

# Moon Miners' Manifesto

& The Moon Society Journal

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# 189

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## In FOCUS: The International

While it is not quite official yet, the die is clearly cast. The International Space Station which was explicitly designed around the capabilities of the U.S. Space Shuttle fleet, is headed for a future in which the ultimate SUV, space utility vehicle, will have exited the scene.

ISS is currently bravely "hanging on," dependent entirely on the capacities and capabilities of the 40 year old Soviet-Russian Soyuz capsule and its cargo version, the Progress freighter. The Americans are doing what they can to assist from the sidelines.

Will there be 7 more Shuttle flights as promised? Or will NASA's "Space Transportation System" remain grounded by fears that it cannot fly safely again - if it ever did. Almost everyone agrees that it is safer, and more economical to separate manned-rated crew-passenger transportation from the delivery of new construction components, cargo and consumables. This was obvious from the outset to those who dared to be honest about it, but the false economies of a one-size-fits-all utility space truck convinced the myopic bottomliners, who, alas, control almost everything in all areas of economic activity. *Spilt milk!*

Griffin plans to accelerate the development of the replacement Crew Exploration Vehicle. But for ISS, the CEV

## Space Station in the Post Shuttle Era

may come too late. Help may come from two unlikely quarters, unlikely, that is, from the perspective of devotees of the status quo and of a socialized space program.

The Russian Space Program has been perennially underfunded from the outset, even before the dissolution of the Soviet Union and the fall of Communism and its top-down centralized planning and management culture. But where the Russians have never taken a back seat is ingenuity and creativity. Using less sophisticated tools and materials, they have found a way to do most anything they have wanted to do. And that gives hope to those of us who are not slaves to the belief that the state-of-the-art way is the only way.

The Russians are working hard on a 7 passenger *Klipper* vehicle to replace Soyuz. We can all hope that it is available for service before the CEV. After all, the *Klipper* has been a real project, not a last minute paper study, for some time now.

We can also put hope in the new breed of commercial space transportation companies. Many of them are concentrating either on small payloads, or on the growing demand for space tourist experiences. As far as the need of ISS go, what is more exciting is the prospect that a commercial firm may take what's left of the [ ⇒ p. 2, col. 2 ]

## Cooking on the Moon

This may seem to be a trivial topic at first. But to most of us, when the day is done, and we are tired out and in need of serious regeneration, "what's for dinner?" trumps "what happened on the stock market, today" anytime. And we also want to be assured that what's-for-dinner is flavorful, palate-pampering. Some pleasures are essential, after all! Turn to pages 7-8.



# Moon Miners' Manifesto

**Moon Miners' MANIFESTO/ Moon Soc. Journal** is published every month except in January and July.

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- **Moon Miners' Manifesto CLASSICS:** Beginning with 'July 2004, we have begun an effort to re-edit, reformat, re-illustrate and republish the timeless articles of MMM's first ten years, with the intention of publishing two issues, each covering one year, in PDF format only, for free downloading, each January and July.

- **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 and 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

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- **The National Space Society** is a grassroots pro-space membership organization, with 10,000 members and 40 chapters, dedicated to the creation of a spacefaring civilization.

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- **MMM's desktop publication** has received computer hardware and software support from the **Space Frontier Foundation**, 16 First Ave., Nyack NY 10960; 800-78-SPACE - SFF seeks to open the space frontier to human settlement as rapidly as possible.

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- **The Moon Society** is "dedicated to overcoming the business, financial, and technological challenges necessary to establish a permanent, self-sustaining human presence on the Moon." — See contact information on page 9.

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

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=> IN FOCUS Editorial continued from p. 1.

Space Shuttle components and put together a family of "shuttle-derived" cargo carriers that can carry the big loads into space, both to finish the Space Station as presently conceived, and to expand it beyond those politico-economic and artificial constraints. This expansion will happen the sooner the Russians and others get equal say over the Station's future. Given that NASA is the partner not living up to its commitment, such a shift in management decision-making is only fair.

In an era when ISS can grow free from concern over a NASA veto, ISS could add an enterprise sector, opening up the station to real commercial activity for the first time (beyond the space tourism adventures the Russians have skillfully insisted upon as the sine qua non of their continued participation in the program)

We might see the Space Station governance then pass to an International Space Station Port Authority. For NASA, this may be a hard thing to swallow. But any good parent knows that s/he has to let her child go free!

ISS could grow less expensively, adding inflatable components providing significantly more volume for both the weight and the money, such as those just about ready to fly from Bigelow Aerospace. [[www.begelow-aerospace.com](http://www.begelow-aerospace.com)] Other firms, convinced that the era of expansion into Low Earth Orbit is at last upon us, will get into the act.

But even as all this unfolds, the ISS will lose its special status as "the" space station. "The" in the sense of something unique and solitary by nature, should be a word abolished from the dictionary and human parlance, at least when we are talking of things made by man. The very use of "The" by NASA is somewhat of a brainwashing technique chosen to discredit the idea of commercial and/or private versions. All the talk of the Russians dividing their attentions to the side, NASA's *need* to deorbit Mir was the more insistent given the unmentioned threat to ISS uniqueness.

NASA itself, however, clearly saw the need for another station in an orbit less inclined to the equator and better able to serve as a transport depot for deep space missions. This need remains. NASA turned its back on this in order to accommodate the Russians, the price of having a station instead of no station.

But the same commercial providers mentioned above will sooner or later see the need for one or more additional station. One size has never fit all in any category! We need stations devoted to science, stations devoted to industry and manufacturing, stations devoted to tourist services. The forte of the present station is Earth Science and Observation. It's highly inclined orbit allows ISS to pass over everything from about 60 °N to 60° south. Only the arctic and antarctic regions lie beyond its purview. To our thinking, the best thing about the Clinton compromise was that it guaranteed that sooner or later, additional stations would be built. *And that is how it should be!* PK

## Tame an Asteroid to Move a Planet

*By Robert McGown*

If we bring an asteroid into the inner solar system and use an orbital slingshot like a spacecraft uses, we can transfer angular momentum and inertia to an orbiting body. In this way, we can transfer energy between the inner planets and Jupiter, thus moving the planets to a more desired orbit. Using very little energy, an asteroid(s) inertia can be redirected by various means of propulsion. Directing this force over thousands of years would create new solar system orbital paths.

Astronomers studying orbital mechanics have looked at the instability of the Jovian/Saturnian system for over 300 years. From the historical orbital calculations of La Place to the recent papers of Korycanski, Laughlin and others, modeling concepts of reshaping the planets to more favorable orbits are being explored. They propose using a Kupier belt object as an attractor mass since it would be easier to change its orbit. NASA's new Kupier Belt mission may want to explore possible candidates in the solar system.

My research began in the early 80's: I discussed solar system orbital engineering with some science fiction writers some of whom are also theoretical physicists, like Frank Tipler. I recently had the opportunity hear Dr Laughlin's presentation on the "Future of the Solar System" and discuss solar system models with him. Researchers from the Oregon Chapter of the National Space Society, L-5 researchers have studied the de-orbiting of the retrograde Martian asteroid moons and the orbital consequences & advantages to moving Mars into a more favorable inner orbit. Using ion engines, or a steer-able mass driver to create energy transfer, it is possible to navigate a controlled asteroid to direct Mars closer to the Sun.

Another advantage of using asteroids for tugging on the orbit of Mars is the possible high water content of certain asteroids, such as Ceres. This may be the key for terraforming the ancient oceans of Mars. An asteroid could also be used to reduce total kinetic energy for bringing Mars into an inner orbit. It could be possible to use an asteroid such as Ceres, or other large solar system bodies to add  $\Delta V$  for a gravitational assist to the Earth each time it makes a pass through the earth orbit. The orbital dynamics could be engineered to give a gradual assist to the orbit that would move the Earth further away from the warming sun. This may be a logical step in the protection of the Earth as a whole. Solar system engineering projects, like space development projects, need to be established with respect to their importance, political climate, and funding.

John McCarthy, a computer science instructor from Stanford, in a web-published paper describes of one of the ideas from Korycanski and Laughlin to boost a tame asteroid, making several thousand passes with Mars, Venus, and

Earth, exchanging angular momentum. Using this model requires orbital interaction with two other planets besides Mars. With a gravitational boost (addition or subtraction), it might be possible to move Mars with rocket supplied inertia. He discusses moving Mars directly opposite the Earth, which is the least stable of the Lagrange points. Presently, numerous teams have researched the mathematical models of the solar system. The moving of Mars or the reengineering the solar system may take a time scale in the order of tens of thousands of years rather than the millions of years it takes with natural processes.

"Orbital Element Modification" is a general class of proposals for the re-engineering the solar system to improved and favorable to life. The future conditions on Earth will necessitate and prioritize of each such project to counter the effects of our variable star, the Sun, and global warming. Humankind has the potential for getting more than one habitable world and a more stable solar system for future life in the solar system. One logical idea is to move Mars to an AU directly opposite the Sun from the Earth.

Even the early Greeks, had the idea of a hidden world, the anti-chiton. It was a counter world behind the Sun, in the opposite side of Earth's orbit. Here we have the similar final goal, moving Mars to approximately  $1\pm$  AU in a leading Lagrange point of the Earth. Mars should not be the only body in the solar system that we may consider moving.

In the old model of the solar system, the Sun swells to a red giant in about 8-10 billion years from the present and engulfs the Earth. The new astrobiology global warming model shows the oceans of the Earth evaporating in one to five million years. What will it be like living on the surface of the Earth in just 200 years with the present rise in global temperature? This model of the Earth's biosphere system in a rapidly warming greenhouse is not the only part of the global warming equation. The study of stellar evolution cycles to better understand our own Sun with the H K Project at Mt Wilson observatory has been an ongoing project for over 40 years. Research indicates that active Sun, a variable star, is also heating up.

### Solar System Modeling Considerations

With the discovery of other solar systems in our galaxy, extra solar planets like 51 Pegasi provide us with additional models. Through our observations, we know that planetary systems have migrated in the solar nebula through the lifetime of many solar systems. Even in our own solar system, we have observed the migration of the orbital path of Neptune and possibly Jupiter to another orbital path. Debris in the solar system has changed orbital paths, subtracting kinetic energy of the gas giants within the solar system over long time scales. Using a gravitational boost or the subtraction of orbital kinetic energy, a planet could be moved over long periods of time.

