in lunar orbit have the potential to cut the cost of sending humans to Mars by more than \$10 billion per year.**

**To this end, NASA has decided, at long last, to invest in VASIMIR propulsion.**

<http://www.spaceref.com/news/viewpr.html?pid=46392>

VASIMIR = VARIable Specific Impulse Magnetoplasma Rocket

[https://en.wikipedia.org/wiki/Variable\\_Specific\\_Impulse\\_Magnetoplasma\\_Rocket](https://en.wikipedia.org/wiki/Variable_Specific_Impulse_Magnetoplasma_Rocket)

“VASIMIR is not suitable to launch payloads from the surface of Earth due to its low thrust-to-weight ratio and its need of a vacuum to operate. Instead, it would function as an upper stage for cargo, reducing the fuel requirements for in-space transportation.”

**This new propulsion system will greatly shorten transit times Earth-Mars and Mars-Earth to a 10<sup>th</sup> of the time conventional rockets would take**

- **This greatly reduces exposure of humans to cosmic radiation**
- **Spending less time in microgravity, it delivers humans to Mars “ready to hit the ground running”**
- [ See the cover masthead of this issue for an artist rendering of a Vasimir Rocket ]
- In the past, NASA seemed reluctant to invest in the VASIMIR project    ##

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



**Economic Assessment and Systems Analysis of an Evolvable Lunar Architecture that Leverages Commercial Space Capabilities and Public-Private-Partnerships**

13 July, 2015 – [www.nss.org/docs/EvolvableLunarArchitecture.pdf](http://www.nss.org/docs/EvolvableLunarArchitecture.pdf)

20 July, 2015 – [www.spaceref.com/news/viewpr.html?pid=46392](http://www.spaceref.com/news/viewpr.html?pid=46392)

**NASA-Funded Study Reduces Cost of Human Missions to Moon and Mars by Factor of Ten**

**National Space Society Press Release Posted: Monday, July 20, 2015**

This study by NexGen Space LL was partly funded by a grant from NASA's Emerging Space office in the Office of the Chief Technologist. The report's conclusions are solely those of NexGen team authors.

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The study, "**Economic Assessment and Systems Analysis of an Evolvable Lunar Architecture that Leverages Commercial Space Capabilities and Public – Private – Partnerships,**" finds **public-private partnerships are able to return humans to the Moon for approximately 90% less than the previously estimated \$100 billion, allowing the United States to ensure national security in a new space age.**

"The Space Frontier Foundation supports and recommends public-private partnerships in all proposed human spaceflight programs in order to reduce costs and enable these missions that were previously unaffordable," said the Space Frontier Foundation's Chairman of the Board, Jeff Feige. "**This is the way that America will settle the final frontier, save taxpayers money and usher in a new era of economic growth and STEM innovation.**"

**STUDY ASSUMPTIONS**

- 1) PUBLIC PRIVATE PARTNERSHIPS AS ACQUISITION STRATEGY
- 2) 100% PRIVATE OWNERSHIP OF LUNAR INFRASTRUCTURE AND ASSETS
- 3) INTERNATIONAL LUNAR AUTHORITY TO REDUCE BUSINESS RISK
- 4) EVOLVABLE LUNAR ARCHITECTURE

TECHNICAL ANALYSIS

GENERAL TECHNICAL APPROACH

ANALYSIS METHODS

PHASE 1A — ROBOTIC SCOUTING, PROSPECTING, SITE PREPARATION

PHASE 1B — HUMAN SORTIES TO LUNAR EQUATOR

PHASE 2 — HUMAN SORTIES TO POLES

PHASE 3 — PROPELLANT DELIVERY TO L2 & PERMANENT LUNAR BASE

PHASE 4+ (OPTIONAL) —

REUSABLE OTV BETWEEN LEO AND L2

TECHNICAL RISK ASSESSMENT

LIFE CYCLE COST ESTIMATES

BASIS OF ESTIMATE

GROUND RULES & ASSUMPTIONS

HISTORICAL DATA

MODELING & ANALYSIS

SCOPE

Modeling & Analysis Drivers

Context, the NASA Budget

LIFE CYCLE COST ASSESSMENT

Results Summary

Life Cycle Cost Assessment

Forward Work ###

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## MMM suggestions of strategically thrifty ways to “open” the Moon

By Peter Kokh

### MMM THEMES: Lunar Architecture & Construction

[http://www.moonsociety.org/publications/mmm\\_themes/mmtt\\_construction.pdf](http://www.moonsociety.org/publications/mmm_themes/mmtt_construction.pdf)

**MMM # 18** Strategy For Following Up Lunar Soil–Processing With Industrial M.U.S.–c.l.e.

**MMM # 66** Lunar Utilities Infrastructure: Wiring the Moon; Light Delivery Systems

**MMM # 67** Water Reservoirs; Settlement Water Company

**MMM # 74** Housing on the Moon; Shielding & Shelter; Visual Access; Letting in the Sun;  
Drop-in Utility Cores; Modular Element Testbed Ensembles

**MMM # 75** A Successful Lunar Appropriate Modular Architecture

**MMM # 116** A Modular Approach to Biospherics

**MMM # 135** Cast Basalt: Startup Industry With Two Great Tricks

**MMM # 198 The Outpost Trap:** Technologies Needed to Break Free;

I. Transportation Systems;

II. Expansion–friendly Modular Outpost Architectural Language;

!!!. Locating for Local, Regional, Global Expansion Options

**MMM # 199** The Outpost Trap:

IV. In Situ (local) Resource Utilization;

V. Industrial Diversification Enablers;

VI. The Entrepreneurs;

VII. Moonbase Personnel

**MMM # 200** The Outpost Trap:

VIII. Strategies for Organizations helping make it happen;

IX. A Lunar Analog Program can Make it Happen

**MMM # 224** An International Lunar Research Park

**MMM # 232** Lunar Base “Preconstruction;” Pete’s Shielding Blog

**MMM # 234** Cast Basalt: Critical Role for Lunar Industrialization, Settlement Construction;  
Basalt: What its availability means

**MMM # 258** Moon and Mars Outposts: Building Sheltering Structures First

### MMM THEMES: LUNAR ECONOMY

[http://www.moonsociety.org/publications/mmm\\_themes/mmtt\\_LunarEconomy.pdf](http://www.moonsociety.org/publications/mmm_themes/mmtt_LunarEconomy.pdf)

**MMM # 6** “M is for Missing Volatiles;” “M is for Methane & ‘Mmonia;”

“M is for Minimizing the cost of importing Methane, Ammonia, and Hydrogen

**MMM # 16** Glass–Glass Composites & “Spin–Up”

**MMM # 18** A Strategy For Following Up Lunar Soil–Processing With Industrial M.U.S.–c.l.e.

**MMM # 22** 1st Exports

**MMM # 23** Helium–3

**MMM # 24** Gas Scavenging

**MMM # 32** Import Export Equation; Diversification Subsidies; Not In My Back Yard (NIMBY):  
The Import/Export Sleeper; Gross Imports that Could Count as Net Exports

