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

Moon Miners' Manifesto

& Moon Society Journal

171 – December 2003

Published monthly except January and July., by the **Lunar Reclamation Society** (NSS-Milwaukee) for its members, members of **participating National Space Society chapters**, members of the **Moon Society**, and individuals world-=wide. EDITOR: Peter Kokh, c/o LRS, PO Box 2102, Milwaukee WI 53201. Ph: 414-342-0705. **Submissions:** "MMM", 1630 N. 32nd Str., Milwaukee, WI 53208; Email: kokhmmm@aol.com

December 1986 ------- December 2003
This **17th Anniversary Issue** opens our **18th year** of continuous publication.

In FOCUS: A "Bone Dry" Moon? No Polar Ice? Not a Problem!

An alarming headline: "Water on the Moon? Scientists Await Definitive Answer," By Rick Callahan, 11-/12/03 www.space.com/scienceastronomy/moon_ice_0301112.html

Astronomers "at Cornell University have used the mammoth radar dish at Puerto Rico's Arecibo Observatory to probe craters more deeply than ever before -- as far as 20 feet (6 meters) down. And still there's no sign of thick layers of ice." ... "the apparent lack of large ice tracts suggests there isn't a big supply of life-sustaining water nearby if people ever wanted to colonize the Moon."

Mike Delaney <mdelaneyis@eircom.net> writes " What effect, if any, might this have on our plans?"

Prior to the Lunar Prospector mission (Jan. 6, '98 - July 31, '99), most people were betting that there wouldn't be any polar ice, but were happy to be proven wrong. We were one of those.

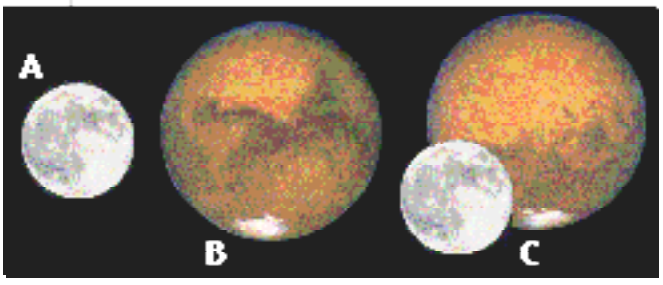
Our enthusiasm for the Moon was grounded in the belief that we don't absolutely need polar ice. There is enough hydrogen in the topsoil in the form of solar wind protons that have been "adsorbed" to the fine particles over billions of years of exposure. Our reasoning is based on the feasibility of simple resource husbandry:

> If, whenever we move regolith, whether to use it as shielding, or in the process of road construction, or to mine it for other elements, or to use it to make cast basalt - or for whatever --- whenever we move regolith, we should religiously scavenge it for solar wind volatiles (hydrogen, carbon, nitrogen, helium, argon, neon, etc.)
>
> This requires heating the regolith and trapping (and separating) the outgassing volatiles. If we do this religiously, we will never want for anything. If we do helium-3 mining, then production of other byproduct volatiles like hydrogen will be enormous.

Common misinterpretation of **Lunar Prospector**'s findings, that we would find layers of easily mineable ice in permanently shaded polar craters, has led to a groundswell of enthusiasm for locating the first moon base at one of the poles, the South Polar Mt. Malapert site in particular. We have grave misgivings about this idea. [➪ p. 2, col. 2]

Where next is a critical decision. We must get it right!

The Bush Administration is considering which path to take in a NASA rededicated to going somewhere. The Moon *first,* say some. Mars *first,* say others. We all stand to lose if the answer is not "to Mars by way of the Moon," with needed equipment optimized for commonality on both worlds. Read "MMM's Platform for the Moon," page 3; "The Moon as a Stepping Stone to Mars," page 9.



Moon Miners' Manifesto

Moon Miners' MANIFESTO/ Moon Soc. Journal is published every month except in January and July, by the Lunar Reclamation Society. In January and July, all members and subscribers recieve **Moon Miners' REVIEW** instead.

• **MMM** is being reedited for the World Wide Web by members of the Artemis Society International. => www.asi.org/mmm

• **MMM's VISION:** "expanding the human economy through off-planet resources"; the early era of heavy reliance on Lunar materials; earliest use of Mars system and asteroidal resources; and the establishment of the permanent settlements necessary to support such an economy.

• **MMM's MISSION:** to encourage "spin-up" entrepreneurial development of the novel technologies needed and promote the economic-environmental rationale of space/lunar settlement.

• **MMM retains its editorial independence.** MMM serves several groups each with its own philosophy, agenda, and programs. Participation in this newsletter, while it suggests overall satisfaction with themes and treatment, requires no other litmus test. Any presumption that participating organizations can be labeled by indirect mutual association is unwarranted.

• For the current space news and near-term developments, read *Ad Astra*, the magazine of the **National Space Society**, in which we recommend and encourage membership.

• **The Lunar Reclamation Society** is an independently incorporated non-profit membership organization engaged in public outreach, freely associated with the National Space Society, insofar as LRS goals include those in NSS vision statement. LRS serves as NSS' Milwaukee chapter
=> www.lunar-reclamation.org

• **The National Space Society** is a grassroots pro-space membership organization, with over 25,000 members and 80 chapters, dedicated to the creation of a spacefaring civilization.
The National Space Society, 600 Pennsylvania Ave. SE, Suite 201, Washington, DC 20003; Ph: 202-543-1900; FAX: 202-546-4189; 202-543-1995 NSS Space Hotline; nss@nss.org => www.nss.org

• **MMM's desktop publication** has received ongoing support (computer hardware and software) from the **Space Frontier Foundation**, 16 First Ave., Nyack NY 10960; 800-78-SPACE - SFF seeks to open the space frontier to human exploration and settlement as rapidly as possible.
openfrontier@delphi.com => www.space-frontier.org

• **The Moon Society** is "dedicated to overcoming the business, financial, and technological challenges necessary to establish a permanent, self-sustaining human presence on the Moon." — See contact information on page 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.

÷ **EMAIL** to KokhMMM@aol.com (*preferred*)

÷ **Mac diskette** or **typed hard copy** to:
Moon Miners' Manifesto, c/o Peter Kokh,
1630 N. 32nd Street, Milwaukee WI 53208-2040

fi IN FOCUS Editorial continued from p. 1.

Our reasons?

- **A polar site is an extreme environment** difficult to work in. It is either cold during *dayspan* when the sun is *just* above the horizon at a low angle, giving little heat, or *bitter* cold during nightspan, much colder than elsewhere on the Moon during sundown. The shadows are very long and constantly changing as the sun moves around the horizon, making it difficult to recognize where you are, or where you are going.
- **This site is not near the resources needed** for industrialization. A resource using settlement should be along a mare/highland coast so as to have ready access to both suites of regolith. If you need a million tons of iron and a thousand tons of water, does it make sense to ship the iron where the water is or vice versa? Did we build Los Angeles at Prudhoe Bay? The nearest highland/mare coastal areas to Mt. Malapert are some 1,300 miles or more away in Mare Australe, Mare Nubium, and Mare Humorum.
- **At the so-called peak of eternal light** sunlight is available in interrupted fashion for about 75-85 % of the time. It is not the same part of the mountain that enjoys this much sunlight, so solar arrays will have to be built in several locations around the mountain in terrain that may not be level, at sites difficult to get to by vehicle from one to the other. The amount of expense and effort and danger involved in erecting a solar power network capable of tapping power for only some of the nightspan will probably be greater, on all counts, than simply biting the bullet and developing a nightspan power system at a more buildable site, where the resources are, along a highland mare coast, well away from the poles. The attraction of Mt. malapert is the fantasy that here we won't have to worry about providing nightspan power. Not so? If we have to have power reserves for 15% of the time, we might as well figure out how to provide them for 50-% of the time, so that we can go anywhere on the Moon and not be trapped in this imaginary solar ghetto.

Back to the Hydrogen Problem. Lunar Prospector *did* detect hydrogen, *thoroughly immixed with the soil.* In effect, the soil is like permafrost, but without ice "layers." If this makes it more difficult to mine, that may be a good thing.

