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

Moon Miners' Manifesto

& The Moon Society Journal

www.MoonMinersManifesto.com

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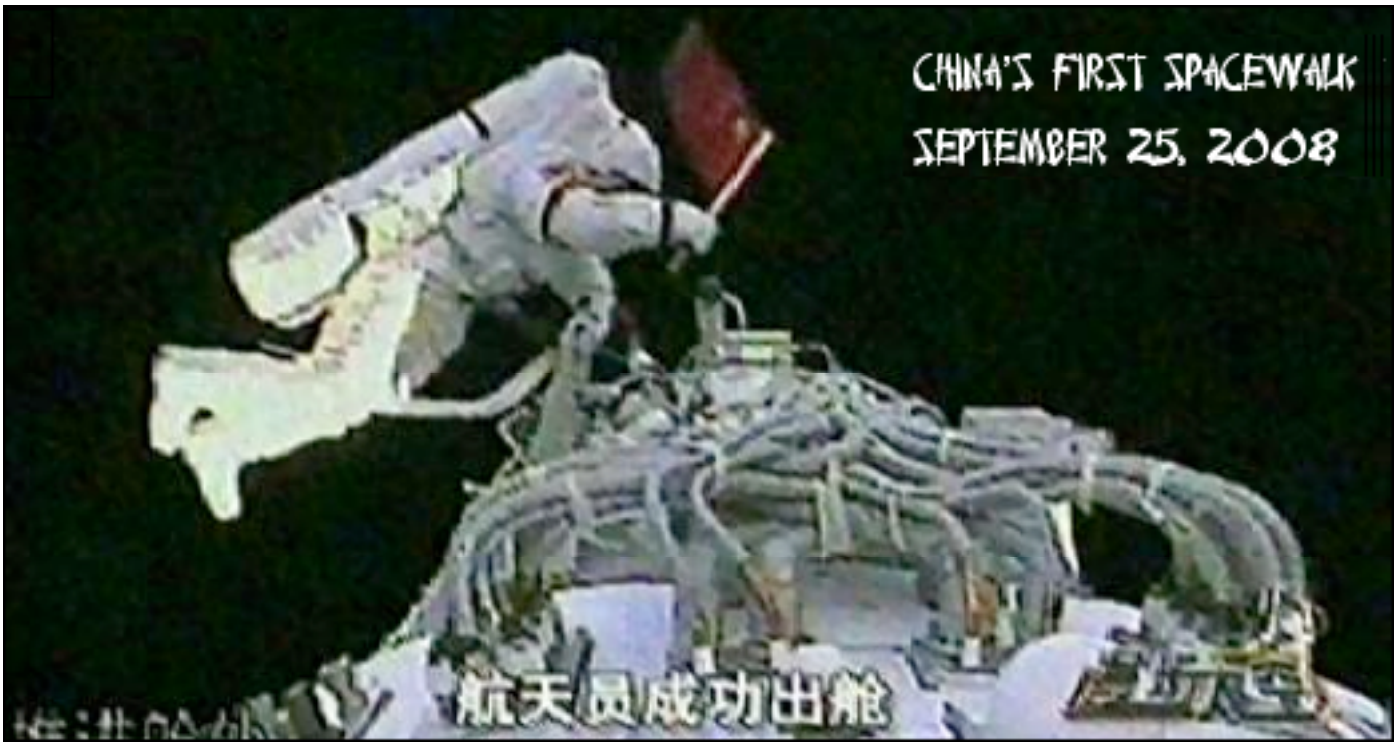

Above: **China "steps" boldly to catch up**

Feature Articles in This Issue

Kindle™: prototype electronic book reader for a paper-free lunar frontier

Amazon.com has introduced a wireless electronic "reader" with which one can read whole books, newspapers and magazines. Physical paper "books" would be prohibitively expensive to import to the Moon, or to produce on location. In contrast, wireless "shipping" of the contents that distance would be trivial. For more on this glimpse of the future lunar frontier, see pp. 6-7.