**MMM # 65** Lunar Industrialization: Substitutions Game; Fast Road to Lunar Industrial “MUS/cle; Stow–  
away Imports

**MMM # 116** Uranium and Thorium and a Lunar Nuclear Fuels Industry

**MMM # 123** Thorium the Key to Opening Up Mars

**MMM # 126** “Potentiation” – Getting Through the Nightspan on the Moon’s Own Terms

**MMM # 128** Justification for Early Operation of a Lunar Mining Facility

**MMM # 136** An ‘All-in-One’ Moon Resort

**MMM # 144** Stay–home Shadow Settlers Brains & Skills “Tele–help” to reduce labor costs on the Moon

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- MMM # 188 Zero–Mass Products & Services as a Major Part of a Lunar Frontier Economy  
 MMM # 229 Resources of Mare Imbrium and Oceanus Procellarum; Lunar Industrialization:  
 Defining the Lunar Industrial Seed: What Comes Before and How?  
 MMM # 230 Lunar Industrialization: Defining Lunar Industrial Seed: What Comes Before How?;  
 Defining the Lunar Industrial Seed: Manufacturing  
 MMM # 231 Lunar Industrial Seed: The “cle” part of Industrial Development MUS/cle Strategy;  
 A Basalt Fibers Industry  
 MMM # 234 Lunar Basalt: What, Where, Critical Role for Lunar Industrialization & Settlement  
 MMM # 239 Could the Best Place to Mine Asteroids be on the Moon?:

=====

## MMM THEMES: TOURISM

[http://www.moonsociety.org/publications/mmm\\_themes/mmm\\_tourism.pdf](http://www.moonsociety.org/publications/mmm_themes/mmm_tourism.pdf)

- MMM # 69 Tourist Earnings  
 MMM # 102 Archive Luna: The Grand Archives of Earth and Humanity  
 MMM # 115 Skiing the Moon  
 MMM # 117 Scenic Cableways; Land–cruising Gypsy House Boats; Cruising Mare Crisium  
 MMM # 161 Tourist Clusters on the Moon  
 MMM # 244 Could Paying Working Tourists Open the Moon Faster, for Less?

## MMM's List of High Priority Planetary Science Missions



By Peter Kokh

### The MOON

- Global Lavatube Mapper – [www.moonsociety.org/competitions/engineering/SkylightExplorer.ppt](http://www.moonsociety.org/competitions/engineering/SkylightExplorer.ppt)
- Lavatube Skylight Explorers:  
<http://eselenology.offworldventures.com/wp-content/themes/mimbo2.2/images/SelArticleSpr2011.pdf>  
[www.moonsociety.org/competitions/engineering/SkylightExplorer.ppt](http://www.moonsociety.org/competitions/engineering/SkylightExplorer.ppt)

### MERCURY

- North polar Lavatube Mapper & Skylight Explorers Probe (see links above)

### MARS

- Global Lavatube Mapper and Skylight Explorers (see above)
- Permafrost Mapper
- Flight Demonstration first in Hellas Planitia, then in Valles Marineris
- High resolution mapper looking for **relics of ancient shorelines** in the Hellas basin and elsewhere

### ASTEROIDS

- Mission to Pallas, about the size of Vesta but in a high inclination orbit

### VENUS & GAS GIANTS

- Aerostat Atmosphere Probes able to handle high pressures and temperatures  
[https://en.wikipedia.org/wiki/Colonization\\_of\\_Venus#Aerostat\\_habitats\\_and\\_floating\\_cities](https://en.wikipedia.org/wiki/Colonization_of_Venus#Aerostat_habitats_and_floating_cities)  
[http://www.moonsociety.org/publications/mmm\\_papers/venus\\_rehabpaper.htm](http://www.moonsociety.org/publications/mmm_papers/venus_rehabpaper.htm)

### EUROPA

- Ice Crack Explorer – water oozing up cracks in ice might include any frozen samples of life below

### TITAN

- Great Lakes Boats, Subs { [www.space.com/29953-titan-submarine-nasa-niac-proposals.html](http://www.space.com/29953-titan-submarine-nasa-niac-proposals.html) }

### NEPTUNE & URANUS – Cassini type missions for both

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## Alan Bean: from “Moonwalker” to Artist

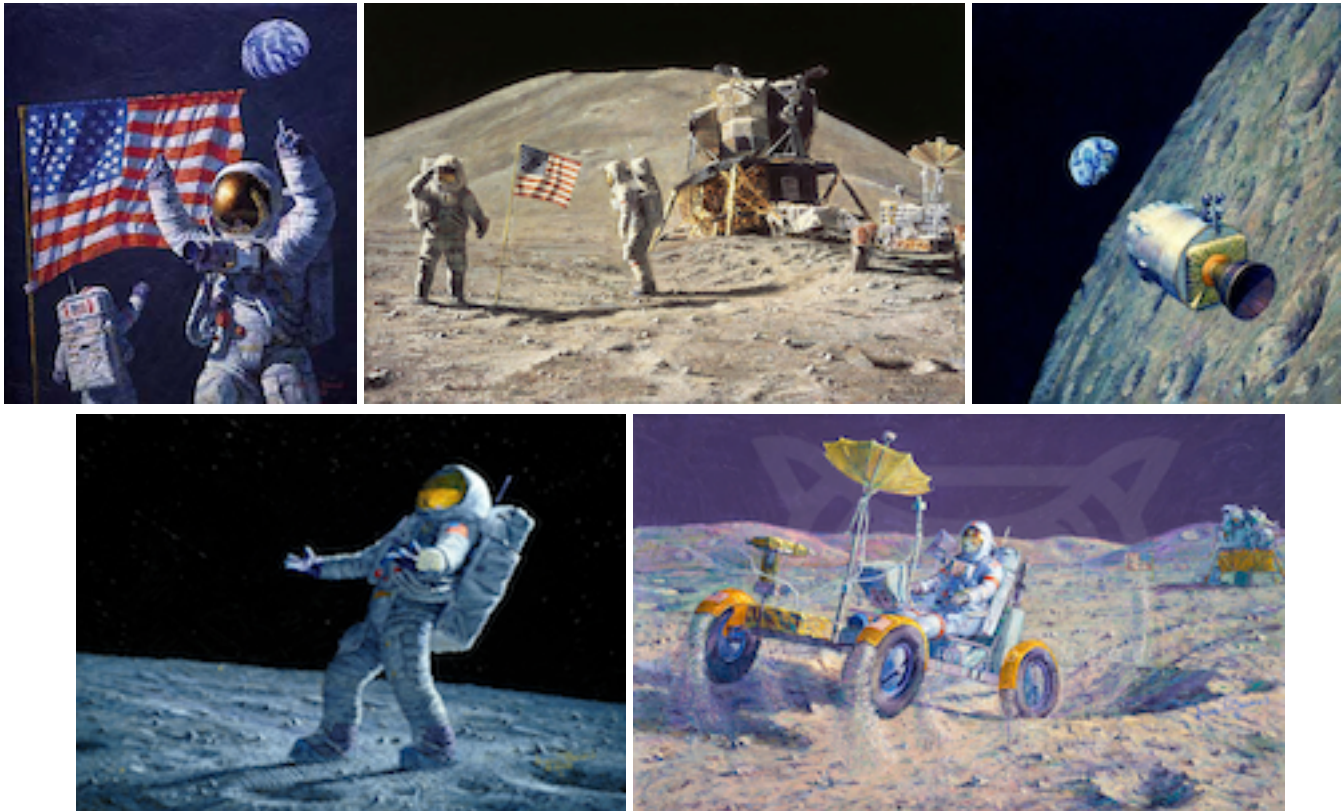
By Peter Kokh

Born March 15, 1932 in Wheeler, TX, Alan Bean, now 83, is one Apollo astronaut who found a way to keep his experiences on the Moon live and vivid, by producing art to inspire others. Bean was the 4<sup>th</sup> person to set foot on the Moon, the lunar module pilot on Apollo 12, in the second lunar landing. \ in the Ocean of Storms, Oceanus Procellarum, November 20, 1969, accompanied by mission commander Charles “Pete” Conrad.