- it will be less tempting for those who want to use it up for rocket fuel (lunar settler needs be dammed)
- the poles will lose their attractiveness as a first outpost location. We will be more inclined to do the right thing and set up along a mare/highland coast, either Angus Bay in NE Mare Crisium, or in Mare Frigoris or elsewhere.

The absence of easily minable layers of ice is not discouraging news. - PK.

MMM's Platform for the Moon

We start another year of **Moon Miners' Manifesto** with a comprehensive look at where we should be going, and what projects (government, private enterprise, and societal) we should be supporting to advance the realization of our vision of integrating the Moon into Earth's Economy.

Government funded missions are appropriate to answer questions about the Moon's

- Origin and evolution, Geology and typography, Composition and mineralogy
- Economically significant resources (Sudbury analogs)

Priority government/agency-funded Missions include:

- South Pole-Aitken basin [SPA] farside sample return
- Nearside central peak sample return (mantle material)
- Polar cold trap "ground truth" sampling missions (ice?)
- Orbital & impact lavatube detection & mapping
- Optical Wide-array telescopes
- Farside Radio Telescope installations

Industry/enterprise–funded missions are appropriate to:

- Map, quantify and qualify resources with near-term development potential
- Do on site teleoperated demonstrations of element production, building materials manufacturing, and other near-term product and technology development
- Up close high resolution photography for use in film and other audiovisual productions
- Test transport equipment for near-term tourism use

Industry and Enterprise–funded efforts are appropriate for: pre-development, for the sake of profitable terrestrial applications, of technologies that will be needed to open the space frontier (Spin-Up.) See MMM # 132 pp 1-4

- "Poor ore" mining technologies
- Novel building materials (glass-glass composites, alternative alloys, cast basalt, etc.)
- Synthetic chemical feed stocks
- Hybrid hydroponic/geoponic food production systems
- Mini-biospheric technologies

Industry/Enterprise-funded efforts are also appropriate for on location (on the Moon) demonstrations of:

- Helium-3 Harvesting methods
- Illmenite Oxygen, Iron, Titanium Production methods
- Glass-glass composites manufacturing systems
- Cast Basalt products manufacturing
- Sintered iron product manufacturing
- Gas scavenging and separation methods
- Silicon solar cell production
- Site grading methods
- Shielding emplacement methods
- Dayspan/nightspan energy management systems
- and more!

Space Organization–funded efforts are appropriate to:

- Outline potential Spin-up" business plan opportunities and publicize them to would-be entrepreneurs
- Found an Institute of Lunar-appropriate industrial design and/as-part-of a University of Luna-Earthside
- Define and list potential masters and doctoral Theses Topics in various fields that could advance our state of knowledge and preparedness to open the lunar frontier
- Define (and pre-design) Return Moonbase Improvements over the Apollo Lunar Module (room to sleep prone, walk, lounge, exercise; capacity to overnight (full-sunth mission capability, missions long enough to grow plants to harvest); recycling of human wastes (directly or indirectly); demonstration plant design; design of experiment tinkering labs; etc.;
- Hold contests to design and develop best teleoperated shielding methods, etc.; moonbase outfitting & layout, etc.,; the time-delay limits of teleoperation, etc.

Individually undertaken and funded efforts [MMM # 105 pp 1-2 The "Man in the Mirror" Strategy for Opening Space] are appropriate for:

- writing theses on various topics that advance our state of knowledge and preparedness to open the Moon
- writing books about the Moon and about the prospects of lunar development and life on a future lunar frontier to help broaden the base of public support
- help pre-develop lunar-appropriate art & craft media

Joint Projects for Moon–focused & Mars-focused Societies:

Moon-supporters should realize that it is in their greater interest to maximize the design of any facilities and equipment that would also be useful on Mars, for commonalities of parts and systems.

Mars-enthusiasts should realize that any systems needed on Mars that would also be needed on the Moon, if designed and developed to maximize commonalities of parts and systems, if deployed, tested, and debugged on the Moon first, would greatly reduce the risks of failure, setback, tragedy and catastrophe in the opening of Mars.

Given these shared interests, Moon-focused and Mars-focused societies should do what they can, *jointly,* within their budgets and abilities to raise special project funds, to insure that any government/agency designed systems, whether meant for the Moon, Mars, or both worlds, are optimized for commonalities of parts, systems, etc.

Further, Moon-focused societies should work on identifying early lunar industrial products that might have a market on the Mars frontier. Any effort to make the lunar frontier pay for its own expansion will have a better chance of succeeding if the potential market is expanded beyond Earth-based and Earth-orbit based consumers.

This is MMM's Platform for the Moon. It is not an impossible plan. It does demand swallowing of pride *and* a cessation of the "let George (government) do it" mentality.

NRA–03–OBPR–07: Research Opportunities for Ground–Based Research in

Space Radiation Biology and Space Radiation Shielding Materials

by Gordon Haverland, P.Eng., Matter Realisations
< ghaverla@materialisations.com > Nov 19, 2003

The above is the proper title for a NASA program that I learned of on 2003/11/04.

Background

Cosmic rays are a particle radiation from space. In terms of number, the largest component are protons, such as from the solar wind. In terms of effect (and especially biological effect), the most worrisome component are the highly charged, heavy ions. These heavy ions with very high kinetic energies, can travel quite far in matter. A few inches in aluminum for example.

If we say we want shielding for cosmic rays, most people would immediately think of lead (Pb). Lead is really only great for X-rays, for things like cosmic rays it is actually worse than no shielding at all (for any practical thickness of lead). The best material we have at this time is polyethylene, and it is they hydrogen atoms that are the important factor in shielding cosmic rays (without generating high secondary radiation fields).

- Polyethylene is the current best material. Polyethylene is 14.4% hydrogen by mass, densities tend to be below that of water.
- Some suggested shielding materials have included a solid wall of hydrogen (which would need cooling to stay as solid hydrogen) and tanks of water. Water is "only" 11.2% hydrogen by mass.
- Liquid hydrogen has a density of 0.07 g/cm^3. This is much less hydrogen per unit volume, than is found in polyethylene.

Hydrogen Storage Materials

We want a lot of hydrogen per unit volume. The hydrogen economy industry (hydrogen powered cars, fuel cells, etc.) has an interest in storing large amounts of hydrogen per unit volume, and with little "parasitic" mass (non-hydrogen mass). Cryogenic and pressure vessels are possible storage systems, but the better systems are hydrogen storage materials. These special materials can reversibly store hydrogen a number of times within the material.

The first solid-state, hydrogen storage material I forced myself to remember is $LaNi_5$. It could hold more hydrogen per unit volume, than was found in liquid hydrogen. But on a mass fraction basis, this material stores very little hydrogen. (Since liquid hydrogen and solid hydrogen have about the same density, it doesn't really matter which we compare it to. Liquid just happens to be more convenient.) This material started research into hydrogen storage materials.

Hydrogen Storage Materials – 2002/2003

There are now many different families of materials which are being investigated as hydrogen storage materials. For the hydrogen economy, you would like for it to be easy to get them to release the hydrogen as well as having large capacity. For shielding, we would just as soon have the release of hydrogen be restricted.

Lithium Nitride

The latest information I have on these materials, is that the current record holder is Li3N (lithium nitride) at 11.4%. Lithium nitride has a density of 1.38 g/cm3, so if you filled it with hydrogen you should have about 0.171 grams of hydrogen per cubic centimeter. Which is 20% better than a polyethylene having a bulk density the same as water.

When hydrogen is absorbed into lithium nitride, a chemical reaction takes place, much like a battery. Lithium amide and lithium hydride are produced. These two compounds will react at temperatures above 200C and low hydrogen pressures to release the hydrogen.

Lithium nitride, whether loaded with hydrogen or not, is not a nice compound to work with. It is reactive, easily reacting with water to produce ammonia. It may be explosive, or violently decompose, under certain circumstances. Not something one wants to see in radiation shielding.

Lithium

If you have worked with radiation shielding before, you probably immediately remembered something. Lithium (Li-6 in particular) is good at absorbing neutrons, and some neutron shielding materials are polyethylene loaded with lithium compounds (boron compounds are also common).

