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

Moon Miners' Manifesto

& Moon Society Journal

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In FOCUS: Close Encounter of the Red Kind – Mars!

August 28, 2003, Mars will be the closest to Earth in 50,000 years. 34,650,000 miles (145 times the mean distance of the Moon.) It won't get this close again for thousands of years to come. In comparison, Mars was 65 million miles from Earth in the February 1995 opposition.

For observers in general as well as for us space enthusiasts in particular, fair skies permitting, this could be an exciting event. Not to worry if on the appointed day, your location is lost in the clouds. Mars will be well placed for days (and even weeks) before and after the event. So if you want to have a look, you will get a chance.

At opposition, Mars will have an apparent diameter of 24 arc seconds, about 1/75th the apparent size of the Moon. But that means that through binoculars or telescope with a 75 power eyepiece, Mars will look as big as the Moon does to the naked eye. You'll see an orange disk and a white polar cap, but not much more without a good instrument.

The timing could not be more fortuitous. The Mars Society, The Planetary Society, and The National Space Society will all be making the most of the occasion to boost interest in Mars Exploration and space in general. Several Mars probes are en route. Two prototype "Mars Habitats" are in place in the Canadian Arctic and the Utah desert with simulation exercises underway amidst steady publicity.

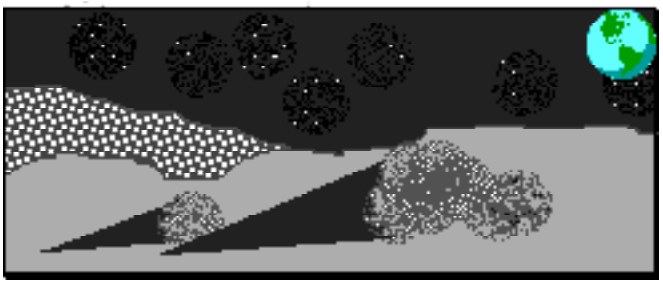
Best observing is from 10 PM to 2 AM on August 26th, 27th, 28th. Good observing from July 27th to Sept 27th.

Mars will not be the only beneficiary of all this attention. People looking through a telescope for the first time will also take a look at the Moon (half moon a week after opposition will be especially favorable) and see much more astounding detail. After the event is over, "out of sight, out of mind," Mars will be easily forgotten. But not the Moon, whose presence in the skies needs no hype. To the naked eye, Mars even at best is but a bright point of light. But the Moon is clearly a "world." To a lesser extent, Jupiter and its 4 major moons, Europa in particular, will also receive attention.

To be sure, much of this increased interest in Mars, the Moon, and even Europa, will be purely "astronomical," a matter of satisfying intellectual curiosity. Only some will be motivated to show greater support for space exploration. Mars will sow seeds. It is up to us space society members, to reap the harvest. [➪ p. 2, col. 2]

Nightspan Life – Out on the Surface!

"It was the nights before sunrise, and all through the town, moon folk kept cozy and busy deep down. But out on the surface, not a creature was stirring, not even a miner." Not! As forbiding as it may seem to be out on the surface during nighspan, some Lunans will venture out there for work, others for play and recreation. It's all part of learning to be at home. See pages 4-8..



Moon Miners' Manifesto

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• **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

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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.

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fi IN FOCUS Editorial continued from p. 1.

For those of us interested in Mars Exploration, and establishment of a permanent outpost possibly leading to settlement, this opposition, and the landings of the probes and rovers now en route to Mars, will be a prime opportunity to state our case to anyone suddenly more attentive. Many new supporters prove to be easily discouraged, unrealistically expecting immediate results. We need to be realistic in our promotion of government or international efforts to explore and open Mars. The economies of the world remain in a shambles, with little reason for optimism. Yet the technological barriers to Mars exploration, even by humans, are steadily falling.

For those of us also, or more, interested in the exploration of the Moon and the establishment of a permanent human presence there, the going would seem easier. The Moon is a regular and self-advertising presence in the skies, daytime as well as nighttime. Yet this can work both ways, for "familiarity breeds contempt."

As for obstacles, we do not need, nor would we be wise to pursue, government tax-funded programs to further our goals. NASA *does* seem interested in a farside sample return mission (we *haven't* been there, *haven't* done that!) and may someday be tasked with setting up optical and/or radio telescopes on the Moon. Beyond that, private enterprise, whether in pursuit of resources or the ultimate in tourist experiences (and probably both in a step by step combination) seems the better route to pursue and support.

Only those Moon and Mars supporters who have yet to realize that last point see the Moon and Mars as an either/or question. For those of us who see the enterprise route as eminently pursuable, there is no need to choose. Any attention given Mars by governments and government agencies is to our benefit. There are many technologies needed to open either that are needed to open both. And someday, both human worlds will be part of a triangle of trade with the homeworld, to the great advantage for all three. For a graphic of Earth-Moon-Mars Trade possibilities, download the pdf file SystemTradeRoutesTP.pdf from the directory http://nsschapters.org/hub/pdf/

We can only hope that some of our youth not preoccupied with the usual self-indulgent distractions will be motivated by this splendid Mars opposition to join and support our space societies and projects. All of our societies are "graying." The Planetary Society, National Space Society, Mars Society, and Moon Society memberships are growing steadily older. New younger members are not joining in numbers needed to replace them. This is a problem for all volunteer organizations.

Meanwhile, find yourself a pair of binoculars or small telescope or hook up with a local astronomical society so you can have a peek at Mars as it will never again appear in our lifetimes.

For more information, do an internet search for "Mars Opposition 2003." *Engage!* PK

Frog and Hostel

Part III

The Hostel's Role in the Division of Labor

© 2003. J. Craig Beasley < bginstitute@ev1.net >

The Hostel: Provisioning the Lunar Log Cabin

In writing the Frog and Hostel (F&H) paper [1] for ISDC '91, Peter Kokh had four principal objectives:

1. Define the logical division of functions between the visiting vehicle and shelter, and how these differ with the particular purpose of the hostel and the prospects for its future.
2. Define design constraints on the visiting vehicle. Co-designing this vehicle will be necessary if the potential of the hostel approach is to be realized.
3. Outline logical paths of evolution towards stand alone status for the Hostel.
4. Examine possible architectures, whether for pre-fabrication on Earth or for construction on the Moon using native materials.

This is one of the things that is the most attractive about the F&H method, its pre-planned evolutionary configuration. It meets the need of true habitation of a frontier as it is transformed it to fit the environment. The technical key for this approach, in my opinion, is to keep the expansion and reconfiguration of the system as open as possible. This means designing the structure and geometry of both halves of the system to accept "black boxes" of generic size, shape, and mass, at least as much as possible.

For the moment we'll focus on the Hostel Division of Labor, which could be considered the second half of the first objective.

HOSTEL Division of Labor [See Box at end of this article for items detqiled in original paper]

At first, the triple stack SpaceHab Moonbase [2] would house space-intensive functions, such as:

1. **"Bedrooms" with Personal Computer Networking.**

Certainly, the bedrooms would be merely curtained or portable wall sections of the Hostel, to allow for some small measure of privacy. In a space as small as a Hostel struc-ture, any concessions to privacy may be considered frivo-lous luxuries. However, even a small allowance of personal space may go a long way into taking care of the psycholo-gical needs of the crew during a four-week stay.

Personal terminals would connect in these bunking spaces, linked to the computing hardware in the office and multi-media library areas of the Hostel. Given the ample multi-tasking capabilities and relatively low mass of today's computers, there should be no reason to have separate computing facilities in the Hostel.

2. **Lounge/Dining "Ward Room"**

As important as privacy may be to the individual crewmembers, the flip side will be the avoidance of loneliness and disconnection. A common meeting area will minimize the impact of this flip side. The Ward Room would be near the available galley, and would consist of comfortable but practical seating around a worktable and a display device for computing and commu-nication. This arrangement would allow for teleconferen-cing and recreation at the display center, and would be a common area for group meals and discussion.

3. **Exercise Room**

Since the cislunar transit portions of the mission will be very short, it's unnecessary to have exercise facilities in the Frog, but the much longer stay on the surface lends exercise a much higher importance. A simple stationary bicycle or treadmill and a resistance training system would appropriately be located in the Hostel.

4. **Project workstations**

A set of dedicated work areas with will be vital for projects during the missions. Each workstation would provide a stable working surface to perform repairs, build experimental apparatus, and study samples of lunar materials. Storage areas would also be included for the sorting and protecting of items in work. These work stations could be a set of enclosed secure cabinets with a fold-down worktable at each location.