Advanced orbital mechanics and computer modeling of the three body problem will bring about important



changes in the way we see the solar system. Propulsion and engineering systems are being designed to give additional  $\Delta V$  to push stable asteroids or bodies in slightly unstable orbits like Enceladus. The resonant orbit of Enceladus, of Saturn could be modified to approach the inner solar system. Enceladus, 498 km in diameter, 1.24 gm/cm, is especially interesting, since it has a recently discovered magnetic field revealed by the Cassini spacecraft. The best safe orbit for the greatest the gravitational transfer would be desired. This could act like a gyroscope for the orbiting body.

Ion propulsion systems would be needed to ever so slightly tweak the orbits of bodies that could be used to move the Earth or Mars into more favorable climatic positions for life to thrive in the temperate zone. Even Pluto could be brought into the inner solar system. Calculations and experiments would be required to determine the force required to release Enceladus from Saturn's resonance. Also, other bodies in the solar system in unstable horseshoe orbits could be redirected to transfer kinetic energy through their gravitational influence.

"Trans Neptunian Objects" (TNO) are of a special interest because of their orbital dynamics. Space engineering techniques could also be applied to the orbits of these bodies in the solar system to act as an additional accelerating attractor, tweaking the Earth's orbit in each decadal passing. Some TNO objects have a sporadic orbit that could be altered with rockets at perihelion. If the Earth's global warming gets out of control, we may want as many as 1,000 or more attractor masses to tug the Earth into a more favorable orbit.

Some of these objects, like 2060 Chiron, a 71km diameter, possible a burned out comet) have long term orbits between Jupiter and Saturn that may be steerable from the mid-solar system. One of my astro imaging projects was to image 2060 Chiron, during its last approach. Chiron is now classified as a centaur, the first of a class of objects orbiting between the outer planets. Centaurs are not in stable orbits and will eventually be removed by the giant planets. KBO's may be difficult to use in the inner solar system, due to their remoteness. In the last decade, NASA has proposed manned missions to the asteroid belt and exploration of Near Earth Objects, NEO's. The close approach of Asteroid MN 2029 mission, new NEO mission opportunities are being studied.

It would be better to use asteroidal bodies than comets in orbital modification projects of things, since comets tend to break up after perihelion passing. Some M-Class asteroids would need to be studied with ground penetrating radar to assure their stability when. These asteroids may be the most stable against the tidal forces involved in a close Lagrange orbit of the Earth Moon system. The New space technologies being developed will modify orbital element modifications possible. With the situation of the impactor of the Deep Impact mission, it was able to

make last minute orbital adjustments. Such is the case of the "Attractor" mass, a name given to the orbiting body that will add inertial energy into Earth/Moon system over thousands of years to accelerate the Earth to a more favorable orbit. However, last minute orbital adjustments would not need to be made because of the long orbital times of the attractor mass. A specific gravitational acceleration would be added to the Earth/ Moon system through precise parallel orbit with the passing of each attractor mass of the body being acted upon. The orbital pass would be carefully timed to not interfere with the tides and the Moons orbit.

Technologies like nanotube ropes and tethers, ice bolt anchors, AI genetic algorithms, and gimbaled stand-off ion engines could be used to tweak the orbits of reactive bodies and control asteroids. The engineering of these systems for the "Zodiac Project" is as important as the development of the present deflection technologies studied in the Deep Impact mission.

Ion engines have been tested with the magnetic sector boundary of the solar wind for negative ionization. The leading edges of an accelerating mass could be shielded from ablation to avoid surface erosion from perihelion approach. An asteroid drive system would need to be engineered with an 80% safety factor to insure the contact for a zero margin of error. NASA also wants beaming technology as demonstrated through the Beaming Prize and research with NASA Institute of Advanced Concepts, NIAC. This technology has demonstrated that it can move objects in space. Taken together with our advances in space engineering show that we will soon have the capability. World space scientists should realize that controlling an asteroid is just as important as deflection technology. In the future, even a solar system like Proxima Centauri or Alpha Centauri systems could be re-engineered to be favorable for life.

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# Hunting Extremophiles in the Devil's Kitchen

By Bob McGown

... The hunt for extreme limits of life both on Earth and other planets such as Mars. What are the parameters of where life can exist on the surface and under the surface of a planet? On Earth, we can map the where those boundary conditions where life exists and then we can search in those areas on Mars.

In the summer of 2004, Tom Bennett of the Mazama Research Committee contacted me about helping two visiting scientists, Ruth Hennebuger and Dana Rogoff, with their project to search for thermophiles, sulfur-based life on Mt. Hood. These anaerobes are an ancient family of bacteria called *chemoautotroph* that live without oxygen. Hydro-steam and sulfur percolating in the Coalman glacier terminal moraine on Oregon's Mt. Hood Crater Rock produce hot fumarole vents. At 89 °C, this is a possible habitat for these unusual bacteria. These steaming sulfur fumaroles make up the Devil's Kitchen, a yellow pockmarked moraine in the Crater Rock area of Mt. Hood. This is a steep field of hot sulfur mud and steam vents, which may harbor bacteria in this extreme environment.

Ruth Hennebuger, a Ph.D. student from Macquarie University in Sydney, Australia, chose this site to investigate extremophiles bacterial life that thrive in the boundary at the very hot and cold environments. Collaborating with her is a biologist, Dana Rogoff, from NASA Ames. She also works for the SETI Institute. These women scientists were up for the challenges of climbing Mt. Hood in August. Dana's boss asked her if she was up to doing some research that involved mountaineering, using an ice axe and crampons; being a rock-climber, she said, "Count me in!"

The search was underway on Mt. Hood to discover highly adapted microorganisms known as extremophiles that thrive within boiling geothermal geysers and deep inside rocks. Highly adapted biology allows them to actually flourish in these extreme conditions feeding on chemicals that would kill most organisms.

After they arrived in Oregon, Ruth and Dana trained for the climb during the week on Mt. Hood's slopes. Tom Bennett, Steve Boyer M.D., and myself, Mazama members, volunteered to be research assistant/sherpas for the astrobiology mini-expedition. Our first attempt on August 5th to reach the Devil's Kitchen ended when we found ourselves hiking up at 9500' in a fierce rain and snowstorm. To avoid being another Mt. Hood statistic, we backed off and headed back for another day.



Steve Boyer packs gear on White River Glacier

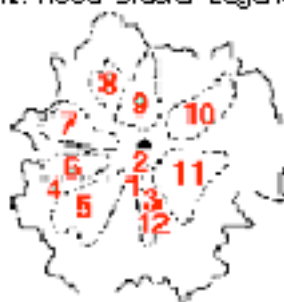
Three days later with an August 2:30 am start, after an assist from the snow cat up to 8,000 feet, we started hiking up the Palmer ski run to the Triangle Moraine. With only the focused beam of our headlamps, we headed up to the discontinuous lateral moraines, connected by snow-fields. Rivulets of glacier milk saturated the ground on their way down the mountain slopes. As we ascended the mountain

in starlight, The Orion Molecular Cloud rose over the White River glacier. Two and a half hours later, after hiking past Illumination Rock on the west, we crossed small sections of water-ice while hiking in the darkness, crossing the icy crust with our crampons and ski poles.

From this vantage point, we ascended the upper White River glacier to the talus slopes below Crater Rock. With the crampons, we crossed the 40° slope streaked with occasional patches of sulfur. With the Colman glacier ahead of us, we crossed the small ravine that flows to the White River. Ahead of us was the yellow-streaked moraine that is known as the Devil's Kitchen. In the Lahar mudflow, this streaming field of sulfur fumaroles was mined with horses for sulfur to be used in gun-powder. From

this vantage point, we ascended the upper White River glacier to the talus slopes below Crater Rock.

## Mt. Hood Glacier Legend



1. Crater Rock
2. Devils Kitchen - Coleman Glacier
3. Steel Cliff
4. Illumination Rock
5. Zigzag Glacier
6. Reid Glacier
7. Sandy Glacier
8. Ladd Glacier
9. Coe Glacier
10. Eliot Glacier
11. Newton-Clark Glacier
12. White River Glacier

At 6:30 a.m. we set up camp in the near-darkness of the shadow of Mt. Hood, at the notch of the moraine, close to the glacier melt moat at the bottom of the glacier. The air temperature was -4 to -7 °C (+19 to +25 °F), with a natural draft following down the gully. In the morning dawn, before sunlight hit the summit of Crater Rock, the sampling began. Ryan, the Timberline guide required by the University, set up a belay to protect Ruth as she traversed the 37° slope of Devil's Kitchen -- approximately 80m x 60 m. The added safety factor was a good idea since there were large voids under the surface of the Devil's Kitchen we detected taking core samples. Tom set up anchors on fixed blocks along the ridge crest with Steve assisting, as he soloed around the fumaroles nearby. Tom collected the samples from Ruth in sample bags while Steve kept Ruth's carpenter

apron stocked with tubes. Dana took sterile swabs at each location and cultured dishes. I recorded the tube samples and also recorded the data logbook. During the course of the day Ruth also logged the PAR UV levels.

There was a considerable amount of data logged at each site. Typically, each sample location involved an hour of sampling investigation. There were a variety of instruments used to log data at the sites, which included:

- 2 laser IR thermometers
- 1 deep temperature probe
- 1 chlorine detector and miscellaneous tools
- 1 pH meter (dry) and litmus strips
- 1 UV PR (photosynthetic active radiation)
- Sterile sampling spoons, knives, saws, and spatulas

Sample location included:

- pre-sample photograph
- sample photograph
- post-sample photograph
- air temperature
- surface temperature
- 3 sample depths -- surface, 5 cm, 10 cm
- PH, 50% glycerol, DNA samples
- F.I.S.H. samples, backup sample

For the next nine hours, Ruth and Dana were belayed as we soloed while investigating each site systematically. Only seldom did they need to rely on their rope belay. We investigated eight sites in the Devil's Kitchen/Colman glacier moraine complex, where the surface temperature was hot enough to melt the gloves off your hands!

Each site had unique characteristics, sometimes radically different from the other sites investigated. The surface textures ranged from yellow sulfur around fumaroles to a green or orange mineral in the crust. The fumarole vent openings ranged in size from 2 cm to 10 cm. One of the first interesting sites of the investigation was in the shape of a cave about 20 cm across with sulfur steam coming out. Dana was especially interested in this site since she was studying bacteria that were UV resistant. The vents, steaming sulfur, that lined cracks in the rocks were worthy of investigation.