So, not only is lithium nitride a potentially useful shielding material on the basis of hydrogen density, it should also be quite effective at reducing secondary neutron fields. One downside of using lithium for absorbing neutrons, is that the radioactive form of hydrogen (tritium) is evolved. I suspect that Lithium (either Li-6 or Li-7) might have a "large" cross section for reacting with incoming cosmic rays, which would be another negative factor. Nitrogen is mostly N-14, which is known to react with high energy protons (like those found in cosmic rays) to produce C-14. The production of C-14 shouldn't pose as much of a problem as H-3, but lithium carbide is not known as a hydrogen storage compound. Transmutation of nitrogen to carbon would reduce the hydrogen sotage capability with time.

Offgassing

When polyethylene absorbs particle radiation, on the average some hydrogen will be evolved and lost. One potential advantage to using a hydrogen storage material, is that it might be better at reabsorbing this evolved hydrogen, if it is sealed inside something. And since lithium

nitride might be evolving tritium as it absorbs neutrons as well, we probably should attempt to seal our lithium nitride. How long it will stay sealed is open to speculation, since micrometeroids like to poke holes in things.

Conclusions

Hydrogen storage materials, and lithium nitride in particular, should be considered as cosmic ray shielding materials. The hydrogen economy people are looking for compounds which will easily release hydrogen, and the release rate is probably effected by alloying and doping. For shielding, we want to decrease the release of hydrogen. The "matrix" may participate in positive or negative ways, so we will want to consider all the possible nuclear reactions and radiation physics. It might be worthwile sealing the shielding materials, to lower the rate of hydrogen loss.

< GH >

Colonizing a *Bone Dry* Moon:
Transporting the Seed of Industry

by Dave Dietzler < Dietz37@msn.com > 1378 words

No plume of water was detected by Earth-side telescopes when Lunar Prospector was crashed into the Moon. Recent radar studies that only covered about 20% of the south polar region to a depth of 20 feet did not detect slabs of ice. In either case, crystals of ice dispersed throughout the Moondust would not have been detected. A lunar polar lander is badly needed to sample the Moondust and tell us exactly what and how much hydrogen bearing substance is there. Until then, our plans to use lunar polar ice for rocket fuel just long enough to get a foothold on the Moon are almost baseless. However, if the Moon is bone dry we can still do the job.

If we are to land 20,000 tons of equipment, as in O'Neill's original scenario, on the Moon to build a base and a mass driver that then provides millions of tons of materials for more development on the Moon and in outer space, we are going to need quite a bit of rocket fuel. With 330 second space storable hydrazine and nitrogen tetroxide powered rockets we will need 14,680 tons of propellant and 2935 tons of tankage and motors (about 20% of propellant mass) to land all this from lunar orbit. The total mass in lunar orbit will be 37,615 tons. For efficiency, the landing vehicles will be cannibalized to get aluminum, steel and plastics.

It may be possible to fly by WSB orbits to capture into lunar orbit without retro-rocketing, as did the Japanese Hiten spacecraft, but this might not be the "free lunch" that's hoped for. We will need 11,157 tons of hydrazine and N2O4 to brake all this into lunar orbit and about 2230 tons of tankage and motors which will be discarded after use or recovered in lunar orbit someday and cannibalized. The total mass of payload to be accelerated out of LEO to escape velocity will be 51,000 tons. The mass of LH2 and LOX to propel all this out of Earth orbit will be 69,100 tons and the tankage plus motors will be 13,820 tons. That 13,280 tons of rocket stages will be discarded into space or crashed into the Moon after use. The total mass for this project in LEO is then 133,920 tons. At $1000 per kilogram to LEO, less than one tenth today's price, it will cost $133 billion to boost all this to Earth orbit. There will have to be orbital fuel depots to store water that will be converted to LH2 and LOX when ships are ready to depart for the Moon and a substantial robotic and manned presence in LEO to prepare all the rockets and cargo. I have not allowed any margin, but this discussion is for comparison of lunar transportation systems rather than actual specifications. At more than $133 billion it seems that this project is going to have trouble getting funded. Only 15% of the mass launched is actual lunar payload and the rest is propellant, tankage and motors.

Confidently presuming the presence of six billion tons of lunar polar ice, it would be possible to mine the ice with a small number of robotic devices, fuel up a reusable nuclear thermal rocket powered freighter with water and use it to stock up a fuel depot at L1. From there, a tiny chemical rocket burn sends the water down to LEO in reusable aerobraking carriers. In LEO, the water is decomposed with solar powered electrolysis cells to get rocket propellant for reusable rockets that move cargo from LEO to L1 where cargo is transferred to nuclear steam rockets and landed. Presuming that this can be done economically, we hardly have to send any propellant up to LEO and costs are slashed. This demonstrates the value of in-situ resource utilization once again. But what if the water isn't there? Or it exists in quantities too low to mine practically?

At this point we have to be clever. Solar electric propulsion like that used on the ESA's SMART-1 becomes attractive. If we are going to deliver 20,000 tons of payload, 14,680 tons of hydrazine plus N2O4, and 2935 tons of landers to lunar orbit with 6000 second ISP ion drives, we will need only 2650 tons of propellants. The "fuel" could be zero boil-off lithium. The drive itself won't be too massive and the solar panels would be recruited for other purposes (thereby making them part of the useful payload mass), so we can fudge a little and ignore the mass of the ion drive and solar panels. Now we have about 41,000 tons to LEO and that would cost about $41 billion at $1,000 per kilo. That's a substantial reduction. With 20,000 tons of equipment on the Moon, most of it teleoperated and some of it using AI and capable of self replication, we can build habitations on the Moon anticipating humans, dig mines, refine moondust and build mass drivers to launch millions of tons of material into space for construction.

Our labors are not finished. Solar electric propulsion is very slow. It will take months, even a year or more, to spiral out of LEO and then brake into lunar orbit. That's

just fine for cargo, but it will not suffice for humans. This is unappealing not only because of our impatient nature, but months spent spiraling out through the Van Allen Belts will be deadly unless the ship is shielded to an absurd degree. What we need are high thrust rockets in order to race through the VABs and reduce radiation exposure. In the absence of water ice for liquid hydrogen and LUNOX, the only substances on the Moon that can be used for high thrust rocket fuel are aluminum, magnesium and oxygen. These might be mixed up to form a monopropellant slurry as demonstrated by Wickman. It might also be possible to take beads of magnesium or aluminum and sinter them in a form to make a solid fuel for a hybrid rocket that uses LOX, something that has yet to be shown. Extracting metals and oxygen from regolith is more complex than simply roasting out water, but it can be done. We will need more than just a few ice miners and nuclear thermal steam rockets, but the day would come when we had to stop using precious lunar polar ice for rocket fuel and switch to aluminum, magnesium and LUNOX anyway. With 20,000 tons of cargo on the Moon it should be possible to build a mass driver and launch moondust (or preferably, alumina and magnesia) carrying modules to lunar orbit where they will then rendezvous with solar electric or nuclear electric powered freighters that load up and haul the moondust over to L1. From L1 the modules will be shot down to LEO with a small chemical rocket burn and aerobraking carriers. The ion driven freighters will go back to lunar orbit to collect more modules launched via lunar surface mass drivers. The material will be smelted in LEO to get rocket propellants. Small manned rockets will race from LEO to L1. Material will also be smelted at the L1 depot to get Al and LUNOX for landers that convey humans to and from the lunar surface. Interlunar rockets will reload with Al and LUNOX at L1 and fly back to LEO, perhaps making use of aerobraking for efficiency.

There are a couple of worthwhile refinements to think about also. What if the first one or two thousand tons of cargo sent to the Moon consist of equipment expressly designed to manufacture Al and LUNOX along with some rocket vehicles? It would not be necessary to convey landers, hydrazine and N2O4 with the next 18,000 to 19,000 tons of cargo. Rockets fueled with indigenous lunar propellants could land this remaining cargo and billions of dollars could be saved that otherwise would be squandered launching lunar landers and their propellants to LEO. What if we build an Earth-Moon cycling station out of some Shuttle ETs accessed by Al/LUNOX powered taxis? Astronauts could travel in greater comfort and that would improve morale. A station at L2 would be necessary for such a cycling station, but it would probably be worth it.

see:
http://groups.msn.com/DaveDietzler/spacesmelting.msnw

< DD >

Outer Space Resolution of the Wisconsin Greens Party

Submitted by Bill Hensley* <hensley@acronet.net>
to the Wisconsin Green Party,
and passed as a resolution on October 18th, 2003
* a member of the Wisconsin Mars Society Chapter
< www.chapters.marssociety.org/usa/wi >

Whereas, the peaceful exploration of Outer Space has been usurped by the militarization of Outer Space.

