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

Moon Miners' Manifesto

& Moon Society Journal

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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

In FOCUS: Vision must be defined in terms of Obstacles & Challenges

Every movement and organization and enterprise has a basic, success-enabling need to define itself in terms of its Vision and Mission. For us in the pro-Space community, a Vision Statement describes the kind of world or universe in which we want to live, but is not yet at hand. The Mission Statement lists the means at our disposal by which we propose to work and strive to realize that Vision.

In composing our Vision Statement we list things which are not yet reality: "communities of people living and working beyond Earth's surface," for example; or human settlements in space, on the Moon, Mars, and elsewhere, using the resources of those places both to support themselves and help solve difficult problems on Earth." In the latter statement, we have included references to real challenges: sustaining life on worlds and in locations far less blessed with resources than our homeworld; helping overcome problems on Earth such as a growing need for abundant, and clean energy.

Stating a Vision Statement in reference to the challenges and obstacles in the way of its realization is definitely useful, perhaps even essential. Simple common sense should tell us that any Vision that does not explicitly recognize the obstacles and challenges in that stand in the way of its realization is no more than a grandiose group hallucination.

Why is statement of the principle obstacles and challenges that important? It's simple. The statement of obstacles and challenges define the Mission of the organization or enterprise, setting the principal Agenda for the effort. Is this not tantamount to combining the Vision and Mission Statements into one? No, because the Mission Statement must do more; it must list the principle means at our disposal by which we can make progress in addressing those obstacles and challenges.

The Vision Statement then is much more than a Prophecy. And membership much more than a matter of getting a front row seat from which to watch the grand vision unfold. For the Vision is clearly not guaranteed. There are obstacles and challenges that need to be addressed and overcome by marshaling all the resources available to the organization or enterprise, and if these are insufficient, then by aggressively developing the missing tools and resources. The Vision is a Dream to be realized by Work. The Mission outlines a work strategy. [➪ p. 2, col. 2]

From Sword to Lunar Plowshare

On December 22nd, one of 150 SS-18s permitted by the U.S.-Soviet START treaty to be converted into launch vehicles, lifted off from Baikonur, Kazakhstan with TransOrbital's "Trailblazer structural test article" satellite, successfully launching into low Earth orbit. Now renamed the *Dnepr*, this vehicle may launch the first and several follow on commercial missions to the Moon. p. 16

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*)

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fi IN FOCUS Editorial continued from p. 1.

How are space Society's doing? I'm not sure an MMM report card can be accurate or helpful, and may even be counterproductive by stirring up defensive reactions. But let's take the plunge. Rather than take offense at low scores, we hope society leaders will be inspired to more effective and comprehensive overall efforts. .

Planetary Society

- Excellent development and follow through on projects that advance the realization of its Vision.
- Aggressive pursuit of resources needed for projects.
- Poor marshaling of the talents of individual members
- Does not encourage or recognize local chapters.
- Overall Score **A–**

National Space Society

- Addresses legislative and political obstacles only, not seeing any other obstacles as within its purview because it considers members as mere check writers and political activists, ignoring a tremendous talent pool of tens of thousands of gifted persons.
- Will not consider projects that can't be funded out of membership dues left over from basic operations.
- Self-limiting effectiveness. Overall Score **C**

Mars Society

- Has a definite Vision and Mission Statement that identify concrete areas of activity that will advance the realization of the Mission.
- Aggressive Projects Policy, going out and finding needed resources it does not already have.
- Initially aggressively sought to put the talents of all its members to work, but now neglects this resource.
- Some Task Forces are floundering. without leadership.
- Some real successes. Overall Score **B++ / A–**

Artemis Society

- Has a definite project but doesn't engage in periodic review and self-reinvention. Website projects only. Concentrates on fine-tuning the "reference Mission," ignoring challenges it could benefit from addressing.
- Self-selected ineffectiveness. Overall Score **B**

Moon Society

- Except for one reference to the need to get private enterprise involved in developing technologies needed, Vision and Mission Statements seem to be those of a fan club: "we're interested in all things Moon and we are the place to talk about it." No game plan or strategy to leverage what resources it does have.
- No strategy to marshal the talents of its membership, much less identify them, except for involving them in discussion groups and web projects
- Waiting for more members before taking on projects
- A dedicated core without a plan. Overall Score: **C**

MMM wants all these Societies to succeed!

We point out shortcomings as would a friend. **PK**

MMM: 16 years & Counting
A Word to Our Readers

With this issue, Moon Miners' Manifesto begins its 17th year of continuous publication. It is our near term goal to reach issue #200, marking the completion of 20 years - two full decades -- and then, if health is still with us, to keep going indefinitely.

I have often said, not quite as jokingly as it would seem, that I will quit putting out Moon Miners' Manifesto when I can start publishing "The Mother Moon News" from my new home in Luna City.

But there are clouds on the horizon. Circulation continues to spiral down. Domestic (U.S.A.) mailings are now under 300 and the minimum for bulk mail is 200. Under that minimum we may have to cut the size of the publication in half to get under one ounce for first class postage and still incur higher postage costs. Much sooner than we had anticipated, there may come a time when publishing Moon Miners' Manifesto as hardcopy becomes an impractical proposition.

We have already begun producing an electronic version, in pdf format, to serve the Moon Society's need to reach its many overseas members in an affordable way. However, spread of the pdf version has far exceeded our expectations, to the point where it has become the principle cause of the rapid decline of hardcopy circulation. It could well turn out to be the nail in the coffin.

The Lunar Reclamation Society has no means to police the availability of the pdf file. However, we retain the right, if abuse continues to proliferate, to unilaterally abrogate any and all agreements to make MMM issues available in pdf format.

Our final recourse would be to discontinue publication of MMM entirely. We all have a stake in seeing that this does not happen.

Meanwhile, we will continue to make MMM the best publication we can. A happy, productive, and fruitful New Year to all our readers, even our growing number of unpaid ones. And may we make progress in *our journey home to the stars*, through our continued hard work. *Peter Kokh*, Editor MMM.

Cheesy Paints for Lunan Artists

by Dave Dietzler <Dietz37@msn.com> and Peter Kokh

Casein Based Paints by Dave Dietzler

A painting medium in common use by artists here on Earth, "Casein-Tempera Emulsion" may lend itself to use by early lunar pioneers. Casein [Latin case(us) = cheese] is a protein precipitated from milk and is the basis of cheese and some plastics. An emulsion can be made of this protein, water, and lime to serve as a binder for fine art paints. Tempera is a painting technique using such an emulsion. Casein sets quickly, mat, and transparent, all of the pigment is exposed, making a very luminous surface..

Early settlers may not enjoy fresh milk from goats, much less from dairy cows, but powdered milk may be a regular imported food supplement, and source of casein.

You can read more on this medium and how to prepare and use casein tempera emulsions, at:

http://www.mauigateway.com/~donjusko/final.htm#CASEIN-TEMPERA

"Lunar Kosher" Considerations by Peter Kokh

While this tempera emulsion may work with many inorganic pigments, casein, being organic, in our opinion should be reserved for use with organic dye stuffs so that waste paint and discarded artifacts can be recycled into the biosphere. Yet most vegetable dyes apparently "bleach out" when used with casein emulsions.

This creates quite a challenge for would-be Lunar Appropriate Art Media Pioneers {LAAMP} It would be great to have another paint medium than inorganic sodium silicate (waterglass) in order to diversify the art media options open to Lunar Pioneers. But how do we do achieve this goal? Experimentation is essential. Any satisfying results may lead to a Casein-Tempera medium quite distinct from that practiced here on Earth.

This may seem an absurd concern for those preoccupied with frontier hardware questions, and even those concerned with lunar agriculture and biospherics. But in the long haul, the burden of transforming a bleak frontier into a truly human one will fall on the shoulders of pioneer artists and craftsmen who find ways to transform moon-dust-based stuffs into human expressions of beauty. Art and craft are not luxuries. The battle for the Moon will be won or lost on a host of fronts: metallurgy and other materials science, engineering and architecture, agriculture and biospherics - we understand those. But it will be a battle not just to establish and preserve environments that sustain the body, but also a battle to establish environments in which the human spirit can thrive and reach new heights.

Meanwhile, read about our previous attempts at a lunar-appropriate painting medium at:

http://www.lunar-reclamation.org/page15.htm

<MMM>

Tourist Clusters on the Moon

by Peter Kokh

Foreward

In MMM #136, JUNE 2000, pages 5-8, we wrote about an "All-in-one Moon Resort." This article described the general advantages of various locations on the Moon from the viewpoint of visibility of Earth above the horizon, concluding that locations on the limb, where due to libration effects, Earth was sometimes just above and sometimes just below the horizon offered the "best of both worlds," that is, the advantages of Nearside locations along with the advantages of a Farside one.

The article also traced a surprising scenario, which is becoming more and more plausible as time goes on: tourism, not industrial development of lunar resources, may pace the opening of the Moon. We have put this article online at the following address:

www.lunar-reclamation.org/moonresorts_paper.htm

What follows is a fresh, shorter, look at how tourist facilities are likely to multiply on the Moon.