Some steaming 2 cm vents at the west end of the moat below the Colman glacier and the east wall at the Devil's Kitchen hydrothermal vents had the possibility of being some of the most extreme high and low temperature sites. This was what Ruth was looking for in her PhD investigation.

Ruth, Dana sample Coleman Moat



Collecting Samples



Sampling on the slope of Devil's Kitchen



Toward the end of our adventure, Steve made a solo dash for the summit without the burden of a heavy rucksack. Using two ice tools, he weaved in and out of the crevasses on the Colman Glacier. After a long day of sampling, we could see that the lifts were already closed and the sun was low, so we packed up and headed down the mountains. Extending our ski poles to maximize length for the descent, we made our way down the snowfields between the talus fields. On the descent, the snow was firm and we enjoyed a standing glassade on our three and a half mile descent off the mountain. Steve skied ahead with samples in his pack packed in blue ice.

Along our route, Dana sampled colored snow. The pink watermelon snow, lichen feeding off of Aeolian nutrients was to be cultured later. We arrived back in the lodge at 5:30 p.m. with fieldwork completed. Later, Ruth and Dana planned to work in the OHSU lab, isolating extreme forms of bacteria. The samples were packed in dry ice for the long flight home. Ruth and her team in Australia still had a challenge to complete the DNS sequence of these live forms.

On the drive back to Portland, Tom and I discussed the project in the larger context of the hunt for extreme limits of life both on Earth and other planets such as Mars. What are the parameters of where life can exist on the surface and under the surface of a planet? On Earth, we can map those boundary conditions where life exists and then we can search in those areas on Mars. The habitable zone, which may have existed for 4.5 billion years on the Earth's surface, may have only existed on

the surface of the red planet for less than a billion years. The evolutionary path of microorganisms on Earth and Mars may be radically different or show the same patterns. And although the "habitable" zone" is much different on Earth than on Mars now, we can learn a great deal about extreme forms of life on these planets that may also exist on extra-solar planets, planets orbiting a star other than the Sun. On Mars, the habitable zone may have lasted periodically for less than 1 billion years.

Because of my deep interest in astrobiology, as well as my climbing experience (Mazamas & American Alpine Club) I felt very fortunate to have been a part of this expedition hunting extremophiles on Mt. Hood, an excellent combination of science and climbing! As a member of Oregon Team SETI, it was a particular pleasure to meet Dana and Ruth and discuss common interests. I look forward to learning the results of lab research on the samples we collected. If there were ever-another visit to other mountain environments to search for extremophiles, I would be honored to be one of the team. <RMcG>





## on the Moon

by Peter Kokh

We, all of us (or those of us who get beyond boiling water and making toast), have our preferred ways of food preparation and cooking, ways that suit our individual personalities and lifestyles. Some of us happily take hours to prepare great dishes from scratch, micromanaging every ingredient, patiently going through all the steps in proper sequence, mastering all the tricks of the trade. We are would be candidates for Iron Chef. Others, like myself, want our robust flavors the quick and easy way: just add a can of tomato or cream of mushroom soup, put it in the oven at 350° for an hour and a half, and viola!

Some like to simmer or smother. Others to bake or broil. And then there are those who insist on (egads!) frying as the only way to get that down home deep southern taste!

Will the lunar frontier be so forgiving an environment, letting each of us indulge our preferred cooking habits and methods? The short answer is "maybe someday, but not in the foreseeable future!"

### In the beginning – ingredients and recipe starters

What the program managers for the first NASA lunar outpost will order to be shipped to the Moon is one thing. What makes sense, may or may not be something else. Here, we take the viewpoint of what practices are sustainable, that is, once we realize that we are back on the Moon indefinitely, with an open-ended future. Here are the premises from which we argue:

- It costs much less to send dry and dehydrated food stuffs and ingredients (spices, herbs, recipe starters, etc.) than to send fresh, frozen, or canned items.
- It makes sense to ship to the Moon, only those things that can eventually be provided from lunar gardens - why get the pioneers spoiled?
- Variety is the spice of life. At whatever reasonable cost, lunar cooks and chefs need a staple of versatile ingredients with which to prepare a wide variety of tasty meals from a minimum of ingredients. So those spices and those plants that support the most diversified cuisines will have priority.
- Shipping prepared items will probably be out. Most of them may not dehydrate well. That means no canned and bottled condiments, soups, broths, sauces, for cooking, no dressings for salads. And forget about TV dinners! Now dehydrated meals, of the kind available in camping supply stores, may be tapped for early missions, but are not likely to be selected as a regular import. When push comes to shove, the ingredients supporting the most versatile cuisines, are the likeliest to get a ticket.

Growing herb and spice plants in frontier gardens will have some deserved priority. Settlement self-sufficiency is the Holy Grail, after all. But clearly, priorities will be set: those plants easiest to grow *and supporting the most diversified use* will be the first to be cultivated. So if you, as a lunar chef or cook, want an herb or spice that is only of limited use and/or is hard to grow - forget it!

### Homestead Gardens to the Rescue

Whatever strictures may apply to settlement-owned and operated farms and gardens, what individual lunar homesteaders choose to grow, produce, and pre-prepare in their own garden spaces (assuming that lunar homesteads are built to include these, a very wise policy) is pretty much up to them. Homegrown food item specialties not otherwise available will be a major wellspring of Cottage Industry. Settlement markets supplied by homestead gardeners, will offer prepared sauces, soups, jams, and special combinations of herbs and spices, prepared condiments, salad dressings, garden juices (à la V-8) and even wines are sure to appear.

The insatiable needs of the cook, as well as of the home furnisher will be primary fuel for private enterprises springing up, at first, as spare time, after work hours activities. Out of such beginnings will the first real businesses not devoted entirely to production of capital goods and export products develop.

What herbs and spices and other recipe starters are selected for import from Earth are most likely to come in bulk, and that is how the lunar cook/home shopper will find them available. No handy (and exorbitantly overpriced) small bottles and shakers! Just transport yourself back a century or so, to the days of the old General Store, and you will get the idea.

### Salad Stuffs, vegetables, and fruit from the Garden

Our experimental space agriculture efforts to date have centered on a few staples: potatoes, wheat, rice, lettuce, etc. All of these go a long way to supporting many kinds of preparation and presentation, so they are apt choices to begin with. But fast forward to a decade after the first permanent outpost has begun in earnest to grow into a civilian pioneering hamlet. Those managing the community gardens will want to start with crops that are easily grown and versatile in their uses.

On the other hand, those preparing meals will be just as concerned with full flavor and gusto, with interest to the palate. They will have their wish list: onions, tomatoes, garlic, and on and on. Not to forget coffee, my personal drug of choice. "Easy to grow" be damned! Again, the cottage gardener to the rescuer. The community gardens manager need not worry about coffee. Coffee will come!

Fortunately, many fruit trees have now been bred in fruit-laden dwarf varieties, just right for the tight, low indoor ceiling spaces of settlement gardens. A plus is that many fruit tree woods, notably apple, cherry, and pear, produce excellent hard woods, great for carving.

In the past two decades, we in America have been introduced to, and have begun to take for granted, a host of tropical fruits: kiwi, starfruit, etc. The settlement gardens may at first provide only a temperate climate suitable for growing traditional species. As the settlement expands, separate climate-controlled garden farms will be able to raise tropical varieties as well.

In short, we'll start with a few versatile staples. But in time, *as the population and total demand grows*, the specialty food items will appear. In the beginning there will be nutritious food - say your "grace" and "thanks." After all, what is a frontier if it does not start off "rough." But once a critical mass of industry can support accelerated growth and a steadier, larger influx of new settlers, the frontier, as all frontiers before it, will begin to show some "sophistication" and one place it will show up first is the dinner table.

#### **Humans are Omnivores – grains & veggies plus**

Some of us are vegetarians. We've either been raised that way or have chosen that as a lifestyle, whether because it suits our tongues or our philosophies.

The rest of us (most of us) are still meat eaters. Forgive me if I take what may seem to be a cheap shot here, but it occurs to me that in nature, it is the carnivores and omnivores that are the most intelligent, and the herbivores which are the most, well, *you pick the word*.

But this is not about philosophies. This is about what can and cannot be supported on the early frontier.

Raising "meat" for want of a better word, requires more acreage, devoted to forage and feed for livestock, than does growing vegetables and grains. It is a less efficient form of agriculture, if you will, and there have been, and will be, situations where that is *the* single most important consideration. The early decade(s) of the space settlement frontiers are likely to fit that mold. We won't be raising livestock.

Dehydrated meats anyone! There is always beef jerky and faux bacon bits. And don't forget soy-based veggie burgers. (Most of those commercially available are anything but tasty. However, I've found some that pass my taste buss.) Meat available in dehydrated form is likely to be available for a garnish, rather than as an entree - in casseroles and salads, if you will. Fortunately for myself, I like casseroles. Some refuse to try them (again.)

What about a decade or two down the line? Some livestock are more efficient to raise than others. Foremost amount these would seem to be the Cavy, a mainstay of Peruvian cuisine (known to us as the Guinea Pig); then the rabbit, then the chicken. Pigs (ham and pork) will beat out the cow (beef).

But don't forget fish! Some species, especially Talapia, grow very well in greenhouse-based water recycling systems, and that makes them a shoo-in for number one non-vegetarian food stuff item on the early frontier.

If and when we start mastering growing individual

meat tissues in vats (meat "without the face") with far greater efficiencies than farm-raised animals, meat will begin to resume its customary place of honor on the settlement dinner plate.

#### **And then man discovered fire ...**

It is no secret that male cooks prefer gas stoves to electric ones - we want the instant gratification of real fire on demand. Unfortunately, fire produces byproducts. In the ordinary anything-but-airtight home, these gases are not a big problem (though children in homes with gas ranges suffer twice the incidence of respiratory problems). On the space frontier, with absolutely airtight spaces, combustion byproducts will be an absolute "no no."

But there are other culprits, which again is no problem in most leaky homes, but which could be most troublesome on the frontier: humidity (steam vapors) and grease/oil aerosols. We can't just turn on the range hood ventilator to dump these culprits "outside." That would throw out precious air with its contents, the baby with the bath water, as the saying goes.

What does that mean? It means that a lot of us, should we be so lucky as to have the chance to pioneer the Moon, are going to have to change our favored ways of cooking. *Here is the bad news, as we see it.*

- no open boiling (putting a lid on it won't do)
- no open flame cooking (forget about BBQs!)
- no frying !!!