Whereas, the last four U.S.- backed military conflicts have used Outer Space- based technology to disrupt the computer and communication systems of sovereign states.

Whereas, the funds required for continuing peaceful Outer Space exploration have been used, instead, for the design, implementation and deployment of wasteful and dangerous Outer Space hardware, such as the Strategic Defense Initiative (SDI).

Whereas, the Wiscconsin Green Party calls for the end of Outer Space militarization.

Whereas, the Wisconsin Green Party recognizes the need for the inspiration and education which the peaceful exploration of Outer Space provides.

Whereas, the Wisconsin Green Party recognizes the need for Outer Space- based systems to monitor environmental conditions on Earth, to the benefit of all.

Whereas, the Wisconsin Green party recognizes that the many advances in Outer Space technology benefit all people on Earth, as well.

Whereas, the Wisconsin Green Party embraces peaceful Outer Space exploration as a means for all people on this planet to work together, rather than fight apart.

Whereas, the Wisconsin Green Party recognizes that children designate Outer Space as their number one interest, even above the study of dinosaurs.

Whereas, the Wisconsin Green Party recognizes the inspiration provided to children by Outer Space exploration can prompt them to pursue Math,

Whereas, the Wisconsin Green Party proclaims that the benefits derived from inspired education would be well worth the investment in peaceful Outer Space exploration.

Now Therefore, it is resolved that the Wisconsin Green Party goes on record as opposing any form of Outer Space- based military aggression.

Let it further be resolved that the Wisconsin Green Party supports only the peaceful and sustainable exploration of Outer Space, on a case by case, mission specific basis, and supports any and all International treaties concerning peace in Outer Space.

Great work, Bill!

http://www.moonsociety.org

Please make all submissions to: KokhMMM@aol.com

The Moon Society was formed in July, 2000 as a broad-based membership organization with local chapters, to spearhead a drive for further exploration and utilization of the Moon in cooperation with other like-focused organizations and groups.

Artemis Society International was formed in August 1994 as a forum for supporters and participants in the **Artemis Project™** quest to establish a commercial Moon base as a first step to a permanent, self-supporting lunar community. **ASI** does not engage in any form of commercial business directly, but seeks to build a Project support business team. Registered trademarks of the **Artemis Project™** belong to **The Lunar Resources Company®**

Join/Renew Online at
www.moonsociety.org/register/

- $35 USA/Canada + MMM hardcopy
- $60 elsewhere + MMM hardcopy
- $35 anywhere + MMM electronic PDF file
- $20 Student/Senior + MMM electronic PDF file

Questions? email: membership@asi.org

The Artemis Project™ http://www.asi.org/

- Artemis Reference Mission
- Artemis Data Book

Project LETO™ http://www.projectleto.org/

Please send all mail related to Memberships to:
The Moon Society Membership Services
PO Box 940825, Plano, TX 75094-0825, USA

How to fix MMM Subscription Errors:
www.asi.org/adb/06/09/04/1999/09/news-19990915.html

Two Challenging Projects for the Moon Society

By Peter Kokh < kokhmmm@aol.com >

This year two major outreach initiatives have been introduced, both focused on Mars, The Moon Society would, in our opinion, do well to emulate both of them, even if (why not *especially if*) it means going outside our current ranks to find the volunteer talents needed.

An on-line library of papers dealing with Mars

You can read about this project, largely the work of just one ambitious volunteer, at www.marssociety.org. Categories of Mars papers have been established ranging from analog research stations, technologies for robotic and human Mars exploration, utilization of Mars resources, the search for life, settlement, to related societal and philosophical implications that may be expressed in fiction or non-fiction. Past Mars Society conventions are included. More at: http://www.marssociety.org/content/papers/Marspapersnabstrs.asp

How could we produce something similar? First we'd have to find a volunteer or team of volunteers (in a "divide and conquer" approach) to undertake the project/. Then we'd have to prioritize, decide where to start. There are available Moon-related papers from past Lunar and Planetary Institute conferences, past Return to the Moon Conferences, past NSS International Space Development Conferences, and the recent Space Age Publishing sponsored Hawaii conference. That represents quite a pile.

Finding web space and web tools is not a problem. Finding people and getting started is where the challenge lies. We think it is definitely worth our collective attention.

A Traveler's Guide to Mars: The Mysterious Landscapes of the Red Planet, by William K. Hartmann, available for $13.27 (paperback) from Amazon.com.

This is a monumental work, expertly organized, and beautifully illustrated, which sucks the reader in and makes one ready and eager to take a trip to Mars, no matter what the cost, no matter how much time it would take out of one's life.

Now the Moon is not Mars. There are some major differences that will be relevant to how a "Traveler's Guide to the Moon" would be organized and structured, to how it is illustrated with photos and illustrations. Our work would be different. But it is something that is clearly needed if we are to capitalize on the current reawakening of public and government interest in the Moon.

I encourage any readers who might like to collaborate on the creation of a similar Traveler's Guide to the Moon to buy this book, read it, and study how it was put together. Anybody, who after reading Hartmann's book is interested in a similar Moon-focused project, should contact me at kokhmmm@aol.com.

What *You* can do to Further the Establishment of a Lunar Frontier: Part II: Defining a Project and its Phases

by Peter Kokh < kokhmmm@aol.com >

Last month, we talked about how we can maximize the internal limits of the Society's "Membership Box" by finding ways to push our own individual buttons of interest and talent. You may find a project that you can do from start to completion all by yourself. That's great. Get to it!

Chances are, however, if an appropriate personal project does comes to mind, as you start to lay out all the steps and phases it will probably take to produce something worth the effort, you will find that you have only part of the expertise the project seems to call for. You need a partner or a team, and that may be discouraging. Take a breather, but don't drop your idea.

Team projects: opportunities to start or grow an Outpost

In the history of the various space societies, many team efforts have been launched only to founder on the shoals of a common obstacle: team integration. Unless a project is an electronic one such as software or a web-based service, it is difficult and impractical to accomplish with a geographically distributed team, even with local clusters working on separate subsystems. If your project has a physical side, requiring hands-on work and systems integration, a local team will work best.

Don't have a local team? Of course, you don't. That's great! There can be no better hook with which to recruit people to start a local outpost (and eventually a local chapter) than a concrete project! Define all the expertise and talent and experience needed, Write up the benefits your completed project will provide or contribute, and then start recruiting.

If you have a chapter or local group in place, and you are short any needed talent or expertise, don't scale back your project to fit the talent on hand, or settle for what your present group can produce. Go out and recruit the missing pieces of your team. An outpost/chapter that is project-driven will be much more vigorous and satisfying than one that is merely discussion-driven!

Do publicize your project in the Moon Society Journal's Chapters & Outposts Frontier page (usually page 12 in each MMM) and do ask for any assistance that will be effective at long distance. Your efforts will inspire other groups and individuals to find a way to launch their own.

Entrepreneurial Opportunities:

Does your project have income earning potential? You may not have thought of that aspect, but it may be worth brainstorming it for money-making potential. If it is only pocket change at stake, pursuing it under the aegis of a Moon Society Chapter (minimum 5 members) or Outpost will do just fine. But if your project seems like it could earn serious and steady income, you may want to organize as a small startup business. Do a complete business plan workup, hustle up some earnest money (from your own pockets, insurance policy loans, etc.), and then take it to any of the various institutions willing to help small entrepreneurs with needed cash. Then you might join the Artemis Society Enterprise Team.

Need help defining your project? developing a business plan?

Greg Allison, a one man dynamo in the National Space Society, has, over the past decade, developed a series of business and project incubator workshops under the name "**The Foundry**." The Foundry has been a regular feature of NSS' annual International Space Development Conference, at which the Moon Society regularly endeavors to have a presence. The next ISDC is set for Memorial Day Weekend 2004 in Oklahoma City. The Foundry sessions are open to everyone (do register for it and commit yourself to the entire run of workshops - this is not something to audit on a drop-in/drop-out basis). Best of all, there is no cost beyond registration for the ISDC itself. For more information, visit these websites:

The Foundry - http://www.nsschapters.org/foundry/
ISDC 2004 - http://www.nsschapters.org/isdc/2004/

Depending on the status of your team-building needs, you can go through The Foundry exercise on your own, or encourage other team members already onboard to go through it with you. The Foundry is that it is geared specifically to help people develop space-relevant projects, endeavors and enterprises of all kinds, scopes, and sizes.

