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

Moon Miners' Manifesto

& The Moon Society Journal www.MoonMinersManifesto.com

208 SEPTEMBER 2007

Feature Articles in This Issue

Above: *"*Money", *up front, during, and after* Moon Missions in which Private Enterprise is involved, is the subject of our major article this month – ***below***

Vanity, Experiences, Service:
Three Hooks for Commercial Space pp 3-7

Lunar Settlement has *Already Begun !*
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Is that a Light on the Moon?
Charles Lesher page 8

In FOCUS ◎ Scaled Composites Tragedy: We Must Move On!

Eventually, [on the Space Frontier as anywhere else] the death rate is one per person. Let's live, and preferably do something significant, until we get there. - Claire McMurray

On July 27th, three people lost their lives working to pave the way for civilian tourists to fly into space. The "nay say" vultures pounced on this accident as expected to decry the foolishness of this insolence of those who would soar beyond Mother Earth. =>> p. 2, col B

The Tragic Blast at Mohave Airport

The darkened area in the photo at right shows the extent of the area affected by a blast on a remote pad at Mohave, some 95 miles north of Los Angeles, that killed three and injured three more on July 26. [credit KCAL-TV, Los Angeles]. Aerial video of the blast aftermath showed a charred and twisted flatbed trailer attached to a truck cab with a large silver tank next to it. The Scaled Composites Bunker was 200 yards away.

Moon Miners' Manifesto

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• Moon Miners' Manifesto CLASSICS: The non-time-sensitive articles and editorials of MMM's first fifteen years have been re-edited, reillustrated, and republished in 15 PDF format volumes, for free downloading from either of two locations:

www.Lunar-Reclamation.org/mmm_classics/
www.MoonSociety.org/publications/mmm_classics/

• MMM's VISION: "expanding the human economy through off-planet resources"; the early era of heavy reliance on Lunar materials; early use of Mars system and asteroidal resources; and establishment of permanent settlements supporting this economy.

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

• 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.

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• For additional 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 nonprofit membership organization engaged in public outreach, freely associated with the National Space Society, insofar as LRS goals include those in NSS vision statement. LRS serves as NSS' Milwaukee chapter: www.Lunar-Reclamation.org

• The National Space Society is a grassroots pro-space membership organization, with 10,000 members and 50 chapters, dedicated to the creation of a spacefaring civilization.

National Space Society, 1620 I Street NW, Suite 615, Washington, DC 2006; Ph: (202) 429-1600 - www.NSS.org

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

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⇒ IN FOCUS Editorial continued from p. 1.

It took some time before the dust cleared, not from the explosion site, but from the chitter chatter of the media and the Internet. *No,* a spacecraft had not exploded. *No,* an engine being developed for a spacecraft to carry humans, had not exploded. The nay sayers must have been disappointed!

Instead, the accident was an industrial one, not directly related to spaceflight at all. Despite all the doom and gloom gibberish, there seemed to be no immediate rush for the exits for those lining up for the first flights on Virgin Galactic's SpaceShipTwo that Scaled Composites is working on at Mohave. *Instead, four new people signed up,* and no one already signed up seemed to have any misgivings. Perhaps these tourists, unlike the media scavengers, are made of the right stuff. No surprise!

How the markets will react (Grumman now owns 100% of the stock in Scaled Composites) doesn't really matter in the long run. Investors include the skittish as well as those "in it for the long haul."

There were a lot of press releases by Space Groups too, asking prayers for those who died, as if they were any more heroic than those many thousands who die day in and day out in industrial and construction accidents worldwide.

In the end, the opinions of the timid do not matter. The space tourist movement is not up for public approval in some national or international referendum. Nor does Congress have anything to say about it.

The only people who matter are those who want to go, and those who want to help them go, to the edge of space and beyond. And who among them is stupid enough to think that this was a crucial and critical matter? It happened. Those who knew the deceased grieve for them, but as we would grieve for anyone. No one, none of us, not you, not me, is guaranteed a full life. When you come down to it, we are not guaranteed to survive childhood, much less adolescence. No, not even childbirth. We aren't even guaranteed to be born. All any of us are guaranteed is the right to try to live meaningful lives while we are here, whether our time be short or "four score and twenty."

There have already been many deaths since we humans became jealous of the stars. Explosions on launchpads, explosions of rockets, crash landings, yes. But also a lot of indirectly related accidents: burns, falls, and other things. But this is so in every field. Is there some society that keeps the annals of bridgebuilding and sings the praises of those martyrs who died building bridges? or Tunnels? or Skyscrapers? In all these areas of activity, humans have tried to remake their world. Hubris? No! *It is what being human involves.* If we were not made of such a drive, we would not have yet learned to use vines to swing from tree to tree, or use animal hides to keep us warm in northern winters. We would never have made a raft, a dugout, a canoe, a supertanker. We would yet to have invented the wheel (or axle as I would put it.)

Those who recoil at deaths along the way to the future are not part of the future. They just come along for the ride, enjoy what the rest of us make and create, follow where we would lead. But that's it! *We are the leaders. We have no reason to fear. Risk comes with the territory.* What is risk free is also worth free.

Let's move on! – PK

VANITY EXPERIENCES SERVICE

3 Hooks for Commercial Space

by Peter Kokh

VANITY Products – the piggy bank route to space

Applied Space Resources' Lunar Retriever Mission

At least companies have attempted to beef up their up front capitalization by the sale of what has come to be known as "vanity products." Applied Space Services, now apparently defunct, tried to capitalize its Lunar Retriever Sample Return Mission by selling space on micro-engraved disks in a lunar time capsule called Millennial Archive. The mission was otherwise sound, in our opinion, and would have collected samples from a previously unsampled terrain (Mare Nectaris) as well as attempting to robotically improve the local terrain to make it friendlier for future visitors. More on that on an upcoming second article on "The Developer's Role."

www.spaceagepub.com/subscribers/LDarchive/LD20010319.html
www.space.com/missionlaunches/missions/moon_doggies_000918.html

TransOrbital's TrailBlazer

TransOrbital, a company created by members of the Artemis Society, also had a great plan, but similarly struggled to build up front capital with its invitation to "send your messages and memories to the Moon." This mission seems to be in limbo or suspended animation at the moment, its website not updated in three years.

www.transorbital.net/bluespartan/index.php?action=products

Bigelow Aerospace and Genesis 2

BA is also now in the vanity products business, having offered to fly business cards and other items on its recently launched Genesis 2 one quarter scale version of the large inflatable modules it is planning to launch in a few years. In this case, however, extra income is clearly not the goal. Rather, BA is endeavoring to call attention to the opportunities for business in space that its low-rent, low-lease options that will be made available by its planned first modular inflatable space station. Indeed, BA has added a twist. Your business cards, signs, logos, or whatever will be photographed floating inside the Genesis 2 module while it is in orbit – items and pictures sent up by paying participants in the Bigelow Aerospace "Fly your Stuff" program. This takes a big step beyond **recognition**.

http://www.bigelowaerospace.com/fly_stuff/

The Future of Vanity Space Products

Vanity space products have been around for a long time, if you include the "name a star for $35" schemes and the lunar land sale schemes. Experience with the Millenium Archive and similar schemes show that people would rather keep their money than insure that someone they will never know may find what they wrote or a photo of themselves ten thousand years from now on the Moon. It is not enough of a hook.

Bigelow Aerospace's approach is far better as there is timely reward: you get to see your "whatever" float in zero-G inside the Genesis 2 inflatable.

Memorials in orbit, on the Moon, and beyond

Celestis and other organizations have tried to make a buck by offering to transport a "symbolic portion" of one's cremains into orbit in a lipstick size container, for a price comparable to a traditional burial. However, one is still left with disposing the "non-symbolic" major portion of one's cremains, and with the cremation cost itself. Further, in most of these cases, the cremains portion is put in a temporary orbit that will soon decay.

Now if they would offer to soft-land one's full cremains, an average of 3.5 lbs or 1.6 kilos on the Moon in a crater designated as a memorial repository, and did so at an affordable price, that might get some business. But until space transport to the Moon is much cheaper than it is now, that's a dream for some future tomorrow. And sending one's full cremains on an interstellar journey would cost even more.

SELLING EXPERIENCES *in Space*

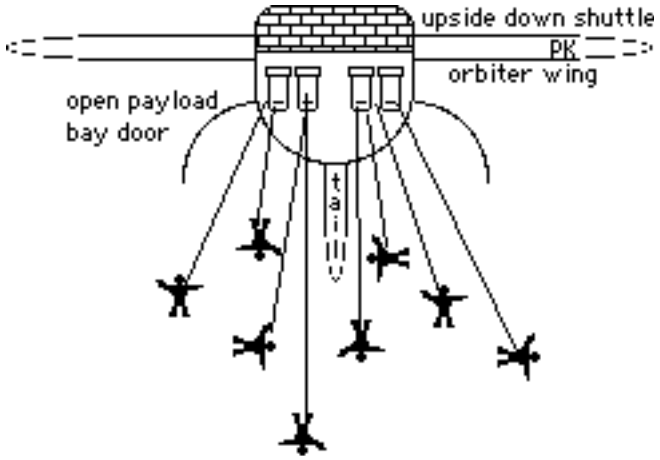
One could argue that selling the sight of one's whatever floating in zero-G inside Genesis 2 is an experience, or would be, if the one paying for it got to watch it on TV or the Internet *live.* But at least this is moving in the right direction. Experiences are invaluable. Money spent on vacations to far away lands or awesome national parks can leave a lasting impression on one's soul. We yearn to experience things that are out of the everyday routine humdrum ordinary. We yearn to experience things that previously we could only dream about. And while many of us are left behind economically, there is an almost obscenely large number of people who can afford to pay big bucks for the experience of a lifetime.

A suborbital trip to the edge of space is something that most of us realize is just around the corner for the price of an around-the-world cruise, a vacation class that is now a sustainable market. Space Adventures has now apparently sold its first $100 million ticket for a ride to the Space Station on a Soyuz, where after a week, that Soyuz will dock with another Soyuz logistics module providing life support for a week or so, and then take off for a loop around the Moon featuring a close pass over the sunlit farside. If they are smart and televise key parts of this experience, it will whet the appetite of many others. At latest count there are now more than 900 billionaires in the world.