Bean resigned from NASA in June 1981 after 18 years as an astronaut, to devote his time to painting. Many of his paintings hang on the walls of space enthusiasts. He said he was fortunate enough to visit worlds and see sights no artist's eye, past or present, has ever viewed firsthand and he “hoped to express these experiences through his art.”

As a painter, Bean wanted to **add color to the Moon**. “I had to figure out a way to add color to the Moon without ruining it,” he remarked. In his paintings, the lunar landscape is not a monotonous gray, but shades of various colors.

He is the only artist to use **real moon dust** from keepsake patches from his space suit dirty with moon dust. He adds ✓ **tiny pieces of the patches** to his paintings, which make them unique. And ✓ **the hammer used to pound the flagpole into the lunar surface**, and a **bronzed moon boot**, to texture his paintings.



Editor's selection of three of Bean's paintings

You Tube: <http://airandspace.si.edu/exhibitions/alan-bean/>

Available Alan Bean originals: [http://www.alanbean.com/available\\_originals.cfm](http://www.alanbean.com/available_originals.cfm)

**DVD: “Alan Bean Artist - Astronaut”** (the You Tube video above is a shorter version,

**Editor. We strongly recommend this thorough explanation of his work by the artist himself**

**Bean also had a featured role in the documentary Lunarcy**, along with Peter Kokh and Chris Carson of both the Moon Society and the National Space Society ##

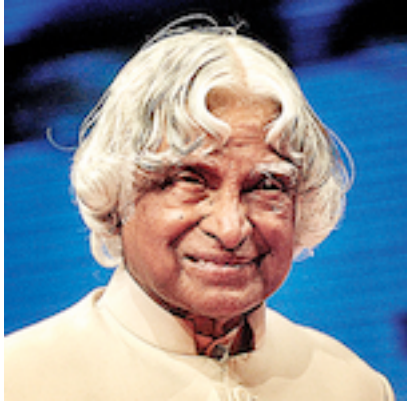


## Dr. Kalam Dies – former President of India and Solar Power Satellite Advocate

July 27, 2015, Shillong, India

[https://en.wikipedia.org/wiki/A.\\_P.\\_J.\\_Abdul\\_Kalam](https://en.wikipedia.org/wiki/A._P._J._Abdul_Kalam)

<http://thelogicalindian.com/news/dr-apj-abdul-kalams-remarkable-list-of-achievements-and-awards/>



Dr. Kalam left – right Kalam receiving award from David Dunlop in Toronto



The University of Luna Award for Dr. Kalam

Sept. 9, 2010 – [www.moonsociety.org/reports/Kalam\\_award\\_announcement.html](http://www.moonsociety.org/reports/Kalam_award_announcement.html) 09.30.2010

“Today, the Moon Society presented its University of Luna Award to Dr. A.P.J. Abdul Kalam for his vision and advocacy of space solar power to meet global requirements for clean energy, economic development, and environmental restoration.

David A. Dunlop, Moon Society Director of Project Development and our unofficial roving Ambassador, made the presentation at the prestigious McDonald Club in Toronto, Ontario after a two-day drive from his home in Green Bay, Wisconsin, stopping at the Milwaukee home of Society President Peter Kokh to pick up the award. to Dr. A.P.J. Kalam for his vision and promotion of space solar power as a solution to global requirements for clean energy economic development, and environmental restoration”

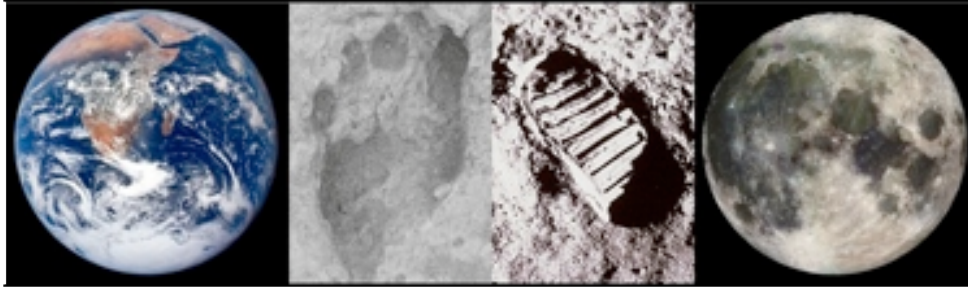
**Moon Miners' Manifesto #205**, May 2007 featured a three page article about Dr. Kalam's vision.

Since then, **MMM #237, August 2010**, featured a two page article about Dr. Kalam's Space Solar Power Challenge to the National Space Society and to the World, an address delivered via telecom at the 2010 International Space Development Conference in Chicago over the Memorial Day Weekend. ##



**THE MOON SOCIETY – LUNAR FRONTIER SETTLEMENT – [WWW.MOONSOCIETY.ORG](http://WWW.MOONSOCIETY.ORG)**

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



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

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

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

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

**Our Vision says it all – “Who We Are and What We Do” –**

[www.moonsociety.org/spreadtheword/whowhat.html](http://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](mailto:president@moonsociety.org)



## The Moon Society – Lunar Frontier Settlement – [www.moonsociety.org](http://www.moonsociety.org) p.2

### From Moon Society President Ken Murphy

In a recent post at NASAWatch, space gadfly Keith Cowing made the assertion that space advocacy has largely been ineffective despite decades of effort

<http://nasawatch.com/archives/2015/08/space-advocacy.html>

What Keith is speaking to is the efforts by larger organizations like National Space Society and The Planetary Society to influence the dialogue on a national level, mainly through efforts at driving the political process. In that regard he is correct, and the effect has been de minimis. This is part of why The Moon Society is a-political. Our members are encouraged to exercise their rights as citizens to influence the political process, but The Moon Society does not see government as the solution to humans living and working on the Moon.

Lunar development is part of what will become the human story. To some extent that development will be provided by the government, but will be driven by human activity of all kinds.

That is why The Moon Society explores concepts like the Cislunar Econosphere – what kinds of developments in cislunar space can help grow our economy? What opportunities will drive efforts towards the Moon? We aren't focused on any single "killer app" that will suddenly make all our dreams come true; rather, we are looking at the many ways that Lunar exploration and development are being advanced.

Educating politicians about space activities and their importance is an important activity, but so too is educating the general populace about space and what benefits it can offer the human condition on Earth. Far too many are indifferent to space activities, fueled by an ignorance founded on most people having at best a middle school-level education about outer space. This doesn't have to be the case, but how will people learn? The media has done a poor job reporting on space activities, teachers have to teach to the next mandated test, the internet is a confusing and muddled place to try to learn more, and frankly people have a lot going on in their busy lives. These aren't barriers, but rather define an opportunity.