Free Consulting

Perhaps you do not need more (or any) local teammates but do need to tap the brains of others with particular expertise or experience to solve a particular one-time problem. You can place a classified ad on the Space Chapter Hub website (http://nsschapters.org/hub/) and/or post request on moon-discuss@moonsociety.org, artemis-list@asi.org, or ask someone with access to post it on the NSS and Mars Society discussion lists. We space frontier people are only too happy to help. We're all in this together!

The bottom line is that as a person passionately interested in the opening of the space frontier to settlement, you owe it to your own dreams to contribute whatever you can with your own talents and abilities. Given the seemingly discouraging time lines, few of us can hope to be among the actual pioneers. But by contributing what we can simply by application of our own talents, we can become real ancestors to those pioneers who will get the chance to make it real. What more can one ask for?

The Moon as a Stepping Stone to Mars

by Peter Kokh

"A serious project of going to Mars
will include the Moon in some manner."

James Lovell, December 17, 2003

A decision to return to the Moon before mounting a manned expedition to Mars is the nightmare that has haunted Mars Society founder Robert Zubrin for many years. Yet it seems clear to all less emotionally involved that the pluses, for real and lasting success on Mars, of establishing an outpost on the Moon first *could be* enormous.

The recent failure of the UK's **Beagle** Marslander mission to survive planetfall on Mars in a functional state, in the wake of so many previous Mars lander probe failures is ample evidence of the high technological threshold of Mars missions in general. Mars is some 150 (min.) to 1,040 (max.) times as far from Earth as the Moon. One immediate consequence is that while probes and facilities on the Moon can be teleoperated from Earth or Earth orbit with less than 3 *seconds* time delay, remote control is all but impossible on Mars at time delays of 6 to 44 *minutes*.

Trip times to Mars of 6-9 months with currently available chemical rockets, compare poorly with 3 day ones to the Moon, a factor of 20-30 times shorter. For cargo (unmanned) craft, this may not be a problem. For humans this will mean that much more exposure and vulnerability to cosmic radiation and solar flares. It will also mean much more consumables brought along - just for the trip.

More importantly, while optimal windows to the Moon occur monthly -in a pinch, we can go there *anytime*. In contrast, windows to Mars are tightly constrained by orbital mechanics to a period of a couple of months every 2 plus years. The significance is that while an outpost on the Moon can be *resupplied regularly and rather quickly*, a Mars outpost would have to *bring along enough supplies and replacement parts to survive without outside help, resupply, or rescue for periods of two or more years*. The Moon can be done via an "umbilical cord" if you will, whereas Mars will require a presupplied 'yolk sac' for growth and nourishment.

It should be clear even to the shallow-thinking "been there, done that (the Moon)" crowd that a Mars outpost will be significantly more of a logistical challenge, and, if involving equipment that has not been pretested in an analogous "field," will involve considerable and unnecessary risk of unrecoverable disaster at unrepeatable expense. If it is important to open Mars, then it is important to reduce these considerable risks to a minimum. As the age old maxim has it, "anything worth doing, is worth doing well." So let's indeed go to Mars, the right way, using a lunar outpost to make sure we have everything right.

Advantages of a prior outpost on the Moon

1. Field testing equipment

New untested and nondebugged equipment on Mars had better work, or be fixable by the crew on hand with tools and parts on hand. Pretesting on Mars "analog" sites on Earth will hardly be adequate. The conditions are not sufficiently similar. Equipment can be field-tested and debugged with far less risk to life on the Moon, where resupply, rebuilding, reconfiguration, overhaul - and, if necessary, rescue - will be *significantly easier, safer, faster, and cheaper*. An equipment failure on the Moon will be survivable, with recovery relatively swift. Failure on Mars could be crippling and quite possibly catastrophic. Equipment needed in common on Moon and Mars will include:

- regolith shielding emplacement equipment
- other earth-moving equipment
- mining equipment
- construction equipment
- manufacturing equipment
- life support / biosphere maintenance equipment
- farming/agriculture/food production equipment
- power generation equipment
- ground transport equipment
- communications equipment

2. Human Factors Engineering

In this area of concern, enthusiasts in the Mars Society have made great strides. Analog stations on Devon Island (Canada) and in Utah, have proved their value in testing the effects of isolation on human crews. We have learned much. But despite efforts to "observe simulation," not going "outside" without "spacesuits" and only via an "airlock," we could gain much more confidence in an environment whose unforgiving hostility guaranteed compliance, in which the weight and cumbersomeness of space suits was accurately modeled, etc. No one has spent more than a few days at a time on the Moon. Lunar missions of "Mars Mission length" would have a better chance of exposing any critical problem points.

3. Frontier Health Care

NASA has been brainstorming a compact medical complex able to handle most emergencies from trauma to appendicitis. Field testing this complex in real lunar frontier situations would guarantee an improved version for Mars, where *emergency return* to Earth is *not an option.*

4. Long Range Applications

If the lunar and Martian frontiers are opened in step, Moon first, down the road, a lunar settlement could produce some of the heavy equipment needed on Mars at shipping cost savings. The lunar frontier *would* also be *the premier source of field-tested settlers* for Mars.. **< PK >**

Moon Society Chapters & Outposts — The Outpost Frontier Report

Brigham Young University Student Outpost

Now operating as: **BYU Space Development Club**

http://www.et.byu.edu/groups/sdc/

from Jonathan Goff < jag42@et.byu.edu >

Nov. 6th Meeting : the meeting went fairly well. About 10 people came. Jared Haslem from the BYU Business Plan competition gave an explanation of the competition, and some good solid advice for checking to see if a business idea is really an opportunity.

We also had elections for officers, the following being elected:

- Jonathan Goff--President/Webmaster
- Donovan Chipman--Vice President
- Danny Farnsworth--Treasurer/Secretary
- Nicole Guillian was also voted in for an as yet unnamed position, (Publicity/Hospitality Coordinator?).

Several people officially joined, bringing us to about 8 dues paying members.

I'm in the process of getting a page up with a membership roster, as well as a page with the club officers (and contact info). Keep checking back the club website from time to time.

Nov. 13th Meeting : We had a good meeting, even though it was relatively late in the evening. This week we're back to the old schedule: 6-7pm in CTB 250. Last time we had a short discussion about the basics of earth-to-orbit flight and its mpacts on design of space vehicles.

Nov. 20th Meeting : Donovan Chipman will be giving a presentation on current commercial space ventures (also known as Alt.Space), and their status. It should be an interesting report, and should be a nice change of pace.

We're also going to start organizing project teams for our projects next semester. We'll be looking for a team-leader for the hydroponics team, and a team leader for the rocket propulsion team.

Jonathan Goff, BYU SDC President

Moon Society Eurochapter Launched

www.moonsociety.org/chapters/europe

Team Leader:Michael Delaney (mdelaneyis@eircom.net)

Team E-Mail Address:europe@moonsociety.org

This is the homepage of the Moon Society's Euro-chapter. This new, and hopefully revolutionary, chapter will bring the European members of the Moon Society together, in an effort to enhance our cooperation.

Through this site, members will be able to follow developments, communicate with the other members, receive and volunteer for tasks regarding projects and their areas of expertise, etc.