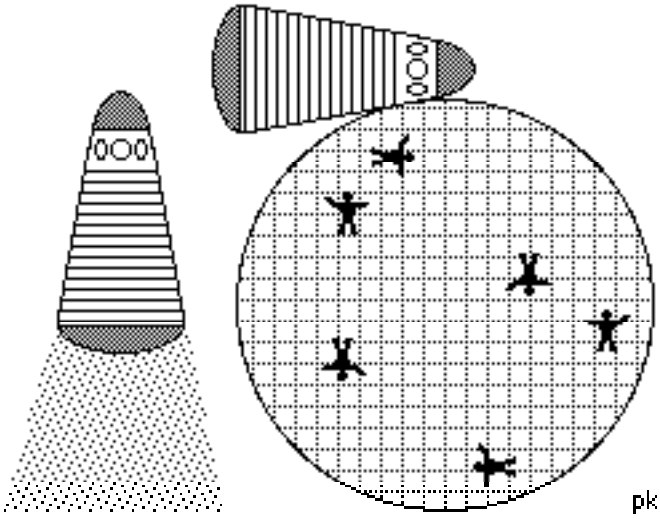
But there is potentially much more to experiencing space than just freefall and the stupendous view of Earth. Orbital Outfitters is working on a rentable pressure suit, and an inflatable raft-shield. The idea is to allow some suborbital tourists, making the ride on a space plane with an airlock, to go out the portal, inflate their raft-shield and literally sky dive from space back to Earth from a 100 miles up. [Illustration on page 14] And don't you think that in this age of Xtreme sports and rich jetsetters that there won't be plenty of takers! People are willing to pay top dollar for *extra*-ordinary vacation experiences. This is a specialty market that has been growing for the past two decades.

And while Bigelow is planning his first inflatable space station for commercial customers, there is nothing to prevent a commercial customer from leasing space for tourist experiences. See the illustrations on page 14. The true orbiting tourist hotel complex cannot be far behind.

On May 28, 1994, at the 1994 ISDC in Toronto, Ontario, the Lunar Reclamation Society Mission Control Workshops™ Team conducted a three breakout workshop on "Tourism in Earth Orbit - and Beyond." Breakout Team I under Mark Kaehny, tried to imagine what sort of tourist experiences would be possible on the first flights to orbit, before any orbiting hotels were built as destinations. Here are some of their sketches, both involving recreational EVAs or spacewalks by those tourists who were up to it.



Tether-restrained "free" floating
Space Shuttle type Payload Bay Passenger Cabin Orbiter



"Truly free" floating within "invisible" net
Delta Clipper type Passenger Orbiter shown

Once space planes start flying people to orbit, the demand for "outside" "floating free" activities will grow, and any number of thing s tried.

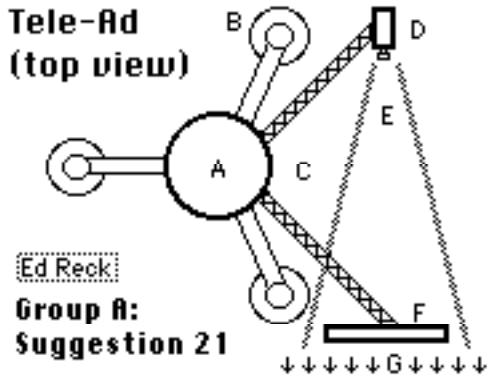
on Earth, of the Moon

But there are humbler products, more within the range of us *hoi polloi* blue and white collar working classes and middle management types. One suggestion is to land a number of teleoperable rovers, and raffle off the right to race them. When enough raffle tickets were sold, the first race would be run. Then another raffle and another race, until the rovers died. That could pay for itself, but like any game, would have a limited lifetime before raffle ticket buyers demanded a game-on-the-Moon experience more challenging and exciting.

Perhaps the simplest and cheapest "sure bet" moneymaker I have come across is the suggestion of artist Ed Reck as a participant in the Commercial Moon-base Brainstorming Workshop held at the First Contact 2 Science/Science Fiction convention in Milwaukee, WI on October 7, 1995 with Peter Kokh and Greg Bennett among leading three of the breakout teams.

Ed, part of Greg's team, proposed a simple lunar lander that would have a camera on one boom and a small electronic billboard on another, with a well chosen interesting moonscape in the background. Down to basics there would be two core components of this system:

(a) Robotic Probe - B/W Camera10 frames/sec.
(b) Signs on the Moon whose message can be telechanged from Earth, with image of sign in lunar setting transmitted to Earth - i.e. real time unobtrusive advertising on the Moon.
NOTE: This was in 1995, and what we could do with this idea today goes far beyond what any of us foresaw twelve years ago.



KEY: A. Lander core with power and communications package; B. One of three landing pads; C. retractable booms; D. videocam; E. Videocam's field of view; F. Electronic message board tele-changed from Earth; G. Background scenery.

Another idea was to draw messages on sand with a stick, and photograph these. [anything from ads to expensive but cherished Valentine Day "I love you" cards - authenticated.]

Again, this simple system falls under the category of experiences, yes vanity too. The variety of this humbler class of experiences for armchair tourists will grow even as the variety of in space experiences for those who can afford them and are willing to take the risk grows also.

But space experience need not be restricted to being a passenger. Consider working vacations! People pay good money to go on archeological digs. Others pay to man the sails on Windjammer Cruises. There is no reason why crew members of spaceplanes (hopefully, the pilot and copilot being excepted) can't go to the highest qualified bidder, including the price of training. Keeping paid crew to a minimum, and maximizing the percentage of paying crew slots, is one way to make such outings more affordable for all.

Selling "Experience" would definitely seem to be a more promising business plan component than selling vanity! And for those who can't afford to go, raffles make it possible for them to have virtual experiences at one end of a joy stick operating something actually on the Moon or elsewhere in space. And why not elsewhere? As the number of persons who become really adept at

managing the 3-second time delay of teleoperating rovers and dragsters on the Moon grows, there may be some interest in seeing how far people can push tele-operation, time-delay-wise. We could invent some kind of game between teleoperable whatevers in deep space, not on a planet, and ever increasing the Earth- arena distance and with it, the time delay to be mastered. There would be levels of mastery, with 3 seconds as level 1, 6 seconds as level 2, 12 for level 3, 24 for level 4 etc. etc. until no one could master the next delay-doubling jump. See: MMM # 131, December, 1999, p. 6. THE COLLOQUIPAUSE: end of conversational space

While business plans built around providing special experiences are certainly more sound than those business plans that only tickle one's vanity, perhaps the most viable business plans are built around providing services. One such plan is that of Orbital Outfitters which we mentioned just above: they would provide suits and equipment for space-diving experiences. But that is just one example. In reality, many types of service needs are begging to be enabled.

SERVICES TO CUSTOMERS

Services in Low Earth Orbit

Services could be provided customers of ISS or other future in orbit space stations. That the ISS has been severely cut from its intended size and functions by the Bush Administration pulls the blanket from many of the business plans listed below. None of these ideas are new, many of them based on the Shuttle External Tank [see: **http://www.space-frontier.org/Projects/ET/**] but the volume of need for them, and the way Roscosmos and NASA do business hasn't left much incentive for them.

- **An orbital tug** to move satellites and other items from one orbit to another, or simply to give them a boost back up to a longer-lived orbit, including geosynchronous orbit
- **A fuel depot** for craft bound for GEO, the Moon, Mars
- a maintenance and assembly garage with parts and tools cribs and teleoperable robo-mechanics
- **A derelict satellite salvage business**. Any part or material that can be reused and is already in orbit is much less expensive than its equivalent still on Earth
- **A supplier of consumables & collector of waste**s.

Services in GEO - geosynchronous Earth orbit

GEO is getting crowded. By international agreement, parking positions must be 2° apart, meaning that there are only 180 parking spots available. Meanwhile worldwide demand is on the increase.

The obvious solution is **GEO-condominium**s, giant platforms at each slot to which an unlimited number of satellites could be attached. The platform would provide solar power, station-keeping, and communications, services that the satellite owner would purchase or rent or lease. This condominium platform idea is so obvious that it has occurred to a number of people. But no one yet has taken the plunge. In time it will become a matter of national interest, but we'd much rather see this developed by private enterprise or consortia than by inefficient socialized national space agencies.

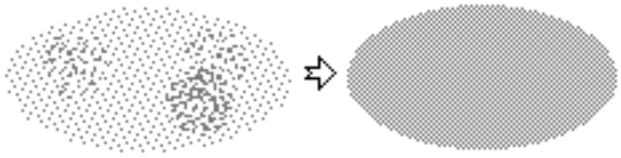
Another business plan for GEO is to **introduce space solar power by the back door, using relay sats to** beam power from one place on Earth where there is an excess to another place where there is a deficit. In other words, we would jump start solar power generation sats by simply introducing solar power relay sats.

Site Development Services on the Moon

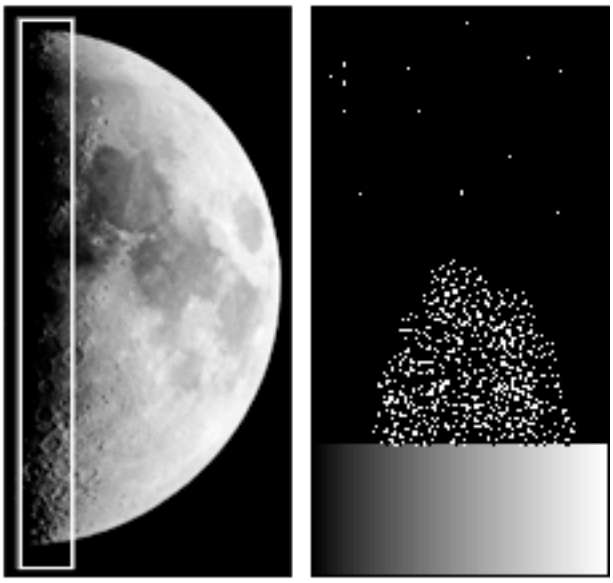
Even before the first national space agency or darkhorse commercial enterprise lands a first permanent habitation module on the Moon, there are options for private enterprise - opportunities to pave the way. Part of Applied Space Resources *Lunar Retriever* mission plan was to pre-land two robot rovers that would clear, fix, or stabilize the troublesome ultra-fine abrasive moon dust that could damage expensive equipment that might be stationed there later.