IN FOCUS ◎ Using the Green Movement to Advance Technologies Needed on the Lunar Frontier

In our article "Books on the Moon" pages 5-6 this issue, we write about Amazon.com's new electronic book reader, the Kindle, as a prototype for what we'll need to read books in a situation where paper will be as priceless as platinum. Amazon's Kindle will appeal to Green enthusiasts (we are one of them) but, of course, Amazon.com went forward with this project for profit motives. But that is immaterial. What counts is that [=> p. 2, col. 2]

Moon Miners' Manifesto

Published monthly except January and July., by the **Lunar Reclamation Society** (NSS-Milwaukee) for its members, members of participating **National Space Society chapters**, members of **The Moon Society**, and individuals worldwide.

• **Moon Miners' Manifesto CLASSICS:** The non-time-sensitive articles and editorials of MMM's first eighteen 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.
• **NSS chapter**s and **Other Societies** with a compatible focus are welcome to join the MMM family. For special chapter/group rates, write the Editor, or call (414)-342-0705.
• **Publication Deadline:** Final draft is prepared ASAP after the 20th of each month. Articles needing to be keyed in or edited are due on the 15th, *Sooner is better!* - ***No compensation is paid.***

• **Submissions by email** to KokhMMM@aol.com - Email message body text or MS Word or PDF file attachments
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⇒ In Focus Editorial continued from p. 1.
Kindle will also appeal to those who would like to find ways to slow down deforestation. Forests help keep the atmospheric cycle healthy, serving as sinks for carbon dioxide. That is especially important as we continue to produce ever more CO2 as consumption of fossil fuels continues to increase as the "Third World" continues to accelerate its already rapid "catch-up" pace.

Inorganic Substitute for Wood Furniture

On the Moon, you can forget about wood "case goods," furniture industry jargon for wood furniture such as dressers, tables, etc., including bedroom sets, dining room sets, etc. So if we can leverage the Green Movement to slow deforestation by switching from wood case goods to a substitue (definitely not plastics derived from fossil fuels) that will not only help slow deforestation but will develop prototypes of something we will need a lot of on the Lunar Frontier. One possibility here is to predevelop glass-glass composites as a substitute furniture material. Just as there is plenty of sand and rock dust on Earth, we have an inexhaustible supply or rock powder and dust on the Moon – called "regolith" or more simply "Moondust."

We've been pushing this for twenty years, and now we have at last a strong incentive to predevelop this technology for making profits here on Earth, hitchhiking on the growing Green Movement. See: http://www.lunar-reclamation.org/papers/glass_composites_paper.htm

In our article in MMM#4 April 1987, "Paper Chase II" www.asi.org/adb/06/09/03/02/004/paperchase2.html we discuss possible substitutes for a variety of wood and paper uses: labels on cans and bottles, posters, letters and greeting cards, wrappings and packaging, and much more. For the Moon, the economic incentive is of "make or break" priority. While at the present, wood and paper substitutes are not always really cost competitive, the motivation of those seeking Green Solutions, especially solutions that slow deforestation, is strong enough to provide a test market for new products that could serve as prototypes for wood, paper, and plastic substitutes we will absolutely need on the Lunar Frontier.

While we don't expect most environmentalists to care a bit about the needs of future lunar pioneers, those space space enthusiasts who do care, can now look for economic support from the Green Movement to help introduce such new products even at a some competitive disadvantge. In other words, the enterprising among us Lunnies ("Lunans") can attempt to predevelop such products in an atmosphere where cost-comparison is not a factor for a growing percentage of those willing to pay a bit more to reduce their "carbon footprint." Ordinarily, new products are at some cost-pressure disadvantage by having to amortize quickly the development costs involved in bringing them to market.

What we are saying, is that right now we have an increasingly more friendly environment in which to predevelop some of the many technologies that will be needed to make a Lunar Frontier work economically in a situation where wood-paper-plastics, ultra-cheap on Earth because of our enormous biosphere, will be ultra-expensive on the Moon where there is no existing biosphere to tap, and where the elements needed to develop a biosphere (hydrogen, carbon, nitrogen) are quite rare.

If you are a Moon guy, and an entrepreneur who wants to help, but needs to make money *now*, this is your big chance. Read the articles cited! **<PK>**

LUNAR ENTERPRISES AND DEVELOPMENT

Especially prepared for *Moon Miners Manifesto*.