Chapter & Outpost Resources Online

The Moon Society Chapters Coordinator keeps a log (with active links) to resources appropriate for use by Moon Society Chapters and Outposts on the Space Chapters Hub website. This log is online at:

moonsociety.org/chapters/milwaukee/msmo_output.htm

Moon Society U.S. Chapters & Outposts

AL – Moon Society Huntsville Outpost, Patrick Vitarius (vitarius@hotmail.com)

CA – Moon Society Los Angeles Outpost, Chip Proser (chippro@aol.com)

CA - (San Francisco) **Bay Area Moon Society Outpost**, Tim Cadell (tcadell@savageresearch.com)

CA – Moon Society San Diego Outpost, David Schrunk (DocScilaw@aol.com)

IN – Indiana Outpost, John Schrock (schrock@ccrtc.com)

MA – Moon Society Boston Outpost, Rob Winchester (robw911icig@netscape.net)

MD - (Maryland, D.C., Virginia) - **Mid–Atlantic Moon Society,** Margo Duesterhaus (margo_duesterhaus@sesda.com)

MO – Moon Society St. Louis Chapter, David Dietzler (Dietz37@msn.com)

NJ – Moon Society Central New Jersey Outpost, Ed Antrobus (moon@nj-space.net)

NY – Moon Society Greater New York Outpost, Ian Randal Strock (irs@panix.com)

NY – Moon Society Long Island Outpost, Arthur Smith, (apsmith@aps.org)

NC – Durham Outpost, David Wetnight (dave@wetnight.com)

OR - (Portland) **Oregon Moon Society Outpost**, Dick Steffens (rsteff@attbi.com)

TX (Dallas), **Moon Society North Texas Outpost,** Scotty Gamenthaler (scottygamm@topher.net)

TX – Moon Society Houston Outpost, Craig Beasely, bginstitute@ev1.net

TX – San Antonio Outpost, Robert Lancaster (fixerbob@worldnet.att.net)

UT (Provo) **Moon Society Utah Outpost, BYU Space Development Club**, Jonathan Goff (jongoff@myrealbox.com)

WI – Moon Society Milwaukee Outpost, Peter Kokh (kokhmmm@aol.com)

Moon Society Central NJ Outpost

NEW >>> http://moon.nj-space.net

I now have an email account (below) set upspecifically for the Central New Jersey outpost, as well as a web page under development at the URL above. If all goes well, I will be holding an interest session at The College of New Jersey this spring.

Ed Antrobus < moon@nj-space.net >

DECLARATION of the International Lunar Conference 2003, November 16–22, Hawai'i Island, Hawaii, USA

"The Moon is currently the focus of an international program of scientific investigation. Current missions underway or planned will lead to the future use of the Moon for science and commercial development, thereby multiplying opportunities for humanity in space and on Earth. We need the Moon for many reasons: to use its resources of materials and energy to provide for our future needs in space and on Earth, to establish a second reservoir of human culture in the event of a terrestrial catastrophe, and to study and understand the universe. The next step in human exploration beyond low Earth orbit logically is to the Moon, our closest celestial neighbor in the Solar System."

"Declaring this, we note large gaps in our understanding and knowledge must be addressed before the Moon can fully serve the noble purposes we identify. Many nations are conducting or planning lunar missions (ESA - SMART 1; Japan - Lunar A, SELENE; China - Chang'e; and India - Chandrayaan 1) that offer an opportunity for international cooperation fundamental for long-term public and private development and science. We strongly support the continued development of these missions. However, more knowledge is needed, requiring more complex capabilities than are now planned, including the first landings of spacecraft on the Moon since the Luna and Apollo programs of the 1960s and 1970s."

Major thrusts

"During the International Lunar Conference 2003, we identified a number of main thrusts for an expanded lunar program: assessment and use of potential ice/water resources at the lunar poles for human use; development of energy resources for both Moon and Earth and establishment of lunar astrophysical observatories. We have concluded that, for the future development of the Moon, the deposits of hydrogen indicated by the USA Clementine and Lunar Prospector missions must be fully understood to confirm their nature and importance for future planetary exploration, development and human settlement."

"We recommend a sequence of technology, exploration and commercial missions on the road to this human Moon presence. We support the goals of a comprehensive series of missions including polar orbiters and landers, South Pole-Aitken Sample Return, Selene-B, Lunar Globe and [the European Space Agency's] Aurora lunar demonstrator. We advocate robotic engineering precursors for in-situ resource utilization and deployment of infrastructures preparing for human-tended operations."

"To encourage and stimulate the peaceful and progressive development of the Moon, we recommend that the international community of national space agencies, companies and individuals operate and maintain an exploratory mission at a pole of the Moon to serve as a catalyst for future human missions within a decade."

"Our vision is one of expanding humanity into space on an endless journey. We believe a human return to the Moon is the next step into the Solar System and the future of the human race."

Major Findings of 30 years of Apollo Science as reasons to return to the Moon

11/15/03 December's Scientific American has a long feature article by Paul Spudis, on scientific reasons (geological mostly) for a return to the Moon. The first few paragraphs are online: "The New Moon" -

http://www.sciam.com/article.cfm?chanID=sa006&colID=1&articleID=0006DD04-865B-1FA2-85B083414B7F0103

Several interesting tidbits about minerals and properties of the Moon that have been figured out in the last 30 years:

- The **high titanium** content found in mare rocks by Apollo 11 was **probably an anomaly**; it doesn't seem to be that high anywhere else.
- The "**KREE**P" (potassium, rare earth, phosphorus) **concentrations seem to be all in the Oceanus Procellarum** - this is from analysis of thorium abundance on the Moon by Lunar Prospector, since thorium is one of the KREEP elements. This indicates that, during the period the Moon's crust was solidifying, the Procellarum area was the last part to stay liquid. There are probably other geological processes from that era that have led to other mineral concentrations.
- The **South Pole-Aitken basin** has altitude differences of 16 km from nearby crater rim to the bottom of the basin. It **appears to be the oldest lunar basin**, but it would be very interesting to the history of the early solar system to figure out whether it is closer to 4.3 billion years old (when the lunar crust solidified) or to 3.8 billion years (when the oldest basin on the near side formed).
- Some of the "highland" areas actually have mixed content, and seem to be where there once was a basin and mare, which was since broken up and buried by debris from big impacts.

Anyway, some hope for differentiated mineral deposits for the Moon miners among us :-)

Arthur P. Smith < apsmith@aps.org >

China: 4 Science Goals for Lunar Orbiters

www.**spacedaily.com**/news/china-03zy.html

1. T**hree-dimensioned graphs of the lunar surface**. will precisely define basic structures and physiognomy units of the lunar surface and the shape, size, distribution, and density of lunar craters. This data will help identify the age of the surface and early history of terrestrial planets and provide information needed to select sites for soft landing on thesurface and for the lunar base.
2. The **distribution** and types of elements focusing on the content and distribution **of 14 elements** such as titanium and iron **which can be exploited**. A map of elements distribution will be sketched. Graphs for lunar rocks, mineral materials and geology will also be drawn. Areas **rich in specific elements will be identified**. Prospects of the development and exploitation of the mineral resources will be evaluated.
3. Detect the **depth of the lunar soil** through microwave radiation. In this way we can calculate the age of the lunar surface and distribution of the lunar soil on the lunar surface. This lays a foundation for the further estimates of the content, distribution, and quantity of helium-3 for nuclear fusion power generation.
4. The **space environment between Earth and the Moon**. The average distance between Earth and the Moon is 380,000 thousand km, which is in Earth's magnetotail. Here the satellite probes solar energetic particles, plasma in solar wind, and the interaction between the solar wind and the moon and between the tail of the magnetic field of Earth and the Moon.

Why MMM is so Late & 4 Pages Short

From Peter Kokh, MMM Editor

On October 12th, the day after we completed MMM #169, the October '03 issue, our desktop computer, a '97 PowerMac 6500, had a hard drive melt down and we have still not totally recovered from this.

Thanks to the local Apple Store, we recovered an "image" of the hard drive, and after a new hard drive was put in the old machine, we were able to restore *all* the files - but, apparently, not all the settings. We have not been able to get that machine online either by phone modem or cable modem, or produce a PDF file.

Meanwhile, we have been relying on a lap top I-Book. Thanks to a new printer for the I-book, we are able to print the hardcopy master again. But we still, as of early January '04, have not been able to produce a decent PDF file. Calls to Apple and Adobe for tech support have been expensive and solved little.

To help catch up, we've shortened this issue to 16 pages and next month's Review issue to 12 pages. A full-size February issue (MMM #172) should be on time.

The Lunar Reclamation Society, Inc.