We can imagine a host of other useful services. each of them involving teleoperators on Earth and teleoperable equipment on the Moon:

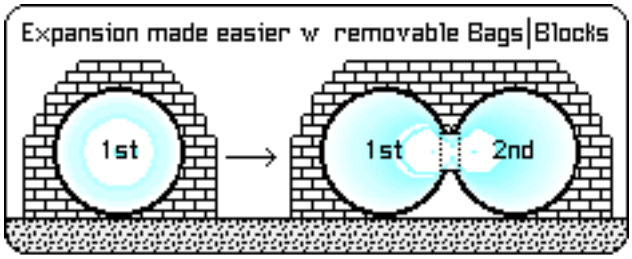
- identifying the best area for a space landing pad to receive intensive regular usage, clearing it of boulders large and small, grading it, compacting and sintering the soil, then install a trio of transponders 120° apart along the periphery.



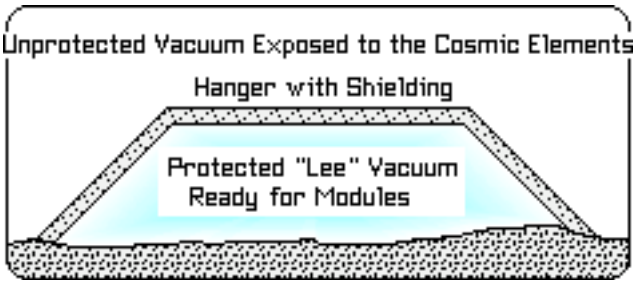
- also identifying the best site for an outpost with ample room for expansion, and clearing and grading that site along with a "road" to the landing/launch pad.
- identifying best adjacent areas for warehousing, solar panel arrays, and other special uses, and preparing them also.
- Testing how high above the lunar surface moondust is levitated as the terminators pass, of vital importance to designers of automated teleoperable telescopes.



- Solar arrays could be installed, complete with buried or trenched cables to the main outpost area and to the landing pad area. Then when the first habitat units are deployed they can be hooked up to power right away.
- Manufacturing on location sand bags filled with regolith or sintered blocks of moondust to be used as removable radiation and thermal shielding.



□ And/or manufacturing of the structural elements needed to build a space frame canopy, then shield it, under which the various habitation modules could be towed and hooked up together.



All of these services could be farmed out by NASA or any other national space agency, to commercial developers.

For more, see MMM #131, December 199, pp. 10-11 "Luna City: The Developer's Role" (reprinted in MMM Classic #14)

www.moonsociety.org/publications/mmm_classics/

[All MMM Classic volumes are free access downloads without a Moon Society username and password, at the above location. Currently all the non-time-sensitive material from MMM's first 17 years are preserved in this archive, one pdf file per publication year.]

Tourist site preparation tasks

□ Rovers preparing sites for Tourist Centers on the Moon could, in the process of site preparation, take photos for use in putting together Tour Guides to use as preliminary advertising.

□ In the meantime, rovers could shoot still and moving panoramas in high resolution of any exceptional scenery around to be used as backgrounds for documentaries and science fiction films. For those old enough to remember, many a cowboy and western film used backdrop scenery previously photographed in SE Utah's Monument Valley.

□ Other scenes worth taping are local sunrise, local sunset, and how the area looks during a total lunar eclipse as seen from Earth; any near by scarps, lavatube openings, exposed bedrock, etc.

"As long as we're here...": Secondary Profit Generators

In 2002, four members of the Oregon L5 Society NSS chapter based in Portland, Oregon, Bryce Walden, Cheryl York, Tom Billings, and Bob McGown put together an interesting list of enterprise opportunities on the early frontier. You can download this paper at:

www.OregonL5.org/docs/sr2002d.pdf

The following ideas are nearer term seeds for early lunar enterprise: (editor's selection and sequencing from a much longer list.)

- **Prospecting:** Ore concentrations (of non-primary elements) on the Moon may require actual prospecting to discover. This would be most efficiently done with hordes of small insect like rovers with geochemical sensors, with humans to follow up later on any samples "tagged" by the robot prospectors as worth a human second look.
- **Prospectors and mapmakers** should be able to sell precise ground-truth data for a price worth their time and effort.
- **Collecting Moondust .** Regular commerce will increase the supply and lower the cost. The potential market is huge, however both
  - □ **for pre-developers of those building and manufacturing materials** that could be produced on the Moon.
  - □ **and for those experimenting with Lunar-appropriate Arts and Crafts ,** *made on Earth* from returned moondust material. Later artifacts could be *made on the Moon* by crew in spare time.
- **Web-cam relays** from fixed and roving cameras might be popular, documenting the whole process of site development, deployment of first phase of the base, etc. Such films would be invaluable training tools for those to follow.
- **Entertainment .** Base crew could **hire out to terrestrial filmmakers to provide unique locations** during their off hours only, and with pre-approval.
- **A teleoperator DJ on Earth** could select music to be played on the Moon and broadcast back to Earth, with announcements ("Our next selection is Arthur's Theme [refrain *'between the Moon and New York City'*], in honor of Mary in Manhattan who is celebrating her 29th birthday, from Chris with love")

1. ***Only*** *those service options which do not take up crew time needed for their principal mission assignments should be considered, unless they lay foundations for a more productive follow-up mission, such as ISRU experiments, power system installations, etc.*
2. ***Commercially provided equipment*** *should include payment for their weight and volume as these are costs of transportation to the Moon.*

Looking ahead to Moonbase Design and Operation

The authors of the paper "As Long as we're here" have recommendations for moonbase designers who by nature of their funding realities tend to be extremely conservative to the point of being "contraceptive." If we fail to allow for expansion, not only in size, but also in function, there is no point in putting up a base at all.

"Many visions of Moon and Mars bases portray small, government-supported outposts conducting pure research. Like an Antarctic base, the outpost is a drain on the economy of its sponsor."

"Space facilities should include some capacity to host visitors. Tourism support presents business opportunities for travel agents, guides, tour companies, housing and housekeeping, restaurants, gift shops, transportation, and entertainment."

"Many small businesses, each contributing in their own way to the economy, will be more robust, more sustainable, and more enriching than any single target

business. *Planners should consider a community's need for small business locations and support infrastructure.* Extra space should be allowed for unforeseen purposes, and for expanding families, small businesses and tourist needs. If planners do not provide avenues for growth, they may make it impossible for communities to thrive."

That's hitting the nail on the head!

Back to Vanity and Experiences

a) Auctioning off Crew Slots

While NASA may naysay any such suggestion, as a total break with the venerable history of the manned astronaut program, there is no reason why, for an enterprise planning to deploy a commerical moonbase, crew slots could not be sold to the highest bidders ***from a select ed list of persons who paid for and have successfully completed their training***. This zeros out crew training costs, and offsets other costs by the amount realized through the crew slot auction. There is no reason to fear that crew performance would suffer if training was duly vigorous and thorough. Mission authorities could still control what crew position goes to whom on the basis of talent, expertise, temperament, and teamwork.

There is established precedent. People pay good money for the privilege or rolling up their sleeves on architectural digs or Windjammer cruises. If people would pay $100 million for a loop around the Moon tour, they might pay more than that to be on a landing mission!

After the first such mission, we might expect the money to be realized from further crew slot auctions to be less. But cutting the first mission cost is a top goal.

b) Auctioning off Naming Rights

This is something that has become quite familiar to most of us in the past decade or two. Corporations and even some individuals, pay good money to put their name on sports arenas and convention centers. Imagine an auction for the right to name the landing site? Starting bids could be preset at $100 or $500 Million or even at a Billion dollars. The right to reject some suggestions could be retained (ex. "The Adolph Hitler Moonbase") and this could be done tactfully by setting a few rules. The base, the landing pad, and the surrounding contiguous territory could all be named this way.

Lesser amounts might be realized by auctioning off the naming rights for individual modules, for the life support system, for the landing pad; even for bunks and private quarters and other "buy a brick" type fundraising efforts.

Nickels and Dimes add up

Many of us, especially those of us who have suddenly found ourselves deep in debt without ever making a "significant" purchase, have found out the hard way that petty nickel and dime purchases can add up to a hefty amount in no time. The temptation of some would be to dismiss these suggestions for fund raising. A penny saved is a penny earned, and a whole lot of pennies can become a lot of money earned. Crew spot auctions, naming rights auctions, and other humble ideas could make or break a marginal mission financially.

We remain "uppity" at our own expense.

<MMM>

Lunar Settlement has *Already Begun*

by Peter Kokh

"Say what?" "How did I miss that?" "Didn't see anything like that in the news!" Well, yes you did, if you are old enough. Now I've got you really puzzled!

If I asked you what is the very first element of a future settlement to be but in place, you might suggest a habitat command center, or a solar power array system, or a transponder to guide incoming ships to the exact chosen location. Good suggestions, and getting close with that last one.

Before the construction teams, human or robotic arrive on any scene, comes the site assessment and selection team, again robotic, human, or both. And it is all the same whether a decision is made to build a settlement on the visited location or not. *The scouting effort is most likely to have left equipment & other objects behind not needed for the trip back home* to Earth, or for study on Earth. "***Garbage***" and "***Trash***" protested the self-appointed guardians of the Lunar Sanctuary as the Apollo 11 ascent vehicle blasted off the plains of Tranquility to bring our first two explorers and their hoard of moon rocks back to our home planet.

Ah, the light bulb goes on! (we hope.) That so-called trash will become the most precious and valuable contributions to a future lunar settlement museum. Now you've got it! We didn't trash the Moon, we left priceless relics of our first visits.

The First Elements of Lunar Settlement are Already in Place on the Moon

They are the artifacts and other evidence of the first human scouting missions to the Moon, that one day will be held in trust by Pioneer Museums for the benefit of the Lunan Settlers and all mankind.