Are there any perfect solutions? Not sure. Some people like microwaves: except for reheating leftovers, I personally hate them. Something old timers will remember may be a better choice: **the pressure cooker**. This device controls and minimizes steam and vapor escape, and by cooking the contents under pressure, is much faster and more flavor-enhancing than ovens or stovetop methods, and *not that much slower* than a microwave.

Smothering is a better solution than frying, as is baking and broiling. To be fair and honest, this is all *excellent material for a small group or chapter project*:

**Study all forms of cooking and rank them according to least production of gasses, steam humidity, aerosol grease vapors, and nuisance odors.**

For our assumptions above should not be repeated as gospel. They seem reasonable, but must be put to the test.

#### **Ingenuity is not to be discouraged**

Frontier entrepreneurs (read restaurateurs) will find a way. (And, yes, you "smell" a future Article)

#### **Relevant Reads from MMM's Past**

- #2 FEB '87 "Moon Garden" reprinted in MMM Classic #1\*  
\* pdf file from [www.lunar-reclamation.org/mmm\\_classics/](http://www.lunar-reclamation.org/mmm_classics/)
- #39 OCT '90, p3 "Saving Money on Food in Space"
- #148 SEPT. 2001 p 3. **EARTHPATCH: Anchoring Lunar & Martian Homesteads**
- #149 OCT. 2001 p 5. **Homestead Gardens & Early Cottage Industry**
- #165 MAY 03 p 3. **Settlement Garden Tours Favorite Pastime**



## The Moon Society



## JOURNAL

<http://www.moonsociety.org>

Please make NEWS submissions to KokhMMM@aol.com

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

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

**PROJECTS:** [www.moonsociety.org/projects/](http://www.moonsociety.org/projects/)

**The Artemis Project™ – Project LETO™ – Rent-MDRS**

**Moon Society DUES** include **Moon Miners' Manifesto**

- **Electronic (pdf) MMM \$35**    **Students/Seniors: \$20**
- **Hardcopy MMM: U.S. & Canada \$35**    **Elsewhere: \$60**

**Join/Renew Online** – [www.moonsociety.org/register/](http://www.moonsociety.org/register/)

### Mail Box Destinations:

- **Checks, money orders, membership questions**

Moon Society Membership Services:

PO Box 940825, Plano, TX 75094-0825, USA :

- **Projects, chapters, volunteers, information, etc.**

Moon Society Program Services

PO Box 080395, Milwaukee, WI 53208, USA

**OUR LOGO** above, shows the Moon in its natural beauty, empty and deceptively barren, waiting for human settlers to shelter and to mother as an adopted new human home world. We have work to do!

## ARTEMIS MOONBASE SIMULATION I

### First Moon Society Mission to the Mars Desert Research Station Is "on the Calendar!"

**Crew # 45, Feb. 25–March 12, 2006**

from Peter Kokh

We are on the MDRS Calendar at last! Near the end of next February, a crew of six volunteers representing the Moon Society will arrive in a spectacular setting in south central Utah to begin a two week stay in a mockup of a Mars base. The Mars Desert Research Station, MDRS, was built by the Mars Society five years ago, as part of its "Analog Mars" program to learn how best and most efficiently to explore Mars, *simply by going through the motions in a setting that puts the participants "in the mood."* Here they can, and have, learned much in many areas of activity that could never have been gleaned from "paper studies."

It would certainly further the Moon Society's pursuit of its goals to do something similar, but we do not yet have the resources or leverage to attempt such a project. So, when at the 2004 Mars Society Convention in Chicago, a year ago this past August, Mars Society President Robert Zubrin remarked that he was willing to rent out this facility to other groups for two week periods for a seven thousand dollar fee, we began planning.

It was clear from the start that even though the terrain around MDRS was reminiscent of Mars, there would be useful things we could do there from which we could derive useful lessons for the Moon. The "Rent-MDRS" project was born. A feasibility study revealed a variety of lunar outpost activities worth simulating. But to be sure that the Utah facility would support them, it was necessary to get ourselves on a regular MDRS crew to have a look and do a thorough "reality check." And so with the enormous help of friend Ben Huset of the Minnesota Space Frontier Society, we landed a spot on Crew #34, February 5-20, '04.

The experience was unforgettable, and encouraging. Some of the ideas we had been looking at were clearly not practical to pursue here, but others were. And while we were out there, we thought of more. We tried to get a two week slot in the 2005 Field Season ending in May this year, but the calendar was full. We had to wait. *Patiently!*

And so here we are! We have a crew slot. Crew #45 Saturday February 25th to Sunday March 12th, just four and a half months ahead. Is there enough time to plan the exercise, find an outstanding crew, acquire the funds for rent and equipment, and pull it off. *Yes! We can do it.*

Below is a sketch of the program, a look at the three crew members slotted so far, and more. Read on!

October 5th, 2005 11:09 pm MT

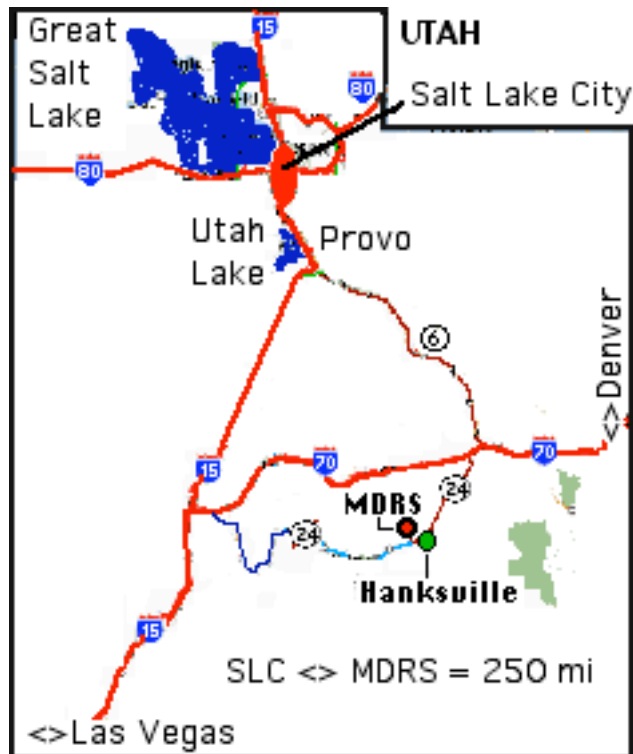
Hi Peter,

*Congratulations! I have reserved Crew 45 for the Moon Society Crew with you as the commander. Please let me know if you'd like me to call your crew by a different name in our announcements and web postings.*

*I look forward to seeing your crew's objectives and approach in making a lunar mission simulation at the MDRS (which will temporarily be the "Moon Desert Research Station" for your rotation!) [snip]*

*Welcome aboard!*

*Tony Muscatello, Program Manager  
Mars Desert Research Station  
The Mars Society*



[www.hanksville.com/](http://www.hanksville.com/) for weather:  
[www.weather.com/outlook/recreation/outdoors/local/84734](http://www.weather.com/outlook/recreation/outdoors/local/84734)

## Goals of a Moon Society Mission at MDRS

The purpose of this Moon Society mission is:

1. to learn from our exercises and
2. to lay the groundwork for more ambitious exercises in missions to follow, and
3. eventually learning what we need to know to define and design our own dedicated lunar analog station at an appropriate lunar analog site.

This fits in with the Society's long range **Project Leto™** as well as laying a groundwork of experience for planning the **Artemis Moonbase Project™**.

## A Preview of the Mission Program

### EVA activities in "Spacesuits"

Mars Society crew volunteers have no trouble getting into the spirit and the mood of "Analog Mars." The landscapes surrounding the MDRS Hab are clearly reminiscent of scenes from *Pathfinder*, *Spirit*, and *Opportunity*. Further, the MDRS terrain is sedimentary and carved by water, similar to Mars. Crew members in street clothes enter a Hab in Utah, don spacesuits, and exit the hatch onto "the surface of Mars." The magic is incredible, powerful.

This scenic and geological mismatch presents a real challenge for Moon Society Crews. Our EVAs will not be about geology or testing equipment to detect microorganisms. But we can test helpful modifications to the EVA gloves, boots, and helmets, as well as electronic and robotic aids to make surface excursions safer and more productive.

To mollify the visual mismatch, our crew might try wearing wrap around (green?) tinted safety glasses under their helmets to help gray out the orange hues. But our excursions will concentrate on the more Moonlike areas of the terrain, such as fields of basaltic bentonite, analogs of expanses of mare lava. The Mars Society will provide maps.

For *nighttime* delight, peering out the Hab crew deck's south porthole, the crew will see Earth hang over the horizon as large as it will look from the Moon, in the proper phase, and always in the same place in the sky, just as would be the case on the Moon. We are looking at three ways to produce this illusion. Price and transportability will decide.

Normally, MDRS crews are discouraged from nighttime EVAs for safety reasons. However we *will do some*, but only in the immediate surroundings of the Hab, with the Hab in sight. A lightweight tower of conduit pipes attached to the fore and aft racks of an ATV will hold a bank of bright halogen lamps powered by a battery pack carried on the ATV. The regular headlights off, the light array 10 ft. above will cast a large bright pool of light on the surface to simulate the Moon's black sky, bright sun, bright surface. We *think* this will work, but we'll "try it at home" first. This, and using the MDRS 14" telescope to view the Moon, will come under "Moon theme" recreation, rather than science.

If we do a sequel mission in 2007, we may test robotic human assistants in EVA field tests. We have a crew applicant in this field, but she is not available this year.

### The "atmosphere" inside the Hab

With Marslike scenery "outside" to keep Mars Society crews in the mood, little if any attention has been paid to do anything within the Hab to further strengthen the illusion. For us, no clearly moonlike terrain beyond the hatch, we will try to provide some lunar frontier atmosphere within by removable artwork, and by setting the diner table with wares that could be produced on the early frontier.

The Mars Society has by and large passed on opportunities to simulate a real frontier diet. At first, with no access to a refrigerator-freezer (except a small one in the lab) the emphasis had been on stocking the Hab pantry with food items with a shelf life of two weeks minimum: lots of canned goods and dry foods. Last season a refrigerator was added: more produce and fresh meat are now available. Not early frontier like, to say the least.