The Dawn of Lunar Tourism

We are, alas, still a long way from returning human pioneers to the surface of the Moon. There are no NASA plans to do so - all such previous studies gathering dust on the shelves per instructions from Congress - and amorphous plans of China, India, and Japan to put people on the Moon cannot yet be taken seriously, none of these nations having yet put an astronaut in orbit. The Artemis Project would set up a first commercial Moonbase, and indeed, this seems a more plausible eventuality than Congress reversing course and ordering NASA to shake a leg.

Everyone waits for someone else to put precursor pieces of the terracing puzzle in place, however, and so we do not seem to be making any real progress. That none of the would be movers and shakers has a critical amount of seed money is the harsh reality, of course.

We have all been quick to herald the opening of the Space Tourist age with the ISS visits of Dennis Tito and Mark Shuttleworth, the first "kids on the block" to come up with icebreaking money. Efforts to get additional camera-toting commoners into space through "creative financing" have so far not succeeded. That's to be expected. The more we rely on multi-party financing, the more failure points we introduce into the plan.

Yet interest of "ordinary people" in space tourism remains quite high. Once someone succeeds in bringing down the ticket price by a factor of ten, then a hundred, the floodgates will first crack, then shatter. Regular traffic will lead to dedicated, if spartan, orbital tourist quarters. As prices continue to come down, and the number of ticket purchasers grows, whole new orbital tourist centers will be developed, unconnected to ISS.

Once we have a dedicated tourist shuttle, it simply requires refueling and reprovisioning that craft to send it and its passengers on a no-land loop-the-Moon up-front-and-personal venture following the default path taken by the limping Apollo 13 craft. Indeed, as we have pointed out previously, tourists could skim over the Moon's farside *before the next humans return to the Moon's surface.* It is a simple fact that landing on the Moon, and then returning, requires additional hardware and fuel. You can read more about "Lunar Overflight Tours" online at:

www.asi.org/adb/06/09/03/02/021/lunar_overflight.html

But where do we go from here? In the MMM #136 article cited above, we suggested that a dedicated surface "hotel" complex might be developed in Mare Marginis (or some other "limb" location.) But the actual step by step development of lunar surface tourism may start quite humbly, without any surface facilities at all. The first tourist lander craft will serve as a self-contained hotel, exactly as the Apollo Lunar Excursion Modules not only brought astronauts to the surface, and then returned them safely to lunar orbit rendezvous, but served as their "camp" while on the surface. Such a craft could set down just about anywhere on the Moon's surface, perhaps visiting a different location on each trip. This "butterfly" strategy would encourage repeat visits by some of the well-heeled early Moon tourists. And as anyone in business knows, the repeat customer is a principal mainstay of success.

First Dedicated Tourist Surface Facilities

From this point in time, it seems obvious that the first permanent habitat on the Moon will be a module (with auxiliary equipment) manufactured on Earth and transported to the Moon's surface. There is simply no other way to get started. We cannot rule out the possibility that once the facility is field-tested, debugged, run through a full lunar dayspan-nightspan cycle and judged "operational" by advance crews, its intended design use will be *for tourists.* After all, we do need to make the first outpost earn money, and tourism is certainly a promising source for a steady revenue stream.

However, this approach would seem to be a dead-end one. Bringing pre-manufactured ready-to-deploy-and-use habitat space from Earth is forbidingly expensive. There will be no way to get beyond the "rugged campsite stage" without first developing the capacity to produce lunar building materials, *and modules,* from processed local moondust - regolith. So while hosting occasional tourist visitors will be an important way to raise capital for testbed lunar industrial experiments, the principal and regular occupants of a first outpost will need to be those pioneering the early industrialization route. Only when we are ready to begin manufacturing, and assembling, and outfitting expansion habitat and function space from modules manufactured on site, can surface tourism grow.

Scattered Tourist Sites vs. Tourist Clusters

Here on Earth, there is a seemingly inexhaustible number and variety of tourist destinations, facilities, and activities from which to choose. In fact, this has been the case since at least the middle ages, but has never been so manifold and so accessible to the general traveling public as today. Yet while we can fly here today, there tomorrow, on a butterfly itinerary that samples many locations, a mainstay of surface tourism, especially for the driving public, has been the tourist cluster: one general destination that offers a great variety of facilities and activities.

The tourist cluster comes in many sizes. There are the mega-clusters of Orlando and Las Vegas, of course. But we are thinking of the many smaller clusters around the country whose development preceded these modern day wonders. Inspired by my own experience, four "gateway" clusters come to mind.

- Wisconsin Dells, WI - gateway to the scenic Dells of the Wisconsin River
- Estes Park, CO - gateway to Rocky Mountain National Park
- Gatlinburg, TN - gateway to the Smoky Mountains National Park
- Cave City, KY - gateway to Mammoth Cave National Park
- and there are many more similar clusters

First Outpost / First Tourist Surface Itinerary Synergy

Now on the Moon, we will, in time, have clusters of tourist facilities and for-profit attractions (frequently disparaged as "tourist traps") at gateways to some of the Moon's more outstanding scenic attractions: the crater Copernicus, approaches to the Alpine Valley, for examples. But it seems certain that the very first lunar tourist cluster will grow up in close proximity to the first lunar commercial-industrial outpost as it gradually develops into a true settlement.

Tourism requires support facilities and support services and people "on location" to man them. However, it will be a while before the tourist stream becomes a steady one and requires the "day job" attention of support cadre on location. In the beginning, tourists will arrive in small groups at infrequent intervals. Tour group leaders familiar with the outpost and the lay of the surroundings can themselves provide much of the support.

They will have the Outpost to visit, and make the tour of surrounding support facilities: solar arrays, fuel tank farms, construction sites, road-building sites, regolith harvesting and mining sites, processing facilities. And, of course, the local scenic highpoints.

As the stream of visitors grows in both numbers and frequency, one can imagine a definite symbiosis emerging between the tour operators and the Outpost and its staff. For example, an additional pressurized motor coach/crew transport could be paid for on a time-share basis by both the Tour Operator and the Outpost Agency and bring real benefits to both. New roads serving new scenic attractions as well as new mining or processing sites could be built. Tour Operator need for automated self-help rest stops would seem to be a made-in-heaven match for the Outpost's needs for a network of service garages/ emergency flare shelters. In short, we can expect a real, if partial, synergy between the driving needs of Tour Operators and the driving needs of an Outpost aggressively expanding in both size, staff, and diversity of activities.

That there will be some friction and disagreements will not discourage such a partnership. Only an Outpost that aggressively seeks to expand along for-profit vectors has any real chance of morphing into a real settlement. And we all know from experience here on Earth how important an economic driver tourism can become.

Location, Location, Location

It could happen that the first outpost-settlement-to-be will be quite close to a major scenic attraction. But it is more likely that scenic advantages will be an important but secondary consideration in site selection. Yes, to support a variety of marketable services, we will want a photogenic site, one with interesting moonscapes, and one from which Earth hangs in the sky not uncomfortably far above the horizon (in "The Postcardlands".) It is also likely that the outpost planners and site-pickers will have the foresight to realize that a mare-highland "coastal" site will offer the best strategic advantages for industrialization: access to both mare and highland suites of lunar regolith resources. And such a site will be much more interesting from a tourist point of view: vistas of great plains along with a setting of nearby mare basin rampart mountains.

Two such site proposals are Greg Bennett's "Angus Bay" (commonly known as Mare Anguis, Sea of Serpents, an irregular winding mare-filled bay off the NE "coast" of Mare Crisium) and our own "North Junction" proposal for an outpost along the north coast of Mare Frigoris at the overland gateway to the north polar icefields. Both offer comfortable Earth viewing and a mix of plains, mountain ramparts and craters.

In time, as diversification of the economy leads to the spread of human presence to many distant locations on the Moon, more scenic attractions will become accessible. A first "service station / flare shed / inn could lead to a cluster of tourist facilities of which providing access to the flagship scenic attraction in the area will be only the first. In clusters, whether of tourist facilities, fast food restaurants, or automobile dealers, everybody benefits from increased traffic. The cluster provides something for everybody within a relatively small area, so more time can be spent on enjoyable activities, less on traveling from one to the other. Industrial diversification keyed to special ore concentrations may lead, but tourism will help build the future map of the humanized Moon. <MMM>

Killer Debris vs. Killer Asteroids

by Larry J. Friesen < ljfriesen@ev1.net >

On the "In Focus" Editorial Essay in MMM # 160, "Killer Asteroids versus Killer Space Debris", you seem to belittle the danger from rogue asteroids (and comets). I know something about both topics, both serious concerns. Compare them is like comparing apples and oranges; they are very different types of dangers, involving hugely different time scales.