Installment 3

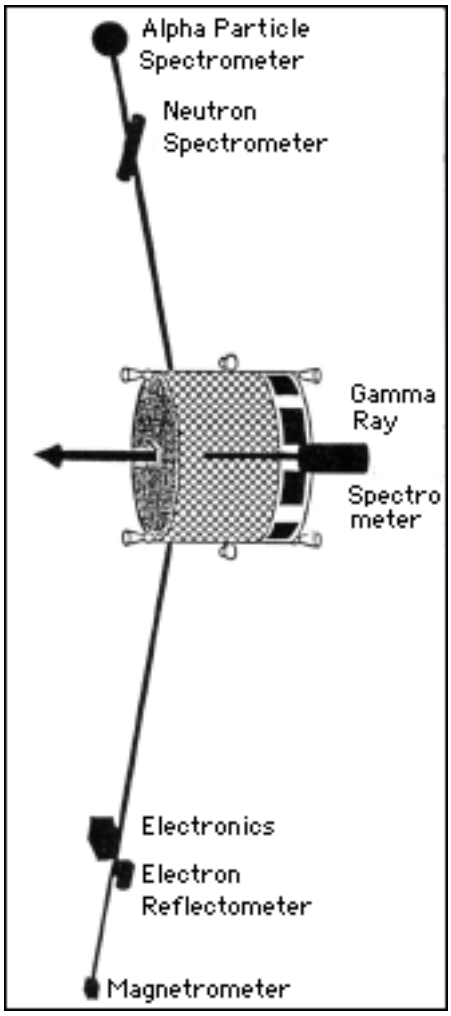
EXHIBIT 6 - Lunar Prospector Mission

Mission Objectives

Low altitude mapping of surface composition, magnetic fields, gravity field and gas release events to improve our understanding of the origin, evolution, current state and resources of the Moon.

Mission Development Timeline

Authority to Proceed Feb '95
Prelim. Design Review May '95
Official Design Review Sept. '95
Final Design Review April '96
Test Readiness Review Aug. '96
Final Readiness Review May '97
Launch June '97



***Lunar Prospector* - booms extended & instruments**

Mission Profile

LLV2 Launch in June 1997 - Minimum Energy Trajectory
2 Mid Course Maneuvers - 3 LDI Burns
1 Year Nominal Polar Orbit Mapping Mission
- 100 kilometer Altitude - 118 Minute Period
- Orbit Maintenance Every 44 Days
- Extended Mission?

Exhibit 6 —Lunar Prospector Mission Profile.

The last unmanned lunar mission of the 20th century by NASA, summarized above, produced critical information on the lunar poles, such as detecting ice possibly stored there. [17]

17 * *Source*: P. Dasch, "Lunar Prospector," *Ad Astra*, May/June 1995, pp. 32/33; www.nss.org). For current information on lunar missions, consult, *The Space Report – The Guide to Global Space Activities* published by the Space Foundation (www.TheSpaceReport.org).

(d) *National space legislation*—in 1995, a "Back to the Moon Bill," part of an Omnibus Commercial Space Act, was introduced into the U.S. Congress—while limited in scope, it would create a legal regime for NASA to purchase lunar data from private enterprise, allowing commercial companies to conduct innovative lunar probes on their own designs. Sadly, it never became national legislation or policy.

The second great American lunar initiative is ongoing, part of the national policy called the *Vision for Space Exploration* . Inaugurated by the second President by name of George W. Bush in 2006 and endorsed by an act of the U. S. Congress, this endeavour tasks NASA to move toward unmanned lunar probes by 2008, and manned missions by 2015, with a goal of returning permanently to the Moon by 2020. The plan is both incremental and cumulative to develop the necessary "Lunar Architecture," beginning by again scouting the Moon with automated lunar trailblazers until astronauts can begin to establish a lunar outpost.