In contrast, we will attempt to simulate a very early lunar frontier diet. LRS member Louise Rachel Quigly, who worked with the Hyatt Regency Milwaukee to create the memorable Saturday Space Frontier Vegetarian Luncheon during ISDC 1998, will be helping us plan an interesting menu. On the frontier, heavy, water-rich canned goods shipped from Earth will be most unlikely. We will feature an interesting variety of ready to rehydrated meal items such as available in camping supply outlets. To that we will add salad stuffs produced in the moonbase garden, and, on both Saturdays, enjoy a gala dinner featuring broiled Talapia, a tasty fish that thrives in greenhouse recycling systems.

## Individual Crew Member Projects

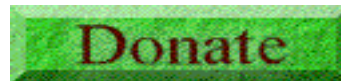
In addition, some of the crew members will bring along their own "mission appropriate" projects. Three crewmembers have been confirmed to date. Applications are now coming in and the remaining three will be selected by mid-November at the latest so that they can make travel plans (to/from SLC). These first three all have projects.

**William Schwarz, RN**, Salt Lake City, and a veteran of crew #33 will be Health & Safety Officer. He will be conducting an extensive Human Factors study as well an Ergonomics Project, aimed at determining (should the opportunity arise that the Society could erect its own Lunar Analog Research Station) how we might better design it, so that all needed functions and facilities are given the appropriate allotment of available space and are best situated in relation to one another to maximize both productivity and crew morale.

**Dr. Leslie Wickman**, Azusa Pacific University, Azusa, CA, will be conducting a Lunar Life Support Systems study integrated, where possible, with MDRS' GreenHab. She will also study EVA suit functions, and crewmember's use of time.

**Peter Kokh**, Milwaukee, and a veteran of crew #34, will be mission commander (scheduling & oversight). He also hopes to conduct some "lightweight" projects of his own. He is working on creating a "lunar frontier atmosphere" for the Hab interior, as mentioned above; He also will be working on designing the daytime and nighttime EVA excursions. He would like to provide some frontier-appropriate musical instruments ("no wood, no copper, no brass") *for others to play*, and hopes to create art/craft tool kits suitable for making "trashure" objects of art out of MDRS trash.

## Funding the Mission: Commitments to date



As mentioned, we need to raise \$7,000 for rent, and we would like to do this *without* dipping into the Society's General Funds. We are in the process of setting up a "Moon Society Projects" fund in a separate account to be fed by member and visitor donations via credit card on PayPal.com. "Donate" buttons will soon be found at appropriate places on the Moon Society website.

*We hope that most of the money can be raised from one or more corporate sponsors.* We are off to a good start with commitments of money and gifts-in-kind:

**Lunar Reclamation Society:** Funds remaining from chapter share of profits from ISDC 1998: **\$1,400** (=20% rent total)

### Gifts in Kind

**Moon Miners' Manifesto** (editor) Various items to create lunar frontier atmosphere inside the Hab. Mission patches and patchwear items for crew members.

**Wisconsin Mars Society:** "Trashure Arts & Crafts Kits"

**American Lunar Society:** Observing Program for crew to use MDRS Observatory and its Celestron 14 telescope to view the waning Moon. Loan of Lunar Stop and filters if needed.

Additional **gifts in kind** may be coming from other Moon Society chapters and partner NSS chapters as well as from other interested supporting nonprofit groups.

## Mission Name, and a Mission Logo/Patch

The Mission Name given on page 9 "Artemis Moonbase™ Simulation 1 (or Sim 1) is not set in concrete but has been floated among the Leadership Council. It capitalizes on the Society's "Flagship Project" - The Artemis Project™ - deploying the first commercial Moonbase.

Launched ten years ago by Artemis Society International, the project has been languishing in limbo, awaiting a fresh infusion of ideas, talents, and funds. The name may be little known outside the society, but within our ranks, the name has capital and significance. Choosing this mission name could trigger fresh interest in the project and a refreshing of the website: [www.asi.org](http://www.asi.org). The publicity for the Mission may infuse new life into the Artemis Project™.

To take best advantage of this opportunity, we need a team of new volunteers to refresh the ASI website: streamline the public version of the Artemis Data Base, and clean up all the broken external links. We have a plan of how to do this ready to put before the Moon Society Leadership Council. What we need now is for some of you to email us at [president@moonsociety.org](mailto:president@moonsociety.org) and ask "how can I help?"

Chip Proser is looking into a Patch Design - we'll need that for advance publicity William Schwarz has volunteered to create and maintain a mission website.



## Call for Crew Volunteers

[Note: if your spam blockers intercepted our October 10th email, or if you are first reading this on the hardcopy of in your mailbox, your response will most likely be too late.]

The Society cannot be responsible for opportunities missed due to member-activated email spam controls! Moon Society members are advised to "white list" email from the Moon Society from these two addresses:

president@moonsociety.org    kokhmmm@aol.com

The Society can also not be responsible for opportunities missed because a member's email inbox is too full.

If you have downloaded this issue as a pdf file from [www.moonsociety.org/members/mmm/](http://www.moonsociety.org/members/mmm/) you have time to send us an application. We need to know your availability for the dates of the mission (you are responsible for transportation to & from the staging point in Salt Lake City. We pay all other costs.) Tell us about your job experiences, other expertise and talents, any applicable training, hobbies, etc. We need a well rounded crew including many talents. Those with mission-relevant projects to pursue on location are most welcome, but we also need those who are there to assist others. Do not apply if you do not work well on a team! Morale is essential, and getting along with others is vital.

Some of those not chosen for this first mission will go into a pool of "backups" should some of the selected crew have to cancel out at the last minute. All applications will remain on file and applicants will be contacted (if we have a valid and current email address for them) if we decide to do a sequel mission in the 2007 Field Season.

## The Great Moonbuggy Race 2006

<http://moonbuggy.msfc.nasa.gov/>  
Fri-Sat, April 7-8, 2006 - Huntsville, Alabama

We had previously been notified that this event, in which we were interested in supporting, had been canceled - "budget pressures at Marshall Spaceflight Center." But the outcry both by prospective participants and by sponsors and cosponsors of past Moonbuggy races, was so strung, that MSFC has now "found" the resources to restore the event.

At this time, we are not sure what form Moon Society cosponsorship will take. Clearly, we can publicize the event on our website and in MMM. We can also offer a special prize, even setting our own standards and criteria.

Fielding a Moon Society-sponsored team entry is another matter. A prospective team would have to organize and come forward, and then convince us of how we should support them and how. Perhaps for the 2007 event.

Meanwhile, send your suggestions of how we can gain publicity from cosponsoring this year's event, email us at [president@moonsociety.org](mailto:president@moonsociety.org) Subject: Moonbuggy Race.

## Chapters & Outposts

### Bay Area Moon Society

<http://www.moonsociety.org/chapters/bams/>

Contact: Jonathan Goff <[jongoff@masten-space.com](mailto:jongoff@masten-space.com)>

Meeting the 4th Thursday of the month at various locations

### Moon Society St. Louis

<http://www.moonsociety.org/chapters/stlouis/>

Contact: Keith Wetzel <[kawetzel@swbell.net](mailto:kawetzel@swbell.net)>

Meeting the 2nd Wednesday of the month  
at the Buder Branch Public Library

4401 S. Hampton, in the basement conference room

We had an exhibit at the Archon 29 Science Fiction Convention in Collinsville, and gave some presentations.

## Moon Society Chapters & Outposts invited to find role in making the Society's 1st Moon Mission at the Mars Desert Station a success

[chapterscoordinator@moonsociety.org](mailto:chapterscoordinator@moonsociety.org)

What can a chapter or outpost do to add to the experience and success of the Moon Society's first lunar base simulation effort? The answer to that depends on what talents, time, and resources the individual chapter members or outpost leaders can bring to bear. It also depends on whether or not a "team effort or project" is feasible.

There are only four months to go before "stage time" as of this writing. That leaves room for only humble and modest contributions.

### Local Publicity

If your chapter or outpost has the opportunity to do any kind of public event, be it an information booth or something else, you might consider featuring the Society's first moon mission field exercise, the rationale behind it, and how it fits into our overall game plan. Prior to the event, you can download pictures from the MDRS website and linked pages: <http://www.marssociety.org/mdrs/index.asp>

After the event, pictures should be available on the Moon Society website.

### Experiments

Your group could put together an experiment that you would like to have a crew member conduct. Here, use your imagination. Those running the mission and participating in it should not be assumed to have thought of "everything." But do run it by us to see if it is something feasible a) for the location, b) in the available time.

<CC>

## ***GREAT BROWSING !***

### **Using Bequests to Open Commercial Space**

<http://www.thespacereview.com/article/434/1>

### **Developing Space Suits for the Moon**

<http://www.thespacereview.com/article/436/1>

### **Disposing of Nuclear Waste in Space?**

<http://www.thespacereview.com/article/437/1>

### **Business Opportunities from Space Tourism**

<http://www.thespacereview.com/article/441/1>

### **SETI Researchers an "arm's length" from UFOers**

<http://www.thespacereview.com/article/444/1>

### **Will Interstellar Travel be for Robots Only?**

<http://www.thespacereview.com/article/448/1>

### **Dawn of the Astrazoic Era**

<http://www.thespacereview.com/article/449/1>

### **It's no longer your Father's Solar System!**

<http://www.thespacereview.com/article/450/1>

### **The Most Important "in situ resource" is Money**

<http://www.thespacereview.com/article/451/1>

### **Polyethelene as Radiation Shielding**

[http://science.nasa.gov/headlines/y2005/25aug\\_plasticspaceships.htm?list741324](http://science.nasa.gov/headlines/y2005/25aug_plasticspaceships.htm?list741324)

### **The Cold Equations of Spaceflight: Bad News for Single Stage to Orbit Buffs**

<http://www.spacedaily.com/news/oped-05zy.html>

### **Keck Telescope can "Null" starlight glare to see any exo-planets present**

[www.universetoday.com/am/publish/keck\\_planet\\_finding\\_ability.html?3092005](http://www.universetoday.com/am/publish/keck_planet_finding_ability.html?3092005)

### **Russian Space Program shows New Life**

<http://www.msnbc.msn.com/id/9509254/>

### **Google Earth – Explore, Search and Discover**

[currently, for newer PCs only]

<http://earth.google.com/>

### **Inflatable 16"Earthball"**

<http://www.earthball.com/>

### **Was the Space Shuttle "a big Mistake"?**

[www.usatoday.com/tech/science/space/2005-09-27-nasa-griffin-interview\\_x.htm](http://www.usatoday.com/tech/science/space/2005-09-27-nasa-griffin-interview_x.htm)

### **JPL Solar System Simulator**

<http://maps.jpl.nasa.gov/>

### **Let's Build the Next Solar Sail!**

[www.planetary.org/solarsail/update\\_20050930.html](http://www.planetary.org/solarsail/update_20050930.html)

## **NASA Selects Team to Build Lunar Lander**

September 30, 2005 - RELEASE: 05-289

NASA's Deputy Associate Administrator for the Exploration Systems Mission Directorate Doug Cooke today announced the selection of NASA's Marshall Space Flight Center, Huntsville, Ala., and Goddard Space Flight Center, Greenbelt, Md., to lead a team in the development of a lunar lander spacecraft.