The Threat of Asteroid Impacts: To put the danger from impacting asteroids and comets in perspective, the chances that any person will die in a meteoric impact are about the same order as the chances that they die in an airplane crash, based on the past rate of impacts on Earth, as well as we can reconstruct and estimate it. A major difference is that most deaths from meteoric impacts will be due to extremely rare bolides large enough to devastate a large region, a continent, or perhaps the entire planet. It may be tens or hundreds of thousands of years between "state busters", and perhaps millions or tens of millions of years between "continent busters" or "planet busters". But when they do occur they will kill huge numbers of people; perhaps millions or even billions at a time.

Many people - including the news media - have a difficult time dealing seriously, both on an intellectual level and an emotional level, with events that are extremely rare, but have enormous effects when they do happen. It seems difficult on the one hand to avoid the "giggle factor" and take the matter seriously at all, and on the other hand to avoid overblowing it. How we get the average person to get over that mental "hump" I don't know.

We've apparently got the media past the "giggle factor". But we may not yet have gotten them to get enough perspective on it to keep from overblowing things. It may be difficult to get them to take a calmer perspective, because news media seem to thrive on sensation.

The Threat from Orbital Debris: Turning to the very serious problem of orbital debris, I've worked in that area. as a part of the NASA - Johnson Space Center (JSC) orbital debris study group. It may interest you to learn that there have been a series of international workshops on the topic, such as you propose. I've participated in a few. NASA's orbital debris experts, along with interested parties from DOD and other agencies, would meet with our counterparts from ESA, Russia (then still the U.S.S.R.), Japan, etc. We would exchange information about what we'd learned about various aspects of space debris, discuss policy recommendations for our various space agencies, and so forth.

Although I'm not currently working in this area, I have no reason to think that these international workshops are not still being held, on a fairly regular basis.

I'm not so sure about a treaty governing practices for reducing the creation of space debris,. I had some interesting discussions about this with Joseph P. Loftus, now retired, who was then one of the associate or assistant directors for JSC. He was a participant in the orbital debris study group, and led many of the discussions, especially those behind the scenes, to push various national space agencies, and international regulatory bodies (UN bodies and others) to adopt sensible policies that would minimize the generation of debris from space operations.

What he, and the rest of us, didn't want to do was to freeze a set of mandatory policies in place by treaty. First, we were getting very good cooperation from nearly every nation with space launch capabilities by presenting recommended policies in the frame of "these are practices that wise spacefaring nations should follow", with a sort of "Good Housekeeping Seal of Approval". It is not too difficult to explain matters to the leading scientists and engineers of nations that have, or are developing, space launch capability, and to get them to realize that when it comes to orbital debris, it is literally true that "what goes around comes around": any junk a nation puts into orbit is as much a danger to its own satellites as it is to every other's.

Second, we were still studying the orbital debris situation, and while we felt we had some useful policy recommendations to make, we weren't sure we completely understood everything yet. In particular, we weren't absolutely sure we knew what the best policies would ultimately be. Joe Loftus pointed out something you may already suspect: that if we fixed a set of rules in place with a treaty, it would thereafter be infernally difficult to change them, even if further research showed that there were better ways to deal with the problem, or even showed that some of the original rules did more harm than good.

Having been away from the orbital debris world for awhile, I am not certain how mature the present researchers now feel our understanding of the situation is. Perhaps now would be an appropriate time to solidify debris reduction policies in a treaty. But my gut feeling is no. If the present policy regime is effective, that is if spacefaring nations, agencies, companies, etc. are following the recommended policies and living up to them, I would prefer to keep the situation on the present level, so that engineers and scientists can have flexibility to recommend changes if their research indicates new hazards or potential improvements in ways to avoid generating space debris.

What would be useful, in this country anyway, is to budget more money to study the space debris situation. What I keep hearing, from my friends and acquaintances who are still in the field, is that most serious players in the space business agree that orbital debris is a serious problem that very much needs to be studied. But in a time of tight budgets, everyone wants someone else's department or program to pay for the research, not theirs.

We can ask our congresspeople to vote for more money to study the orbital debris problem. **<LJF>**

The Mex-LunarHab Project

from Jesus Raygoza B.

Introduction

This is a brief preliminary report from Mexico, about the beginning of the making of our long-term project, a lunar habitat-spaceship named Mex-LunarHab.

I can tell you that defining the hardware is relatively easy to do and that the engineer within each of us wants to sit down and immediately build hardware. But I am interested in focusing such talent and enthusiasm onto a succession of smaller steps which will eventually realize the installation of humanity on the Moon.

As I sat down the first time and I started draw some sketches, many things came into my mind. First, to find the most practical, and safest way to put the Mex-LunarHab habitat-spaceship on the Moon; then, optimizing spaces in each compartment. This was just the beginning. I began to think in terms of cylinders and spheres. A cylinder is simpler to fabricate than a sphere. But a sphere is probably easier to deploy. Let me give you some examples.

Cylinders would likely be machined from slabs of titanium, much as Lockheed-Martin builds Titan and Atlas V airframes. Titanium is very hard to weld but may yield to vacuum processes on the Moon if the working surfaces can be keep clean during welding.

Any cylinders finding its way to the Moon will probably start off as fuel or oxidizer tanks. That is how it pays its way there. Assemble 4, 5, or 6 tanks of comparable diameters and length into a square or polygon with airlock couplings at each joint. Once the tanks are placed and coupled then a sphere is placed in the center [courtyard] of the cylinder ring, bolted to the tanks and inflated. Once the sphere is fully deployed epoxy is injected into cavities in the fabric where it hardens. Then the whole complex is covered with the excavated regolith.

The fuel tanks can even be fabricated with the airlock joint on one end, a receiver on the other. This asym-metry has both advantages and disadvantages. There is a certain functional elegance that anyone who has ever tried to build a model from "bricks" or LEGOs can appreciate.

There is a functional process which will have to be tailored to this particular task. While it is great to have a vision we must realize that the final result may have no resemblance to any early concepts. Our first focus must not be on the image of a habitat, but rather, an image of success: Mankind living, working and relaxing on "the 7th Continent", the Moon. While we can make the drawings, paintings and white papers necessary to keep the enthusiasts committed to the cause, we still have real work to do.

Some other Issues We are Faced With

One of the very early steps is to identify our commercial costumers. Who is it that requires either the presence of humans on the Moon or a product which can only be produced there? These customers have to have a financial advantage from the Moon's products and services before anyone is going to set up cabins there.

The Moon exploration stalled after the Apollo landings because then:

1. It was not a real commitment by the U. S. for a long-range Kennedy-style space program as a whole (no space station, no lunar base, no trips to Mars, etc.
2. whether we like to commercialize first the Moon or not, there was no compelling commercial need.

The national governments on Earth must invest in space exploration and space R&D as done by the U. S. President John F. Kennedy for putting into motion his historic lunar initiative during the early 1960s. Government initiative is certainly very much important and very much needed: That is how the Apollo Program became one of the most successful scientific-technological projects ever in history. Today, it still seems we are to wait that government money may follow private money for the next effort, and everything point straight that that effort will have to be a mostly privately-funded project. Yet, we are to earnestly keep pressing our national governments for investing in space R&D and space exploration.

Which Way to Go?

As a privately-funded project, we do not still know now how it may exactly be funded. But, as we go, the execution of project management and fundraising Mex-LunarHab Project and other legalities could be quite instructive to the United Societies in Space, Inc. (USIS), the Lunar Economic Development Authority, Inc. (LEDA) and the Space Orbital Development Authority, Inc. (SODA).

USIS Bonds, when subscribed, could be one source of infrastructural money (that is money to rise other money). We will go through corporate sponsorships, government grants, tourist attractions (as those already being discussed in Veracruz State about the site for our Mars Simulator Station named Mex-AreoHab Project on the Pico de Orizaba Mountain), postcards, and other publishable goods, etc. As also would the universities bringing some of their research and research money to the project (same as now envisioned for the Mex-AreoHab, which would provide us of previous experience).

Nevertheless, whatever turns out, the next entire lunar effort will be slightly easier than the first time that the United States did it. Since we now have the International Space Station (ISS) we will not need the likes of a Saturn V to launch the whole package. We will still need to send an orbiter and a lander at escape velocity to the Moon. Since it has done before the effort should only be about 50% to 60% of the previous Apollo Program ($25B), adjusted for inflation ($30B).

Future Plans and Activities

Human settlements on the Moon will require real substantial advances in automation, in control mechanisms and monitors to stay operating for a long-term control and maintenance of both recycling and purifying air and water, agricultural, waste management systems, and so on, a very advanced Controlled Ecological Life Support Systems (CELSS).

Mex-LunarHab is intended to be incorporate in an industrial manufacturing park as the one already envisioned to be deployed in the Malapert Mountain (lunar Southern Pole), that will be dedicated to in-situ resources utilization, where raw materials will also be delivered and processed. Another intention for this habitat-spaceship is to be conducting closed habitat tests for long period of times on its Earth site, the Pico de Orizaba Mountain (analog mountain to the Malapert Mountain) in Veracruz State, Mexico.