The "Global Exploration Strategy" emerged in 2006 with the participation of 14 space agencies and assistance from over a 1,000 experts. This produced 200 objectives that might be pursued on the lunar surface. There was agreement that its principal objective is to create a sustainable human and robotic presence on the Moon that opens significant opportunities for science, research, and technological development. Both the VSE and GES makes it clear that other national partners in this lunar enterprise are welcome to share the risk, the costs, the glory, and the eventual benefits! With a $16 billion budget until 2010, the Agency's Exploration Systems Mission Directorate, has been transforming "the vision" into a *bona fide* space program that includes signing contracts and building hardware. All this has to be done while NASA and its partners complete the *International Space Station,* retire the shuttle fleet, and replace it with *Ares* and *Orion* spacecrafts, now in the testing and building stage. A series of sorties to the Moon's poles and equator, reaching lunar sites that were never visited by *Apollo* expeditions, are planned for both robotic and human missions in the next dozen years.

The outpost, which will be developed into a larger base, apparently is to be located at one of the lunar poles, probably in the south to start. The *Lunar Reconnaissance Orbiter* to be launched in 2008 will determine that exact site. The Lunar Architecture Team is working a series of expeditions that would culminate in spacefarers living on the Moon for up to six months. A lunar transportation system is being planned so that each lunar landing, unmanned or manned, will include critical pieces of the new lunar infrastructure. By the end of the next decade, the second group of moonwalkers are expected to include 7 astronauts who bring their own habitats and will likely stay at the start for at least a week. A second-year mission would deliver power generation equipment, unpressurized rover, and other infrastructure. The gradual-build up on the Moon will include extending human stays for 14-days, then 30-days and so forth as each year the mission duration is extended up to possibly six months or more.

Initially, the emphasis will be upon lunar resource utilization or ISRU aimed at self-sustaining operations. Much will depend on available U. S. funding, and agreements at to the contributions of other national space agencies to this macroproject.

The imaginative *Vision for Space Exploration* is about more than merely returning to the Moon for the benefit of earthkind. 18 As Dr. Paul Spudis of Applied Physics Laboratory reminds us, it is to increase human knowledge about the objects trapped in gravity by our star, the Sun, and everything else. In the future, the material trapped in the Sun's vicinity could be incorporated into our way of life. *VSE* 's goal is to extend humanity's reach beyond low Earth orbit and destinations within cislunar space, and then further out into our Solar System. In the process, we will learn new skills and technologies that will eventually be commercialized. It could occupy human ingenuity throughout the 21st century!

Meanwhile, the Mars advocates are encouraged because *VSE* implies that the Red Planet is the next logical target for manned missions beyond the Moon. While continuing to Mars will be most dangerous and costly, the learnings from establishing a lunar base should facilitate that process, especially in terms of a launch pad. Members of the Mars Society estimate that a Mar's manned mission would be possible for an investment of $100 billion, and that one third of the NASA budget now should be devoted to that objective. The search for microbial life there is seemingly worth the effort. In the meantime, robotic exploration of Mars proceeds – in August 2007, a *Delta II* rocket launched a lander *Phoenix* on a nine months journey to study its icy soil. If all goes well with the spacecraft parachuting on the frosty Martian plain, it will be NASA's most northern landing there, a first possibly in capturing and analysing any water that is found. The $420 million mission will be worth it, if liquid water is obtained a little south of Mar's north pole! Such efforts confirm that that the purpose of *VSE* is more than establishing a human presence on the Moon, but to use what we learn there to go beyond, starting with Mars. 19

At NASA's JPL, Dr. Martin Lo designed the flight path for the *Gensis* mission in 2002 to collect solar wind particles. Then he recommended formulation of an **interplanetary superhighway** to make space travel easier**.** Lo envisions a place to construct and service science platforms around one of the Moon's LaGrange points. The latter are landmarks of this interplanetary superhighway to planets, asteroids, and comets. Dr. Lo thinks spacecraft could easily be shunted to and from these lunar stations for maintenance and repairs. By using this "freeway" through the solar system, the amount of fuel needed for future space mission could be slashed (www.genesismission.org).