The hue and outcry began with the liftoff of the Apollo 11 ascent module, and continued with the liftoff's of the Apollo 12, 14, 15, 16, and 17 crews. Also of value are robotic landers and rovers that landed on the Moon. Probes that crash landed will not likely be in salvageable.

So what's the big deal? Well, it is a big deal. Some day, lunan parents will take their kids to the Luna City Museum and other museums in lunar settlements to help them understand the roots of their pioneer frontier culture, the first stages in their learning to make themselves at home on the Moon, now a familiar world, no longer alien. Here they will see the first artifacts of the great, unprecedented first steps of humanity off its home world, to explore and understand a neighbor continent unto itself so different, so seemingly hostile and barren.

Museums have that power to put us in touch with forgotten beginnings, to help us appreciate just how many shoulders we stand upon, and the sacrifices and pioneering efforts of generations who have gone before us to make the life we now have possible. And this is vital for a future-looking frontier. The Moon will open the rest of the solar system someday. And keeping this march into the endless frontier rooted in the depths of the past will keep us on target, keep us human, and, as different as our life is from that of the pioneers, we will come to understand and appreciate. *It has begun!* **<MMM>**

Read "The Luna City MUSEUM Visitors' Guide 2097" in MMM Classic #11, pages 17-18.

Is that a light on the Moon?

Opinion piece by

By Charles Lesher* <chuckmeister999@yahoo.com>

One night in the not so distant future, Americans will look up to behold lights burning on the night side of the Moon... but whose will they be? I question if America has the tenacity to build a permanent presence on the Moon. The wars in Iraq and Afghanistan are draining our resources leaving very little for anything else and the investment in the infrastructure necessary to create a self-sufficient outpost on the Moon is substantial over many years and many governments. Budgets agreed upon in one Congress, are radically altered, or canceled in the next. I fear the first lights on the Moon will not be American. We simply do not have the political will to see it through.

Many reasonable and intelligent people ask why should we care? America has enough to worry about with problems right here in front of us. They say that money for space colonization would be better spent feeding the hungry, obtaining medical care for everyone, solving the energy crisis, and a hundred other issues that are without question, very important. I submit that this is a very shortsighted view. Space has the resources not only to make it profitable, but highly desirable, to go there. Solar energy alone could solve the world's dependence on oil. There are asteroids the size of mountains made of iron and nickel, resources we have not begun to tap and most importantly, elbow room to expand.

Earth is like a potted plant that is becoming root bound. 6.6 billion people share this planet with more arriving every day. I have read predictions that population in 2050 will stabilize around 10 billion. Others say it could exceed 20 billion. While world population skyrockets, oil dependence weakens America even as it triggers climate change and rising sea levels. Where will we find the food, water, and housing for all of these people under such conditions? How will we cope with wars fought over basic necessities? Where can we go to relieve this pressure? Humanity occupies every continent. There are no more New Worlds to explore and claim for our own. Or are there?

Americans should be aware that others are eyeing the Moon with lustful intent. China, Japan, India, and the European Union all have aggressive plans to establish a permanent lunar colony sometime in the early 2020s. Currently, America's space plan calls for a return mission in 2015 and a permanent base by 2024. Instead of properly funding the effort, the Bush administration has borrowed from Peter to pay Paul, forcing NASA to restructure its internal budget to fund the Presidents directive. Planetary science missions, climate studies, and a host of other valuable and needed projects, find themselves strapped for cash or worse, canceled entirely. With the situation we find ourselves in, I have grave doubts that America can sustain the funding necessary to put lights on the Moon.

As a child, I watched Neil Armstrong and Buzz Aldrin walk on the Moon. I consumed science fiction paperback novels and was hooked on Star Trek. In the summer of '69 nothing seemed impossible and I wanted to be part of humanity's expansion into the high frontier. I believed it was inevitable. Today, I don't think it will be Americans turning on the lights of the New World and this failure will mark the end of American leadership. It will be other nations who profit, other people who push the boundaries, others who lead… We will follow…

Here is where I find one remaining glimmer of hope. America is a nation of responders. We allow ourselves to be distracted until something comes along that shakes us out of our lethargy. Only then will we mobilize. It has happened before. In 1957, Americans were cruising on autopilot having won WWII, gotten a handle on the Korea War, and enjoying an economy humming along nicely. Then along came Sputnik, shaking America to its core. That night, Americans looked up to behold a shooting star in the heavens.

To some of them, this was a Russian invasion, an in-your-face threat to their way of life. America responded by not only catching up with the Russians, but in surpassing them. Twelve years after Sputnik, Neil Armstrong and Buzz Aldrin walked on the Moon. Those dozen years encompass some of the most vibrant technical growth in the history of science. America still enjoys the fruits of that labor. However, we failed to follow our success and let the achievement pass into history. But if humanity can avoid Armageddon, someday a nation will make the sacrifice and claim Luna for their own.

Until then, I visit the Moon everyday in my dreams, writing about people living in a society not yet realized. They face the same evils we face today, religion threatening to consume democracy, an American presidency in turmoil, and a Muslim empire growing increasingly strong and intolerant. They struggle through their lives and fight for their freedoms just as citizens have done throughout history. Writing speculative fiction is my way of realizing my dream, my way of sharing hope for our future.

[Editor's note: as always, opinions expressed in MMM are those of the writer, and not attributable to any of the organizations who produce or subscribe to this paper. The editor personally believes *Lunans should rule Luna*, not any Earth nation, not even the United States, not even the United Nations. *Settler Home Rule!*]

* Charles Lesher is the author of **Evolution's Child**, a speculative fiction novel about the near future, available at all major online and walkup outlets. Mr. Lesher holds a BS in Aerospace Engineering and an MS in Materials Science. Having recently joined the Moon Society, he also is a member of the Society's new Phoenix chapter, serving as its webmaster.

Evolution's Child; Republic of Luna

Science Collides with Religion in the late 21st Century
New Speculative Fiction by Charles Lee Lesher.
April 2007, 320 pages
ISBN 097772350X
978-0977723508
http://charleslesher.com

[This book may be offensive to conservative believers or fundamentalists of any faith. MMM takes no stand in such discussion but merely announces the book's availability.]

The Moon Society

J O U R N A L

http://www.MoonSociety.org

http://www.MoonSociety.org/blog/

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/

Moonbase Simulations - Lunarpedia wiki

Moon Society DUES with ***Moon Miners' Manifesto***

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

Join/Renew Online - 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: the Moon in its natural beauty, empty and deceptively barren, waiting for human settlers to shelter and to mother as their adopted second human home world. We have work to do!

Moon Society's Video Team continues to create great videos with our message

from Peter Kokh

It began with a dream and vision of Moon Society Board member James Gholston to create videos featuring a number of speakers on various topics that would clearly state the Moon Society's vision for the future, one in which the Moon plays an essential role in an expanded Earth-Moon economy, with pioneer families and settlements on the Moon as the key. The society is blessed to have Chip Proser, retired Hollywood screenwriter, and creator of the DVD Gaia-Selene (www.gaiaselene.com) as a member. We got Chip and his son Noah to come to the International Space development Conference in Dallas, TX last Memorial Day Weekend, and Chip filmed interviews of some fifteen lunar luminaries while James and Dave Dunlop asked key questions. The first product to come out of this effort was the interview with Venture Capitalist Esther Dyson. Several more are in progress.

Chip and Noah's latest releases are a set of five videos on a Lunar Greenhouse, showcasing the work of Lane Paterson and Phil Sadler working with the U. of AZ's Controlled Environment Agriculture Center (CEAC) in Tucson that produced the highly successful Food Growth Chamber at the Scott-Amundson South Pole Station, a prototype of how biospherics could work in a small Moon or Mars base. Paterson and Sadler came to Dallas at my invitation and their work and vision thrilled everyone.

Do keep checking the Moon Colony Video link on the Moon Society front page, www.moonsociety.org for further releases. We are deeply grateful to Chip and Noah, but also to James, Dave, and the many interviewees.

We need to spread the word and the optimistic and encouraging vision contained in these videos. You can help. If you have a website, put a Moon Colony Video link on it. Tell your friends about it.

This did not all happen without a significant investment on the part of the Moon Society. Your generous contributions will help us continue this work as well as to find other ways to get out the word.

We're going back to the Moon because we must,
to save life here on Earth, and in the process,
create a vital frontier for people who want to
get in on the bottom floor of
pushing human civilization and Earth Life
out into the reaches of the Solar System.

You can give at the time you renew, of follow the links "Make a Donation" or "Giving Options" below the "Join" link in the left hand menu column of the front page.

Society President takes part in public debut of Calgary Space Workers Mobile Modular Moonbase "Command Center"

from Peter Kokh

Ready for the move to Drumheller, Alberta Badlands site: The used 31 ft. Airstream Travel Center has been reoutfitting as a "moonbase command center."

Calgary, Alberta, Thursday, August 23, 2007 – I arrived 11 A.M. MT on a Frontier Airlines Frequent Flyer ticket (15,000 miles) from Milwaukee via Denver and was met at customs by John Hadden , a member of the Calgary Space Workers Society. We recognized each other from pictures. After lunch at Wendy's not far from the airport, we went to John's home, in NE Calgary, where he got ready for work (2nd shift) and I pecked at this keyboard before dozing off. The cooler Canadian weather was welcome.

In early evening, long time friends Paul and Holly Swift, who used to live in Toronto (Paul chaired ISDC 1994) and who have been in Calgary for ten years, picked me up and we went out for ice cream. Paul is head of the Calgary Space Frontier Society chapter.

Friday, August 25, 2007

We drove to Michael Bakk's home on the south side, and it was easy to tell when we were there, the truck trailer combo pictured above was parked right in front. Mike is head of the Calgary Space Workers Society. The two groups work together closely. We did some more work on the trailer, securing things for the haul to Drumheller. We left about 6 pm for that location.