5. Panoramic visual access to the outside.

If this is not in the original landing stack, then it will become a priority for subsequent havens planted on the moon. Depending on how the Hostel is oriented on the lunar surface, the windows already built into the SpaceHab modules would serve this purpose. Of course, the dream is to build the Lunar Hilton with expansive windows overlooking the magnificent desola-tion lunar terrain, but that will be for another time.

6. **A robust shield hangar and habitat cover.**

This substruc-ture item could be stowed inside the Hostel for later external deployment, in sections easily snapped together during an EVA, once the Hostel is anchored to its site. This would provide an excellent storage shed for equipment and materials that would otherwise clutter and contaminate the habitat, such as rover vehicles, earth moving tools, and geological bulk samples.

If plans for expansion are included, the hostel could be designed for the mounting of additional structures [3], allowing a broader network of structural anchors for a new colony's "downtown district".

** Of course, all of these ideas are coming from the brain of this writer (J. Craig Beasley,) and are by no means the end-all of the provisioning tasks for the Frog-and-Hostel system. As always, I remind readers that comments are

highly encouraged in this quest to optimize the F&H system. The architecture of the whole F&H concept is in many ways a study of a process, not merely the design two vehicles. Each half of the system will shift and change as the needs of the colony mission change, which is as it should be. Living and working on the Moon will require human, and hardware, flexibility.

NEXT – The Frog and Hostel Over Time: Give and Take

EDITOR'S FOOTNOTES:

[1] **The Lunar "Hostel:" An Alternate Concept for First Beachhead and Secondary Outposts.** Peter Kokh, Douglas Armstrong, Mark R. Kaehny, and Joseph Suszynski
© 1991 The Lunar Reclamation Society, Inc.
http://www.lunar-reclamation.org/hostels_paper1.htm
This paper was published in its entirety in **The Proceedings of the 10th Annual International Space Development Conference, San Antonio, TX, May 22–27 1991,** pp. 75-92.
ISBN 0-912183-05-5 Univelt, Inc. San Diego, CA

[2] The original paper described several suitable "big dumb volume" architectures that could fly compacted in one Space Shuttle payload. The hybrid rigid-inflatable "donut" design that may have inspired NASA's TransHab was one of these, and the one favored by the authors.

[3] As the "donut" alias "moonbagel" (and TransHab inspiring) architecture has a circular "footprint", two additional "docking ports" at 120° apart would enable adding additional similar units on a hex-grid pattern.

From the original paper,online at:
www.lunar-reclamation.org/hostels_paper1.htm

Initial Hostel (Big Dumb Volume) Functions

- Bedrooms, Lounge, Office, Chapel, etc.
- Main antenna, possible ham equipment
- Personal computers in quarters
- Main power generation equipment
- Surplus compressed H2, O2
- Departure dehumidify/bake cycle
- Main radiator bank
- Open-vac rover
- (no initial plumbing, drainage) Plumingless toilets, waste banking
- Laundry drying
- Main dining area, all meals
- Pantry for standby rations, snack bar
- Infirmary space (future diagnostic/major procedures)
- Dry space-needing workstations
- Sample sorting, display,storage
- Panoramic exterior visual access
- Interior solar access, heliostat
- Space-needing exercise area
- Bedroom consoles, lounge console
- Accumulating library, collections

Mare Frigoris Base Site Looking Better:

Ice at the Moon's Poles Extends to Lower Latitudes than Expected

"Craters as far as 20° away from a pole still have significant amounts (22-27%) [of] permanent shadow."

Source: **"The Moon's Dark Icy Poles"**
www.psrd.hawaii.edu/June03/lunarShadows.html

Quotes from the report

"Especially at lower latitudes (down to70°), larger craters have slightly more relative permanent shadow than smaller craters. Craters nearer a pole (see the 90° red line) contain a larger percentage of shadow than craters at 70°. But more than crater size, they found that latitude is the dominant parameter affecting the amount of permanent shadow in a simple crater. Craters as far as 20° [377 mi. = 607 km] away from a pole still have significant amounts (22% to 27%) permanent shadow.

"Illumination of a 20-km-diameter (32 mi) crater was simulated for winter, equinox, and summer days. The amount of permanent shadow inside the crater corresponds to the value for a day in summers. Armed with these simulation results, a "permanent darkness" equation can be deduced that yields shadow amounts as a function of latitude and crater size.

"Their next step was to examine images of the Moon and identify all the fresh looking simple craters larger than 1 km (5/8ths mi.) within 12° (227 mi. = 365 km) of each pole. By measuring the diameters of these craters and using the "permanent darkness" equation they calculated the amount of permanent shadow. "

Original Reference: Bussey, D.B.J., Lucey, P.G., Steutel, D., Robinson, M.S., Spudis, P.D., Edwards, K.D. (2003) Permanent shadow in simple craters near the lunar poles, Geophysical Research Letters, v. 30(6), 1278, doi: 10.1029/2002GL016180.

Implications for siting of a permanent lunar settlement – Ed.

While everyone else strongly supports a South Polar site because of its unique Mt. Malapert "the Peak of Eternal Light" (in the light only 87% of the time, and not at the same part of the peak; rugged terrain, ultra-long ever-changing shadows, very remote from nearest mare areas - all very serious drawbacks in our opinion) we continue to favor a northern site, along the N coast of Mare Frigoris.

Now we feel even stronger in this conviction, as this study points to several craters near the Frigoris north shore that should have ample ice reserves, less than a 10th as far away as is Mt. Malapert from the nearest southern mare shore. For industrial purposes a highland/mare shore site is ideal, and anything else risks being an assured dead end, including Mt. Malapert at the South Pole. **‹ PK ›**

Night Shadows

by Peter Kokh

On the cloudless, airless Moon, the Sun shines with full industrial strength brilliance. And without an atmosphere to scatter light everywhere, any shadows are ink black. Unless there is sunlight bouncing off a nearby rock or ridge, it is of little use trying to peer into them to catch a hint of what lies hidden there.

But the nightspan moonscapes are hardly a total extension of these black lightless pools. When the sun is up, the glare is so bright, that it is difficult to pick out the stars in the black skies. But as the sun sets, the other lights in the heavens come out to play, with a steady intensity never seen on Earth.

On Earth, the stars are not bright enough to cast shadows detectable by the human eye. And when the Moon is up, it's much greater brilliance rules. The Moon does cast shadows on Earth. Indeed, one can read a book by the light of the full Moon.

Nearside Nights on the Moon

Back to the Moon. It's "nearside" is always turned towards Earth and so the Earth is always in the nearside skies - with three and a half time's the apparent diameter, covering thirteen times as much sky, and, thanks to clouds, snow and ice, shining, phase for phase, with sixty times the brilliance. On Nearside nights, Earth-cast shadows will be pronounced and you will be able to see the unshadowed moonscapes quite well. The apparent diameter of the Earth being nearly four times as great as that of the Sun, the edges of shadows cast by Earth will be considerably less sharp than those cast by the Moon.

Farside Nights on the Moon

Between Nearside and Farside, there is a 14 degree slice (the limbs) which alternately wobbles into and out of view of Earth. But in Farside proper, Earth is never above the horizon. So when the sun is down there are just unimaginable myriads of stars. The brightest "objects" will be the planet Venus, and Jupiter as a poor second, and Mars when its orbit brings it close to Earth. In the cloudfree, haze-free, airless nightspan skies could Venus cast shadows?

Possibly, but there is something else to consider. In the Farside, the Milky Way band of light circling the heavens, our own galactic disk seen edge on from our inside vantage point, will shine with an "experience of a lifetime" splendor, drawing many tourists from Earth. Will the billions of stars in its clouds and swarms of this horizon to horizon stretching band tend to wash out any shadows cast by Venus? I wouldn't know how to calculate the Milky Way's aggregate apparent magnitude, But it would seem that the Farside moonscapes would be clearly but faintly visible in this symphony of lights, but vastly darker than Earthlit nearside terrain. Nightspans on Nearside and Farside will bear no comparison to one another. **<MMM>**

Out-vac Nightspan Life on the Moon

by Peter Kokh

As the Sun Slowly Sets

For the previous two weeks, the unlikely pockets of humanity on the Moon will have been beehives of activity, making use of the Sun's heat, its life-giving rays, and its electrical generating potential, to work through the more energy intensive portion of the long list of tasks needed to keep the community going. All the while they will also be exercising the habit of "energy husbandry" to convert excess solar into reserves of potential energy to be tapped during nightspan. Even so, total available on-line power will drop markedly as the Sun finally reaches the west horizon.