Evidently, in order to get reliable life-support systems, we are to operate indefinitely a required substantial engineering. Thus, keeping in mind, the design of real working improved CELSS is not the only one chal-lenge to cope with, but how to safely put Mex-LunarHab and its respective equipment on the lunar surface. Once we reach the Moon, among some other activities, we are to be efficiently able to establish agricultural facilities there. To get this work done, we have our own skilled Biology Group led by biologist Omar Pensado D., also currently designing experiments for Mex-AreoHab on the Pico de Orizaba Mountain, and already committed for terraforming Mars.

So far, as we go designing other major activities, for our industrial-manufacturing operations, engineer in mines Brad R. Blair (President of LEDA) as well as Gary "Rod" Rodriguez (President of SODA), would have a great opportunity to work with us.

As I myself, in the Designing Group, the Mexican section, are Mario Velasquez R. (structural), and Francisco Tijerina S. (engineering); the latter leading a group of other 24 engineers and technicians from the Laguna Verde Nuclear Plant. The U. S. section is formed by advisers as Drs. David G. Schrunk and Madhu Thangavelu, Gary "Rod" Rodriguez, and Felipe A. Hernandez (from Chile). In designing Extra-Vehicular Activities (EVAs) systems will be a NASA expert, Pablo De Leon (from Argentina); and in space suits, Elaine A. Walker. In computational designs is Rodolfo Hernandez B.; in telemedicine, Leticia Magaña C. (both also members of the Mex-AreoHab Team). On legal space issues: Esq. Declan J. O'Donnell (President of USIS) and Dr. David G. Schrunk.

Regarding current journalism made in the United States about the Mex-LunarHab Project, special thanks to Steve Durst and Michael R. Cerney of Spaceagepub. Also, special thanks to Cayetano Santana G., Juan Antonio Fernandez M. and the rest of The Mars Society Spain (TMSE) for publishing this project in Spain and the rest of Europe.

We still have to deal more with robots, tractors and other transport systems. About nuclear power, the power plant engineers onboard might plan a section of the "reservation" for isolated tests of nuclear power sources, which would have to primarily be previously supervised and regulated by the Federal Commission for Electricity (CFE) expert engineers themselves, already working along with the rest of us.

Conclusion

We can, and will, design several of lunar habitats. Almost all of them will be useless because they fail, one way or another, to address the requirements of a paying customer. We must take care not to destroy, scrap or excessively cannibalize any experimental habitat structures. They are very useful for the tourism business, whether they are kept on-site in a tourist area or whether they may be moved to the Pico de Orizaba Mountain to add to tourist attractions there. Along the way we will solve particularly tough technical and logistical problems and yet fail to meet a customer's needs.

Therefore, as the creator, coordinator, and collaborator being now involved in the early design of such habitat-spaceship, my position is to find a proper way to get this project done; to start to be making the dream of "Newton Base", in the Malapert Mountain a reality.

One Step at a Time

The Mex-LunarHab Project is still in its infancy and will have to be developed in full later. Trying to make a final habitat design just now is premature. We can not make a final design now because we do not have a customer and we do not know his requirements: We can not certainly begin to solve a problem when it has not even been posed or specific tasks to presently be done on the Moon. The same thinking is true even of a prototypical proof-of-concept installation. We must find sponsors who have something to gain from giving their money which will unleash us to build the necessary hardware to stay on the Moon. Our Mexican Team is gaining experience by planning now, and constructing and making operational the Mex-AreoHab hardware example later. For the Mex-LunarHab hardware, we are to work out the general ideas, next we make a presentation and then we get customers.

Jesus Raygoza B.
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- President, the Mexican Space Society (SEM)
- Board, Lunar Economic Development Authority (LEDA)
- Secretary & Regent, United Societies in Space (USIS)
- Board, Space Orbital Development Authority (SODA)
- Board, Institute for Advanced Sciences (ICA)
- Board, The Mars Society Spain (TMSE)

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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Why not start a Moon Society Outpost?

Peter Kokh, Moon Society Chapters-Coordinator
chapters-coordinator@moonsociety.org or (414) 342-0705

By the time this issue of MMM arrives in your mailbox, the list of Moon Society Chapters and Local Contacts at www.moonsociety.org/chapters/ will have been updated. Any such list needs periodic housekeeping to remove listings and links that become inactive or go dead, as well as to add new listings. After a long period of inattention, we've done our homework and the revised more accurate list is ready to post.

The new list includes thirteen (and only thirteen) U.S. chapters and local contacts - "Outposts." They are, in alphabetical order of the state in which they are located. (Only the three underlined outposts have active websites):

- **CA** Bay Area Moon Society (San Francisco, Oakland, San Jose area and surroundings)
- **MD** Mid Atlantic Moon Society (Washington DC, Baltimore, and surrounding area)
- **MO** Moon Society St. Louis Outpost
- **NY** (1) Greater New York City
  (2) Long Island
- **NC** Durham area
  OR Oregon Moon Society Portland
- **PA** Pittsburgh
- **TX** (1) Dallas
  (2) Houston
  (3) San Antonio
- **WI** Moon Society Milwaukee Outpost
- **UT** Utah (Provo, Salt Lake City)

Let's fill the many holes in this list and on the map!

We made every effort to contact those local contacts on the old list. If you had been listed as local contact, but do not see your area on the list above, and still wish to serve as a local contact, please contact me ASAP!

If you live in an area that does not have a chapter or local contact in the list above, and would like to serve in that capacity, please contact me also.

It's now easier than ever to be an effective local contact!

We now have in place many new resources to help local chapters and contacts. And we are developing more. It is up to each "Outpost" to be as active as he/she/they want to be. The minimum level of activity is to answer any email from members or prospective members that comes your way, and to forward any inquiries which can be better handled on the national level (Media and PR requests, for example.)

We have seven (7) active International Outposts. These are listed on page 12, below.

Join (renew/rejoin) the Moon Society today!
http://www.moonsociety.org/register/

Oops! A Low Report Card Grade!

Editorial by Peter Kokh

In this month's In Focus Editorial, pp. 1-2, "Vision must be defined in terms of Obstacles & Challenges," we graded the various Space Activist Societies on how well each has defined its Vision in a way that leads to action, and on how effectively each is pursuing its mission. We gave a better than average grade to the Planetary Society and the Mars Society, and a lower than average grade to the National Space Society and the Moon Society.

We belong to all five societies listed, and our remarks, where critical, come from a concerned, devoted friend. *We have all accepted unnecessary limits* on the avenues along which we strive, and in the tools and resources we choose to use. We can all do better!

This is not to say that we haven't done a stellar job in some respects. Randall Severy and CyberTeams, Inc. in particular earn, and deserve, highest marks for putting web resources and tools, and continuing to develop and perfect them with amazing resourcefulness, at the disposal of Artemis Society International, the Moon Society, the Mars Society, and the National Space Society chapters.

But our challenge is not only to use these tools to the limit of their capacity, but to not restrict ourselves to what we can do with them. Our membership remains low and there are reasons for this. We have failed to cast the grand vision we all have in terms that are clear to potential new members. We have failed to come up with sexy self-funding projects that inspire people to join our ranks. We have done well at marshaling the electronic talents and genius of our membership, but have overlooked as spurious the other collective talents of our membership base.

We have dwelled on our limitations in an almost defeatist fashion. "Our numbers are too small to do anything. Our collective dues, less expenses, are insufficient to support any projects, even a membership drive." Someone once said, "first, tell me all the reasons why we can't do such and such -- then tell me how we are going to do it *anyway*." Well, we have the first part of that exercise down pat. The rest requires resourcefulness, the ability to identify new tools and find ways to leverage what we do have. It requires homework. Ugh! It requires doing things we don't do naturally.

We do not make a habit of asking our members:

- What particular glimpses of humanity's possible future on the Moon excite you most? (= on what items do we need to show some progress in order to earn your renewal of membership?)
- What are your occupational proficiencies and expertise? What hobby/sideline talents do you have? If you could choose how to be involved, what would that be?
- What kind of projects would you personally like to be involved with? How do you think you could fit in? If you were a Society Leader, what duties and tasks would you assign yourself?

This type of exercise is vitally important! If we are in the habit, as are most space societies, of reducing our members to (dismissing them as) mere dues payers, we are involved in an exercise of self-castration. This kind of dismissal is an occupational hazard of those who select themselves to leadership roles. They reduce what can be done to what they themselves are able to do or know how to do. That is a dangerous game. This practice is common to all the major space interest societies.

Leaders commonly consider only those activities and projects that can be centrally organized, and that can be supported by anonymous membership resources. The **Gross Societal Product** is then necessarily limited to the **Lowest Common Denominator**.

This may not be meant as arrogance, but in effect, that's what it is. Leave things to us pros. You be the fans and support us with your dues. It wouldn't be so bad if all the challenges and obstacles to the realization of our vision could be adequately addressed from so narrow a talent pool.

As a Society, we need to get past the self-congratulations for those things we do well, and on to addressing those things we do poorly. To our credit, we are trying!