We arrived just before dark, secured the truck and trailer beside the Homestead Museum where events were to take place on Saturday, found a hotel and got a bite to eat. Alberta east of Calgary is mostly treeless plains with few trees. Drumheller sits in the Red Deer River valley, long known as Dinosaur Valley for all the fossils found there. It is quite the tourist mecca. They have had an unusual amount of rain this year, and the valley was much greener than usual, not exactly what we wanted for a moonbase setting. The soft eroded contours of the hills do remind one of the soft meteorite-eroded contours of the lunar terrain.

The next morning we got everything set up and were ready for a stream of visitors who never came. As luck would have it , a local lad was one of four remaining "Canadian Idol" contestants, and he was in town to thrill locals and visitors with his singing.

Sunday, however, we had fair traffic. I took notes to give Mike on how to improve his setup, displays, and handout materials, and brainstormed how he could set up an analog moonbase operation despite all the vegetation.

Rationales for a Mobile Modular Outpost Architecture

This Calgary group is pursuing a mobile modular approach and that makes a lot of sense. While the Mars Society is trying to cram all outpost functions in one structure, NASA expects to deploy several interconnected modules on the Moon, an architecture that is could be made friendly to further expansion, if done right. While NASA's outpost will not be mobile, a mobile one would serve the needs of explorers who wanted to visit several sites, provided that these sites could be easily reached overland. The crew could just "break-camp" and tow everything to a new location and set up shop there.

No one analog site serves all needs

But there is a practical down-home reason for mobility. There are many things an "Analog" Lunar Research Station" could explore and test. Geological field work and and equipment would require a pretty good mineralogical and geological similarity of the analog site to conditions on the Moon. But on the one hand, NASA has already done this kind of research on the Moon itself during the Apollo years, and on the other, there are few really good analog sites on Earth for this purpose. As to processing technologies, these can be tested in a lab. Biological field work is also inapplicable. The Moon hosts no life, not even the most primitive.

Physical Regolith analogs

Regolith handling, on the other hand, is a whole complex area of activities in which we are unsure of ourselves and of how to proceed. And here we are dealing with the physical behavior of the regolith particles, their mineralogical makeup being irrelevant. Where will we find terrestrial material that behaves like regolith? It is very unlikely that we will. We may have to make it. And since we will need lots of it, hundreds of tons if not much more, we need to find the cheapest combination of ingredients that will do the trick. We talked about this in MMM #200, November 2006, p 10. Analog Outpost Options Cont: Physical Analogs.

If we focus on regolith handling technologies, teleoperations, and other research areas where the geological and mineralogical character of the site is not relevant, then we can set up shop wherever it is convenient for logistical or other reasons, importing our special surface material to the site.

Drumheller's Dinosaur Valley

East of Calgary, broad flat sedimentary plains stretch for hundreds of miles through the Canadian breadbasket of Eastern Alberta, Saskatchewan and SW Manitoba all the way to Winnipeg. The Red Deer River flows from the Canadian Rockies through this plain, its course taking it between Edmonton and Calgary toward Drumheller, where it has cut a deep valley. In the sides of this valley, many a dinosaur skeleton has been found.

The Calgary Space Workers: Why Drumheller?

The Calgary Space Workers found this site somewhat moonlike, and it is. Not unlike similar sedimentary eroded hills and cliffs in south central Utah around the Mars Desert Research Station, Dinosaur Valley too has soft rounded contours, the work of soft and hard rains through the millennia. If you are old enough to remember the artistic portrayals of the Moon's mountains by Chesley Bonestel and others, you may remember our surprise on arriving there, that there were no sharp craggy peaks and crater rims, but mostly soft rounded hills. Even the mountain size hills (Apollo 15's Mt. Hadley is some 15,000 ft or 4,500 meters give or take) looks like just a taller round hill. In the Moon's case, it was not a watery rain, but the incessant soft micrometeorite rain which has smoothed most edges. Lunar slopes are seldom more than 30° while those at Drumheller and Hanksville can be somewhat steeper, up to 50°.

That, however, is where the similarity ends. You can clearly tell the different strata revealed by the carving waters in layers of sedimentary rock, just as you can in Utah. Only here, the colors are more subdued, more gray. In that respect, Dinosaur Valley is more apt than Utah.

Utah wins in that it is more arid, the rains coming much less often, and in the area around the Mars Desert Research Station, there is almost no vegetation at all. In Drumheller, however, there is quite a bit of inconvenient greenery, especially at the time of my visit - this season has been one of the wettest on record for Drumheller. On the average, the valley gets only 32.5 cm (12.8 inches - compared to 5-9 " in Hanksville) and very little humidity.

Finding a site:

Will the CSW crew be able to find a site where this inconvenient green distraction is minimal? On our visit, Michael Bakk, CSW "Captain" spoke to several landowners who were receptive to the idea of hosting his facility. We will see what the future will bring. Expense is an issue, and a donated site will have to do.

Dealing with vegetation:

Having and maintaining a Moon-like atmosphere, here in a psychological sense, is much more important for productive effective work by the crews that visit the site, than one might think. The rounded gray hills, themselves fairly denuded, certainly set the scene. It is the vegetation on the valley floor that is the problem.

One way to deal with it would be a 6-12 ft tall mound row or wood fence, painted to blend in with the hills above. That would block out eye level vegetation beyond. But what about vegetation within the perimeter? One could uproot it and install barrier fabric that would discourage new growth. Using herbicides should be a last resort. One would want to return the site to its natural state in due time. Above the fabric, one could deploy the imported physical analog regolith material.

Many things affect the expense of such an approach such as size of the area within the perimeter. For the purpose of teleoperations experiments, and regolith handling experiments, and shielding experiments, a few acres should do, but of course, the more, the better. This is an approach, however, that allows expansion.

Adding Lunar "Regolith"

Perhaps most our moonlike brew could come from the various sedimentary rock layers in the surrounding valley walls. There are coal sediments nearby that could be powdered to "blacken" the mix. Available also are sandstone (silicates) and bentonite, an aluminosilicate weathered from volcanic ash. Finely crushed glass and powdered iron would add to the physical behavioral similarities we want. For the finest element, talcum powder might work, but Canada is an importer, not an exporter of this product. Perhaps a local second best product could be identified. One thing is important: to avoid materials that plants find fertile!

Not unlike a lunar mare/highland coast

It all began with an Airstream

Michael Bakk had identified an available used Airstream Travel Trailer as as good a starter module as any. It was streamlined, aluminum clad, and mobile. This module demonstrates utility systems, air recycling, hydroponics and other control and command systems. Next in line is a Workshop that would allow expansion work and alterations and hookups to be done on location. The workshop may be a hard hull module also, rescued from some prior use.

Next would come an inflatable connector tube into which all the major modules would be plugged. I'd suggest that crew quarters (a dorm) should come next, because only then will visitors be able to imagine themselves as part of a crew on the Moon. An agricultural - biosphere- biowaste recycling system is also planned. And from there, the options are endless.

Money, money, and more money

Of course, such an ambitious plan can hardly be realized by clipping coupons, selling lemonade, or washing cars. To their credit, CSW has already raised over $50,000 in donations. That is a very respectable sum for a relatively small local outfit. They seem to know what they are doing, be aware of the cards stacked against them and determined that they can put it all together.

The Moon Society cheers them on, and will help in whatever non-monetary way we can. While we work on our own plans and also look for a suitable location, the footwork of our friends in Calgary, will make our path and choices easier. *Go CSW, go!* **<PK/MSJ>**

Chapters & Outposts

Moon Society Phoenix Outpost Blog

http://www.moonsocphx.blogspot.com/

Contact: Craig Porter <portercd@msn.com>

We had a great weekend at Spacefest 2007

SPACEFEST 2007 is over. August 17-19 were 3 days of lectures about Space, Astronauts to sign autographs and take pictures with and of, long with lots of Vendors and information booths. For those that missed it, you missed a good time.

(R) Chuck Lesher, (L) Craig Porter at Spacefest

CopperCon27 www.casfs.org/cucon/ by Craig Ward

This science-fiction "con" was held the 2nd week end of September. A large number of people stopped by the Moon Society table to pickup information packets and ask questions and comment on the table set up. Chuck and I operated an outreach table at CopperCon27 this past weekend.

We had a lot of interest among the convention goers, young, middle aged and older. We talked to several authors and other notables in the local area.

Chuck Lesher, above right, a member of the Moon Society, Rocket Engineer, Materials Scientist and Author explains the Moon Society to an interested Couple and answers their questions.

Chuck's Book "Evolutions Child" is available on Amazon.com.

See Chuck's article, "Is that a light on the Moon?" page 7-8 above.

CopperCon27 cont.: On Sunday the Nationally and Internationally known Entertainer, Educator and Emcee, "Dr. Sky" stopped by for a visit prior to his Space tourism Presen-tation for the Con. Information on "Dr Sky" may be found on http://www.drsky.com/

We will probably be asked to have a table at the State Fair, Oct. 12 - Sunday, Nov. 4, in the Geological Resources Building and Arizona State University will be having a science day later this month or earlier next month and we have been invited to participate.

More and more of the attendees at our events are expressing how they want their children or grandchildren to be more involved in Space and the Moon. And when we hand out the material to the younger generation the usual response is "cool".

Moon Society Phoenix Chapter in the works!

I have down loaded the rules and bylaws for Moon Society Chapters so we can start writing our own in preparation for the day than will come.

Chuck Lesher is going to develop a website for the Phoenix Moon Society and we are going to move the blog over to the website. Then we are going to add more content to the website.

Also, Steve Kates, an area and nationwide educator/entertainer/emcee, known nation wide as "Dr. Sky, is hosting a viewing of a new Ron Howard Movie,"In the Shadow of the Moon". He has asked us to have a table at the viewing of the movie, we still have to work out the details.

Phoenix Outpost Next Meeting

Next meeting will be the second week end of October, the 13th. All persons interested are welcome at our meetings. Location and Time will be posted as soon as available. September's meeting was unofficially at the CopperCon27 SF Convention. Upcoming events may include a Movie Premiere, an event at ASU for one of their Science Fairs and another SF Convention for this year.