PO Box 2102
Milwaukee
WI 53201

www.lunar-reclamation.org

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

LRS NEWS

• **November 15th Outreach Opportunity Report:** Matt Giovanelli of the Wisconsin Mars Society had arranged for that chapter to have an information table at the State Lego competition at Rufus King HS, the theme of the event being "Mission to Mars." We contributed several display items, including a diorama of the Arctic Mars Station on Canada's Devon Island.

LRS Upcoming Events

Updates at: www.lunar-reclamation.org/page4.htm

Saturday, DEC. 13th 1–4 pm (locationabove)

LRS Meeting, Mayfair Mall, Garden Suites **Room G110**, which is located on the lower level "Garden Suites East" near the mall entrance below the cinema complex.

Annual pre-Holiday Pot-luck & Classic Sci-Fi Film

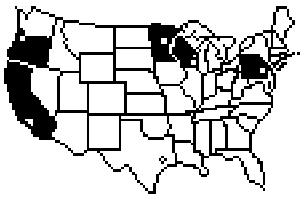
(DVD) **When Worlds Collide** (1952)

- Joint event of LRS, Wisconsin Mars Society (WMS), and Moon Society Milwaukee Outpost (MSMO)
- Space Exhibits

Saturday, JAN. 10th 1–4 pm

LRS Meeting, Mayfair Mall, Garden Suites Room G110, which is located on the lower level "Garden Suites East" near the mall entrance below the cinema complex.

U.S. CHAPTERS



NSS Chapter Events

MMM

6 Chapters Strong

For Chapter Resources, visit the Space Chapter HUB Website: [http://nsschapters.org/hub/]

CALIFORNIA

OASIS: Organization for the **A**dvancement of **S**pace **I**ndustrialization and **S**ettlement

P.O. Box 1231, Redondo Beach, CA 90278

Events Hotline/Answering Machine: (310) 364-2290

Odyssey Ed: Craig Ward - cew@acm.org
E-mail: oasis-leaders@netcom.com

[http://www.oasis-nss.org/]

Odyssey Newsletter Online
http://www.oasis-nss.org/articles.html

Regular Meeting 3 pm 3rd Sat. each month

Microcosm, 401 Coral Circle, El Segundo.
Information: OASIS Hotline, 310/364-2290; website.

- **DEC. 13, 3 pm. --** OASIS Monthly Business Meeting at the home of Bob & Paula Gounley, 1738 La Paz Rd in Altadena. Call *OASIS Hotline,* for more information. NOTE*: This is the **second** Saturday in December!*
- **JAN 17, 2004, 3:pm --** OASIS Monthly Business Meeting, at the home of Bob Gounley & Paula Delfosse, 1738 La Paz Road, Altadena. Call the *OASIS Hotline,*

Looking Ahead

- **January 2-4, 2004** -- Planetfest 2004! Pasadena, California. Info: www.planetary.org/planetfest04

Recurring Events

- **Fridays, 7 pm** "Night Sky Show." -- **8 pm** Guest lectures. Santa Monica College John Drescher Planetarium, 2nd Flr Technology Bldg, 1900 Pico Blvd. $4 /show; $7/both. 310/452-9223 www.smc.edu/events/weeklyeven.
- **Fridays -** "Mike Hodel's Hour 25" webcast. The world of science fact/fiction: interviews, news, Radio dramas, artists, writers, stories, reviews. www.hour25online.com

MINNESOTA

Minnestoa Space Frontier Society

c/o Dave Buth 433 South 7th St. #1808
Minneapolis, MN 55415

Tom Greenwalt (w) 763-784-6244 (h) 763-442-6015
David Buth (w) (612) 333-1872, (h) (763) 536-1237
Email: tomg@mnsfs.org

[www.mnsfs.org/]

- **L5MN/MnSFS's 24th Annual Election Results**

Tuesday, November 11, 2003 at 7pm in Room 324 at CMU we saw a "Mars Exploration" Program presented by Tom Greenwalt. After the Program we held the elections. The results are:

- Executive Director: Craig Borchard
- Assistant Director: Rich Brown
- Secretary: David Buth
- Treasurer: Tom Greenwalt
- State Councilor 1: Scott Shjefte relected
- State Councilor 2: Jim Cran up for re-election next year
- State Councilor 3: Ben Huset up for re-election 2005

The Constitutional issue of changing the name of sub-chapters to co-chapters passed

David Buth - MnSFS Secretary

- **Rover Meeting Minutes:** The Rover Meeting began shortly after 2:00PM Saturday December 6th 2003 In attendence were: Craig Borchard, Jim Cran, Tom Greenwalt, Ben Huset, Rich Brown, David Buth and Scott Shjefte.

The initial trigger that started this topic is that the Science Museum of Minnesota is giving 3:1 grants of money to local science organizations to help strengthen local infrastructure. The MN Space Frontier Soc. received a letter from the Science Museum letting us know that we are encouraged to apply for matching funds for a project.

First order of business was to define what project MNSFS wanted to do and was within our technical and financial reach. Four small projects were proposed:

1. Full size model of Mars Explorer Rover. Light-weight stationary model for display at outreach events.
2. 1/4 scale (OPS) Mars Explorer Rover that is functional.
3. Expand the multiple small remote control rovers we have used at past outreach events.
4. Marscape Table Top Terrain (T3), to be used with the rovers from item 3.

Project Heads for each of the projects were assigned. The project heads will be researching the feasibility, ballpark costs and a preliminary design.

1. David Buth is head of the Full size model of MER.
2. Craig Borchard is head of OPS.
3. Scott Shjefte is head of multiple units.
4. Ben Huset is head of T3.

Writing a proposal to submit to the Science Museum for matching funds will be done by David Buth, Craig Borchard and Tom Greenwalt.

The second Rover Meeting will be on Dec 13th 2003 6:30PM, Radisson South (in lobby.) The third Rover Meeting will be on Dec 31st 2003 at 5:00PM at 8625 W River Road.

Funding Update – The MNSFS is planning to apply to the Science Museum of Minnesota for the 3:1 matching funds for the maximum amount. If we put up $200 the Science Museum will match with $600 for a total of $800. $800 will get used up pretty quickly by any one of our four proposed projects though. So Scott Shjefte has generously offered to match any additional donations toward the MNSFS Mars Rover project up to $500 (Thank you Scott). And when Scott's $500 has been matched the next $500 donated will be matched by my company Trancer Software.

January Events

Tuesday, JAN 13th, 7-9 pm - MN SFS **General Meeting**.
Coffman Union UofM Room 324

Saturday, JAN 17th, 1-4 pm - MN SFS **Business Meeting**
St. Anthony Park Library's Meeting Room, 2245 Como Avenue, St. Paul, MN 55108.

WISCONSIN

Sheboygan Space Society

728 Center St., Kiel WI 54042-1034

c/o Will Foerster 920-894-2376 (h) <willf@tcei.com>
SSS Sec. Harald Schenk <hschenk@excel.net>

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

[http://www.tcei.com/sss/]

- We meet the **3rd Tuesday** of the month at **7-9pm**

DECEMBER 16: Stoelting House, Kiel
JANUARY 15: UW-Sheboygan, Sheboygan
FEBRUARY 19: Stoelting House, Kiel

OREGON

Oregon L5 Society, Inc.

P.O. Box 86, Oregon City, OR 97045
voice mail / (503) 655-6189 -- FAX (503)-251-9901

[http://www.OregonL5.org/]

Allen G. Taylor <allen.taylor@ieee.org>
Bryce Walden <moonbase@comcast.net>
(LBRT - Oregon Moonbase) moonbase@attbi.com

- Meetings **3rd Sat.** each month at **2 p.m.**

Bourne Plaza, 1441 SE 122nd, Portland, **downstairs**
NEXT MEETINGS: **NOV 15th, DEC 20th, JAN 17th**

PENNSYLVANIA

Philadelphia Area Space Alliance

PO Box 1715, Philadelphia, PA 19105
c/o Earl Bennett, EarlBennett@erols.com
215/633-0878 (H), 610/640-2345(W)

[http://pasa01.triipod.com/]

- **PASA regular** business luncheon/formal meeting, **1-3 pm**, the **3rd Saturday**, every month, at the New and Improved **Liberty One** food court on the second level, 16th and S. Market. Go toward the windows on the 17th street side and turn right as you enter the area near the windows. Look for table sign. Parking at Liberty One on 17th St.