Coming up in September is not only International Observe the Moon Night (InOMN), but also an eclipse at the end of the month, the last in this "blood Moon tetrad". Both represent excellent opportunities to reach out in your local community and help to educate people about the Moon and the benefits it offers for a better tomorrow. You can find a local InOMN event at: <http://observethemoonnight.org/>; Your Moon Society president will be speaking at the UT Arlington Planetarium and doing some sidewalk astronomy that night.

As part of our rejuvenation efforts, I'd like to welcome Chris Carson to our Board of Directors. Chris has been a long-time advocate of Lunar development, and will help strengthen our efforts going forward. Congratulations also to all of our returning officers, who will continue the ongoing challenge of making The Moon Society more relevant in the 21st Century.

Space advocacy under the traditional model of big projects, government politicking, and cults of personality will be less effective in the near future. There is nothing that says that The Moon Society must follow that model, and we don't. Our focus will continue to be seeking out and supporting ways to advance humanity's growth into cislunar space, to our Moon, and out into the Solar System.

**Let's make it happen! – Ken Murphy**

### Science Fiction for Younger Readers

**Ken Murphy's Out of the Cradle Site – [www.outofthecradle.net](http://www.outofthecradle.net)**

"Choose Your Own Adventure #26: Moon Quest" – Anson Montgomery

"Cosmic" – Frank Cottrell Boyce

"Crater" – Homer Hickam

"Laddertop" – Orson Scott & Emily Janice Card

"Lunar Pioneers" – Robert Black

"Space" – Roger Reid

"Thea Stilton and the Star Castaways" – Geronimo Stilton

"Tumbler" – Brand Gamblin

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



## 2015 Moon Society Officer & Director Election Results

### Officers who carry over until next year's election

- PRESIDENT **Ken Murphy**, and
- SECRETARY **James Gholston** continue in office and will be up for re-election next year

### Officers who were re-elected or newly elected\* in this year's election

- VICE-PRESIDENT **Paul J. Banyai** # 1126
- TREASURER **Dana Carson** # 10

### Directors who carry over until next year's election

- DIRECTORS **Phill Crume** (Chairman of the Board) and **Allen Steinberg**

### Directors who were re-elected or newly elected\* in this year's election:

- **Jim Keravala** # 1677
- **Rose Dieterman** # 1340
- **Chris Carson\*** # 1478

## Gateway to Space 2015 – St. Louis. MO – Sept 25–26, 2015

**Join us for an exciting one-day seminar in the Boeing Prologue Room!**

### Theme: Commercial Spaceflight

**Mission Statement:** The mission of Gateway to Space 2015 is to educate attendees about the significant contributions of McDonnell Aircraft Corporation, McDonnell Douglas, and Boeing to spaceflight; to explore current commercial Space endeavors; and to envision how commercial spaceflight will impact future space colonization.

**...educate, explore, envision...**

### Schedule (subject to change):

#### September 25, 2015, Friday Evening:

Dinner at Eclipse Restaurant at the Moonrise Hotel for speakers, committee members, and guests.  
(Attendees will pay for their own meal and speakers will be hosted by St. Louis Space Frontier.)

#### September 26, 2015 Saturday:

8:30am – Registration and Coffee

9:00am – Welcome

9:15am: Dr. Henry Brownlee Jr., Boeing Historian, Birth of the American Space Program and Commercial Space from a Boeing & McDonnell Douglas Perspective ....educate...

10:15am – 10:50am – Former McDonnell Douglas

Engineer discussed Commercial Spaceflight from a Pioneer's Perspective ...educate...

11:00am – Sheryl Kelley, Boeing Commercial Programs Business

Development Manager; Joel Allen, Software Engineer, Space Vehicle Training Program; CST-100 Update: Boeing's Commercial Crew Program ...explore...

12:00–1:00pm – Boxed Lunches & Explore Aerospace History in the Boeing Prologue Room

1:00–1:50pm – Maggie Duckworth, Home Grown Electrical Engineer, Mars One Finalist, "Moving to Mars!"

2:00–3:00pm – NASA speaker

3:05–3:35pm – Ron Jones, BioSpace Experiments, Business Development, How to get YOUR BioExperiment flown! ...explore...

3:40–4:40pm – Michael Snyder, Director of R&D, Made in Space, will address commercial Space from a small startup perspective and address current developments in 3D Printing: The New Gateway to Space ...envision...

4:40–5:00pm – Wrap Up and Call to Action ... educate, explore, envision...

5:00pm – Clean up

5:30pm – Celebration Dinner at Pueblo Nuevo for committee, speakers, and guests (Attendees will pay for their own meals, and guest speakers will be hosted by St. Louis Space Frontier)

**Register Now! Limited seating! Registration Fee: \$30 for St. Louis Space Frontier members & Students \$50 for non-members    ##**

For past articles, Visit [http://www.moonsociety.org/publications/mmm\\_classics/](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](http://www.moonsociety.org) p. 4

March

# Chapters & Outposts

2015

## ORGANIZING “OUTPOSTS”

**Bay Area Moon Society, CA Outpost – South San Francisco Bay –**

<http://www.moonsociety.org/chapters/bams/> Contact: Henry Cates [hcate2@pacbell.net](mailto:hcate2@pacbell.net) Meeting the 1<sup>st</sup> Tuesday of the Month at Henry's home

**Moon Society Nashville Outpost** – Contact: Chuck Schlemm - [cschlemm@comcast.net](mailto:cschlemm@comcast.net)

## 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](mailto:kokhmmm@aol.com) – MEETINGS, 2nd Saturday 1–4 pm monthly except July, August,

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

**Upcoming Meetings: SEP 12, OCT 10, NOV 14, DEC 12**

On Saturday, September 12 1–4 pm at Mayfair Mall, Room G150, we will host our **Pluto Palooza Party**, with updates on the findings of the New Horizons probe, and more.

**Moon Society St./NSS Louis Chapter** - <http://www.moonsociety.org/chapters/stlouis/>  
[www.meetup.com/Saint-Louis-Space-Frontier-Meetup/](http://www.meetup.com/Saint-Louis-Space-Frontier-Meetup/) – <http://stlouisspacefrontier.org/>

Contact: Robert Perry [surfer\\_bob@charter.net](mailto:surfer_bob@charter.net) – We meet the **4th Saturday month** in room 162 of McDonnell Hall of Washington Univ., held jointly with the St. Louis Space Frontier, a chapter of the National Space Society.

Space Trivia Night: Sat. Aug. 8<sup>th</sup>, 7:30 pme 2720 Sutton Boulevard, 2720 Sutton Boulevard, Saint Louis.

**EVERYONE LOVES TRIVIA.** by Judy Tippet The St Louis Space Frontier is having their first ever Trivia Night on August 8th at a venue in Maplewood called Focal Point. This evening is a fund raiser to support the Gateway to Space Seminar we are offering on September 26th at Boeing's Prologue Room.