Moon Society St. Louis

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

Meeting the **2nd** Wed. monthly at Buder Branch Library
4401 S. Hampton, in the basement conference room
Contact: Keith Wetzel <kawetzel@swbell.net>

Eight members came to the Sept. 12th meeting. Dave Heckproposed a weekend trip to a Farm Equipment Dealer in Belleville to look at how they (farmers) do stuff we want to do. Dave also reported on the ISDC Conference. We are planning a gorup movie event.

GREAT BROWSING !

Color in the Solar System (artist Don Davis)
www.donaldedavis.com/2002_addons/SSYCOLRS.html

Eisenhower on why we should go into Space
http://www.thespacereview.com/article/932/1

Search for Political Consensus on Space today
http://www.thespacereview.com/article/933/1

A renaissance for space solar power?
http://www.thespacereview.com/article/931/1

Book Review: Rocketeers (space entrepreneurs)
http://www.thespacereview.com/article/928/1

Is NASA its own worst enemy?
http://www.thespacereview.com/article/945/1

Clusters of smallsats to replace big satellites?
http://www.thespacereview.com/article/937/1

Burt Rutan on the Scaled Composites Tragedy
http://www.thespacereview.com/article/943/1

Shift to Space Resource Exploitation could alter space power ranking
http://www.thespacereview.com/article/942/1

The V-Prize: promoting development of point-to-point suborbital vehicles
http://www.thespacereview.com/article/940/1

Book Review: Calibrating the Cosmos
http://www.thespacereview.com/article/939/1

Saving the Vision for Space Exploration
http://www.thespacereview.com/article/953/1

Book Review: Laika (1st dog in space)
http://www.thespacereview.com/article/953/1

Lineup from Sun down in size: all solar system objects over 200 miles in diameter (all 88 of them)
http://kokogiak.com/solarsystembodieslargerthan200miles.html

A Side of Mercury not seen by Mariner 10
www.spaceref.com/news/viewsr.rss.html?pid=24947

The Fermi Paradox: Back with a Vengence
http://sentientdevelopments.blogspot.com/2007/08/fermi-paradox-back-with-vengeance.html

Eighth Continent Project to Integrate Space Business into Global Economy
www.spaceref.com/news/viewpr.html?pid=23436

Photovoltaic Solar Power Economical by 2014?
www.usatoday.com/tech/science/environment/2007-08-26-solar_N.htm

'Tow Truck technology For Satellite Operations'
http://www.physorg.com/news107446980.html

Hole in Asteroid Belt Reveals Extinction Asteroid?
http://www.physorg.com/news108218928.html

bluish grey wallpaper - moonrise over mountains
http://www.moonsociety.org/chapters/stlouis/images/mtn-wallpaper-1024.jpg

"Galactic Suite" Hotel, $4M/3nights, 2012??
http://www.galacticsuite.com/

GREAT SPACE VIDEOS !

MOON COLONY VIDEOS - The Moon Society

Orbital Fueling Station Part 1
http://link.brightcove.com/services/link/bcpid537086541/bclid537026504/bctid1182681168
Orbital Fueling Station Part 2
http://link.brightcove.com/services/link/bcpid537086541/bclid537026504/bctid1182685174
Orbital Fueling Station Part 3
http://link.brightcove.com/services/link/bcpid537086541/bclid537026504/bctid1173352004
Orbital Fueling Station Part 4
http://link.brightcove.com/services/link/bcpid537086541/bclid537026504/bctid1178164920

Lunar Greenhouse Part 1
http://link.brightcove.com/services/link/bcpid537086541/bclid537026504/bctid1155224527
Lunar Greenhouse Part 2
http://link.brightcove.com/services/link/bcpid537086541/bclid537026504/bctid1155139375
Lunar Greenhouse Part 3
http://link.brightcove.com/services/link/bcpid537086541/bclid537026504/bctid1155139377
Lunar Greenhouse Part 4
http://link.brightcove.com/services/link/bcpid537086541/bclid537026504/bctid1155139378
Lunar Greenhouse Part 5
http://link.brightcove.com/services/link/bcpid537086541/bclid537026504/bctid1155224535

Moon Society -ISDC 2007, Dallas, TX
http://link.brightcove.com/services/link/bcpid537086541/bclid537026504/bctid1133264137

Venture Captialism at ISDC - Esther Dyson
http://link.brightcove.com/services/link/bcpid537086541/bclid537026504/bctid979216060

These Videos were produced by Celestial Mechanics, Inc., Los Angeles. (Moon Society member Chip Proser)

OTHER VIDEOS BY CELESTIAL MECHANICS

Nuclear Fusion
http://link.brightcove.com/services/link/bcpid537086541/bclid537026504/bctid537026635

Tranquility Dome
http://link.brightcove.com/services/link/bcpid537086541/bclid537026504/bctid537026635

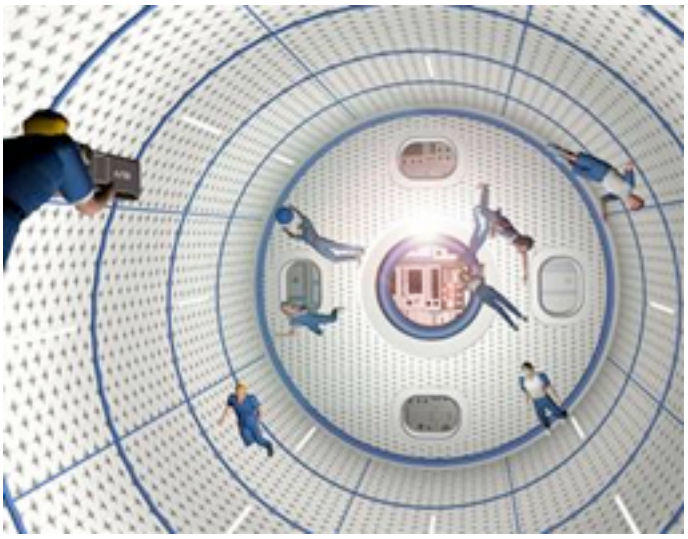
Moon Rush 1 - Dennis Wingo
http://link.brightcove.com/services/link/bcpid537086541/bclid537026504/bctid537093114
Moon Rush 2
http://link.brightcove.com/services/link/bcpid537086541/bclid537026504/bctid537084106
Moon Rush 3
http://link.brightcove.com/services/link/bcpid537086541/bclid537026504/bctid537084107
Moon Rush 4
http://link.brightcove.com/services/link/bcpid537086541/bclid537026504/bctid537018481

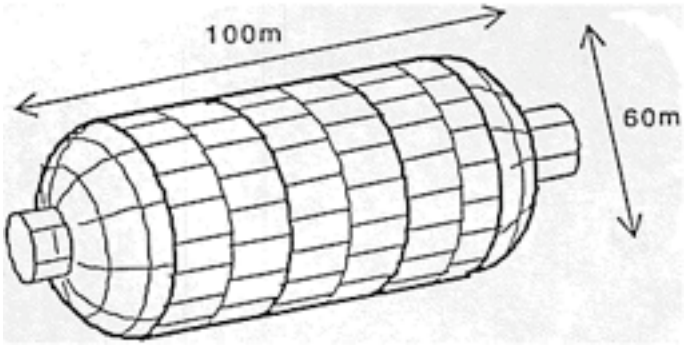
MMM PHOTO GALLERY

Orbital Outfitters to make spacesuit and paraphernalia to allow Space Tourist "Spacediving" from 100 km up

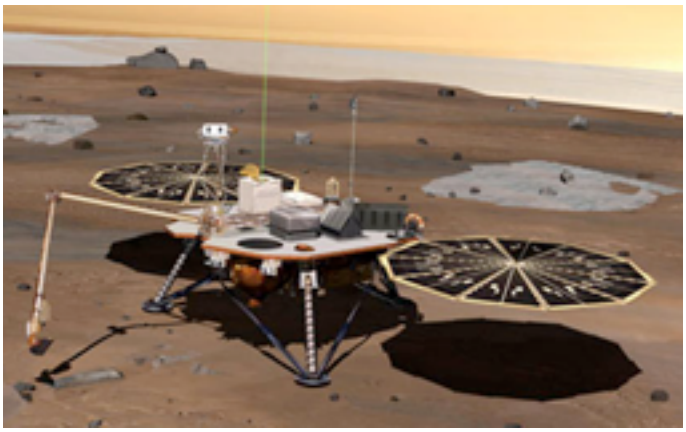
Zero-G Space Sports Nearer than you think

http://www.msnbc.msn.com/id/10396560/



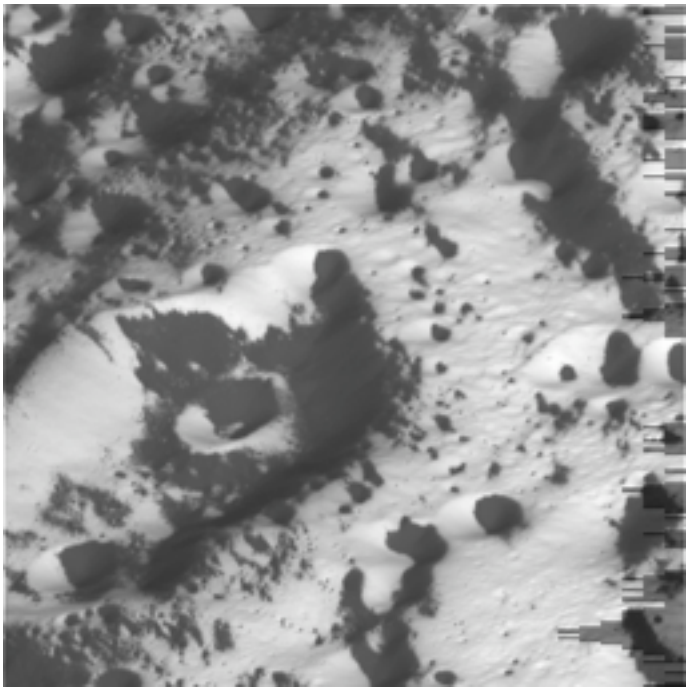


A considerable volume, a bit longer, more than twice as wide as a US football field



The Phoenix Mars Probe on Mars due to arrive May 25, 2008

Phoenix will use a robotic arm to analyze scooped-up samples of soil and ice for factors that will help scientists evaluate whether the subsurface environment at the site ever was, or may still be, a favorable habitat for microbial life. NASA/JPL/UA/Lockheed Martin



First 10 Cassini closeups of surface of Saturn's mysterious moon, Iapetus, Sept 8-10th

http://ciclops.org/view_event.php?id=67&js=1

Below: **An Evolved Soyuz over the Moon**

www.airspacemag.com/issues/2007/september/lunar_clipper.php

New Documentary Film Release:
IN THE SHADOW OF THE MOON

from various sources

All too soon, we will be celebrating the 40th anniversary of man's historic landing on the Moon, with our feet still sadly firmly planted here on Terra Firma. This film tells the story of those few men who have had the enormous privilege of looking back on Mother Earth from the shores of another world. No other humans have ever experienced such a perspective. And only a few of these pioneers, all in their 70s or 80s are still alive to talk about it. This documentary lets us get some feeble feel of what it must have been like – and what it will be like again when a new wave of pioneers returns to the Moon.