Randall Severy has introduced a MY Moon Society Page - to visit yours, go to :

http://www.moonsociety.org/mymoon/login.php

You will be asked for your login name and password (there are instructions if you have forgotten yours or have not yet selected a set). On logging in, you will see a menu that lists any activity teams you may have joined, and which will allow you to quit any teams and to join new teams.

Under discussion is the idea of adding the option of creating a profile of yourself that could list occupational talents and expertise, hobby and sideline talents and expertise and interests, and anything else you think it pertinent to the Society to know in its attempt to pick and design projects that can be supported by our combined talent pool. This would all be totally voluntary, and, should a member choose to file a profile, it will be as detailed or as skimpy as the member feels comfortable with.

Perhaps we could also ask members to express their personal ranking of priorities for goals and projects. This would be a guide to the Society in maximizing efforts that would be rewarded with improved membership renewal rates.

The trick would be to design a database to handle all this information in a way that could be "mined" to help leaders decide if a given project is ripe for pursuing at this time, or should be put on the back burner.

An Annual State of the Society Report

Another innovation in the seminal stage is an Annual State of the Society Report. The last such Report was published in MMM # 124, April '99, "State of the Artemis Project", 2/27/99 by Gregory Bennett. Our plan is to make such a report a team effort, thereby greatly reducing the burden on any one person. Various point persons would contribute reports on website resources and improvements, state of the chapter and outpost system, Society publicity and publications, membership growth and retention, Society presence at various conferences and conventions, various ongoing projects, etc.

If each point person keeps a running log of efforts in progress, successes and setbacks, it should be a relatively painless and straightforward task to put together an annual report on a regular basis. Hopefully, we can get back on track with a new and encouraging State of the Society Report by the 4th anniversary of the last one.

Membership Retention

Publishing an Annual Report on the State of the Society and our Progress towards the realization of our Vision is essential in any effort to improve membership retention. The embarrassing truth is that of the 1200 persons who have joined Artemis Society International and its successor in membership services, the Moon Society, since 1994, only 300 are still with us. That in itself is a report card with a "You must show improvement!" warning written in bold red letters all over it. It is far easier and cheaper to retain a current member than to recruit a replacement. Any membership drive needs to start with membership retention. Otherwise we are but pouring new water into a badly leaking pot.

Member Recruitment Requires Expanded Menus.

We have to stop looking at this effort as simply a matter of finding the money to effectively get the word out about our existence. Who cares about our "existence!" *Are we doing anything? Are we making progress? Are we a bandwagon worth hopping aboard?*

Before we can effectively look for members, we have to make ourselves attractive. Right now we have many ways for technonerds and html whiz kids to get involved. What menu options for involvement do we offer to the vast numbers of people interested in space and the possibility of settlements on the Moon using local resources, persons who may well not fall into the technonerd, html whiz kid category? Not much! Here's where the rest of us come into play. We, not the technos, have to come up with the projects and involvement options that will attract others like ourselves. The web teams have done wonders to date, and we mean no offense to anyone, but we need to get real on a much broader front of activities.

Each of us can help and play a role. But to do so, we have to stop waiting for leaders to suggest ways in which we can become effectively involved. That is *our* job, not theirs. *We* know what *we* can do. They do not. Each of us must look at ourselves. What do we know how to do, do reasonably well, enjoy doing - whether professionally or on the side, it does not matter - that could be put to work in one way or another to advance our goals? There are many challenges and obstacles, many vectors and fronts on which the battle must be waged. Each of us has our own insights, and truthfully, our own set of horseblinders. We cannot rely on any leadership group to be without their own set(s) of horseblinders, perhaps blind to what *we* can contribute.

What we see *as possible* is in large measure colored by our individual talents and abilities. We have all heard the witticism that if one's only tool is a hammer, all problems look like nails. If our only tool is a pair of websites, all problems seem to be web problems. The more tools we *collectively* have, each owned and wielded individually, the more likely we are to *collectively* address challenges and projects in an appropriate manner. But the Society cannot know the extent of our collective talents unless we each individually 'fess up and step up to the plate. Again, don't wait to be called on. *Call on yourself.*

Ask yourself what kind of projects or tasks could put your talents and abilities to work. It doesn't matter if the project seems small or insignificant. Let events be the judge of that. All too often, little steps enable much larger ones. Every contribution has meaning, often beyond what we can foresee. Nor does it matter if the project seems too big and involved for you alone. Do what you can to define the project then throw it out to see if there are others who want to work with you. Throw it out where? The email discuss lists are one place to search for help, but all too often all that happens there is wandering talk that never leads to any results. MMM (and the MSJ pages) are available. We are more than happy to run Classifieds: ♪ help and assistance wanted; ♪ help and assistance available.

To retain current members and attract new ones, we must do a good job of putting people to work, or giving them a wider menu of opportunities to play a role. Each member is a would-be pioneer, and it is out of stock like us that those who do pioneer the Moon will come.

Financial Resources

The National Space Society sends out fund-raising appeals regularly, but only to increase general funds. The Moon Society does not even do that. The Planetary Society and Space Studies Institute send out appeals for donations to *specific projects*. That is what gets members to take out the wallet. To limit our efforts to our dues base invites failure. We must be "The Little Society that Could.".

Moon Society St. Louis Outpost

How MSSLstarted and grew to five members.

From Dave Dietzler <Dietz37@msn.com>

Keith Wetzel started it all. He got interested in the Artemis Project via the website. He got a list of email addresses and found me {Dave Dietzler] and Chris Nobbe.

Burt Sharpe's email address was listed along with one of his "Planet Moon" articles in "Return to the Moon 2" along with a note that he was from St. Louis, so I emailed him some time ago to see if I could make a new friend. After we had a Moon Society meeting I thought, "hey, I wonder if Burt Sharpe would..." Christie Dudley responded to one of our flyers at the Archon sci-fi convention.

Email and the websites have been central to this. Good old fashioned flyers also. We haven't even hit the St. Louis Astronomical Society yet. I am enthusiastic them.

Keith knows all about computers, his trade. I just learned how to burn a CD two days ago and bungled through my first practice slide show today. Burt worked as head of Lunar experiments for NASA, so he really gives us credibility. Christie Dudley works for Space Adventures as a travel agent booking weightless flights on their plane as well as other stuff. Chris Nobbe is a teacher of gifted kids and they use lunar colonization as a way to stimulate creative learning. They have a Moon Madness night every year at school where all the kids' art work is displayed, guest speakers, telescope viewing, etc. Next one January 16, '03.

All we need are more members, then the ugly process of electing officials and holding structured meetings. I hope dues don't become a turn-off, but if the organization grows and events are hosted, we will need the green stuff. I will agitate for free trial memberships if that ever happens.

I also want to contact any NSS (National Space Society) members in the area. There is no NSS chapter in St. Louis presently. When we get this thing going with more members, I want to start a small free newsletter for members. I'm going to call it THE L1 GATEWAY.

I want to contact the X PRIZE Foundation, 722-A Spirit of St. Louis Blvd, St. Louis, MO 63005; 636-519-9449 [www.xprize.org/]. They are based here in St. Louis, where Charles Lindberg is still a local hero. They may have some interested parties. The Mercury and Gemini capsules were made here as well as the airlock on Skylab. So there must be more space oriented people here.

We had another Moon Society meeting last night, Wed. Dec. 11, and six people including myself showed up. So now we have one more than the five members needed for a charter. The new guy, David Heck, found out about us through The Manifesto, so I guess he is already a Moon Society member. We discussed goals for the chapter, so we're starting to move beyond just hanging out and talking. I've sent a message directing our local members to the chapters hub websites if they haven't been there already. Things are gradually taking shape. **<DD/MSSL>**

Moon Society Milwaukee Outpost

From Peter Kokh <kokhmmm@aol.com>

This month we designed and built a table top stand to hold an overhead banner. Made of inexpensive and easy to work with one inch (inside dimensions) PVC pipe and fittings, the unit fits a 5 foot folding table, with a pair of extenders to fit standard 6' and 8' exhibit tables. The overhead pipe has a 52" clearance over the table. The pipe diameter is just right for standard shower curtain hooks to use in hanging a banner or other items. The unit breaks down into a number of cemented subassemblies that slide into a "quiver" made from a 4" perforated PVC drain pipe with caps and handle, for storage and easy transportation. The entire unit, including holder, cost us about $10. The blueprints, list of materials, and easy instructions are posted on the Space Chapter Hub website at this address.

http://nsschapters.org/hub/exhibits/tabletopper.htm

Along with our new Artemis Moonbase Exhibit (see last month's Moon Society Journal pages), the tabbletopper debuted at the holiday potluck and science fiction film classic event on December 14th, a joint celebration by the Lunar Reclamation Society (NSS), the Wisconsin Mars Society, & Moon Society Milwaukee Outpost. **<PK/MSMO>**

Moon Society International Outposts

Canada (Toronto) — Simon Rowland — <simon@eagle.ca>

Finland (Helsinki) — Jokke Kaksonen — <jokke@celes.pp.fi>

Germany – Gottfried F. Zojer – <goenzoy@gmx.net>
http://www.moonsociety.de

Ireland — Dale Amon — <amon@vnl.com>

Netherlands - Heico J. de Boer <heicodeboer@hotmail.com>

New Zealand — Vik Olliver — <vik@asi.org>

United Kingdom — Richard Perry — <rperry@dial.pipex.com>

Meandering *through the Universe*

Column on the Cooperative Movement on the Space Frontier

Space Frontier Dawn Period

I occasionally wonder how long space settlement will remain in a state which might reasonably be defined as "early," "primitive," or perhaps "pre-robust" once the great adventure has begun. Barring amazing breakthroughs in technology (or, at least, amazing breakthroughs in popular mood and interests) I think it is fair to say that the space frontier will be a much more challenging frontier than any other humans have yet faced. It is not only a more challenging frontier to get settlers to, but it is a more challenging frontier to merely survive on, to say nothing of building a thriving culture. Additionally, it is a more challenging frontier on which to build a functioning and flourishing economic infrastructure. Considering all of that, it seems likely that space settlement will remain in a vulnerable, non-robust, "primitive," "early" state for at least forty years, and possibly as long as a few hundred years.