Finally, the great solar furnaces and turbines will be shut down and the activities they support will stop. Those industries that depend indirectly on abundant electricity generated by solar arrays must likewise phase down. For whether supplied by standby nukes, fuel cells, spinners, or closed loop hydroelectric systems, the total amount of on-line electrical power will be likely be appreciably reduced for the fortnight to come. Industry after industry will switch gears, taking up now those more labor-intensive tasks strategically postponed during dayspan. The Sun will next rise in 354.367 hrs or 14.7653 days.

For many industries the emphasis will shift to maintenance, repairs, and changeout of equipment. For many workers, it will be rather like switching jobs every two weeks. And perhaps that will be a welcome break in the routine, an anticipated periodic shot in the arm, essential in sustaining personal and communal morale.

Workers who by dayspan crew industries that do not have a proportionate list of postponable energy-light labor-heavy tasks to keep them busy during nightspan, might shift to quite different company co-owned ventures that are task-lopsided the other way. Among those will be some surface activities that require little energy and a minimum of light.

The Sun now set, Lunans, temporary personnel and permanent settlers alike, may have more scheduled leisure time. Some of them may want to spend a portion of that time on the surface. Probably, most will not. Out-vac spaces in and around the settlement that were scenes of moderate to busy activity during dayspan will seem eerily quiet, like our own urban cities and towns in the wee hours before the first rush of morning traffic. To us early birds, the world suddenly appears quiet, especially friendly, all our own. It may be so for those who relish venturing onton the surface after the long sundown (the sun will take 30 times as long to set on the Moon as it does on Earth.)

Sulfur lamps will provide a minimum of lighting, much as standby emergency lighting does in our factories and office buildings during a power outage. Just enough to find your way, not enough to work by.

Nightspan Out–vac Activities

On the Moon, the nightspan is 14.75 days long, 30 times as long as an average terrestrial night. Sunshine is the principal readily tappable local source of energy on the Moon. Its unavailability during nightspan makes the Moon a forbidding place to many people with low pioneer spirit quotients [PSQ]. In every frontier of the past, pioneers found themselves challenged by the unavailability of various things they had taken for granted "back home." Those who survived, did so by turning to their inner resourcefulness; they "found" ways, not just to make do, but to thrive. Lunan pioneers with the right stuff will learn not to fear the night, but to love it and cherish is as an equal movement in life's rhythms.

We will not earn the right to say we have a permanent human presence on the Moon until we have learned how to enjoy and relish what most Earthfolk would fear. We have to take back the lunar nightspan from the dread bogeyman of the energy desert that will test our metal.

It's all about learning to live on the Moon, on the Moon's own terms. On Luna, do as the Lunans do! On Earth we have many examples in Nature of plants and animals who have seasonal changing rhythms: squirrels, birds, bears, the list goes on and on. Their daily rhythms adjust to someimes drastic changes in the environment.

Out–vac Nightspan Jobs

The various items of equipment needed to convert excess solar energy into potential energy that can be tapped at night will need maintenance from time to time, and nightspan is the ideal time to give these chores full attention. The same goes for mining equipment and any machinery used in processing and manufacturing that is situated out on the surface, exposed to vacuum.

Other Nightspan Out-vac jobs may include surface warehousing, tending observatories and other scientific installations, and jobs involved in transportation and shipping. Field work such as surveying, road construction, and prospecting will largely cease. An exception may be blacklight prospecting, in the earthlight shadows, *if* the use of ultraviolet lamps proves to be useful in detecting certain desireable minerals.

Nightspan Recreation

An all-bases-covered strategy for squirreling away enough sun-derived power to allow the settlement to keep productively busy with energy-light and labor-intensive tasks during nightspan is not our topic, and had been covered elsewhere [MMM #90 p. # NOV '95 pp. 7-8 "OVERNIGHTING: Consumating the Marriage of Moon & Base."] Most pioneers will find ways to keep busy in this fashion in the private and common (middoor) settlement spaces below the regolith blanket that shields them from the cosmic elements. But others, like night-active animal species on Earth, may look forward to a chance to "go out and play" (or work!) with the Sun safely below the horizon, unafraid to deal with the Moon as it is.

Even if UV "blacklight" lamps prove to be of little or no use in prospecting, amateur rock collectors may find them useful in searching earthlight shadows for "pretty" rocks, especially in locations closer to the limbs where, the Earth hangs lower in the sky and earthlight shadows will be longer. For Farside settlers and persons on tours of duty, it may be considerably more popular, given the total absence of earthlight. This hobby activity would be moderately expensive - spacesuits must be purchased or rented.

Even at night on Nearside, a dazzingly brilliant Earth always in the sky, there will be shadows. Possibly a game of shadow hide and seek would enjoy some popularity. Others will simply enjoy cruising the earthlit moonscapes, finding in them a beauty absent in the glare of the untempered sun. (The light of the Full Earth will be eighty-some times as bright as the Full Moon we enjoy.) Tourist excursions may take coachloads of pioneers out onto the roads surrounding the settlement for just such enjoyment. There may be a Sunrise/Sunset Chasers Club in which people travel to see the sun rise or set from spectacular locations such as crater rims. There mal be motoring clubs for those who enjoy nightspan road rallyes. Some may prefer to ride in spacesuits in open-vac rovers or ATVs. IR night vision goggles may be common equipment.

Will pursuit of amateur astronomy take settlement dwellers and others stationed on the Moon out on to the surface? Peering through an eyepiece while wearing a helmet would seem to be discouragingly cumbersome, so it seems more likely that ways will be found to bring star and planet images safely indoors without loss of quality so that they can be studied and observed in shirtsleeve comfort. And for this activity, whether it is dayspan or nightspan will make no big difference as telescopes can be designed to baffle out the Sun's glare, exposing black heavens.

As settlers become more at home ...

For many persons living in sunnier, warmer climes, the idea of outdoor winter sports (here on Earth) seems forbidding, something to watch on TV from the snug safety of comfortably warm indoor lairs. Even for many more hardy northerners, winter sports are for kids and others. But there are a surprising number who have learned to enjoy winter, even look forward to it. Not just the beauty of fresh-fallen snow, but for the thrills of skiing, tobogganing, skating, snowmobiling, etc.

On the Moon, perhaps most settlers will be quite content to find nightspan diversions and recreation safe inside their comfortable regolith-shielded homesteads and middoor spaces. But their will be some who will make a point of venturing out-vac, even during nightspan, and finding ways to enjoy themselves. The challenge alone will beacon them. Perhaps you will be one of these. **< MMM >**

A Word about Nightspan Moonsuits

Spacesuits designed for EVA in Earth Orbit (Shuttle and Space Station activities) are designed to walk a tightrope between searing sunlight and the intenesly deep cold of space while in the shadow of the Earth. Typically, an astronaut space-walker will be in sunlight about an hour give or take, then in shadow for a similar length of time, back in sunlight (depending on the height of the orbit), back in shadow, etc.

In contrast, the Apollo moonsuits were designed for midmorning lighting conditions on the Moon. [MMM # 90 NOV 1995, p 7. OVERNIGHTING on the Moon, P. Kokh] It was never NASA's intention to have personnel on the Moon in midday or afternoon high heat conditions, much less at anytime between sunset. and sunrise!

Now there will always be some demand for "wear anytime" moonsuits. But for many dayspan only or nightspan only users, suits maximized either for heat rejection (day suit) or for heat retention (night suit) will provide superior performance and comfort.

We have written previously about the need to face head on the midday lunar heat. [MMM # 115 MAY. '98 p 8. "HIGH NOON: Coping with Dayspan Heat," P. Kokh} After all, what kind of economy could we have if we confined our surface activities (prospecting, settlement and road construction, mining, exporting and importing, etc.) to a few days early in the two-week long dayspan? Similarly, what kind of an economy could we build if no one dared venture out on the surface during the equally long nightspan?

We do not pretend to know how to maximize a suit for heat retention. But the problem is much simpler than it would be if there were somewhere on Earth equally cold conditions, <-200° F = < -90° C, and colder yet for those working in permanently dark lavatubes or polar craters, - 315° F = -193° C, = 80° K. Why? On Earth the dominant chilling force is convection, heat carried off by the air and wind. On the airless, windless Moon we have heat loss only by radiation to cold surfaces and the near absolute zero cold of space itself. (Ignoring convection losses through the soles of moonboots, of course.) An inward-facing silver lining would work to retain body heat.

Have such suits been developed? It would seem unlikely, there never having been a planned need for them. But there seems no need to fear the cold of night, even if our not-so-well prepared astronauts have reported feeling the "bone-chilling cold of space" while engaged in EVA in the shadow of Earth while working on the Station, Hubble, or other piece of hardware.