The lander is tentatively planned for launch as early as 2010. It will demonstrate the ability for precision landings at targeted locations on the Moon; evaluate landing zone environment; and determine if lunar resources can support a sustained human presence.

"This mission will have as a primary objective to determine whether there is water-ice in the permanently dark areas within craters in the Moon's polar regions. The existence of water-ice has important implications in living off the land when we return with human explorers," Cooke said. "The lunar lander will test critical automated descent and precision landing capabilities needed for human landings, including surface hazard avoidance during landing. The discoveries from this mission and the data it collects will play a vital role in humans returning to the Moon and living there for extended periods," he added.

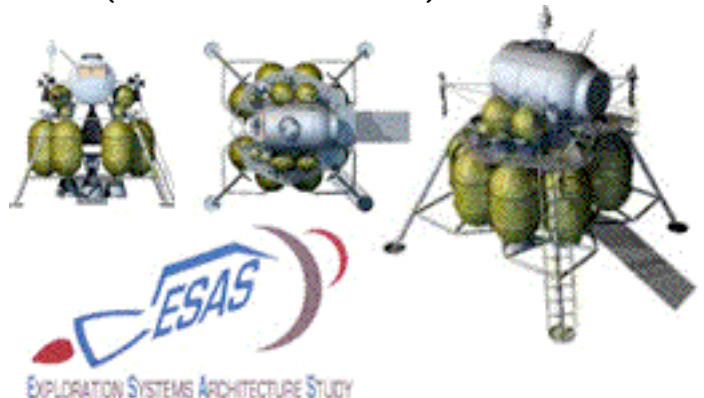
The Robotic Lunar Exploration Program (RLEP) program is intended to provide a series of robotic missions to support human exploration. The lunar lander spacecraft is the second RLEP mission. The Lunar Reconnaissance Orbiter (LRO) is the first mission developed under the RLEP. The LRO is being built at Goddard and is scheduled for launch in 2008. The orbiter will carry six instruments that will map and photograph the lunar surface, search for surface ice deposits, and investigate space radiation.

For information about NASA and the new era of space exploration on the Web, visit: [www.nasa.gov](http://www.nasa.gov)

Michael Braukus/J.D. Harrington

Headquarters, Washington

(Phone: 202/358-1979/5241)



NASA Gearing Up For Return To Moon; ESAS Features New Lunar Surface Access Module (Pictured) Designed To Land Four Astronauts Anywhere On Moon For Weeklong Stay; (Credit: NASA [thanks to Lunar Enterprise Daily, 10-11-05.

## DVD Review: Gaia Selene

by Douglas Jobs- Monday, August 15, 2005

### Gaia Selene:

#### Saving the Earth by Colonizing the Moon

By Charles Proser - CustomFlix, 2005 - [www.gaiaselene.com](http://www.gaiaselene.com)  
DVD, 75 min. - ASIN: B0009834EC - US\$24.95

Charles "Chip" Proser knows drama. With screen-writer credits for movies like *Top Gun*, story author and producer credits for movies such as *Innerspace*, and years of experience with Hollywood and the film industry, few are better than Proser at using the medium of film to stimulate the mind and evoke the deepest of human emotions. Proser delivers on both counts with his new non-fiction DVD documentary *Gaia Selene: Saving the Earth by Colonizing the Moon*. For those with an interest in the fate of humankind over the next century (which should be everyone) as well as those who have an innate yearning to see our species extend its range beyond the Earth, *Gaia Selene* is required viewing.

*Gaia Selene* is a collection of interviews with experts in fields as varied as the energy crisis, global warming, nuclear fusion technology, space militarization, lunar solar power, Near Earth Asteroids, space elevators, space tourism, and more. These seemingly disparate fields are woven together into a compelling theme through narra-tion provided by the author. The common thread is that humanity is in trouble - we are depleting our resources at an unsustainable rate, in the process destroying the very bio-sphere we ourselves require for life - and that the only way we can sustain our species in the years ahead is by looking upward toward the Moon.

The renowned British astrophysicist Stephen Hawking once said he did not believe humanity would survive the next thousand years unless it moved into space. Proser and his experts underscore Hawking's dire prediction by noting the accelerating increase in the world's population, the rapid pace of extinction of animal species, the increasing violence of hurricanes and other extremes of weather, the loss of vast stretches of ocean coral, the growing size of the hole in the ozone layer, and many other troubling phenomena. Furthermore, as more and more of the Third World becomes connected to the worldwide power grid, the demand for electricity will skyrocket, far outpacing anyone's ability to provide it. Humanity's vast oil reserves are predicted to run out before the turn of the century, leaving the Earth in desperate straits for energy. Not to mention that over the next century there is a 1:45 chance of a cataclysmic asteroid impact ending all life on Earth.

Finding solutions for these problems begins with an examination of the resources and threats in space and on our near neighbor, the Moon. *Gaia Selene* makes a strong argument that humanity must, now, focus tightly on, and gain mastery of, the heavens. Concepts such as beaming solar power from the Moon to the Earth to provide energy, developing Helium 3 fusion technology to generate clean nuclear power, building settlements on the Moon to provide an expansion valve for humanity, and even converting threatening Near Earth Asteroids into sources of metals and carbon compounds for industry - these and other ideas are explored in detail.

In addition to the discussions and interviews that form the main body of the documentary, Proser has included additional features many will find useful. A number of scientific papers in .pdf format are appended which can be accessed if the DVD is loaded on a PC. There is an intriguing slide show

illustrating various space structures and lunar activities, with both artist paintings and computer-generated renderings. (In fact, throughout the DVD are computer animations and illustrations of every kind.) There is even a short section of "online links" which can be used to access related Internet websites.

By barreling into our technological future unchecked, humanity risks running out of the resources that Earth has to provide. The Earth is finite, but the ability of humans to reproduce and to use increasingly more and more energy seems limitless. There are risks from without, such as asteroid impacts, that we must also take into account. As a species, we must accept responsibility for our future and exert control over these forces. The lives of our children, grandchildren, and the very fate of humanity depends on it. That is the lesson of *Gaia Selene*. ###

Douglas Jobs ([douglas.jobs@space-settlement-institute.org](mailto:douglas.jobs@space-settlement-institute.org)) is the president of The Space Settlement Institute, "Finding Ways to Make Space Settlement Happen in Our Lifetimes" ([www.space-settlement-institute.org](http://www.space-settlement-institute.org)). Note - The Space Settlement Institute does not receive any proceeds from the sale of this DVD.

### SMART-1 set for more Lunar Science

[www.esa.int/SPECIALS/SMART-1/SEM88X9DE\\_0.html](http://www.esa.int/SPECIALS/SMART-1/SEM88X9DE_0.html)



[Artist's Impression]

26 Sept. 2005 - ESA's SMART-1 mission in orbit around the Moon has had its scientific lifetime extended by ingenious use of its solar-electric propulsion system (or 'ion engine'). New simulations and analysis allowed the SMART-1 flight control team to successfully operate the engine until the almost the last drop of fuel was consumed and an orbit with one-year lifetime was reached. In the extended scientific phase, science operations will include so-called 'push broom' observations, in which the spacecraft will be able to take color images of the Moon surface by superimposing sequences of images of the same area taken with different colour filters. In addition, until the craft ends in an impact, it will concentrate on:

- surveys of the composition of the Moon
- studies of polar regions illumination
- the search for ice
- low-altitude observations

<ESA/SMART-1>



## EuroMARS Hab Ships Out to England 9-25-05

From: Robert Zubrin <zubrin@aol.com>

EuroMARS, The European Mars Arctic Research Station, has been taken out of storage in Chicago, and is on its way to England.

EuroMARS was conceived as the third of the Mars Society's Mars analog research stations. Destined for a Marslike region of volcanic terrain on the north coast of Iceland, the station will allow greatly expanded European participation and European-North American collaboration on Mars analog research activities. Together with the Mars Society's other analog station, the Flashline Mars Arctic Research Station (FMARS), which is located in the cratered polar desert on Canada's Devon Island, and the Mars Desert Research Station (MDRS), located in the fossiliferous sedimentary terrain of southern Utah, the three stations will enable year round Mars exploration operations research activity in three of the primary geologic types of interest. A 4th station, in a desert area of Australia boasting stromatolite fossils of the oldest known life on Earth is also planned.

Funds to allow fabrication of the EuroMARS were raised in 2001-02, and the station was placed on display at the Adler Planetarium in Chicago during the summer of the latter year. There it was manned by Mars Society volunteers who explained the station and its purpose to over 50,000 visitors. However, as a result of the internet crash, further funding necessary for field deployment in Iceland was not forthcoming, and the [disassembled] station was placed in storage for three years.

Now however, as a result of successful fundraising activity by the Mars Society UK, funds have been raised allowing the transportation of the station to England, where it will be placed on exhibit throughout the winter at the scientific centre in Swindon. European Mars Society leaders report that further funding is now being negotiated that should allow deployment of the EuroMARS to Iceland following the exhibit during the spring of 2006.

EuroMARS will be erected at the science centre during October, and will be available for inspection by attendees of the Fifth European Mars Society Conference, EMC5, which will be held in Swindon, England, Nov 4-5, '05.