Meeting Dates: DEC 20th, JAN 17th
Call Earl or Mitch 215-625-0670 to verify all meetings

- **Meeting Locations:** For December we will gather at The Philcon Science Fiction Convention at the Pennsylvania Convention Center (between 10th and 12th on Arch Street in Philadelphia) at some point. January we will meet at The New Jersey State Museum for Super Science Weekend on the 11th and 12th.This will be from 9 to 6.on Saturday and noon till 6 p.m. Sunday. We will meet on the 17th for our regular meeting at Liberty One.
- **Meeting Notes:** We had reduced attendance of our coordinators at the meeting this month due to other activities cutting into their ability to attend. This included prep. time for Philcon event(s) noted above as well as an over all dissipation of members into other activities. We have discussed a partial solution to this in the form of meeting earlier in the month (2nd week end) and on Sunday afternoon instead of Saturday. This could bring two more of our people in. The "graying" of membership also has come up and needs to be fixed. You may think of this paragraph as a note on what needs to be worked on after our elections in December. Our most active sub group, Independence Mars, (see below) is even affected. I will send a separate mailing on this general subject to our members.

Larry, our webmaster brought up new material added to our site due to our Mars Society groups participation in an event promoted by The Antique Radio Society. More on this later. He also brought up the need for net security again which led to a discussion about spam and attacks by disgruntled friends and acquaintances and hackers. Ad Aware by Lavasoft was introduced as a partial solution by me. It functions differently from virus scanners and picks up quite a bit of self installing junk.

Larry recommends deleting anything you are not sure of.

Dotti brought material from several publications including the November Smithsonian report on "celestial Sight Seeing" by Michael Benson which was a tour of the photographed solar system from a number of missions (no Pluto shots yet). Dotti also reported on Shooting in Space by astronaut/photographer Don Petit and partners on the problems of imaging from space.This from the November issue of National Geographic in a section with out page indexing. Both articles had great pictures.

Mitch Gordon brought material from several sources including a letter from Robert B. Brabham who sent us a pamphlet on our recently opened National Constitution Center. On space related material, Mitch reported on a poignant story in Ad Astra on "The Space Ships that Never Where" Unfortunately this was not a bunch of science fiction speculations but rather where the ones from the hard science (and engineering) side of the budget. From the recently deceased X-38 back past the Delta Clipper shut down back into our hope filled past. Pages 25 to 31, by Travis Kircher. Also in this issue; "My trip to Mars" at Disneyworld. which is doing great advertising for this new ,visitor participation, exhibit. It sounds like a great activity to go for. Pages 32 to 37. By Joe Marine.

Mitch also reported on the recent Lunar eclipse viewing from center city where it was clear enough to get lots of public attention. Some people are lucky! Speaking of the Moon; Mitch will be on the panel "Terraforming the Moon" at Philcon.

Earl Bennett reported on event and technical topics: the event was the previously noted Independence Mars activities as part of the Antique Radio Society memorial event commemorating the 65th anniversary broadcast of The War of the Worlds. We set up at The David Sarnoff Library which is named after the founder of R.C.A.. This event at Grovers Mill in New Jersey was staged on November 1st. Our group talked about possible real Martians (read: us) and the work of the Mars Society. This effort was interesting to several guests and may result in some new members. Gary Fisher, the President of our Mars Society chapter, and son Ben brought material for both adults and children with a multi table display for adults and the Rescue the Astronaut display for children to run Rovers on a simulated Mars surface. In audition Mtchelle Baker, Penny Glackman and her husband also helped promote the Society to this special gathering. Several of the attendees (including a retired organic chemist) stayed to learn more till we tore down. See our website for pictures from the event.

Afterwards we ate at a Chinese restaurant in celebration. Thank you Gary! I also reported on articles in **Sensors** Magazine: "Nano-technology Enabled Sensors: Possibilities, Realities and Applications" Which describes what several researchers think is possible in this feel could be possible as well as actual applications being developed for chemical and biological weapons materials and precursor sensing along with other sensing and instrumentation applications based on the ability to assemble a number of atoms in controlled ways to the capability to produce arrays of millions of sensing sites on disposable "labs on a chip" that can themselves be mass produced. One area that I am interested in is also mentioned: the application of the larger scale, "meso scale" technologies to radio frequency systems. These, unlike the Carbon Nano Tubes featured at the beginning of the report, are in the multi-micron size range and are even now in commercial products. This excellent article was produced by Sharon Smith P.H.D director of Technology for Lockheed Martin corp. and David J Nagel P.H.D. ,Research Professor at George Washington University. There is a bibliography and reference Site list for further reading. There is also an article on"Wireless Wearables" (smart space suits leading to Smart Suits for the well dressed executive?) that may be of general interest as the incorporation of technology into almost everything we come in contact with beyond Earth is an often unstated given. Several fashion designers have design technological enhancements into clothing in the past but this is more of a future investment oriented article The article was written by J. Timothy Shea and John Gordon of Venture Development Corporation. These are from the November issue of Sensors.

Also: **NASA Tech Briefs** is introducing a new publication: **Nanotech Briefs** which will be a bimonthly publication inaugurated in January 2004. See Nanotech Briefs.com for a free copy or subscription qualifications. Earl also brought a copy of **Artemis** Magazine, for Winter 2003, which included reports on The I.S.D.C held in San Jose California this yea under the auspices of the National Space Society with much material from a number of groups and individuals. One of the presenters I have reported on in the past, David Criswell, was there talking on the production of power from Lunar Power Farms (my description based on "wind farms". Lots more material with emphasis on the Moon and using its resources. Report by Arthur Smith, a director of the Moon Society as well as President of the Long Island Space Society. Also of note was an article on the X-Prize Race for the X-Prize" by Matthew Brewer that includes the background for the prize and a number of pictures of craft under development and a list of websites on these and even more flight systems being worked on for this contest. Artemis is a publication of The Lunar Resource Company and welcomes subscriptions and author submissions. See www.LRC Publications.com

Submitted by Earl Bennett

NAME _____

STREET_____

CITY/ST/ZIP_____

PHONE #S_____.

❍ **$38 NATIONAL SPACE SOC.** dues includes *Ad Astra*

❍ **$20** NSS dues if under 22 / over 64. *State age* ___

600 Pennsylvania Ave SE #201, Washington DC 20003

Join **The Moon Society** - dues address on page 7

- **For members residing in the U.S & Canada:**
  Printed **MMM** delivered by postal mail: **$35**
  Electronic (pdf) **MMM** available on website: **$35**
- **For members residing in other locations:**
  Printed **MMM** delivered by postal mail: **$60**
  Electronic (pdf) **MMM** available on website: **$35**
- **Students/Seniors** Electonic (pdf) **MMM** on website: **$20**

INDEX to # 171 DECEMBER 2003

Member Dues -- MMM/MMR Subscriptions:

Send proper dues to address in chapter news section

=>for those outside participating chapter areas <=

❍ $18 Individual Subscriptions to MMM/MMR: Outside North America ❍ $50 Surface Mail -- Payable to "LRS", PO Box 2102, Milwaukee WI 53201

CHICAGO SPACE FRONTIER L5

❍ $15 annual dues

LUNAR RECLAMATION SOC. (NSS-Milwaukee)

❍ $18 reg. ❍ $24 family ❍ $15 student/senior

MINNESOTA SPACE FRONTIER SOCIETY

❍ $25 Regular Dues

OREGON L5 SOCIETY

❍ $25 for all members

O.A.S.I.S. L5 (Los Angeles)

❍ $25 regular dues with MMM

PHILADELPHIA AREA SPACE ALLIANCE

❍ Annual dues for all with MMM $20, due in March or $5 times each quarter before the next March

SHEBOYGAN SPACE SOCIETY (WI)

❍ $15 regular, ❍ $10 student, ❍ $1/extra family memb "SSS" c/o B. P. Knier, 22608 County Line Rd, Elkhart Lake WI 53020

Moon Miners' MANIFESTO

Lunar Reclamation Society Inc.
PO Box 2102, Milwaukee WI 53201-2102.

==> *Mail Carrier, Time Sensitive Material* <==

Non-Profit Org.
U.S. Postage Paid
Milwaukee, WI
Permit No. 3532