Read also this previous article:

• MMM # 151 DEC. 2001, p 3. Engaging the Surface with MOON SUITS instead of Spacesuits, P. Kokh

Around the Campfire

Since time immemorial, ever since the taming of fire, we have found warmth, comfort, and company huddled around campfires and hearths. The fireside has been the most social of places, the place where stories were told, myths and legends learned, mighty feats planned, and dreams made. It is the "hearth" that has been the tradi-tional "soul" of the home. In some languages "hearth" and "home" are one word. Nestling around the fire is something we all enjoy. But however infrequently enjoyed, the magic of the controlled fire is universally so positive an uplift that it is possible to wonder: "can it be humanity if there is no campfire?"

Yet on worlds without oxygen-sweetened atmospheres such as the Moon, open fire is not possible. We'll have to huddle within the very limited atmospherules of mini biospheres in which open fire cannot be tolerated.

Yet this gloomy verdict may only apply to fires in which the combustion products are smoke and toxic gasses. For Out-Vac campsites, it should be possible to devise a tightly confined hearth stand in that slowly feeds together pure hydrogen and oxygen. With burning confined to a nitrogen-free chamber, the only combustion product would be steam, pure water, usable for drinking or other purposes. What we are talking about is a modified fuel cell, in which the (2)H2 + O2 = (2)H2O reaction is run somewhat faster, not so fast as to be explosive, but fast enough to sustain a flame, perhaps with a harmless enough additive (if one can be found!) to colorize the normally invisible H+O fire.

I'd be surprised if such a device now exists, or a market for it - not back here on the open air, open sky Earth. But out on alien shores, a flame-in-a-jar contraption might create enough symbolic warmth and cheer to become commonplace. For the wanderlust-driven, owning such a pocket hearth could be a real psychological enabler. See the ad in the employment wanted section: "Have fire chamber, will travel - anywhere!

* The above is an edited and abridged version of an article that appeared in MMM # 52 FEB '92, p 6. The FIRESIDE, P.Kokh. Also published in MSFire Fanzine, Vol. 2 #5/6, Fall 1996, online at: www.uwm.edu/~schamber/MSFS/MSFire/Vol2No5-6/fireside.html

Relevant Readings from MMM back issues

MMM # 7, JUL '87, "POWERCO"
MMM # 31, DEC '89, pp. 3-5, "Ventures of the Rille People" (Prinzton design study), V. * Multiple Energy Sources.
MMM # 43, MAR '91, pp. 4-5. "NIGHTSPAN"
MMM # 90, NOV '95 pp. 7-8 "OVERNIGHTING: Consumating the Marriage of Moon & Base"

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http://www.moonsociety.org

Please make NEWS submissions to
David Wetnight at newsmonger@asi.org
Other submissions: 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 explor-ation 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®**

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Questions? email: membership@asi.org

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

- Artemis Reference Mission
- Artemis Data Book

Project LETO™

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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

Moon Society PO Box 940825 Plano, TX 75094-0825
August 1, 2003

Moon Society Ellections 2003

Dear Moon Society member,

It is time for the annual election of officers and directors in the Moon Society. This election is being conducted by both email and paper mail ballots. You may vote either way. The Board of directors has set October 1, 2003 as the date by which ballots must be received by the Moon Society.

There will be three directors elected this year to maintain the board at a total of seven. Officers whose terms expire this year are Vice-President and Secretary. All offices are for two year terms. A separate action of the board waived Article V.3.b of the bylaws to allow John R. Schrock to run for the Board.

Each candidate that gave us an electoral statement has this statement included at the end of the ballot. Please consult these statements for guidance in voting.

This is a preferential ballot. Indicate your preference with numbers, 1 being your first choice, 2 your second, and so on using the form on the reverse side. Do not skip or duplicate any numbers. If you prefer, you can stop voting before you have reached the total number of candidates for any one office. If you do so, and during the counting that point in your ballot is reached, your ballot will be counted as "no preference" for that position.

Please email your completed ballot to the Moon to the elections email address: elections@moonsociety.org or mail it to the paper mail address above by October 1, 2003.

If you vote by email, remember to include your membership number. We will be sending an email ballot out to all current Moon Society members with valid email addresses on file.

Moon Society Officers vote

Vice-President - Only one nomination was received
[ ] David Wetnight # 627 (incumbent)
[ ] write in candidate _____ #_____
Secretary - Only one nomination was received
[ ] Amy McGovern # 647 (incumbent)
[ ] write in candidate _____ #_____

Board of Directors Vote

Four Nominations received for 3 slots
Place 1 - 4 beside each name (in order of preference)
[ ] Dana Carson # 10 (incumbent)
[ ] Ian Randal Strock # 27 (incumbent)
[ ] Randall Severy # 125 (incumbent chair of board)
[ ] John R. Schrock # 1178
[ ] write in candidate _____ #_____

_____ #_____
Voter's Signature Membership #

Candidate Statements:

David Wetnight # 627 (incumbent vice-president)

"I would like to continue to work for the Moon Society in office of the Vice-President, and to devote my available time and energy to the needs of the society."

Amy McGovern # 647 (incumbent secretry)

"I am a senior postdoctoral research associate at the University of Massachusetts Amherst. My research interests include artificial intelligence, machine learning, with a particular interest in autonomous robotics as related to space exploration. I have been the Moon Society secretary for 2 years and would like to continue to help the Moon Society advance its goals of enabling space exploration and lunar habitats. For more information on my work, please see: <http://www-anw.cs.umass.edu/~amy/>"

Dana Carson # 10 (incumbent director)

"I'm a computer consultant dealing in web based systems. Previously I worked for Westinghouse Aerospace building tools for the embedded systems developers. I've been a space enthusiast since Apollo and have been on the board of the Moon Society since its founding"

Ian Randal Strock # 27 (incumbent director)

"I'm one of the founders of the Artemis Project, and completely involved in it. I've been serving as Director of Publicity and Communications, talking with the media and finding more opportunities to tell the world of our activities. I'm happy to continue serving as a Director of the Moon Society, and appreciate your vote."

Ian Randal Strock is the editor and publisher of **Artemis** Magazine: Science and Fiction for a Space-Faring Age. Previously, associate editor of **Analog** and **Asimov's** science fiction magazines. He is a writer of fiction, nonfiction, puzzles, and opinion whose work has appeared in Analog, The New York Times, Games Magazine, Absolute Magnitude, Mercury, and many others. To support his Artemis Project involvement, he spends his days as a stock trader. Context, in Columbus, Ohio, 3-5 October will be his first science fiction convention as Editor Guest of Honor.

Randall Severy # 125 (incumbent director, chair of board)

"In several leadership roles in Artemis Society International since late 1995, I have worked hard to help build the society into an effective world-wide organization. When the Moon Society was founded, I joined the board of the new organization to continue that effort. I also founded CyberTeams, one of the early program participants in the Artemis Project. To help other program participants get started and develop, I formed the Artemis Project Business Team. If re-elected to the Board, I will continue to devote my time to growing the organization and supporting projects launched by the Moon Society..

John R. Schrock # 1178

"I am running for one of the Moon Society Director positions. I have worked this last year to create our web site's new front page, and helping with our Help Director answering Society e-mail. As a builder, contractor, and salesman in the lumber business, I have strengths in getting material and people in the right place and at the right time. I believe very much in the Space Settlement Initiative, and plan on helping get a full size model of the Artemis Moonbase™ going in the near future."

Artemis Project™ Business Plan & Spin-up Business Opportunities

by Peter Kokh

The "soul & inspiration" of the Artemis Project™is the conviction that private enterprise can find a way (or combination of ways) to put a permanent manned outpost on the Moon on the back of profitable endeavors. While entertainment revenue sources may have been the original thought, we've always been open to complimentary sources.

——————— Online Reading on This Topic ———————

- **About ASI** - MMM #90
  www.asi.org/adb/06/09/03/02/090/about-project.html
- **Road to Space: Going Back with Entertainment Dollars** - MMM #88
  www.asi.org/adb/06/09/03/02/088/investment-return.html
- **Moonbase Brainstorming Workshop** - MMM #91
  www.asi.org/adb/06/09/03/02/091/workshop.html
- **"As long as we're here...": Secondary Profit Generators for Moon & Mars Bases** – www.OregonL5.org/l5sr02d.html

The above Oregon L5 paper is must reading for anyone interested in the for-profit road to Lunar Settlement. Download it and put it in your Library! Let it inspire you to brainstorm additional opportunities.

Below is a new suggestion from Robert P. Moore, 20579 E CR. 160, Altus OK 73621. The beauty of it is that it falls in the category of "spin-up" business plans, things which can be started up here and now, for profits here and now, which will be of great help once we'reon the Moon.