Movie Trailer:
http://www.ifilm.com/video/2893859/subchannel/movies?sublisting=&sort=&&relatedPage=5&numPerPage=10

The 1 hr 40 minute film stars those trailblazers still with us. Buzz Aldrin, Alan Bean, Jim Lovell, and Edgar Mitchell – not Neal Armstrong, who has always seemed to treat the experience as a private one, not to be shared

"It's an extremely simple film," British director David Sington told reporters this week. "It's kind of like an astronaut's home movie."

"Apollo 13" director Ron Howard assisted Singleton in putting the film together. The task meant pouring over all the records in the archives: NASA's video records spanned 100 hours. It was a feat to pick and choose which would make it into the 100 minute film!

The technical record is clear and extremely well documented. In "In the Shadow of the Moon," the idea was to help us sense the personal and emotional side of what went on during these missions, from the inner perspectives of each astronaut. It is one thing to marvel at what was done, and to appreciate the enormous technical feats accomplished. But the real human story is how it felt to these select few who had experiences never felt by other humans.

To be sure, that is some exaggeration. Other explorers, here on Earth, who were the first humans ever to stand on ground never touched by humans before, and were aware of that, must have had a similar experience. But there it ends. No one else has looked back on where they came from, where all other humans live and toil, from a vantage point so far away, in which our home world is but a tiny blue marble in the black of space.

Charles Duke , Apollo 16, relates, "I don't remember once, at any of the briefings, anybody asking, 'Well, what did it feel like?'" NASA was all business. Personal impressions and feelings were out of bounds.

As for the technical side of the story, the film goes into the details of the first Moon landing, by Apollo 11. The other missions were largely technical repeats, albeit with some innovations, notably the Moon Buggy used in the last three landings.

In response to questions about the stubborn stories that it was all a hoax, Duke says "We went to the moon nine times. Why would we fake it nine times?"

This is a story largely told by the astronauts themselves, not Mission Control, reporters, or historians. We knew that all the astronauts were expert test pilots, men of steel nerves. We assumed that they had no feelings that everything was business, just another test flight in an unusual set of locations. We are used to thinking of them has hot jocks. This film lets us get well behind that practiced façade. The astronauts who took part in this production were paid expenses only.

When you think about it, the film was a revelation to the astronauts themselves, who had not shared with their fellows their personal experiences and feelings. In that respect, producing this film must have bonded them to one another as never before, "Oh, you felt that way too?"

Now that we are looking forward to a new era of manned exploration and activity on the Moon (even if future administrations or Congresses pull the plug, India and China are determined to go, India because it needs lunar materials to build solar power satellites to serve its burgeoning economy) we are turning our attention to the Moon once again. Even well-healed tourists are beginning to queue up for loop-the-Moon flights.

Someday, the experiences of these few men will be shared by many more. And as explorers give way to pioneers, the curtain will finally rise on the Moon, not as a unique perch from which to look back at "the" world, but as a new human world, one which is about to become less alien, about to become home sweet home for countless generations to come. ***See the film !*** **<MMM>**

In your Area: http://thinkfilmcompany.com/schedule/films/in+the+shadow+of+the+moon/

The (Blog) CARNIVAL of Space

by Henry Cate <cate3@panix.com>

The idea of a blog "Carnival" is to put a variety of related blogs on display for a casual viewer, like if they were walking through a traditional carnival. An instance of a blog carnival is a post with links to a variety of posts on other blogs all on the same topic or theme. (For example there are blog carnivals about education, birds, capitalism, and so on.) Many blog carnivals come out once a week; some are less frequent. A blog carnival post will highlight some of the more interesting posts on the carnival's topic or theme.

Part of the reason blog carnivals are called carnivals is because they sometimes move around. Like a carnival which travels from town to town, blog carnivals often go from one blogger to another, to share the work load, and to get additional exposure for the carnival.

Many viewers will check out a carnival because it is a quick way to learn about other blogs, without having to go to each of the 20 to 50 blogs in the carnival. A carnival provides an opportunity to give more exposure to a set of blogs, a win-win for the bloggers and for the readers. Some of the top blogs, like Instapundit, will mention every carnival they learn about. Carnivals also give bloggers a chance to see what other bloggers are saying about a given topic.

If you want to see some of the variety of carnivals, check http://blogcarnival.com/bc/clist.html

How the Carnival of Space began

On the weekend of March 22-24, this spring, I attended Space Access '07 in Phoenix, AZ. It was the first time I had ever gone to a conference on Space. It was a blast. I blogged extensively on the conference. My couple dozen posts came to over 40 pages on the various talks.

My wife and I have been running the Carnival of Homeschooling for over a year now. Naturally I went looking for a Carnival of Space. I thought it would be nice to submit my Space Access '07 introduction post to a carnival about space. I couldn't find one. I asked the other bloggers (Transterrestrial Musings, Space Politics, Selenian Boondocks, and HobbySpace) at Space Access '07, they didn't know of a Carnival of Space.

I then tried to talk several bloggers who focus on space into organizing a Carnival of Space. Many said it seemed like a good idea, but that they were too busy. After a week of pondering I've decided to kick off the Carnival of Space. The plan is for the carnival to come out weekly.

Twenty Posts and Counting

So far, participant bloggers have included, Why Homeschool (Henry Cate), Universe Today, Music of the Spheres, Star Stryder, The Planetary Society (Emily Lakdawalla), Liftport Staff Blog, Advanced Technology, Out of the Cradle (Moon Society member Ken Murphy)

To get an idea of the breadth and diversity of topics covered (chosen by each participating blogger) you can check out the Carnival of Space Archive:

http://whyhomeschool.blogspot.com/2007/05/carnival-of-space-archive.html

The First Twenty Weeks

1 - whyhomeschool.blogspot.com/2007/04/first-carnival-of-space.html
2 - whyhomeschool.blogspot.com/2007/05/carnival-of-space-week-2.html
3 - universetoday.com/2007/05/17/carnival-of-space-3/
4 - universetoday.com/2007/05/24/carnival-of-space-4/
5 - whyhomeschool.blogspot.com/2007/05/carnival-of-space-week-5-space-is.html
6 - flyingsinger.blogspot.com/2007/06/carnival-of-space-6-isdc-edition.html
7 - starstryder.com/2007/06/14/carnival-of-space-7/
8 - universetoday.com/2007/06/21/carnival-of-space-8/
9 - planetary.org/blog/article/00001018/
10 - whyhomeschool.blogspot.com/2007/07/carnival-of-space-week-10.html
11 - space4commerce.blogspot.com/2007/07/carnival-of-space-week-11.html
12 - flyingsinger.blogspot.com/2007/07/carnival-of-space-12-galactic-extra.html
13 - liftport.com/progress/wp/?p=1222
14 - universetoday.com/2007/08/02/carnival-of-space-14/l
15 - starstryder.com/2007/08/09/carnival-of-space-15/
16 - advancednano.blogspot.com/2007/08/carnival-of-space-16.html
17 - planetary.org/blog/article/00001103/
18 - outofthecradle.net/archives/2007/08/carnival-of-space-18/
19 - universetoday.com/2007/09/06/carnival-of-space-19/
20 - flyingsinger.blogspot.com/2007/09/step-right-up-carnival-of-space-20.html

Instructions for submitting to the Carnival of Space.

If you are a blogger, you too can join the fun. Submissions for the **Carnival of Space** are due to: **CarnivalOfSpace@gmail.com** by 6:00 PM (PST) on the Wednesday evening of the week. It will be appreciated if the submissions come in earlier. The carnival will be posted on Thursday.

Please send the following information:

Title of Post
URL of Post
Name of Blog
URL of Blog
Brief summary of the post

About Henry Cate:

Henry is a member of the Moon Society and the anchor of the Bay Area Moon Society Outpost in the South Bay area of Silicon Valley and San Jose.

You can read the bio on his personal blogsite at: blogger.com/profile/03097237237859928969

Editor's Comment: as a long time space activist always looking for ways to get the word across, I was delighted to learn of Henry's innovative effort and have been following it since this spring. Thanks to Henry, thousands of people are learning more about space. To Henry, as a Homeschooler, this seemed especially important. How many homeschoolers would think to tell their children about Space? His approach is fresh and guarantees that a wide variety of topics will be discussed from many vantage points. Many people write me with this same question: *"What can I do?"* Henry came up with his own answer. He is an example to us all. **<MMM>**

Lunar Reclamation Society, Inc.

P.O. Box 2102
Milwaukee
WI 53201

www.lunar-reclamation.org

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

2006 LRS OFFICERS | BOARD* |Contact Information

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< kokhmmm@aol.com > 414-342-0705
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< James_Schroeter@excite.com > 414-333-3679
TREAS./ Database – *Robert Bialecki 414-372-9613
Newsletter Mailing – Carol Nelson 414-466-2081

LRS News

● **September Meeting**: Peter was nursing a bad cold and neither Doug Armstrong nor James Schroeter could make the Sept. 9th meeting. Bob Bialecki, Ken Paul, Charlotte Dupres, and Elizabeth Beasely held down the fort.