Hosted by: [Christine Nobbe](#) (

**Upcoming meetings: SEP 26 – OCT 24 – NOV 29 – DEC 28**

**THE ST LOUIS CHAPTERS INVITE YOU TO GATEWAY TO SPACE – FRI EVE, SATURDAY, SEPT. 25–26**  
 (see preceeding page for program highlights)

**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.

**SEP 19 = OCT 17 – NOV 21 – DEC 19**

**Tucson L5 Space Society** – Now serving Moon Society Members [www.tucsonspacesociety.org/](http://www.tucsonspacesociety.org/) (not updated) – [www.meetup.com/NSSPhoenix/events/161939572/](http://www.meetup.com/NSSPhoenix/events/161939572/) (not updated)

Contact: Al Anzaldúa – [www.lpl.arizona.edu/calendar/934](http://www.lpl.arizona.edu/calendar/934)

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

Contact: Eric Bowen [eric@streamlinerschedules.com](mailto:eric@streamlinerschedules.com) – Meeting 7 pm 3<sup>rd</sup> Mondays of even # months in the conference room of the Bay Area Community Center at Clear Lake Park: **OCT 19 – NOV 21**



## AUGUST 2015 SPACE NEWS BROWSING LINKS

### SPACE STATIONS + ROCKETS + COMMERCIAL SPACE

[www.space.com/30125-neemo-astronauts-virtual-reality-space-tech.html](http://www.space.com/30125-neemo-astronauts-virtual-reality-space-tech.html)

[www.space.com/30134-beamed-propulsion-reusable-launch-vehicles-startup.html](http://www.space.com/30134-beamed-propulsion-reusable-launch-vehicles-startup.html)

[www.space.com/30221-plasma-rocket-technology-nasa-funding.html](http://www.space.com/30221-plasma-rocket-technology-nasa-funding.html)

[www.spacedaily.com/reports/China\\_Tests\\_New\\_Rocket\\_999.html](http://www.spacedaily.com/reports/China_Tests_New_Rocket_999.html)

[www.space.com/30125-neemo-astronauts-virtual-reality-space-tech.html](http://www.space.com/30125-neemo-astronauts-virtual-reality-space-tech.html)

[www.space.com/30359-private-space-stations-reality-2025.html](http://www.space.com/30359-private-space-stations-reality-2025.html)

### EARTH + NEAR SPACE

[www.space.com/30199-more-than-space-salad-zero-g-botany-is-rewriting-textbooks.html](http://www.space.com/30199-more-than-space-salad-zero-g-botany-is-rewriting-textbooks.html)

[www.nasa.gov/press-release/nasa-notifies-congress-about-space-station-contract-modification-with-russia/](http://www.nasa.gov/press-release/nasa-notifies-congress-about-space-station-contract-modification-with-russia/)

[www.space.com/30258-nasa-gecko-space-robot-sticky-feet.html](http://www.space.com/30258-nasa-gecko-space-robot-sticky-feet.html)

<http://finance.yahoo.com/news/could-innovation-signal-breakthrough-fusion-205100351.html>

### MOON

[www.space.com/30352-fire-fountains-ancient-moon-explained.html](http://www.space.com/30352-fire-fountains-ancient-moon-explained.html)

[www.space.com/30161-moon-water-cubesat-lunar-icecube.html](http://www.space.com/30161-moon-water-cubesat-lunar-icecube.html)

[www.spacedaily.com/reports/China\\_Tests\\_New\\_Rocket\\_999.html](http://www.spacedaily.com/reports/China_Tests_New_Rocket_999.html)

[www.space.com/30333-moon-billboard-pocari-sweat-sports-drink.html](http://www.space.com/30333-moon-billboard-pocari-sweat-sports-drink.html)

[www.space.com/30277-bigelow-aerospace-private-space-station.html](http://www.space.com/30277-bigelow-aerospace-private-space-station.html)

[www.space.com/30352-fire-fountains-ancient-moon-explained.html](http://www.space.com/30352-fire-fountains-ancient-moon-explained.html)

[www.space.com/30161-moon-water-cubesat-lunar-icecube.html](http://www.space.com/30161-moon-water-cubesat-lunar-icecube.html)

[www.spacedaily.com/reports/China\\_Tests\\_New\\_Rocket\\_999.html](http://www.spacedaily.com/reports/China_Tests_New_Rocket_999.html)

### MARS

[www.space.com/30143-mars-society-greenhouse-crowdfunding-campaign.html](http://www.space.com/30143-mars-society-greenhouse-crowdfunding-campaign.html)

<http://finance.yahoo.com/news/could-innovation-signal-breakthrough-fusion-205100351.html>

<http://news.sciencemag.org/space/2015/08/mars-scientists-tap-ancient-river-deltas-and-hot-springs-promising-targets-2020-rover>

[www.marsdaily.com/reports/Mars\\_Rovers\\_and\\_the\\_Last\\_Moonwalker\\_to\\_Invade\\_Poland\\_in\\_September\\_999.html](http://www.marsdaily.com/reports/Mars_Rovers_and_the_Last_Moonwalker_to_Invade_Poland_in_September_999.html)

[www.space.com/30320-nasa-2020-mars-rover-landing-site.html](http://www.space.com/30320-nasa-2020-mars-rover-landing-site.html)

[www.space.com/30367-india-mars-probe-3d-chasm-photos.html](http://www.space.com/30367-india-mars-probe-3d-chasm-photos.html)

[www.space.com/30155-nasa-drones-on-mars-video.htm](http://www.space.com/30155-nasa-drones-on-mars-video.htm)

### ASTEROIDS + COMETS

[www.spacedaily.com/reports/New\\_Study\\_Sheds\\_Light\\_on\\_Origin\\_of\\_Most\\_Common\\_Meteorites\\_999.html](http://www.spacedaily.com/reports/New_Study_Sheds_Light_on_Origin_of_Most_Common_Meteorites_999.html)

[www.space.com/30191-asteroid-impact-early-warning-system-first-telescope.html](http://www.space.com/30191-asteroid-impact-early-warning-system-first-telescope.html)

[www.space.com/30181-ceres-bright-spots-mountain-video.html](http://www.space.com/30181-ceres-bright-spots-mountain-video.html)

[www.space.com/30189-dwarf-planet-ceres-missing-craters-mystery.html](http://www.space.com/30189-dwarf-planet-ceres-missing-craters-mystery.html)

### OTHER PLANETS +

[www.space.com/30384-enceladus-sample-return-mission-timeline.html](http://www.space.com/30384-enceladus-sample-return-mission-timeline.html)

[www.space.com/30265-pluto-nitrogen-atmosphere-mystery.htm](http://www.space.com/30265-pluto-nitrogen-atmosphere-mystery.htm)

<https://solarsystem.nasa.gov/planets/plutotoolkit.cfm>

### ASTRONOMY + ASTROBIOLOGICS

[www.space.com/30233-exploding-star-lithium-discovery-video.html](http://www.space.com/30233-exploding-star-lithium-discovery-video.html)

<http://news.sciencemag.org/environment/2015/08/why-water-worlds-won-t-host-life>

<http://news.sciencemag.org/environment/2015/08/why-water-worlds-won-t-host-life>

[www.space.com/30260-earth-sized-planet-could-have-oceans.html](http://www.space.com/30260-earth-sized-planet-could-have-oceans.html)

<http://news.sciencemag.org/sifter/2015/08/dark-energy-survey-spots-new-neighbors>

[www.space.com/30366-stephen-hawking-black-hole-mystery.html](http://www.space.com/30366-stephen-hawking-black-hole-mystery.html)



[www.space.com/30366-stephen-hawking-black-hole-mystery.html](http://www.space.com/30366-stephen-hawking-black-hole-mystery.html)