Lunar Ark suggestion.

We need an "Ark" situation where human DNA is offered as BACKUP for the race. A marketable condition exists. Do it here and now with intents to locate to the Moon when possible. There are many people that have no biological heirs that would pay to have their DNA preserved against the time when the catastrophic asteroid hits or atomic war, etc. All seeds and species and ecosphere need BACKUP. Moral issue of actual use is bypassed since "use" is to save "all" biosphere ONLY in case of total destruction against a far future time. **‹ RPM ›**

Mail for MSJ

Higher Res. Edition of Consolidated Lunar Atlas

from Eric Douglass < ejdftd@mindspring.com > July 15, 2003

I have done considerable work with the Consolidated Lunar Atlas, and the Lunar and Planetary Institute site had posted this project at their web site. Well, when I did my original digitalization of this work, I was using a 1.3 megapixel camera....which in its day was pretty hot stuff. But the digital cameras have increased the size of their chips considerable, and so I recently finished re-digitalizing the CLA with a 5 megapixel camera.

The LPI has now replaced my old project with this new one...only now the images are of much higher resolution, and so will stand up to considerably more manipulaation with you photography programs. Further, this time I not only imaged the entire photograph (called 'Hi-resolution Tiff, Full Frame), but then imaged just the central section of the image with the camera (called 'Hi-resolution Tiff, Close-up). These files are compressed with a lossless compression scheme (LZW compression) so that the file sizes are around 3 megabites.

The new images are at the old URL:
http://cass.jsc.nasa.gov/pub/research/cla/index.shtml

In addition, the LPI is planning on releasing the entire project on a 2 CD rom set later this year.

Eric Douglas,
American Lunar Society
http://otterdad.dynip.com/als/

"A *true* flags-and-footprints mission"

From Kaido Kert < kaido.kert@it.ee >

I just thought of a fun lunar lander project. Put together a robot that can draw footprints into the sand, given a proper jpg (or better, SVG) file. Then put up a website where people can order _their_ footprints to be reproduced on the moon and order a print, say for a $100 a print or so.

For limited quantities and $10,000 a piece, we could first plant all sorts of flags too ;)

A _true_ flags-and-footprints mission, is it not ?

Kert

COMMENT (on the Footprints idea only): Sounds like a great idea, Kert. Homework: (1) brainstorm the apparatus necessary (lowest mass, compact size, minimum power, etc.) as this will determine cost of mission to be recovered with profit from sales. (2) Price structure. - **PK**

NASA Notice of Prospective Patent License: Bigelow Development Aerospace Division, LLC

[www.spaceref.com/news/viewsr.html?pid=9731]

[Notice (03-079)] SUMMARY: NASA hereby gives notice that Bigelow Development Aerospace Division, LLC, having offices in Las Vegas, Nevada, has applied for an exclusive license to practice the inventions described and claimed in U.S. Patent No. 6,231,010, entitled ``Advanced Structural and Inflatable Hybrid Spacecraft Module,'' and U.S. Patent No. 6,547,189, entitled ``Inflatable Vessel and Method.'' Each of the above-listed patents is assigned to the United States of America as represented by the Administrator of the National Aeronautics and Space Administration.

Written objections to the prospective grant of a license should be sent to the Johnson Space Center. NASA has not yet made a determination to grant the requested license and may deny the requested license even if no objections are submitted within the comment period.

FOR FURTHER INFORMATION CONTACT: James Cate, Patent Attorney, NASA Johnson Space Center, Mail Stop HA, Houston, TX 77058-8452; telephone (281) 483-1001.

COMMENTS:

Greg Bennett < asi.org > This is really something I don't understand. Why would, and how could, the government grant an exclusive license to build inflatable space station modules?

Arthur P. Smith < apsmith@aps.org > Well, patents aren't anything new - my question would be why does NASA hold any patents? But I guess that's normal procedure for government agencies these days. I have worked at or with various Department of Energy labs over the years and usually any patents developed by lab personnel do get assigned to the lab contractor (since most are contractor-run),or the DOE directly.

Or is the question why a patent on inflatable space station modules was even granted? It does seem obvious; if you can dig up prior descriptions of such a thing you might be able to invalidate it.

Peter Kokh < kokhmmm@aol.com > I haven't seen the patents. Clearly, the basic idea of inflatable habitats or hybrid rigid-inflatable ("structural inflatable" habitats cannot be patented. Only particular designs or means of concretely realizing this general idea would be patentable. It would seem that NASA's own TransHab program and Lowell Wood's (Lawrence Livermore National Labs) prior work and designs provide some precedents. Without seeing the patents, I could not say whether any of my own designs are related. If so, I would be delighted that someone could pick up the idea and run with it, when I could not.

How to Grow Your Chapter or Outpost

by David Heck < david.p.heck@boeing.com >

I'm a member of the St. Louis Chapter and wanted to drop other outposts and would be chapters afew words of encouragement. Our chapter formed almost a year ago with 2 people, then grew to four, and now hovers around 6.

What I wanted to pass along was some of our ideas for recruiting strategies. Before I do, I think you need to consider what your goals are....(get a job, make billions, retire at 25) ..

Do you want to share ideas with others in your area? yak about the moon & space ? gather research ? find out more about what's happening in the scientific community and with aerospace corporate R & D ? Do community education & out-reach ? help push the world closer to the Moon ? Our goal is ***All of the above*** (whatever, whenever).

We started as just a yak-a-blab session (at 3 to 4 people), turned to a "get-a-charter" machine, then moved back to an idea exchange & educational/outreach organization. Do we have a plan ? Do we know where we're going ?Who's driving the boat ? What is your name ? What is your quest ? What is the average speed of an un-laden swallow on the Moon ?

So ..... *First - get the bodies*, then find out what they want to do and find a way to fit your wants & desires into the mix. In my case, I design fighter aircraft structure for a living. My area of interest is structures design (habitats, vehicles, towers, landers, etc). Others like chemistry and geology. One is a travel agent/web designer .... Everybody has a different interest area in a different time frame (near future, early colonization, multiple Moon metropolitan areas). Every thing can fit, as long as you can keep the topics organized by scientific field & timeframe. *The key is to get the bodies !!*

Maybe they can be "provisional" members ... maybe they can be student members (I've asked Peter Kokh if student membeship can be made free with limited benefits) - again, *get the bodies, figure out the rest later...*

So... how to get the bodies ...

First, colleges & universities have lots of possibilities. (we've got several in the St. Louis area (Univ. of Mo, Washington University, St. Louis Univ.). Our plans for university recruiting include:

- posting flyers at bulletin boards, especially in libraries, astronomy, science & engineering buildings;
- attending meetings of clubs with similar "themes", ie Astronomy, Adventure Gaming, Sci-Fi

For non-university access,

- we've posted a few flyers at public libraries (picked up one member)
- passed out flyers at Sci-Fi conventions (picked up two)
- written articles for the MMM (Dave Dietzler is a frequent contributor) (picked up 2, including myself).
- We've also got a website (it's pretty pathetic ... http://chapters.moonsociety.org/stlouis/, and we're working on a new one, but it needs more work - http://www.gxptravel.com/moonsociety/)
- We also have a "blab" session at a local "Borders" bookstore that hosts various special interest groups.
- Some of our members have attended a St. Louis Sci-Fi writers meeting as a way to "cross-pollinate."
- We're also planning a meeting at a local Micro-Brewery.

Second - *Find a Leader* (not a tyrant and not the guy who does ALL the work either). If nobody else wants to, do it yourself (take one for the team).

- Be willing to stand up, write some notes & ideas on the board (even if they're wrong).
- Take notes & send out some meeting notes (if you're working on a project, it's good to keep track).
- Send out an e-mail reminder of when the meetings are (everybody gets busy & forgets sometimes)
- Don't be afraid to ask somebody else to help. If nobody volunteers, *Pick Somebody.*
- Make an AGENDA for the meeting (see if somebody wants to talk about a particular subject the next meeting so everybody can read up on it). If you're really on top of things, send out the agenda BEFORE the meeting (I used to, but I've gotten lazy)

I really feel that "organization" is the key to keeping things from being chaotic, but you need to allow some rambling, babbling, yakking to go on. Nobody likes a tyrant. The meetings should be relaxed, fun, and occasionally get something done. When we sit around at Borders, things tend to "dry up" a little (run out of things to talk about). When we're having a meeting at the library, things tend to follow more of an agenda ... sometimes just follow up ideas from our "yak" sessions at Borders, sometimes to work on *real* projects (like getting ready for a Sci-Fi convention in October.)