Once human expansion in space has entered a robust and flourishing state it will be able to solve any problems it is likely to face on the fly. We needn't worry about anticipating and trying to prepare for those problems. They are *no* concern of ours except for science fiction entertainment purposes. That is not what the current space enthusiast movement, nor this column are about. When I write these columns my concern is with those things which might hinder or promote the early stages of space settlement, those things which could possibly result in a temporary or permanent death to space settlement, those things which might prevent or reduce the likelihood of such a negative outcome and those which seem like they might help advance the current of space settlement on to a more mature and robust stage.

I also try to give consideration to the problem of how we might get from where we are right now (stuck here on Earth), to where we want to be (starting to irrevocably settle space). The other fundamental guiding concern I try to address is how we can arrange things so that we, ourselves, or at least people like us can be included in the great challenge and adventure, and not just money bags, PhD's, the prettiest of the muscle bound, and folks of the far future.

Maybe I'm wrong ... maybe most space enthusiasts are convinced that the space frontier will be so quick and easy to settle that the only hold up is the public will. Get the public in line and we'll all be living in space in a matter of months. Or maybe most space "enthusiasts" actually don't really care if space is ever opened to settlement. Maybe they just like to be part of a fantasy. Or maybe they don't really want to go, don't really want anyone else to go, and don't really want to do anything which might actually promote an irreversible opening of the space frontier to settlement. Maybe I am just deluded, or have misunderstood the situation, or am just plain on the wrong track altogether.

Maybe, but since I am convinced that is not the case (though I realize that I probably only have the foggiest sense of how things might really turn out to be) I press on in hopes that I might add a little bit to the ultimate success of space settlement and perhaps even hasten the course of events.

Who will go? How will they live?

However, if space enthusiasts really ***do*** want to be able to go themselves, if they really ***do*** want people like them to be able to go, and if the settlement of space, rather than being a cake walk, will be tough and trying, expensive, slow to mature to robustness and so forth, then for a long time (in terms of human lifetimes) there will be unavoidable limits on who gets to go. If those assumptions are correct, then we are confronted by some tough, inevitable, unavoidable questions.

What characteristics and/or circumstances should disqualify a person from going? What characteristics and/or circumstances should make a person more qualified to go? How should lists of positive and negative characteristics be determined? Who should get to make these kinds of decisions?

How will people "make a living?" Will settlers be given the bare necessities but no pay? Will they be paid and in turn have to purchase the necessities or die? Or will there be enough wealth to provide the necessities and some level of payment as well? How will expenses like transportation from Earth to the space settlement be paid for?

A Business Plan is Critical

"This is the first frontier faced by humans which is unassailable without a business plan."

The list of *fundamental* questions goes on and on and on, making it clear that this is the first frontier faced by humans which is unassailable without a business plan. And it not only requires a business plan, but it demands a superbly crafted, unerringly reality based, absolutely comprehensive business plan crafted to a finer level of detail over a broader scope than any that has ever been seen before.

Clearly, making the plans for the first few space settlements is a monumental task. But it is not an impossible task. The common person now has access to unprecedented and astonishing computing power. And through that computing power and advances in communication systems they also have unprecedented communication and networking power. These are not only advantages for people, but they are also advantages for data sets (such as busi-

ness plans). That is to say, regardless of who is working with data, the "system" which includes the data, the people who are trying to achieve some result, and the hardware and software which connects the two ... that "system" is now far more capable of generating far more complex and inclusive patterns (i.e. results) than has ever been possible in the past and for far less cost.

The Human Factor

The greatest bottleneck remaining is the "human factor." The "human factor" includes such things as insufficient motivation, misguided and/or misdirected motivation, lack of vision, unrealistic vision (both too negative or too positive), and lack of resources. Consequently, planning has to start with an accounting of current resources, an assessment of reality (what is possible at the current stage), and the development of a plan which utilizes only the currently available resources under the currently imposed circumstances of reality to access a greater breadth of resources and create a greater set of possibilities to be utilized in the subsequent reality.

It is usually advantageous to make preliminary outlines of plans for later stages based on the anticipated resources and reality expected to result from current and future progress. The problems, wasted resources, frustrations, burnout, and all too often, failures come from allocating too much time and energy spent speculating on, dreaming about, and constructing detailed plans and expectations for later stages while not allocating enough time, energy and resources to the details of the current steps.

It is only useful to tackle nearer term problems

Because our goal is so lofty, so complicated and so expen-sive it is an ever present temptation to fall into this tar pit and waste our time trying to solve the problems of the 20th generation of space dwellers, or neglecting critical but annoying or less interesting nearer term problems, or even trying to solve problems which don't actually exist. The 20th generation doesn't need our help! It is the pre-immigrants, the first immigrants and the next generation or two who need all the brain power we can give them. Critical problems need to be addressed whether they are not interesting to us or not. And we just don't have enough resources to waste our time solving problems which don't exist.

There are various groups, publications, etc., which are making a good start at sorting things out and chipping away at figuring out how we can get to, and live permanently, in space. I commend them. Yet it seems that there is still room for a fundamental reevaluation of the whole problem: who will go, how they will be selected, what they will need to get there, how to obtain the means to get there, how they will live there, how they will get what they need to live there, etc., etc., etc.. **<RRR>**

Holiday Message From Ray Bradbury

[To Planetary Society members. Reprinted here for the sake of sentiments expressed in which many of us share. A previous survey showed that 12% of MMM readers were also members of the Planetary Society.]

Dear Friends,

Twenty years ago, I had my first "Martian encounter" with Planetary Society co-founders Carl Sagan and Bruce Murray, along with Arthur C. Clarke and Walter Sullivan, at Caltech in Pasadena.

It was clear that this mob of bright minds understood that we do not go to other worlds because they are there, but because we must. Some day, I know we will prevail on Mars and the other planets, putting forth something of ourselves and shouting, "I'll be damned! Yes! We had a vision. Now we know it was right!"

As you know, playing a part in this journey into space has often been the province of just a select few scientists and engineers. But thanks to The Planetary Society, other dreamers like us - hundreds of thousands of us from around the world - have had the chance to play a direct and meaningful role in the exploration of other worlds.

In fact, we Members of the Society, united by our commitment to uncovering new knowledge about the stars and planets that share our corner of the galaxy, have often been the driving force that has kept this journey alive.

Indeed, time and time again, our efforts have led to some of the most exciting advances in space science and exploration in the past two decades.

Like Carl and the rest of us, you, too, understand that we have no choice but to explore those other worlds. You know how important it is for our visionary Society to remain strong, vibrant, and able to "make it happen".

That is why I hope you will join me in giving Planetary Society Gift Memberships this holiday season to your friends, colleagues, and family members. Your help will ensure that we make this grand adventure come to fruition.

Happy Holidays.

Sincerely,

Ray Bradbury

Gift memberships, whether in the Planetary Society, the National Space Society, the Mars Society, and/or the Moon Society are a great way of spreading the vision to others and to grow the team of those committed to do what they can to make our shared dream(s) come true. So are individual gift subscriptions to MMM.

Why wait until next holiday season! Birthdays, graduations, and other occasions are also appropriate for membership/subscription gifts. Indeed, such gifts need no special occasion at all. That we care is enough!

Book Announcement: "LAUNCH OUT"

December 2002 PRESS RELEASE

LAUNCH OUT, a science-based novel about space industrialization, has just been published. The futuristic volume centers on the leadership of private enterprise in developing an industrial park and base on the Moon. The plot focuses upon the synergistic planning and efforts of two high tech companies in this regard - one based in LaJolla, California, the other in Kyoto, Japan.