[www.space.com/30366-stephen-hawking-black-hole-mystery.html](http://www.space.com/30366-stephen-hawking-black-hole-mystery.html)

[www.space.com/30366-stephen-hawking-black-hole-mystery.html](http://www.space.com/30366-stephen-hawking-black-hole-mystery.html)

[www.space.com/30291-1-7-billion-year-old-star-cluster-snapped-by-eso-observatory-video.html](http://www.space.com/30291-1-7-billion-year-old-star-cluster-snapped-by-eso-observatory-video.html)

[www.space.com/30335-giant-galaxies-habitable-planets.html](http://www.space.com/30335-giant-galaxies-habitable-planets.html)

## EDUCATION + OUTREACH + MEDIA

[www.space.com/30232-exoplanet-naming-contest-iau.html](http://www.space.com/30232-exoplanet-naming-contest-iau.html)

[www.nasa.gov/press-release/nasa-awards-grants-to-expand-stem-education-at-minority-serving-institutions](http://www.nasa.gov/press-release/nasa-awards-grants-to-expand-stem-education-at-minority-serving-institutions)

[www.nasa.gov/mission\\_pages/insight/main/index.html](http://www.nasa.gov/mission_pages/insight/main/index.html)

Selections  
from the



## GLOSSARY

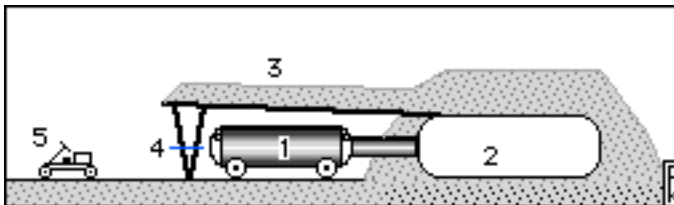
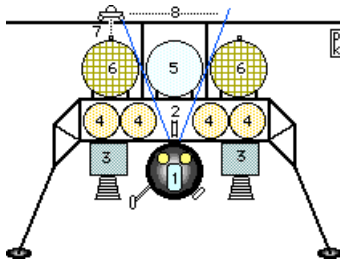
"MMM Speak"– New Words & Old Words with New Meanings

<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.



**Hydro–tectonic Worlds** – "Earth–like planet", "M–Class Planet" – We've all heard these phrases but no one seems to have tried to get at the essence of what they mean. "Hydrotectonic" is our definition: active tectonic processes in the presence of water, i.e. continents and oceans. Mars does not even come close. Any tectonic activities on Mars ground to a halt long ago, probably due to insufficient water and too swift an internal cooling.

**Living Walls** – Modular vertical plant–filled systems which actively filter a building's air. Taking up wall space which might otherwise go unused, rather than precious floor space, such units can go anywhere from living rooms to hallways to offices to laboratories. The Living Wall concept has enormous potential to make a modular approach to biospherics work.

**Luna Cotta** – a take–off on "Terra Cotta", the matte light rust unglazed ceramic of common flower pots. Luna cotta is made of steam–rusted moondust which is then compressed into a mold and micro–wave sintered, could add a welcome bit of "anything but gray" color to lunar homesteads/ The color goes great with plants and could be used for statues and other artifacts as well.

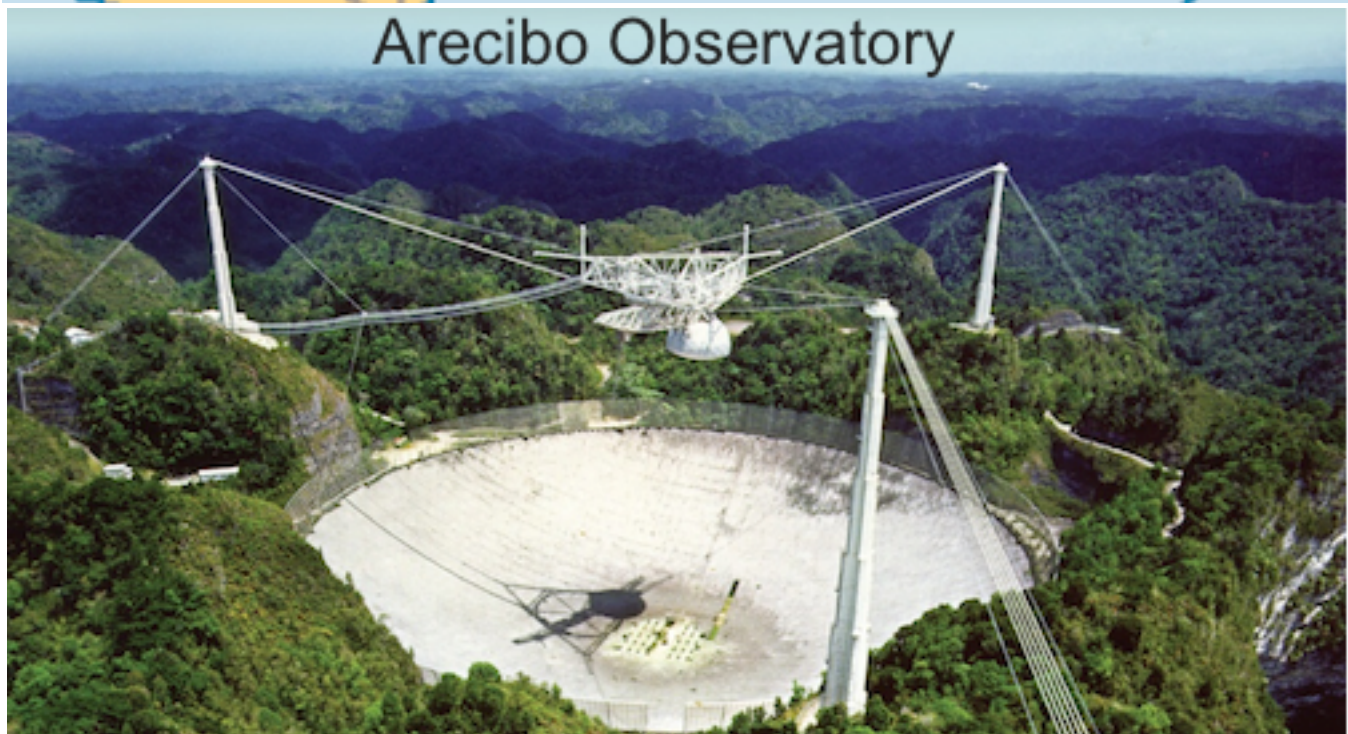
**Lagrangian Sargassos** – The Lagrange points, especially L4 and L5 both in the Earth–Moon system and in the Earth–Sun system are gravitationally stable areas that will tend to collect dust and debris, much as does the so–called Sargasso Sea area in the North Atlantic Ocean

**Lunox** – Oxygen produced from lunar regolith, usually stored in tanks in liquid form

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



35TH ANNUAL  
INTERNATIONAL  
**SPACE**  
DEVELOPMENT  
CONFERENCE



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

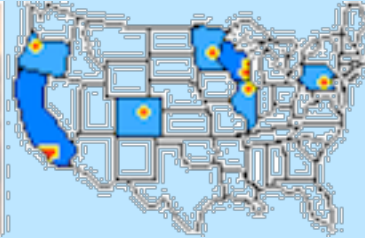
If you have never been to Puerto Rico, this is your chance to see an island of legendary beauty, history, scenery, and rich culture – including a visit to the famous Areceibo Radio Telescope. This is a temptation not to resist!