I hope this gives you a few ideas. **<DH>**

NOTE: The above is the slightly abridged text of a letter sent to BYU & Utah Outpost leader Jonathan Goff and copied to the Chapters-Coordinator.

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:
www.moonsociety.org/chapters/milwaukee/msmo_output.htm

GREAT BROWSING

LiftPort: The Space Elevator Company

http://www.liftport.com/

Space Elevators Article

www.spacedaily.com/news/materials-03w.html

Welcome to Orion's Arm

http://www.orionsarm.com/intro/welcome.html

- A collective hard science SF worldbuilding endeavour
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- the next evolutionary development of popular SF
- transhumanist projection of where we might be heading
- A bunch of semi-sane sentients having fun together
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- incorporates mythological, archetypal themes

MartianSoil.com

http://www.martiansoil.com

by Joost Schuur, jschuur@jschuur.com

Martian Soil consolidates Mars related news items from various sources on the Net into an easily digestible, daily 'blog' format. It is my hope that the site will inform fellow space buffs like myself about the latest scientific developments in its exploration.

Taking the Pulse of Stars & Exo-Planets

http://www.space.gc.ca/most

To Mars via Spitzbergen – Move over, Devon Island!

NASA eyes Norway's Svalbard islands for Mars research

www.spacedaily.com/2003/030707150638.v3hitwma.html

52% favor return to Moon, Moonbase

www.chron.com/cs/CDA/ssistory.mpl/space/2001674

Data Storage on the Moon?

http://eletters.wnn.ziffdavis.com/zd/cts?d=75-38-1-1-273644-1641-1

The Lunar Settlement Initiative

http://www.lunarsettlement.org/

Mail For MMM

Moonbases: Artemis & Plymouth

Your fine MMM #166, p. 17, says LRS/Milwaukee showed the "Plymouth" film last May. One of our last East TN Space Society activities was that same video, before the members scattered/got busy. An early work, for sure.

I was in Las Vegas in May for my Beirut high school reunion. My wife and I were blown away with the Space Station in IMAX 3-D. And we know from "Apollo 13" and "Crouching Tiger, Hidden Dragon," not to say Harry Potter and the Hobbit versions, what is possible to put on film.

I'm glad I could download the Virtual Internat'l Space Station (p. 14) if I had slightly different hard/software, haven't tried it yet. And I'm interested in the Sims in Space concept, haven't checked how that's moving along. Well, I hope. One of my life goals 20 years ago was, "vacation on the Moon."

Any time now, someone could make hard science-fiction movies showing lives in a Moonbase at 1/6 G, on Mars at 1/3 G, scenes on a space station at micro-G, all that. Don't know if footage on the Vomit Comet costs more than out of Industrial Light and Magic, but for those of us not expecting to live to see live coverage from a moonbase any time soon, it's a very real possibility.

Might we hope someone could make millions out of such a movie (timeless human relationships, Shakesperean story & dialog skills?) and then plow the millions into real heavy lifting vehicles? Movies are not taxes. People wouldn't have to pay. Recreation and space, isn't that part of the Artemis concept?

Lucien Faust < FaustLR@aol.com>

NASA Pluto Mission to Rely on Atlas 5

www.space.com/missionlaunches/atlas5_pluto_030725.html

Humanity's first probe to take an up-close look at Pluto and its moon Charon will be launched in January 2006 on a Lockheed-Martin Atlas 5 rocket, NASA officials say.

Search for Life Could Include Planets, Stars Unlike Our Own

www.spaceref.com/news/viewpr.html?pid=3D12226

"The search for life on other planets could soon extend to solar systems that are very different from our own, according to a new study by an Ohio State University astronomer and his colleagues. In fact, finding a terrestrial planet in such a solar system would offer unique scientific opportunities to test evolution, said Andrew Gould, professor of astronomy here.

HP iPAQ Pocket PCs on 2004 Moon Mission

New PC to Facilitate Wireless Communication in Space Palo Alto, CA July 15, 2003 -- HP (http://www.hp.com) (NYSE:HPQ) plans to launch its HP iPAQ Pocket PCs into outer space onboard TransOrbital's TrailBlazer spacecraft, the first commercial mission to gain approval from U.S. authorities to explore, photograph and land on the Moon.

With an early 2004 launch date approaching, Trans Orbital looked to the newly introduced HP iPAQ Pocket PC h5550's innovative engineering, mobility, simplicity and ease of use to facilitate wireless communication within the satellite. The handheld device will integrate with the TrailBlazer systems on board to enable TransOrbital to effortlessly synchronize and share data while in space, during transit to the Moon and while orbiting the Moon.

During future launches, the HP iPAQ Pocket PCs may be used for wireless communica-tion with cameras that are tethered on the outside of the spacecraft to provide superior video streaming capabilities for display on Earth. Future applications also may include the ability to communicate via e-mail with the Trailblazer lunar orbiter while it is orbiting the Moon and on the Moon's surface.

The first and only private company to be licensed by the U.S. Dept. of State and the National Oceanographic and Atmospheric Administration for Moon travel, TO believes that important and affordable advances in science, medicine, communications and information technology can be achieved by forming strategic global corporate alliances for space exploration.

TransOrbital will use the ISC Dnepr rocket from ISC Kosmotras for the Moon launch. The Dnepr LV is based on the world's most powerful SS-18 ICBM. The light-class launch vehicle is able to deliver 3,500-4,000 kg of payload into low earth orbit. More at www.kosmotras.ru.

TransOrbital, Inc. is a privately owned supplier of lunar delivery services, aerospace design, analysis and launch services. Established in 1998, TO is the first company of its kind authorized by the U.S. government to photograph, explore and land on the lunar surface. The 2004 TrailBlazer spacecraft's primary mission is to return HDTV video and other multimedia content from lunar orbit to market as commercial products, as well as the delivery of both personal and commercial cargo to the Moon. TransOrbital's first Moon mission will provide HDTV (high definition TV) views of equipment left behind from past Apollo and Russian landings. The mission also will deliver a time capsule containing personal cargo from Earth, including personal messages and artifacts. Media collected during the mission, including a "barnstorming" video filmed as the capsule reaches the lunar surface, will provide TransOrbital with an array of content vital to future scientific and exploratory endeavors, as well as educational and entertainment uses. More at www.transorbital.net.

To Mars via Spitzbergen

NASA eyes Norway's arctic islands for Mars research

www.spacedaily.com/2003/030707150638.v3hitwma.html

Move over Devon Island! NASA is eyeing Norway's Svalbard archipelago in the Arctic Ocean as a testing ground for future expeditions to Mars. Agency officials would like to test robotic equipment there and train future Mars astronauts in landscapes that resemble some of those on Mars: "volcanoes, glaciers, warm springs that shoot up from the permafrost and landslides dotting the landscape," according to Hans Amundsen, a geology researcher at the University of Oslo who will lead the US-Norwegian expedition to Svalbard this summer ('03) for field work. A NASA team recently tested an ice robot on the Longyear Glacier.

Facts on Spizbergen (Svalbard)

- Discovered in the 12th century, an international whaling base during the 17th & 18th centuries. Under Norway's sovereignty since 1920. This northernmost part of the Kingdom of Norway consists of nine main islands. Glaciers and snowfields cover 60% of the total area
- Location: North Atlantic, N of Norway at 78° N, 20° E. 62,049 sq km (24,000 sq mi, smaller than W. Virginia)
- Coastline: 3,587 km. (2,230 mi.) Fjords along W & N coasts Ice floes often block the entrance to Bellsund (a transit point for coal export) on the west coast and occasionally close parts of the northeastern coast to maritime traffic
- **Arctic Climate:** North Atlantic Current flows along W and N coasts of Spitsbergen, keeping water open and navigable most of the year ; cool summers, cold winters.
- **Terrain:** wild, rugged mountains; much of high land ice covered; west coast clear of ice about half the year; highest point: Newtontoppen 1,717 m (5,645 ft.)
- **Resources:** coal, copper, iron ore, phosphate, zinc; fish, wildlife. No arable land, no crops, no trees, few bushes.

Lunar Rocket & Rover Co. *Shadow I* upper stage to carry student payload on Super Loki launch August 6th

Florida Space Authority News Release July 25, 2003
http://www.floridaspaceauthority.com

CAPE CANAVERAL – On August 6th, 2003, a small payload from the Rossmoor Elementary School in Los Alamitos, Ca, will launch from Cape Canaveral Air Force Station's launch complex - 47 on a Metro-Rocket System powered by a Super-Loki Solid Rocket Motor into Suborbital Space.