The 304 page book has sixteen chapters and ten relevant illustrations. The plot covers the actions of sixteen "technauts" on the lunar surface in 2010. Through "flashbacks," the reader learns the 20-year saga of multinational corporations within a "Global Space Trust" to get the spacefarers and their robots on the lunar surface. The premise is that if taxpayers are to get ROI [Return On Investment] on the Apollo mission expenditures over thirty years ago, then settlement and commercialization of the Moon will require strategic alliances between both the private and public sectors, as well as among world corporations and universities. The economic rationale for such a macroproject, entitled "Lunar World," is that humanity's survival and progress on Earth requires utilization of its sister planet's resources, especially lunar solar energy. For this to happen in real time, the work even envisions a "Lunar Economic Development Authority" coordinating the international investment in the venture.

The author, **Philip R. Harris, Ph.D.**, spent twenty years researching and writing LAUNCH OUT, in the hope of convincing people why human evolution offworld is both a necessity and eventuality. Although this is his first fictional endeavor, Dr. Harris, is author/editor of forty professional books and noted particularly for the MANAGING CULTURAL DIFFERENCES SERIES (www.bhusa). A management/space psychologist, he is an associate Fellow of the American Institute of Aeronautics and Astronautics. A former NASA consultant and Faculty Fellow, Phil received eight awards for excellence from the Aviation/Space Writers Association. The founding editor of the journal, SPACE GOVERNANCE, he also contributed chapters to a NASA publication entitled, SPACE RESOURCES, and authored LIVING AND WORKING IN SPACE (www.praxis-publishing.co.uk)

Perhaps the book's cover quotation by America's rocket pioneer, Prof. Robert Goddard, best describes its vision: "It is difficult to say what is possible, for the dream of yesterday is the hope of today and the reality of tomorrow."

For copies of this LAUNCH OUT limited edition, order from Harris International, 2702 Costebelle Drive, LaJolla, CA 92037, USA (prepaid $30)

Russia to Boost India's Moon Dreams

[See "India's Updated Moon Mission Plans" in last month's issue #160, P. 16]

A Russian space agency team visited Bangalore, India in early December to work out a joint lunar project with the Indian Space Research Organization (ISRO). Russia has expressed that it wishes to provide several launch vehicles for the joint missions. A probe will be first launched to the Moon by 2005 as the first step of the project. Robots will then land on the lunar surface to conduct science investigation.

The project will eventually help Indian astronauts land on the Moon. ISRO has completed a feasibility study to use indigenous technology to launch an orbiting mission to the Moon in 4 to 5 years and the report had been submitted to the India Space Commission in November.

The proposed Russo-Indian joint project would be a result of President Vladimir Putin's visit to India in early December. This development would accelerate India's advancement toward the Moon.

China's own Moon Dreams still Alive

Principal scientist of China's lunar project Ouyang Ziyuan affirms the nation's stratagem for lunar expedition in his article in the national newspaper Guangming Ribao in early December, in which he stresses the necessity for international cooperation in lunar exploration.

The CAS Spece Center also revealed the upcoming Shouzhou-4's detailed science objectives and mission design. It is expected that China will speed up its lunar project after the human spaceflight mission is realized.

Lunar Explorers Website Worth a Viist

http://www.lunarexplorers.nl/

The Lunar Explores society was formed during the 4th International Conf. on the Exploration and Utilisation of the Moon (ICEUM4) organized by the International Lunar Exploration Working Group (ILEWG) at the European Space Agency's Technology Research Centre (ESTEC), in Noordwijk, The Netherlands on 14th July 2000. ***Objectives:***

- Raise awareness of what could be achieved by returning to the Moon through educational and outreach activities.
- Promote international cooperation between scientists working on Lunar missions by providing a neutral platform for their discussions

Transorbital has Successful Moon Test Launch; Ready for Routine Moon Travel in October 2003

SAN DIEGO - 12/22/02: TransOrbital, Inc. [TO] and International Space Company (ICS) Kosmotras today announced a "perfect launch" of TransOrbital's *Trailblazer* satellite. The launch represents a major milestone in TransOrbital's much-anticipated routine lunar delivery service.

The launch, from Kazakhstan's Baikonur Cosmodrome, of the *Trailblazer* into low Earth orbit was called a total success by TO president, Dennis Laurie. This flight mission was to test rocket separation, downlink telemetry, space-craft orientation and mass properties.

Vladimir Andreev, Dir. General of ICS Kosmotras, said, "We are excited about teaming with TO's first commercial development of the Moon. Our Dnepr LV SS-18 ICBM provides a proven cost effective technology for lunar launches." TO is on target to begin routine Moon travel, starting in October 2003. Laurie said, "Significant commercial demand exists for high definition video, lunar mapping, data storage, scientific research, communications, and data archiving. Many corporate marketers see their products associated with the first commercial missions to the Moon." "Additionally, there is worldwide demand from private citizens to send personal items such as photographs, legal documents, business cards, burial ashes, and jewelry to the Moon."

TO is the first and only company licensed by the U.S. Dept. of State and the National Oceanographic and Atmospheric Administration (NOAA) for private sector flights to the Moon. Sir Arthur C. Clarke noted visionary and renowned writer, commented on today's mission, "All good wishes on TransOrbital's successful "TrailBlazer" launch." Support for the Trailblazer program has been provided by a number of companies, including Lunar Enterprise Corporation and Space Age Publishing.

TransOrbital, Inc, [TO] <www.transorbital.net> - TO is a privately owned supplier of aerospace design,rvices. Established in 1998, TO is the first company of its kind authorized by the U. S. government to photograph, explore & land on the lunar surface. The 2003 *Trailblazer*'s primary goal 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 & commercial cargo to the Moon.

Intern'l Space Co. (ICS) Kosmotras <www.kosmotras.ru> – ICS Kosmotras is a private supplier of launch vehiclesfor many companies and countries around the world. The *Dnepr* program is covered by special decrees by both the Russian and Ukrainian governments. *Dnepr LV* is the worlds most powerful SS-18 ICBM, able to deliver 3,500-4000 kg to LEO.

Mail For MMM

The L1 Gateway , October & November MMM #160-1

I found your articles in both issues about "The Earth-Moon L1 Gateway" quite interesting. As you may recall, I've advocated the use of L1 as a transportation center for both lunar and Mars traffic before. I agree that an L1 facility does not have to be built all at once, but can be assembled in stages, as means permit and lunar or Mars operations require. - *Larry J. Friesen*

I haven't read NASA's Next report, but something not destination-driven could wind up with the same ambiguous requirements that the ISS is facing. What's it for? With real specific destinations, you can focus and have clear goals. Otherwise, it's unlikely to generate wide spread support and excitement. When's the last time the public got excited over "space infrastructure"?

So I'm not sure what aspect of the Next L1 plan you are really rejecting as cowardly (page 3) Your ideas on a depot and related capabilities at L1 are worthy of consideration, but I always have problems with concepts that offer solutions before the problem (requirements) are defined. For example, you propose a relay station. But who is on the Moon's nearside to receive those messages? Why are they there? That must be established first before one can determine there is a requirement for the relay station. Second, a supply cache is proposed for Earth-Moon travelers. Again, who are these travelers and what are their requirements? How will it be determined what to store at the depot? Is it cheaper to add redundancy to the travelers equipment vs setting up a cache of spare parts that might not be exactly what they need nor within their means to access?

Concerning the solar power station at L1, won't that location also have long eclipses from the Moon itself? You addressed Earth eclipses (page 5) but not lunar ones. I'm sure those must be more frequent and of longer duration. - *Mike Mackowski*

Get your SAIC 2003 Space Calendar

Chicago Space Frontier Soc. has a limited supply of these beautiful 12 month calendars by **Pat Rawlings**. Available to area members of NSS, Mars, Moon Societies, - for **$5** each ($10 to non-members. As gifts, they bring up space every time one looks at it,l reminding one of the giver. As gifts, they are $5 each to members. Postage $2.50 for one to each address (will send in your name if gift) or if two or more $2.50 plus $1 for each extra to one address.

Send orders to Larry Ahearn/CSFL-5, 610 W 47th Place, Chicago, IL 60609. Checks or Money Orders, OK. No credit cards. Questions?, contact LDAhearn@AOL.com.

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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(* LRS Board Members, plus Ken Paul ..... 426-0432)

LRS NEWS

• **LRS Annual Anniversary & Holiday Party:** Seventeen people took part, including 5 members of the Wisconsin Mars Society and two former LRS officers whom we hadn't seen in a long time: former president Mark Kaehny and former treasurer Duane Krahn. Highlights: a great potluck meal, new space exhibits, and the film classic *Forbiden Planet.*

LRS JANUARY Events

Saturday, JAN 11th, 1–4 pm

LRS Chapter Meeting, Mayfair Mall, Garden Suites **Room G110** (lower level, NE part of Mall) near the ground-level entrance below Cinema complex. FREE to public as usual.