You dersrve it! Plan now! -- <http://isd.c.nss.org/2016>

For past articles, Visit [http://www.moonsociety.org/publications/mmm\\_classics/](http://www.moonsociety.org/publications/mmm_classics/) or /mmm\_themes/



## 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/](http://www.moonsociety.org/chapters/milwaukee/)  
[www.Space-Milwaukee.com](http://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](mailto:kokhmmm@aol.com) VICE-PRESIDENT Doug Armstrong  
 NSS (414) 273-1126 – SECRETARY – Charlotte Dupree NSS (262) 675-0941 [grdupree@charter.net](mailto:grdupree@charter.net)  
 • James Schroeter (414) 333-3679 – [james\\_schroeter@yahoo.com](mailto:james_schroeter@yahoo.com) TREASURER/Database • Robert Bialecki (414)  
 372-9613 – [bobriverwest@yahoo.com](mailto:bobriverwest@yahoo.com) (• Current Members of the MLRS Board of Directors)

On Saturday, September 12 1–4 pm at Mayfair Mall, Room G150, we will host our **Pluto Palooza Party**, with up-dates on the findings of the New Horizons probe, and more.

**Our 2015 Meeting Schedule:** We will meet in room G150 for all meetings except December, in G110:

SEP 12, OCT 10, NOV 14, DEC 12 – Our September 12 meeting will be our **Pluto-Palooza celebration** of the New Horizons Pluto-Charon encounter: Pot luck refreshments, presentation, discussion.

WISCONSIN



### SSS – Sheboygan Space Society

728 Center St. Kiel, WI 54042-1034

[www.sheboyganspacesociety.org](http://www.sheboyganspacesociety.org) c/o Will Foerster 920-894-1344 (h) [astrowill@frontier.com](mailto:astrowill@frontier.com)

SSS Sec./Tres. c/o B. Pat Knier [dcnpatknier@gmail.org](mailto: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**

**2015 MEETINGS:** OCT 15 – DEC 12 (2<sup>nd</sup> SAT in Milwaukee)

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](mailto:odyssey_editor@yahoo.com)  
[oasis@oasis-nss.org](mailto:oasis@oasis-nss.org) – Odyssey Newsletter [www.oasis-nss.org/articles.html](http://www.oasis-nss.org/articles.html)

Regular Meeting 3 pm 3<sup>rd</sup> SAT monthly – **2015 SCHEDULE;** SEP 19, OCT 17, NOV 21, DEC 19



## COLORADO



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

Eric Boethin 303-781-0800 [eric@boethin.com](mailto:eric@boethin.com) – Monthly Meetings every 3rd Thursdays, 7 pm  
 Englewood Public Library, Englewood, CO 80110 – 1000 Englewood Parkway, First Floor Civic Center  
**2015 MEETINGS:** Sept 17, Oct. 15, Nov. 19, Dec. 17

## ILLINOIS



[LDAhean@aol.com](mailto: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. and last about two hours. Each meeting features Board member introductions, general announcements,

**Current news: Ben's pix of recent aurora:**

<https://www.facebook.com/media/set/?set=a.10153524064068516.1073742008.592718515&type=1&l=017cc1b0b7>

## OREGON



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

We meet the 3rd Saturday of the Month at 2:00 PM

**2015 Meeting Schedule:** September 19, October 17, November 21

**Pearson Air Museum at Fort Vancouver National Historic Site, 1115 E. Fifth St, Vancouver, WA**

From I5 take the Mill Plain Blvd. exit and head east, Turn right onto Fort Vancouver Way  
 Turn left when it dead ends at Fifth. Come Early and Enjoy the Museum The Pearson Air Museum is an operational preserved aerodrome and part of the Fort Vancouver National Historic Site of the National Park Service.

**Chapter News:** At the Air Museum's invitation Oregon L5 had a table at the Oregon Museum of Science and Industry's "Space Day" observance on Saturday, July 18. Several hundred people attended.

**Ongoing activities:** We continue to manage **NSS in Second Life** for the National Space Society, with public meetings every week on Monday at 15:00 Second Life Time (= Pacific Time) with participants from US, Brazil, England, France, and other points world-wide.

## PENNSYLVANIA



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

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### The NSSPASA Report for August 2015

We will meet at a special event at the Franklin Institute on August 29 from 11 to 4 p.m.. We were contacted by Derrick Pitts, Chief Astronomer of the Institute, to be part of this event. Due to a computer malf I was unable to sign us up, but, Mitch Gordon, the vice president of our group, handled the response. I will report on this for October. Our regular meetings will be held on September 12 and October the 17<sup>th</sup> respectively at our normal location at The Liberty One Food Court.

From Mitch Gordon who chaired the August meeting: material on the Pluto flyby was given out at the meeting and Janice reported on the surprising findings from the mission in Science Magazine for 7/24/15 (AAAS publisher). Rather than craters mountains were found indicating an active Hadriologic (?) past. There was a bit of atmosphere sensed during the flyby as well.

Larry reported on the website: we are averaging 100 visits per month and recommends visiting our page on the N.S.S. website: go to NSS.org and look in the chapters section for PASA in Pennsylvania. He recommends looking at "This Day in Space History" which you can reach from our site. Thanks to Larry we are now active on Twitter as well as Facebook and our website. Dorothy has a number of contacts through her Facebook activity and Larry noted that a number of activists check us out.

Mitch reported posting our invitation to do outreach at the Franklin Institute at its' Super Space Saturday on August 29 from 11 to 4 p.m.. This was on Facebook. He also discussed several other things he is working on and from publications: Mitch is has been in contact with a representative of the University of Pennsylvanias' School of Engineering. Due to the density of educational institutions in University City Mitch thinks that it would be a good location for an I.S.D.C. in the future. He will discuss this idea with the Penn reps he is in contact with.

Mitch reported that a Time Magazine article (8/3/15) says that a Russian billionaire, Yuri Milner (yes he was named after that Yuri) is planning to put \$100 million into the search for extra terrestrial intelligence using time on radio telescopes. This should get time on quite a few premier instruments and the processing power to comb through the raw output. Who knows: he might crowd source the search and get international prestige as a result of both the search and the opening of the analysis to everyone. And from a past issue of Popular Science (9/2013) on an affordable space plane: the company, Reaction Engines, wants to build a "Synergistic Air-Breathing Rocket Engine", SABRE, which would be part rocket and part jet engine. Mitch did not mention if it was single or used a carrier and fly away section or staging. Parenthetically I will mention that a talk at the Mars Society Conference reported on using a Plasma Engine (which is being tested in some labs) but I felt that the power plant portion of the system seemed a bit sketchy. The Devil is in the Details!

Dorothy brought material from various source but the speaker at the National Air and Space Museum bears particular mention: on September 5th Scott Sackonoff will speak on Space Careers which is also the title of his new book. Dorothy mentions that this might be someone and something that Mitch should mention to the Penn reps he will be meeting.

Earl found a number of interesting things in recent publications including a group of NASA Tech Brief related publications: from Medical Design Briefs: "Robot Named NASA Product of the Year" which has a number of functions useful to astronauts on the ISS, and, people who need some form of help and/or augmentation on Earth. The Robonaut can help inside and outside the space station. The featured part of the device is the robotic glove. It can be used for tasks ranging from factory work to surgical assistance due to its extreme dexterity and range of motion. A number of elements that make up the R-2 Robonaut are patented or are in the process of being patented. And much more in this issue.