Further information about the conference:

T5th European Mars Society Conference (EMC5)

From Earth to Mars November 4-6, 2005

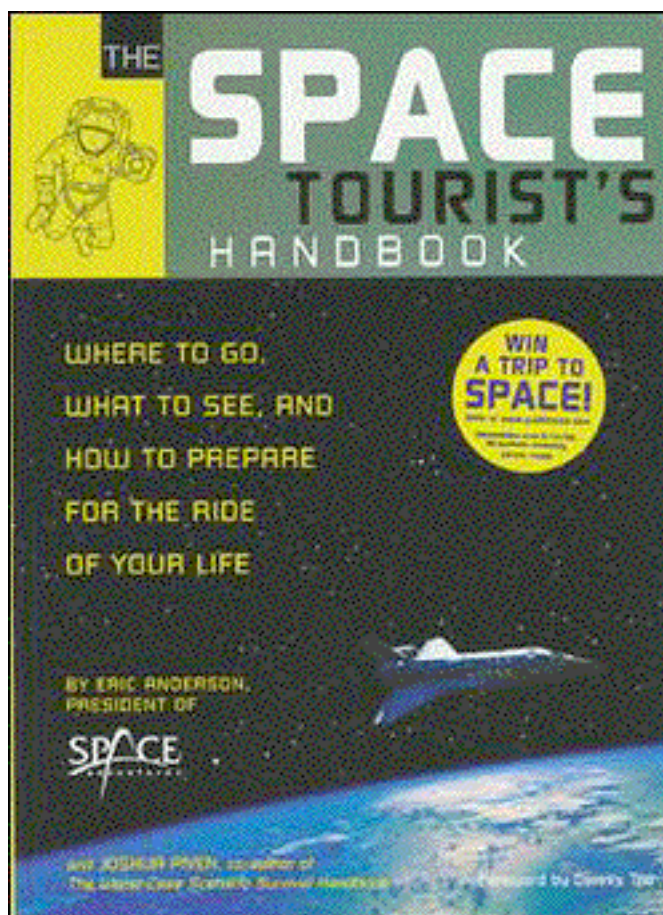
Alexandra House Conference Centre,  
Wroughton, Swindon, England

Guest talks, panels, debates, workshops and events with some of the world's leading experts in Mars exploration and featuring an opportunity to visit the Mars Society's newest Mars Analogue Research Station: Euro-MARS

Robert Zubrin - "Options for Human Mars Missions"

To register, go to: <http://www.marsociety.co.uk/>

[Readers' Service Information]



### Space Tourist's Handbook: Where to Go, What to See, And How to Prepare for the Ride of Your Life

by Eric C. Anderson and Joshua Piven

(Eric Anderson is the president / CEO of Space Adventures, Ltd. Joshua Piven is coauthor of The Worst-Case Scenario Survival Handbook series. )

**Publisher:** Quirk Books (November 1, 2005)

**Paperback:** 192 pages English - **ISBN:** 1594740666

7.3 x 5.6 x 0.7 inches; 12.8 ounces

\$ 5.95 List - \$10.85 Amazon.com

### Japanese Businessman could be Next Space Tourist

<http://japantoday.com/e/?content=news&cat=2&id=351745>

As reported on Japan Today, October 11, 2005, a Japanese businessman, identified only as Mr. Enomoto, but probably Daisuke Enomoto, a 34 year old Japanese investor. He would be the first Japanese private citizen into space and the 4th "Space Tourist" getting a \$20 million ride of a lifetime on an ISS-bound Soyuz capsule sometime next fall.

Meanwhile, RSA, the Russian Space Agency, says its capacity to take paying customers to orbit will go from 2 a year to 4 a year in 2009. The first 3 space tourists were Dennis Tito '01, Mark Shuttleworth '02 and Greg Olsen, '05.

# China's Shenzhou 6 lifts off for multi-day mission with two air force pilots. aboard

MMM Special Report from many sources, and Commentary

On October 11, 2005, China became the third nation to launch a second manned mission, but only the first to launch a multi-person mission on the 2nd shot. That should be taken as clear evidence that they intend to get up to speed quickly. In effect, they bypassed the manned suborbitals, proceeding straight to the Mercury 6 (John Glenn) and then skipped the rest of the Mercury program, the two unmanned Gemini tests and past the first 3 orbit Gemini 3 straight to Gemini 4 or perhaps beyond. "Timid," the Chinese are not.

China has all the records of achievements of the Americans and Russians. They have no doubt about what works. They can skip our mistakes and the dead ends.

So when Shenzhou 5 went up two years ago, many dismissed the Chinese as being 41 years behind. Well now they are 40. We can expect their progress to accelerate as they become more confident. If anything, announced target dates for a docking, a space station, and a Moon mission will prove to have been too cautious. We have only the explosive state of their current economic and industrial growth to look at to signal that China will reach parity in space sooner than we think, especially if, as seems likely, Congress and NASA compete to see who can get credit for stretching out the Moon, Mars and Beyond timetable the most.

China is playing the human hero angle just as have both the Americans and Russians. Space is good for national pride, especially at the outset, when it is all new. Joining Yang Liwei are two new "taikonaut" heroes,

**Fei Junlong**

**Nie Haisheng**



When it comes to introducing women, the Russians were clearly first to take the plunge. But as of last count, there have been a significantly higher proportion of women astronauts in the American program. The Russian early showing was just that: a show, a token, get it over and done with. We'll have to wait and see what role women are allowed to play in the Chinese space program. All three programs began by using military pilots and test pilots. But there is more to space than "piloting," and the Chinese will figure that out soon enough.

The Chinese word for China means "the Middle Kingdom." The Chinese see them selves as in the middle of te front line of humanity. They plan on being "at the center" of Earth's developing spacefaring civilization. It would be a mistake to think that just because many of us Americans cannot begin to imagine anyone else "leading the world" into the future, that the

Chinese are going to oblige us. Pride goeth before the fall.

In the end, it seems a far healthier prospect that the advancing solar-system faring civilization be a truly international one with strong major contributions from the United States, Russia, Europe, China, and India, and quite respectable roles for many other nations.

While the Chinese have a long way to go before they begin to rival our achievements, they are already dreaming dreams as big as ours. And this would seem to be a very healthy development. Much of the world watches with deep interest. The Chinese, no longer the Third World, carry the hopes, dreams, and aspirations of all those peoples still stuck in the "back behind." That there are now three manned space programs can only help spur public interest.

China wants a piece of the pie, a *first cut biggest piece*, not because it wants to best the U.S. and Russia, but because they realize that Space, and the resources to be found there, are essential to a truly open-ended future. We space activists can point to China's dreams and ambitions as evidence that "there must be something of great value" to be found out there. Make no mistake, while China's prestige is a player in all this, the real prize is the possibilities full access to space will win. Even nations without the ability to join the Major Leagues can see that. Yet the un- and under-educated American public does not see it. We are in the throws of the "me right now" generation. What is good for our civilization takes a back seat as our pampered, soft, and risk averse populace indulges itself. Rome repeats! <PK>





**Lunar Reclamation  
Society, Inc.**

**P.O. Box 2102  
Milwaukee  
WI 53201**

**[www.lunar-reclamation.org](http://www.lunar-reclamation.org)**

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

#### **2005 LRS OFFICERS / Contact Information**

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**Newsletter Mailing - Carol Nelson** ..... 414-466-2081  
 (\*Board Members & Ken Paul < kenpaul@cape-mac.org > )

#### **LRS News**

- **LRS October 8th Meeting:** Peter broke the good news that the Mars Society had given the Moon Society a definite time period for its Moon Mission in Utah. He also brought along a "carved basalt" art piece to show the possibilities of this lunar appropriate art form.
- **LRS to have role in Moon Society Mission?:** Peter Kokh has proposed that the remaining funds in the ISDC 98 account, what is left of our share of the conference profits, be used as a downpayment on the \$7,000 rent the Moon Society must pay the Mars Society for its 2 week stay at the Mars Desert Station. See pp 9 ff. "Our original intent in taking on the ISDC was to have money for projects. This is the one!"

#### **LRS Upcoming Events – November, December**

 **Saturday, November 14th, 1–4 pm**

**LRS Meeting, Mayfair Mall, Garden Suites Room G110**

**AGENDA: [www.lunar-reclamation.org/page4.htm](http://www.lunar-reclamation.org/page4.htm)**

Reports on NASA Plans for first new manned mission to the Moon; Show & Tell on Cast Basalt Sculpture, an artform suitable for the Lunar Frontier. Updates on space and space mission news, conferences etc. A look at the calendar ahead.

 **Saturday, December 10th, 1–4 pm**

**LRS Meeting, Mayfair Mall, Garden Suites Room G110**

**AGENDA: [www.lunar-reclamation.org/page4.htm](http://www.lunar-reclamation.org/page4.htm)**

Plans for the upcoming Holiday Classic Film and Potluck annual special December meeting on December 10th.

featuring at 2p.m. **"STRANDED"** [on Mars, of course!]

#### **U.S. CHAPTERS**



**NSS**  
**Chapter Events**  
**MMM**  
**6 Chapters Strong**

**Space Chapters HUB Website:**

**[ <http://nsschapters.org/hub/> ]**

#### **OREGON**

**Oregon L5  
Society**



**P.O. Box 86, Oregon City, OR 97045**


voice mail / (503) 655-6189 -- FAX (503)-251-9901

**[ <http://www.OregonL5.org/> ]**

Allen G. Taylor <allen.taylor@ieee.org>

Bryce Walden <moonbase@comcast.net>

(LBRT - Oregon Moonbase) moonbase@comcast.net

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

**Bourne Plaza, 1441 SE 122nd, Portland, downstairs**

**September 17, October 15, November 19**

#### **MINNESOTA**



**Minnesota Space  
Frontier Society**

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

Tom Greenwalt (w) 763-784-6244 (h) 763-442-6015

David Buth (w) (612) 333-1872, (h) (763) 536-1237

Email: tomg@mnsfs.org

**[ [www.mnsfs.org/](http://www.mnsfs.org/) ]**

**MN SFS News & Pictures**

#### **Pix of IMAX MD Advance Screening**

<http://freemars.org/mnfan/mnsfs/2005-IMAX-MD/>

#### **Pix of Serenity Advance Screening**

<http://freemars.org/mnfan/mnsfs/2005-Serenity/>

#### **Pix from Sept. Meeting**

<http://freemars.org/mnfan/mnsfs/2005-Sep/index.html>

#### **Pix from StarQuest2005**

<http://freemars.org/mnfan/StarQuest/2005/index.htm>

**Tues, Oct 11, 7-9 pm, Rockford Road Public Library, 6401  
42nd Ave. N., Crystal. Dave Buth: the Gaia Theory Updated.**

**Tues, Nov 8, 7-9 pm, Rockford Road Public Library, 6401  
42nd Ave. N., Crystal. Ben Huset, Scott Shjefte, Craig  
Borchard, Rich Brown will speak on Shuttle Replacements.**



# 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/ss/> ]

☎ We meet the 3rd Thursday of the month at 7-9pm

OCT 20th The Stoelting House, Kiel

NOV 17th: UW-Sheboygan, Room 6101, Sheboygan

Dec. 15th The Stoelting House, Kiel

# PENNSYLVANIA

## Philadelphia Area Space Alliance



PO Box 1715, Philadelphia, PA 19105

c/o Earl Bennett, EarlBennett@erols.com

215/633-0878 (H), 610/640-2345(W)

[ <http://pasa01.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. Call Earl or Mitch 215-625-0670 to verify all meetings.