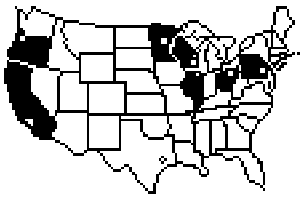
VIDEO "Moon Dreams" a documentary featuring people involved in the Return to the Moon movement: Lunar Prospector's Alan Binder, Artemis Society and Moon Society leader Gregory Bennett, and others

LRS FEBRUARY Events

Saturday, FEB 8th, 1–4 pm

LRS Chapter Meeting, Mayfair Mall, Garden Suites **Room G110** (lower level, NE part of Mall) near the ground-level entrance below AMC Cinemas. AGENDA to be announced

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, 5120 Ewing Avenue North, Brooklyn Center, MN 55429
Dave Buth (w) (612) 333-1872, (h) (763) 536-1237
612-375-1539 (Jeff Root)
Email: mnsfs@freemars.org

www.FreeMars.org/L5/index.html

• **L-5MN/MnSFS's 23rd Annual Election Saturday, Nov. 16th,** Centre Village Party Room, 433 So. 7th St., Minneapolis. This event included a pot luck dinner beginning at 6 PM in the party room. Everone brought something to eat and drink so we had a great dinnerspread. Our video this year included footage of Buzz Aldrin punching out Bart Sibrel, the guy who says NASA faked the moon landings, naturally the room cheered. Then we watched some Martian documentaries and cartoons. After dinner we had the elections. The results are:

- Executive Director: Tom Greenwalt
- Assistant Director: Rich Brown
- Secretary: David Buth
- Treasurer: Craig Borchard
- State Councilor 1: Scott Shjefte
- State Councilor 2: Jim Cran
- State Councilor 3: Ben Huset

• **MN SFS display for shuttle flight STS-113.** Information for the display is based on the current STS press kit:

http://www.shuttlepresskit.com/index.html

We have been doing this for every flight since STS-26. You can see the display at Radio City, 2663 County Rd I, in Moundsview -- http://www.radioinc.com/ - 763-786-4475

The display at the Minneapolis planetarium, which has been our primary display site since STS-26, has been relocated to Onan Observatory while the Minneapolis planetarium is rebuilt. Onan Observatory is in Baylor Regional Park at 10775 County Rd 33, Norwood Young America, MN 55397 -- http://www.mnastro.org/onan/

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: **JAN .18th, FEB 15th**

CALIFORNIA

OASIS

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://chapters.nss.org/oasis

Odyssey Newsletter Online
http://www.geocities.com/CapeCanaveral/Lab/4005/articles.html

☞ **Regular Meeting 3 pm 3rd Sat. each month**

Information: OASIS Hotline, 310/364-2290; website.

JAN 18th -- OASIS Monthly Business Meeting, location: Microcosm, 401 Coral Circle, El Segundo.
FEB 15th -- OASIS Monthly Business Meeting, location: Microcosm, 401 Coral Circle, El Segundo.
MAR 13th -- OASIS Monthly Business Meeting, location: Microcosm, 401 Coral Circle, El Segundo.

Recurring Events

- **The Griffith Observatory** is undergoing renovations and upgrades to reopen in 2003.
- **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/

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**
JAN 21 th at the Foerster Academy of Dance, **Sheboygan**
FEB 18 th Meeting at the Stoelting House in **Kiel**.

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

☞ **NEXT MEETING DATES:**

- **JAN 22nd**? WED6:45 pm Lakewood Library
- **FEB 18 th** ? TUE 6:45 pm Bedford Cyber Cafe?
- **MAR 24th**? MON 6:45 pm Fairview Park Library?
- **APR 19th**? SAT afternoon, Great Lakes Science Center
- **MAY 18th**? SUN morning NASA Visitors Center

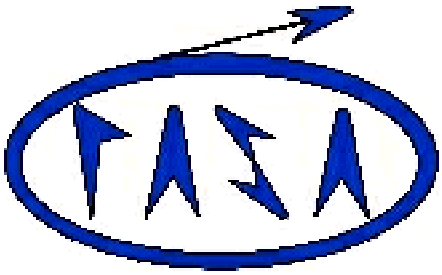
• **December Report:** Our November meeting at the Cleveland Museum of Natural History worked out well - we got into the museum for free, meeting in classroom B, ideal for teaching purposes. 2003 upcoming events were the topic. We went to the 7:45 pm show in the new planetarium - well worth the money. Afterwards we went to the observatory, staying until about 9:45. We had a successful meeting, even if it was only our usual six people.

Our Christmas party was set for 3 pm on December 15th at the Capsule restaurant in Lakewood, 13376 Madison Avenue, a few blocks west of the Madison Branch Library.

• **MMM:** Membership fees for 2003 are due in December. Come January, **Moon Miners' Manifesto** will no longer be an automatic membership benefit. However, MMM has been paid ahead through the March issue, so you will still find MMM in your mailbox for a few months longer.

Members can continue getting MMM, however, by

a. subscribing individually directly to LRS at $18
b. If three or more members wish to continue subscribing and their payments are collected and sent to LRS as a group via the CVSS Treasurer (Bob Gross), the current group rate of $14.40 will apply.



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.tripod.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.

NEXT MEETINGS: JAN 11th, FEB 15th

Call Earl or Mitch 215-625-0670 to verify all meetings

• **November Report:** We are gathering at Philcon, Sat., Dec. 14th, for dinner & planning for next year. Meet at the joint PASA/Mars Society tablein the Marriott just outside the Dealers Room. The January meeting is at Super Science Weekend at The New Jersey State Museum in Trenton NJ.

• **Joint Meeting Notes:** Our umbrella nature means that we host get-togethers with a particular group focus, in this case with members of the Independence Chapter of the Mars Society. The chapter President,Gary Fisher came as did Richard Mallon-Day ,software consultant and Dolphin research, and Bob Meigs also in systems. Michelle Baker, Hank Smith and me (Earl Bennett) are also members.

• **Mars Society Activities:** Gary Fisher discussed the Mars Desert Research Station in Hanksville, Utah which is hours, not miles, off the beaten path. Gary's contribution was work on the Greenhab which has been redone recently. A member in our area donated a new material for the glazing of the structure (Sun-Tuff from Sun Hab, Kutztown, PA.) The device is a "living machine" for experiments in water and waste recycling. It presently is operating as a "simple" water cleaner with its biologically cleaned output being used for toilet flushing duty. Testing kits will be used to see if it can be moved up to limited use on humans. Other work is being done on biologic assay of the surroundings. Gary brought his pictures from the site. Excellent!

Gary also reported on Robert Zubrin's visit to our area, thanks to the Lehigh Valley Amateur Astronomy Soc. in Allentown PA. who had there 45th anniversary banquet featuring Robert as keynote speaker. His presentation was very well received. Over 230 people attended including Gary, Michelle and I and the owner of Sun Hab and his wife.

After an initial period of outreach and sales of Mars Society material at a lobby table we had dinner, an excellent film retrospective of group activities (including building observatory buildings and site civil engineering!) we had the talk by "Bob", door prize announcements (we all won something) and reopening of the table with Robert signing books. It was like a rock star had appeared and Gary reported almost all the literature on Mars and Space were sold. This event led to a discussion at the PASA meeting about working with some group in our area to bring Zubrin to Philcon in 2003, possibly with a tie in from a Franklin Institute lecture or other event. Gary also mailed us pictures from the event

A final note on the Mars Society and Gary's roles in PASA: more is available on Greenhab on the Mars Soc. (.com) site, from the Mars Desert Research Station site, and from Robert Zubrin. From his work as our Exhibits Coordinator, Gary has procured a table for us and the Independence Chapter of the Mars Society at Philcon. Gary also mentioned a need for help with a Mars Society communications project and got several offers of help. Gary and I and the group also talked about locating tools at the M.D.R.S site with the suggestion of R.F. I.D tags such as produced by Maxim Integrated Circuits or Motorola being brought forward by me. That was my technical talk.

Mitch Gordon told us of the November 20th Future of Medicine lecture sponsored by the World Future Society in Philadelphia, "The Gaiaship" a floating ecology/tourist vessel featured on the cover of The Futurist magazine. He also mentioned his authorship of chapter 37 in the forth-coming book Viable Utopian Ideas edited by Art Shostak.

Hank Smith reported on his plans for convention travel and public outreach in the science fiction community (he hosts N.S.S parties and helps other groups with his convention expertise among his many avocations) and did housekeeping with our members at December's Philcon.

Michelle Baker reported briefly on her upcoming outreach for The J.P.L Ambassador to the Solar System Program at Philcon and Super Science Weekend January 11 and 12. She also mentioned an on-line Von Karm Lecture from J.P.L and a webcast on robotics.

• **General Membership Call:** We will perform public outreach and science demonstrations on space and various topics related to that subject at The New Jersey State Museum in Trenton, New Jersey **January 11–12th.** We need volunteers from our membership. If you are a member of one of our many associated dues paying organizations contact myself or the person who has given reports on that groups activities this year (i.e. N.S.S. Mitch Gordon, Planetary Society Dottie Kurtz et cetera). Since this is a major public event for us I am restricting the participants to current members and family. This may seem restrictive, but since we are associated with many space oriented self financed/membership financed organizations, it really isn't. -- Submitted by Earl Bennett

NAME _____.

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❍ **$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

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- **For members residing in the U.S & Canada:**
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  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 $16, due in March or $4 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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