The school payload launch, a cooperative effort between the Florida Space Institute (FSI), the Florida Space Authority (FSA) and the Lunar Rocket & Rover Co., Inc of Los Alamitos, CA, is a milestone in rocket history.

"To our knowledge, this is the first time an elementary school payload will launch as the dedicated payload on a rocket to space," said Robert P. Kleinberger, President & CEO of Lunar Rocket & Rover Co., Inc.

Students from the Rossmoor Elementary School practiced payload processing in teams by packaging simple pieces of paper with their names written on it. Each station had the responsibility of processing its portion of the payload. The last student team packaged the paper into special canisters that were later transported to the Florida Space Institute for payload processing. "The students had the opportunity to see and touch the mock-up of the rocket that will carry their payload into space," said Kleinberger.

This Metro-Rocket System dubbed by the Lunar Rocket & Rover Co., Inc as the Shadow-ID should reach a speed of Mach 4.9 and 370,000 feet (70-miles) apogee altitude after which it will quietly return to the Atlantic Ocean. This altitude is roughly eleven times higher than a Boeing 747 flies.

The launch will officially kick-off the Lunar Rocket & Rover Co. Inc.'s Rocket System Launch Program of the Shadow I rocket system for schools across the United States. "At this time one payload is already in process of being built by Stanford University for a launch on the Shadow IB new composite upper stage for antenna testing. Another team of students at Fredericksburg High School in Fredericksburg, Texas, have also diligently worked since March 2003 and designed a larger upper stage that is now on the drawing board and ready for validation," added Kleinberger.

An 11-foot mock-up of the Shadow IB will be displayed with the Florida Space Institute at the Utah State University Conference on Small Satellites in Logan, Utah from August 11 – 14, 2003.

Robert P. Kleinberger, President & CEO
Lunar Rocket & Rover Co., Inc 562-307-0234
< robert.kleinberger@lunar-rocket.com >
Email: robert.kleinberger@lunar-rocket.com

SpaceDev To Design Lunar Dish Observatory Mission

www.spacedev.com/newsite/templates/subpage_article.php?pid=431

Poway, California (July 24, 2003) – SpaceDev (SPDV) has been awarded a contract by Lunar Enterprise of California (LEC) for a first phase project to begin developing a conceptual mission and spacecraft design for a lunar lander program. The unmanned mission would put a small dish antenna near the lunar south pole. From that location it will be in near-constant sunlight for solar power generation, and should be able to perform multi-wavelength astronomy while communicating with ground stations on Earth.

"... This project ... is in keeping with the original goal of SpaceDev to design, build and fly commercial deep space science missions, and should result in our development of additional transformational space technology," said Jim Benson, founder, chairman and CEO of SpaceDev. "This study picks up where we left off from our original 1997 Near Earth Asteroid Prospector (NEAP) mission design, our 1999 Mars MicroMission design for ... JPL, and our 2001 work with Boeing on possible commercial lunar orbiter missions."

SpaceDev will analyze launch opportunities, spacecraft design, trajectory possibilities, potential landing areas, available technologies for a small radio astronomy system, and communications and data handling requirements. ... SpaceDev's approach is to make systems as small, low-cost and as practical as possible while minimizing risks, in order to successfully demonstrate the performance of science on the surface of the Moon.

"Lunar Enterprise Corporation (LEC) has funded this study to be a catalyst to other individuals, companies and countries to join together in a return to the Moon," said Steve Durst, LEC founder/director of. "Many organizations around the world are planning lunar missions. Corporate and national leaders, and leading lunar scientists, will discuss these projects at the International Lunar Conf. 2003 in Hawaii this November. We hope this project will bring all those parties together to discuss cooperation and identification of resources for concerted lunar activities."

About SpaceDev - SpaceDev (SPDV) (www.spacedev.com) creates and sells affordable and innovative space products and solutions to government and commercial enterprises. SpaceDev products and solutions include the design, manufacture, marketing and operation of sophisticated micro- and nano- satellites, hybrid rocket-based orbital Maneuvering and orbital Transfer Vehicles as well as safe sub-orbital and orbital hybrid rocket-based propulsion systems.

Lunar Enterprise Corporation (www.spaceagepub.com) is a wholly owned subsidiary of Space Age Publishing Co. of Hawai'i and Palo Alto, CA. LEC and Space Age support a wide variety of enterprises & activities consistent with near-term, human, permanent operations on the Moon. #

International Lunar Conference 2003
November 16–22, 2003
Hawai'i Island, Hawaii

http://www.spaceagepub.com/ilc_2003.html

The ILC2003 from 16-22 November on Hawai'i Island, Hawaii, USA promises to be a major, decisive event regarding the permanent human return to the Moon as early as possible. This will be the most important lunar conference of the 21st century and the first international one in the USA in more than a decade. ILC2003 also will serve, with the agreement of the principals most involved, as the 5th International Lunar Exploration Working Group (ILEWG) Conference.

Space Age Publishing Company would like to thank and acknowledge the surge of lunar-committed individuals that have so far made various and significant contributions to ILC2003 by means of paid Registrations, sponsorships, commitments of registration, abstract submissions and all other inquires of interest.

Conference development and Registrations are steadily progressing, with significant participating confirmations from Apollo Moonwalkers Captain John Young (keynote speaker) and Dr. Harrison Schmitt; and top-level space scientists and officials from USA, China, India, Russia, Europe, Japan and elsewhere.

Please note that the Call for Papers abstract submission deadline has been extended to 31 August, and the Interim Registration rate is currently being offered at the low price of $495 through 30 September.

The revised ILC2003 Registration/Announcement v. 2.1 brochure will be available and selectively mailed out starting the second week of August.

Please be sure to learn more about ILC2003 by contacting us at the numbers below or on the Internet at:

http://www.spaceagepub.com/ilc_2003.html

Thank you for your time and interest in ILC2003, and we hope to meet with you this November.

Sincerely,
The Editors and Directors of
International Lunar Conference 2003 c/o
Space Age Publishing Company
Hawai'i Island, Hawaii, USA
Ph 808-326-2014 Fax 808-326-1825

Hotel Information:

The Waikoloa Beach Marriott is on the Kohala Coast of Hawaii Island on the beachfront of beautiful Anaehoomalu Bay with stunning views of Mauna Kea. More Information at:

http://www.spaceagepub.com/travel.html

Two dozen new "moons" get names

July 25, 2003 | At the 25th General Assembly of the International Astronomical Union, held from July 13–26 in Sydney, Australia, the Working Group for Planetary System Nomenclature announced the names of two dozen planetary satellites discovered since 2000.

Welcome the following:

11 newly found satellites of Jupiter (total 61)
Six named for conquests of the Greek god Zeus and five for the daughters of Zeus.

Jupiter XXVIII-XXXVIII (28-38)

Autonoe, Thyone, Hermippe, Aitne, Eurydome, Euanthe, Euporie, Orthosie, Sponde, Kale, Pasithee

12 newly found satelites of Saturn (total 30)
Named for Norse, Inuit, or Gallic giants.

Saturn XIX-XXX (19-30)

Ymir, Paaliaq, Tarvos, Ijiraq, Suttung, Kiviuq, Mundilfari, Albiorix, Skadi, Erriapo, Siarnaq, Thrym

1 newly found satellite of Uranus (total 21)
Named for a character in William Shakespeare's *The Tempest.*

Uranus XXI (21) Trinculo

Most of these objects are rather small, irregularly shaped chuncks of rock and ice under a mile in diameter. For more on Planetary Satellites, go to:

http://skyandtelescope.com/observing/objects/planets/article_827_1.asp

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ExoPlanet Baby Boom

from europa-digest@klx.com

"Which stars are most likely to harbor planetary systems? Before the discovery of the first extrasolar planet around a normal star in 1995, astronomers had no way to answer this question. But now, with more than 1,000 Sun-like stars examined for evidence of planets and more than 100 Jupiter-like exoplanets catalogued, the answer is clear. The stars most likely to host planets are those with more "metals," that is, elements heavier than hydrogen and helium.... See:

http://SkyandTelescope.com/news/article_1010_1.asp

Sublight 'Ion Drives'

Science Fiction, or Science Fact?

http://www.esa.int/export/esaSC/SEM3JQXO4HD_exploring_0.html

FOR IMMEDIATE RELEASE August 4, 2003

National Space Society Mourns Loss of Executive Committee Chairman, Chris Pancratz

WASHINGTON, DC — Chris Pancratz, 52, Chairman of the National Space Society (NSS) Executive Committee, died August 2, 2003, at his home in Virginia after a battle with cancer. During his six years on the Board of Directors of the Society, he worked tirelessly in many capacities.