**Next Meetings: October 15, November 19, December 17**

**Reminder:** Mitch Gordon, our public outreach coordinator, has procured table space at the Franklin Institute for this weekend. Come visit and volunteer!

**September Meeting Notes:** We had a rather interesting meeting with a guest author and space activist visiting. Our guest was Monte Davis who has written a number of articles and papers as well as publishing at Space.com in the *Ad Astra on line* section. This is distinct from the paper publication and is updated frequently. More later on Monte.

Gary Fisher, who is both our Mars Society Coordinator and Mars Homestead Project informant, began our reports and discussions with his trip to both The Mars

Society Conference and our little piece of Mars in Utah at Hanksville. The first part was a whirlwind working visit to the site to work on the closed loop recycling system. He then traveled, after a single day to the Conference in Boulder, Colorado. He gave two talks, one part of a whole tract about The Mars Homestead Project his being: "Conceptual Design of a Wastewater Processing System".

This was followed by another on the subject/problem of patents. The idea here is to have a patent that would be usable for present applications on Earth or near space, but would also be applicable to the use of the material in the patent when we reach another planet (Mars in this case). This is not a joke or frivolous: major international disputes arise over theft of "intellectual property" which includes commercial use of patented ideas or techniques. The rest of the trip was an enjoyable family vacation both to Mt. Zion National Park and then, Hanksville! Maybe they'll move into the area near Simon!

Also from Gary: In *The British Interplanetary Society Journal* is an article on the Australian Mars Research Station's "Biconic Aeroshell" design. The cost is about 1.4 million Australian dollars. All of this engendered much lively discussion from Monte, Janice, Jim, and a number of others.

Also: Gary mentioned a possible project: developing a small rover that would work under real Mars time delay conditions. This would be a Sojourner size instrument mock up (as I understand this). Any takers?? The details are being firmed up and this may be for college aged participants. Last but not least: Mars Society Conference 2006: Washington D.C.!

Dorothy Kurtz recommends the science tract at *Shoreleave* science fiction convention as better than most. She also recommends Uvar Hazey Center extension to the Smithsonian. She visited Canada and The Ontario Science Center. She also publishes Dotty's' Dimensions".

Mitch Gordon gave us our start and stop times for the Franklin Institute International Space Week event that we will be part of October 1st and 2nd. This will be in the rotunda from 9:30 to 5 Saturday; and 9:30 to 4:30 Sunday. He also brought material from *The Futurist* magazine on Space Food. He also brought *Ad Astra* and we had a discussion on several topics as a result. Monte brought up a Robby Davis interview of Guy Tibedo and his work on ascent engines and some facts that had not been made public when major problems needed to be fixed. The application of a suitcase full of cash and its travels was part of the tale!

Hank Smith had lots to say on his travels to Westercon and enjoyed that, and he also attended the N.A.S.F.C. [North American Science Fiction Convention], in Seattle, Washington. He enjoyed that event also: NASFIC is held when the World Science Fiction Convention is outside the U.S. for those who are unable to attend the world event. Hank would like us to help with the Philcon activities once

again and will appreciate our ideas and volunteering for panels and talks. Hankscifi@hotmail.com. Or: 215-455-7108. A side discussion started, partly due to a magazine called Nuts and Volts that I brought in, about the Space Elevator. Hank saw the proponents of this idea Liftport Inc. at Westercon. More later.

Janice brought material from *Science* magazine for September on the impact of Hurricane Katrina on the vicinity of New Orleans and Lake Ponchartrain with satellite photos before and after the storm: although the topography is not discernible the images convey the dramatic change immediately following the storms passing. There was also material on the preliminary results from Deep Impact and its mission to Tempel 1. A post meeting purchase of Sky and Telescope for October has additional information that the "mother ship" will be sent to another deep space object!

Because of the discussion of the Hurricane impact noted previously and the environmental emphasis of many of Janice's topics, with emphasis on Global Warming, Larry, our web and Blog master, brought up the "Underground Oceanographic website" which we might find of interest.

Earl Bennett brought material from several sources but only related two items: in the September Nuts and Volts is an article by L. Paul Versage, a school teacher, in his bimonthly column on The Space Elevator. It includes a history of the idea back to Konstantin Tsiolkovsky, writing in the late 19th century, through the recent Lift Port business activity. Paul included some of the design consideration equations for making such advice and describes a system that would use "climbers" (robots actually) that would move up and down the cables and replace or install them. The piece starts on page 82 and is very good. The other technical presentation was on the "funSat Program" as discussed in the July/ August Amstar Journal. This publication from the Amateur Satellite Corporation explains how schools in Florida competed for a chance to launch a small, 1 kilogram (a familiar number to our group), real satellite into orbit. There are some really cool ideas that students and teachers, and Ham Radio operators have come up with for these "featherweight" (my description) space vehicles. One design was going to try eliminating wires by using an internal wireless network. The winning design was from Embry Riddle Aeronautical University in Florida. The craft is to go up in 2006 on a Russian DNEPR booster. I am making mock ups of these craft for our exhibits. They are ~ 4 inch cubes on launch but can expand once in orbit (!).

And finally news from Larry our web and now Blog Master: as visitors at phillypasa.blogspot.com, we can go to our blog site to see our members postings or can publish ourselves through our personal log-in as P.A.S.A. members via our administrator. I should point out that a sufficiently old computer might have problems getting in so check with Larry on this. My next report will go to Moon Miners and our blog!

Submitted by Earl Bennett CALI FORNIA

# OASIS

**OASIS: Organization for the Advancement  
of Space Industrialization and Settlement  
Greater Los Angeles Chapter of NSS**

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

Events Hotline/Answering Machine:(310) 364-2290  
Odyssey Ed: Kat Tanaka - [odyssey\\_editor@yahoo.com](mailto:odyssey_editor@yahoo.com)

**[ <http://www.oasis-nss.org/> ]**

[oasis@oasis-nss.org](mailto:oasis@oasis-nss.org)

**Odyssey Newsletter Online**

**<http://www.oasis-nss.org/articles.html>**

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

Microcosm, 401 Coral Circle, El Segundo,  
unless otherwise specified

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

## Upcoming Events

- **Sat Oct. 15th, 1:00 pm** - OASIS Monthly Business Meeting at the LBPL El Dorado Neighborhood Library, 2900 Studebaker Rd. Long Beach. A public presentation will follow.
- **Sat. Oct. 15th, 4:00 pm** - OASIS Lecture Series, *Orbital Mechanics for Real People*, presented by Seth Potter at the LBPL El Dorado Neighborhood Library, 2900 Studebaker Rd. Long Beach. The presenter will be Seth Potter. *This event is not library sponsored.*
- **Sat. Nov. 19th** - OASIS Monthly Business Meeting, details to be announced
- **Sat. Dec. 17th** - OASIS Monthly Business Meeting, and Holiday Party. details to be announced

## Recurring Events

- **Fridays** -- Mike Hodel's Hour 25 webcast. The world of science fact and fiction with interviews, news, radio dramas, artists, writers, stories, reviews, and much more. Information: <http://www.hour25online.com/>.

## ISDC 2006 – Los Angeles, CA – May 2006

**Cosponsored by the Planetary Society**

That's all we know now folks. The Dates, the Hotel, the Costs - all these and other "Details" are still a closely guarded secret 5 months after ISDC 2005! *Not good!*

**Note to readers:** As OASIS does not publicize its events on its website more than a few weeks in advance, we regret that we cannot give you advance "heads up" on upcoming events in the month or two ahead. Do consult the website for the latest information. - The Editor

NAME _____  STREET _____  CITY/ST/ZIP _____  PHONE #S _____	<p><b>Member Dues -- MMM/MMR Subscriptions:</b>  Send proper dues to address in chapter news section</p> <hr/> <p style="text-align: center;"><i>=&gt;for those outside participating chapter areas&lt;=</i></p> <p><input type="radio"/> \$15 Individual Subscriptions to MMM/MMR: Outside North America <input type="radio"/> \$50 Surface Mail -- Payable to "LRS", PO Box 2102, Milwaukee WI 53201</p> <hr/> <p style="text-align: center;"><b>CHICAGO SPACE FRONTIER L5</b>  <input type="radio"/> \$15 annual dues</p> <hr/> <p style="text-align: center;"><b>LUNAR RECLAMATION SOC. (NSS-Milwaukee)</b>  <i>new lower rates</i></p> <p><input type="radio"/> \$12 reg. <input type="radio"/> \$15 family <input type="radio"/> \$10 student/senior</p> <hr/> <p style="text-align: center;"><b>MINNESOTA SPACE FRONTIER SOCIETY</b>  <input type="radio"/> \$25 Regular Dues</p> <hr/> <p style="text-align: center;"><b>OREGON L5 SOCIETY</b>  <input type="radio"/> \$25 for all members</p> <hr/> <p style="text-align: center;"><b>O.A.S.I.S. L5 (Los Angeles)</b>  <input type="radio"/> \$25 regular dues with MMM</p> <hr/> <p style="text-align: center;"><b>PHILADELPHIA AREA SPACE ALLIANCE</b>  <input type="radio"/> Annual dues for all with MMM \$25, due in March or \$6 times each quarter before the next March</p> <hr/> <p style="text-align: center;"><b>SHEBOYGAN SPACE SOCIETY (WI)</b>  <input type="radio"/> \$15 regular, <input type="radio"/> \$10 student,  <input type="radio"/> \$1/extra family member</p> <p style="text-align: center;">"SSS" c/o B. P. Knier, 22608 County Line Rd,  Elkhart Lake WI 53020</p>
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☐ **\$45 National Space Society** dues includes **Ad Astra**  
☐ **\$20 NSS** dues if under 22 / over 64. *State age* \_\_\_\_\_  
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P.O. Box 940825, Plano, TX 75094-0825, USA

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## Moon Miners' MANIFESTO

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

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