LRS Upcoming Events – October, November

Saturday, October 13th, 1-4 pm

LRS Meeting, Mayfair Mall, Garden Suites Room G110
AGENDA: www. lunar-reclamation.org/page4.htm
Peter will report on his trip to Calgary, Alberta as the guest of the Calgary Space Workers. Updates on space and space mission news, conferences etc. A look at the calendar ahead.

Friday – Saturday – Sunday
October 26 – 27 – 28
Wisconsin's Independent Genre Film Festival

It Came From Lake Michigan [ICFLM}

www.itcamefromlakemichigan.com/2007/?page_id=13
at the State Fair Youth Center
(on S. 84th Street, one block south of I-94)
www.wsfp.state.wi.us/home/wsfp/
PARK_FACITIES/youth_dorm.htm
LRS will be there
with our table top Lunar Homestead
and an information table.
Join us!

Saturday, November 10th, 1-4 pm

LRS Meeting, Mayfair Mall, Garden Suites Room G110
AGENDA: www. lunar-reclamation.org/page4.htm

MMM 8 NSS Chapters Strong

NSS Chapter Events

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

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
SEP 15 – OCT 20 – NOV 17 – DEC 13
Chapter elections at the October 20th meeting

NOTE: The office of Treasurer, long held by Bryce Walden, will be open. Neither Bryce nor Cheryl will be a candidate. The September meeting will be at the informal location where we've lately been meeting: **Acme Coffee and Gifts, 14th & Washington, Oregon City.** In addition to taking nominations, we'll have space news and events, updates from Second Life activities, etc. Plenty of room there and food and gifts. Non-members also welcome.

Chicago Space Frontier L5

610 West 47th Place, Chicago, IL 60609

INFORMATION: Larry Ahearn: 773/373-0349

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/]

Ben's NWSF con Pix
http://www.freemars.org/mnfan/CVAS/2007-NWSF/

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

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

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

SEP 20: UW-Sheboygan, Room 6101, **Sheboygan**
OCT 18: The Stoelting House, **Kiel**
DEC 20: UW-Sheboygan, Room 6101, **Sheboygan**

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/]
[http://www.phillypasa.blogspot.com/]

PASA regular business luncheon/formal meeting 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/Mitch 215-625-0670 to verify all meetings.

Next Meetings: Sept 16, Oct. 20, November at Philcon

August 18 Meeting Notes: We discussed our upcoming events including preparing for the Franklin Institute Space Week events. We will do public outreach to promote space exploration and the education that makes it possible. Mitch Gordon is working to get us in for October 6 and 7 (the weekend) for table talks and, if the Institute allows, Gary Fisher may also present in a forum on future space exploration. He is normally called upon for Mars and the Mars organizations he is part of but he has a wide range of knowledge on the subject of exploration and also colonization.

Not only will we be doing outreach but Mitch says that several astronauts will be in the area for other events. He noted that Story Musgrave will be at The Union League, a republican organization in Philadelphia, during this period. There may be more.

Our modest efforts will include the famous Space Bricks and, as discussed at our meetings, the production of a number of models of the CubeSat Nano Satellite. As we have noted before: this is the fiftieth anniversary of space exploration and to commemorate this I have promoted the idea that we make a number of CubeSat models. Since we are talking 50 cubes, 4" on a side, this should be an impressive stack! Mitch will bring pictures from recent ***Ad Astras***, (the National Space Society publication) and classic O'Neill Colony illustrations). We shall see what we can achieve.

Larry, our Webmaster, says "more pictures". He says that the numbers of hits have increased and we should add more pictures as this can attract interest. Larry also extended an invitation for Mitch to join the blogsite as a contributor and where he can get a password. Mitch is quite prolific as a writer and enjoys expounding on society and the potential effects of Space on it. Go Mitch! Thanks Larry! .

Dorothy talked on the various ongoing activities at a number of museums including the Franklin Institute in October. The Smithsonian also has an ongoing exhibit "Eyewitness to Space" and a series of ongoing lectures. Dorothy bring a lot of material on events across the Mid Atlantic region.

Earl gave a brief talk on the upcoming Franklin Institute event and what we may do for it. Last year we had our exhibits limited to one day and had great support from our members, including our then new member, Alex Howerton of the Nastar Center. This year we will have two days and will have some new material and a reprise of some older ideas. I have asked Mitch to put together a simple model of the original (publicly announced) satellite, Sputnik 1. At the other extreme, Michelle Baker, and I have started the process of gathering material for construction of 50 CubeSat models.

After discussing the design and representation for a while we came up with an elegant solution for the housings, commodity cubic boxes , and, thanks to serendipity as well as diligent searching, an easy to apply "skin" in the form of decorator contact film. Michelle came up with a great idea to involve people and to spread the desire to learn about the achievements over the last fifty years via questions on each cube about a particular years achievements on each cube, with the answers on a hidden face. We will also include a short listing of the AMSAT and CubeSat Corporations information.

In addition we will bring display materials such as the Space Bricks, a levitation demonstrator (Mass Driver segment) and something else I am thinking of involving a Kilogram mass.

On the literature front, I have received the September ***Nuts and Volts*** which includes 'Some Sensors for Your Balloonsats and the Great Plains Super Launch" by L. Paul Verhage. This article is about adding sensors to a near space launch package. The example is with a number of temperature sensors and a pressure sensing device. These interface to a standard flight computer which records the flight data. The Super Launch is an event where a number of groups involved in exploring this threshold of space, bringing others into this sub field

of "rocket science". And there is more of course.

Analog Science Fiction & Fact had an interesting Alternate View piece by Jeffery Kooistra called "Drilling to the Golden Age" wherein the abilities that some have that come from genetic flukes (rapid calculators and other idiot savants) and those who develop a skill, through constant drill or practice, that become effortless in a conscious sense. We may have many examples of this but he focuses on two primaries with one classic: the training of a certain Mississippi Riverboat Pilot, and how constant drill and testing produced an individual who could navigate the great river in all conditions and in the darkness of pre electric America. "Mark Twain", Samuel Clemens, and his education is given as a great example of what is often disparaged in our current educational system (version 12. something?): the effect of drill and repetitive effort. I think Jeffery is right about this in some important ways: the river pilot learns his skill with years of training and critical examination. A mistake could mean death for people. Sports players are not taught to "feel good about themselves" until it is deserved from winning, or at least putting a maxim of effort, a series of competitive tests. Astronauts and professional artisans all go through training that causes that "effortless" skill to be brought forth. A good thought piece.

Comment: On speaking of good thought pieces, read the August issue of ***Moon Miners'*** on the steps that would lead to development of the resources needed to create a permanent Lunar Base and eventual multi settlement colony. The continued work on what is practical, from an engineering point of view, shows that what were "assumed production methods" from previous expositions on future colonization procedures were just that: assumptions.

This was particularly true for me in assuming that aluminum production would be easy without lots of imported material, and that silicon, the workhorse of many semiconductor devices and micro machines, would also be easy to refine with lots of sunlight and a particle separator. I suspect that photolysis of human and biological wastes also has a flaw that I am missing.

Good thinking articles. *Earl Bennet*t for P.A.S.A.

COLORADO

Front Range L5 Society

[Greater Denver North]

1 Cherry Hills Farm Drive
Englewood, CO 80113

http://www.angelfire.com/space/frl5/

Eric Boethin 303-781-0800 eric@boethin.com

Meeting monthly, every 1st Friday, 7 PM

Denver University's Olin Hall, Room 105
http://www.du.edu/maps/olin.html
at **2190 East Iliff Avenue**, Denver, CO

- **October 5, November 2, December 7**

CALIFORNIA

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

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

- **SEP 15 - OCT 20 - NOV 17 - DEC 13**

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

Upcoming Events

- **Sept 15, 3:00 p.m.** -- OASIS Monthly Business Meeting, at the home of Bob and Paula Gounley, 1738 La Paz Rd. Altadena. Call the *OASIS Hotline,* 310/364-2290, for more information.
- **Oct 20, 3:00 p.m.** -- OASIS Monthly Business Meeting at the home of Craig and Karin Ward, 1914 Condon Avenue, Redondo Beach. Call the *OASIS Hotline,* 310/364-2290, for more information.
- **Nov 17, 3:00 p.m.** -- OASIS Monthly Business Meeting at the home of Steve Bartlett and Tina Beychok, 7108 East Peabody St, Long Beach. Call the OASIS Hotline for more information: 310/364-2290
- **Dec 1, *Time TBD*** -- OASIS presentation on the Mars **Phoenix** mission [http://phoenix.lpl.arizona.edu/] Long Beach Public Library, Los Altos Branch, 5614 Britton Drive, Long Beach. **Return to this page for updates on the start time.** Call the *OASIS Hotline,* 310/364-2290, for more information. *This event is not library sponsored.*
- **Dec 15, 3:00 p.m.** -- OASIS Monthly Business Meeting, at the home of Bob and Paula Gounley, 1738 La Paz Rd. Altadena. Call the *OASIS Hotline,* 310/364-2290, for more information.

Looking Ahead

- **Nov 23-25, 2007 -- Loscon**, [www.loscon.org/] the annual regional science fiction convention of the Los Angeles Science Fantasy Society [www.lasfs.info/]]. OASIS will again be providing science programming and doing public outreach at this event. We also throw a great party!.
- **January 2008 Orbital Express** -- OASIS is working to schedule a presentation on the **Orbital Express** project [http://www.arpa.mil/tto/programs/oe.htm]

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○ **$45 National Space Society dues** include *Ad Astra*
○ **$20** NSS dues **if under 22 / over 64.** *State age* ___
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- **Hardcopy MMM:** U.S. & Canada **$35** Elsewhere: **$60**

P.O. Box 940825, Plano, TX 75094-0825, USA

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○ $15 annual dues

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OREGON L5 SOCIETY
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O.A.S.I.S. L5 (Los Angeles)
○ $28 regular dues with MMM

PHILADELPHIA AREA SPACE ALLIANCE
○ Annual dues for all with MMM $25, due in March or $6 times each quarter before the next March

SHEBOYGAN SPACE SOCIETY (WI)
○ $15 regular, ○ $10 student,
○ $1/extra family member

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

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