"His dedication to the exploration and development of space never wavered," said NSS Executive Director Brian Chase. "Chris saw the organization through several challenges; his leadership will be missed."

Chris engendered support from the entire NSS family, including its international affiliates. "Chris was a true leader. He is to be admired for his never-failing energy and enthusiasm for the NSS mission," said Tim McEgan, President of the National Space Society of Australia. "The loss of Chris Pancratz robs the NSS of a valuable resource – an individual who combined the qualities of understanding and enthusiastically supporting the exploration of space, plus personal energy and organizational drive," said Hugh Downs, Chairman of the NSS Board of Governors.

In addition to being named the National Space Society Activist of the Year in 2000, he also served as Acting Executive Director, Vice President of Public Affairs, and Director of Strategic Planning. He was a major financial supporter of the Society and a frequent contributor to the organization's award-winning magazine, **Ad Astra.**

Pancratz had a long history of community service with the United States Jaycees Foundation, where he served on the Board of Trustees, and the United Junior Chamber of Commerce. He is survived by his wife and two children.

Mr. Greg Allison was appointed Acting Chairman of the Executive Committee.

The National Space Society is an independent, international, educational, grassroots nonprofit organization dedicated to the creation of a spacefaring civilization. The NSS has more than 22,000 members and 50 chapters around the world. Founded in 1974, NSS is widely acknowledged as the preeminent citizen's voice on space.

NATIONAL SPACE SOCIETY - www.nss.org
600 Pennsylvania Ave., SE | Suite 201
Washington, DC 20003
(202) 543-1900 | (202) 546-4189 (fax)

More on Chris Pancratz

- [From www.nss.org] NSS lost a dedicated leader when Executive Committee Chairman Chris Pancratz passed away on Saturday, August 2, after a battle with cancer. To honor the legacy of his leadership, NSS has renamed the Society's annual space activist award the "Chris Pancratz Activist Award."

  The family has asked that, in lieu of flowers, any donations in Chris' name be sent to the National Space Society or the American Cancer Society.

- [FromMark Hopkins, NSS Secretary] A number of people have asked, what is the procedure for sending such donations to NSS? If you wish please send your checks directly to the NSS Office at National Space Society, Suite 201, 600 Pennsylvania Ave. SE, Washington, DC 20003. Do NOT send your checks to various other NSS addresses, including the address used for donations, that are requested for various reasons in our direct mail fundraisers. Include with your check a note that states it is for the Chris Pancratz Memorial Fund. You may also make donations via credit card by calling the Office at (202) 543-1900.

  [from various email sources]

- Chris resigned as CEC July 24th, when he got home from the hospital. The doctors had informed him that there was nothing else they could do to stop the cancer. I was told that he was not able to digest any food this past week, spiraled down quickly, and went into a coma on Thursday, July 31.

- Chris' body will be cremated. *Enough money has been quietly collected to pay in full for a portion of his ashes to ride into space aboard the next Celestis mission.*

COSMOS 1: The First Solar Sail

From a recent Planetary Society Newsletter

This fall science fiction will become science fact On an autumn day later this year, we will launch on its way **Cosmos 1** the first solar sail. This launch will be the culmination of the first international, privately funded space mission in history.

Although this technology has long been foreseen by both scientists and science-fiction authors, no solar sail has ever been built or launched - until now. Under the guidance of The Planetary Society and with funding from Cosmos Studios, veteran space scientists and engineers from the United States and Russia came together to turn this revolutionary technology into reality.

Follow this historic mission at:
http://www.planetary.org/solarsail/index2.html

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!

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(* Board Members, & Ken Paul < kenpaul@cape-mac.org >

LRS NEWS

•**LRS is on summer vacation.** Regular meetings resume in September. See below.

• **LRS mourns the loss of Chris Pancratz.** [see page 17 above] At ISDC '98, Chris took it upon himself to arrange for a motor scooter for conference chair Peter Kokh who was recovering from a recent ankle-shattering injury.

LRS SEPTEMBER Events

Saturday, SEPT. 13 th1–4 pm

LRS Meeting, Mayfair Mall, Garden Suites **Room G110**, which is located on the lower level "Garden Suites East" in the Ne area of the Mall below the cinema complex.

AGENDA TBD. Note: Chapter Pres. Peter Kokh may be out of town at a class reunion. Bob Bialecki will take over.

Collaborating Milwaukee Area Space Groups

Moon Society Milwaukee Outpost
c/o Peter Kokh 414-342-0705 - kokhmmm@aol.com
http://www.moonsociety.org/chapters/milwaukee/
MSMO currently meets jointly with LRS

Wisconsin Mars Society c/o Matthew Giovanelli
7133 West Wells Street, Milwaukee, WI 53213
414-774-8952 - marsmatt@wi.rr.com
http://chapters.marssociety.org/usa/wi/
WMS usually meets at address above on 3rd Sat. 1pm

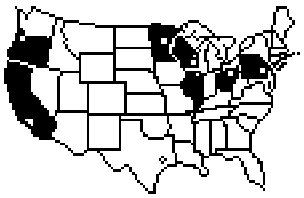
Solar System Ambassadors

PASA - Princeton, NJ/Philadelphia, PA
Michelle Baker - chaos@cybernet.net

CSFS - Chicago,IL
Bill Higgins - higgins@fnal.gov

SSS - Sheboygan, WI
Harald Schenk - hschenk@excel.net

U.S. CHAPTERS



NSS Chapter Events
MMM 8 Chapters Strong

Space Chapters HUB Website:
[http://nsschapters.org/hub/]

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/]

MEETNGS: 3rd Saturday of the month from **1–4 pm**
at the: **St. Anthony Park Library**'s Meeting Room
2245 Como Ave. St. Paul, MN

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**

AUGUST 19: Stoelting House, Kiel
SEPTEMBER 16: Foerster Academy of Dance, Sheboygan
OCTOBER 21: Stoelting House, Kiel
http://www.tcei.com/sss/SSSschud.html

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

Our Website has Moved. NOTE NEW ADDRESS

[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.

- **Aug 16, 3:00 p.m.** -- OASIS Monthly Business Meeting at the home of Steve Bartlett and Tina Beychok, 7018 E Peabody St., Long Beach. Info.: OASIS Hotline
- **Sep 20, 3:00 p.m.** -- OASIS Monthly Business Meeting, location TBD. Info.: the OASIS Hotline, 310/364-2290.
- **Oct 18, 3:00 p.m.** -- OASIS Monthly Business Meeting, location TBD. Info.: the OASIS Hotline, 310/364-2290,

Looking Ahead

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

Recurring Events

- **The Griffith Observatory** is undergoing renovations and upgrades to reopen in 2003. - www.griffithobs.org/
- **Fridays, 7 pm** "Night Sky Show." -- **8 pm** Guest lectures. Santa Monica College John Drescher Planetarium, 2nd Floor Technology Bldg, 1900 Pico Blvd. $4 per show or $7 for 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/

OHIO

Cuyahoga Valley Space Society

3433 North Ave. Parma, OH 44134-1252
c/o George F. Cooper III, Phone 216-749-0017
E-Mail: geocooper3@aol.com

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@attbi.com>
(LBRT - Oregon Moonbase) moonbase@attbi.com

☞ Meetings **3rd Sat.** each month at **2 p.m.**
Bourne Plaza, 1441 SE 122nd, Portland, **downstairs**

NEXT MEETINGS: **AUG 16th, SEP 20th, OCT 18th**

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 from **1-3 pm**, the **3rd Saturday** of every month at the **Liberty One** food court on the second level, 16th and S. Market. Go toward the windows on the 17th street side and go *left*. Look for table sign. Parking at Liberty One on 17th St.

Meeting Dates: AUG 16th, SEP 20th, OCT 18th. Call Earl or Mitch 215-625-0670 to verify all meetings

- **Meeting Notes:** No report issued this month by press time.

Chris Pancratz † August 2, 2003

NSS Chapters Mourn Loss of Champion

[See reports on page 17]

In recent years, Chris Pancratz became very familiar to chapter activists and leaders. At the annual ISDC's, Chris was everywhere. He championed training for chapter leaders, and chapter-oriented programming.

As a human being, he loomed even larger than his size 15 shoes. He will be sorely missed. - PK

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 9

- **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**

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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

CUYAHOGA VALLEY SPACE SOC. (Cleveland, OH)
❍ $15

CHICAGO SPACE FRONTIER L5
❍ $15 annual dues

LUNAR RECLAMATION SOC. (NSS-Milwaukee)
❍ $18 reg. ❍ $24 family ❍ $15 student/senior

MINNESOTA SPACE FRONTIER SOCIETY
❍ $20 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.

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