There were several other publications that may be of interest to the audience members: Test and Measurements Tech Briefs, and, Aerospace and Defense Technologies. Measurements briefs has an article on using "Isotopic Biomarkers for Rapid Assessment of Bone Mineral Balance in Biomedical Applications". Having just seen the Mars One people at the Mars Society Conference I suspect bone condition measurement techniques are very important to them (no simulated gravity during a very long trip).

From the August issue of Nuts and Volts: an interesting advertisement for space enthusiasts: from the Synergy Moon competitors comes an ad for people to join them in creating a suite of devices for the X-Prize competition and beyond Rovers Micro satellites and a Lunar Lander as well as Rovers are to be developed and continued. See [info@synergymoon.com](mailto:info@synergymoon.com) for more. They picked enticing names for several of their projects: the Artemis NanoSat Constellation and The Tesla Orbital Space Telescope.

Also noted in this issue: Chapter Five of L. Paul Verhage's Near Space column on CubeSats. In this report he describes a project that could be done for high school students who are interested in space exploration. His clever use of available material is great: he found that a package ment to hold a baseball that a sports fan would want to preserve fit the requirements almost perfectly as a transparent CubeSat modular demonstrator housing. Most models are either open or closed without a simple way of seeing the workings in a protected way. This is not a toy. Part of the article discusses how the circuit boards and assemblies are developed. Starts on page 70. There is also an article on creating a P.I.C. interfaced barometer and another on a D.I.Y. air quality monitor. Amazing what we can do with our Moores Law (observation) enabled devices.

This has been an unusually good month for articles and reports. And events. From a packed NASA Tech Briefs (volume 39, No.8): NASA and Industry Create Mid-Infrared Detector. This brief report is about a device with a

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well known material: Mercury Cadmium Telluride, which is used for mid and long wave infra red detectors (often cooled), with improved properties. The new device structure, developed by Goddard scientist Xiaoli Sun and his industrial partner DRS Technologies, is quiet enough to count photons at these wavelengths. Many of the images we will be getting from the Webb telescope will be in the range of such detectors. There are Earth based applications for this technology as well. Page 8. There is also a note on this page on the upcoming issue (September) which will emphasize robotics and “soft robots” as well.

But then there was **The Mars Society Convention!** The original reason that Michelle and I decided to go was because of a talk on 3D printing: “Custom 3D Printers Revolutionize the Space Supply Chain” appears in the August Tech Briefs cited above. But Michelle was alerted by the Mars Society before I saw the Spin Off report. The lecturer, Niki Werkheiser, talked about how many useful things, including nano satellites, could be made in space using this technology. Initially basic structures could be made and, as the needed technologies become practical, the other elements could be made with printer and associated technologies.

A significant advantage of fabricating in space was pointed out: if the object does not have to be built to stand high accelerations it could have a lighter mass or more capabilities for an equivalent ground based launch. Niki is a charming and knowledgeable young woman that Michelle and I had a chance to talk to her about this and other topics. Her title is NASA Project Manager for the In-Space Manufacturing Initiative. And she’s a fan of the Maker culture! And there was lots of science at this event: since this is the Mars Society a lot of it was related to what we have been learning about the past and recent history of the Red Planet:

Dr Carol Stoker, Planetary Scientist with NASA’s Ames Research Center, discussed the Icebreaker Life Mission to Mars and what we could do if funding is available. This would look for life on Mars using a number of techniques using a spare rover base from a previous mission (and some of the tools are resurrected too: this is how Phoenix happened!). And another lady looking for life on Mars, from JPL, was Dr Deborah Bass the Manager of Mission Systems Engineering: The Mars 2020 Rover: Programmatic Context and Planning. This project that has priority in the NASA plans and has ongoing funding now. Again, looking for life signs but with a different path that includes more travel than previous rovers. If both happen we will cover a goodly number of possible habitats and some fossil sights. We are seeing “seeps” of some kind of liquid material that may have organics in them and subsurface exploration, down to one meter below the surface, is part of one of the missions. The obvious sedimentary layering in some locations could yield pre ocean loss fossil evidence. Great stuff, fund both!

There was a critique of The Martian, which was pretty accurate overall, and we are still talking about doing outreach for this film. Something was missing from the Conference though: I may have missed it, but, there was no talk of an outreach event plan. Maybe it’s on line but I saw nothing to indicate this would happen. Outreach to Congress got several discussions and panels. We’ll talk to people at The Franklin Institute and promote the film in a grass roots effort here.

There were a number of talks on media and how things are very different from the old days of three major broadcast sources, and how it was sometimes difficult to get space news, to now, when it is sometimes difficult to sift out good content from the many reports and blogs that don’t have external fact checking or peer review. The job of a number of these presentations is to get viewers (“eyeballs”) so sensational content can override scientifically accurate material.

But for future science and the Web: that is The Interplanetary Web! Dr. Vint Cerf gave a short presentation on what is being done to create a truly functional interplanetary equivalent of the World Wide Web. This work has been going on for some time now and the ability of space craft and various landers to communicate and coordinate the sending of hard won data and later astronaut communications on site and back to home base (s). And we are talking of more than Mars. All of the talks that included Deployable sensor platforms, read CubeSats, could use the protocols being developed here for the exploration of our great neighborhood: The SunSpace where we live. Did I mention Selenologist Harrison Schmitt (on Earth he is a geologist, but on the Moon..) Dr. of Geology? He did a stand alone on: “The Moon: The Fastest Operational Path to Mars”. Good talk.

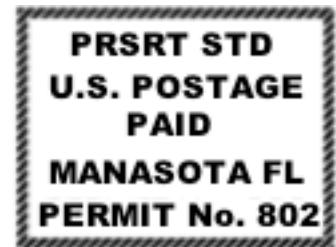
And more: from Analog for October 2015: the Science Fact article is: “Alien Adventures: Rising to the Challenge” on the dream of Mae Jemison, astronaut and physician, who is the principal of The One Hundred Year Star Ship organization. The article has a lot of material on this beginning of a real program (DARPA and NASA funded the first conference in 2011) and you should see Edward M. Lerner’s report in the October 2015 issue. Note that Vint Cerf at the Mars Society event referenced communications from the same star system that is under discussion for the Star Ship project: Alpha Centauri (a triple star system within 4.3 light years of us). Gravitational Lenseing was brought up in his talk.

And finally: we often hear of the supply missions going up to the ISS from the U.S. and Russian spaceports. But a recent report on NHK (a Japanese broadcast company) described the launch of an H-6 resupply mission to the I.S.S.. There were vital materials that needed to be delivered and the Japanese were able to do a last minute (a month is last minute) reconfiguring of the payload and get the supplies up. I should mention that the article from the Sacramento L-5 Society et al, April 23, 2015 was very good. This shows what can be done with the material that is available from NASA and other sources. But note that the report in Moon Miners is not just a cut and paste of the sources. What’s in Moon Miners might be considered an abstract of the full analysis which is available at: [www.SaCL5.org](http://www.SaCL5.org). This level of work reminds me of some of the Oregon Moon Bases 1990s activity. Earl Bennett.

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