1.3 Private Lunar Initiatives

Farsighted business leaders and entrepreneurs recognize that we are in the process of creating a twin-planet economy, and new wealth can be gained on the Moon that will eventually contribute to a thriving and prosperous society on both planets. But to take advantage of lunar opportunity is a very costly and risky investment. Without the aid of the public sector, private lunar enterprise, in the beginning, will rely on government contracts, grants, tax incentives, and other forms of subsidy. In 2004, the Presidential Commission on *Vision for Space Exploration* issued a report highlighting the importance of private enterprise in this national endeavour. But will the U. S. Congress and Administration provide any incentives for that participation? Dr. Wendell Mendell, Lunar & Planetary Exploration chief for NASA, made it clear in an e-mail to the author (12/12/06) that the Agency does not believe that it should be or can be in charge of settling the Moon. Obviously, this will be the business of private enterprise, starting first with lunar contractors, tourists, and then recruiting lunar dwellers. Again, in the exploration of the New World in the 17th century, it was the trading companies who signed up, transported, and initially supported the colonists. The research of Jonathon Karpoff at the University of Washington confirms that historyically in the exploration of previous frontiers, private expeditions were better organized, more adaptable, suffered fewer fatalities, and made the better use of the latest technologies! And so it is likely will be the case in the settlement of the Moon and Mars.

In the 21st century, there are currently few lunar entrepreneurs because of the enormous costs involved in financing a venture, and the inability of raising sufficient funds for lunar projects. It stopped a joint venture exploration mission by LunaCorp with Radio Shack from sending the *Superstar* telecommunications satellite to map the Moon.

That also was the experience of Dennis Laurie, CEO of TransOrbital, Inc. (www.transorbital.net). TO was the first commercial company to receive license approval from both the U. S. State Department and NOAA to launch a mission to the Moon, beyond geosynchronous orbit. The strategy was to send into orbit, and then land a private small spacecraft, *Trailblazer,* on the lunar surface. With photovoltaic cells on each side, power could be independent of orientation and polar orbit. The craft was reconfigurable in design, and capable of carrying a host of payloads. 20 The primary purpose was high-definition lunar imaging of the Moon and nearby objects of interest that might prove of value in planning future lunar missions and landing. Apart from the income produced from the sale of its lunar images, TransOrbital 's market was to be the selling of offworld advertising and public relations by Internet packages, television documentaries, brand naming rights, as well as transportation to the Moon of business cards, messages, and personal or commercial products, plus sale of post-launch extension products. In conjunction with International Space Company Kosmotras, TransOrbital managed in 2003 a successful test launch of its *Trailblazer* satellite from the Baikonur Cosmodrome in Kazakhstant on a *Dnepr LVSS-18* intercontinental ballistic missile. Although TransOrbital had the support of both Space Age Publishing and Lunar Enterprise Corporation, it could never obtain sufficient sponsors or investors to make a final launch to the Moon, or achieve its $150K a month projected income stream. TransOrbital was a magnificent commercial space effort ahead of its time and pocket book.

Entrepreneurs have proposed many business projects for the Moon, most of which are premature. For example. Dave Dietzler want to use the lunar surface for farming (EM: Dietz37@msn.com), while other want to dig down into that surface and build storage units for archives from Earth, as a protection to a catastrophe on the home planet. Another imaginative proposal comes from the Alliance to Rescue Civilization to develop a DNA repository for all life on Earth that is stored at a lunar base (www.arc-sapce.org/). ARC would also deposit below lunar regolith, a compendium of all human knowledge. Its founder, NYU professor Robert Shapiro argues that civilization must protect the things it values. [21]

More immanent is the Centennial Challenge Prize offered in 2006 by NASA and the X Prize Foundation for

private sector innovators. Within context rules, the $2.5m Lunar Lander and Vertical awards go to the competitor providing the best rocket demonstration of a trip from lower Earth orbit to the Moon. The Agency hopes to contract with the winner/s, and intends to continue the program with other lunar challenges as a spur to space entrepreneurs.

Universities are examining prospects for their own lunar missions, seeking alumni support – for example, *Stanford on the Moon* and *Iowa on the Moon.* The former was started by alumnus Steve Durst, founder of Space Age Publishing, to initiate the university to lunar enterprise. The latter refers to Iowa State University whose alumnus, Dr. David Schrunk, who has urged professors and students at his Alma Mater to consider research relative to in-situ resource utilization (ISRU), directed specifcally toward a lander and robot in the equatorial region of the Moon. This aeronautical engineer/physician recommends that a consortium of universities might be formed to design experiments, including lunar manufacturing (EM: docscilaw@aol.com).

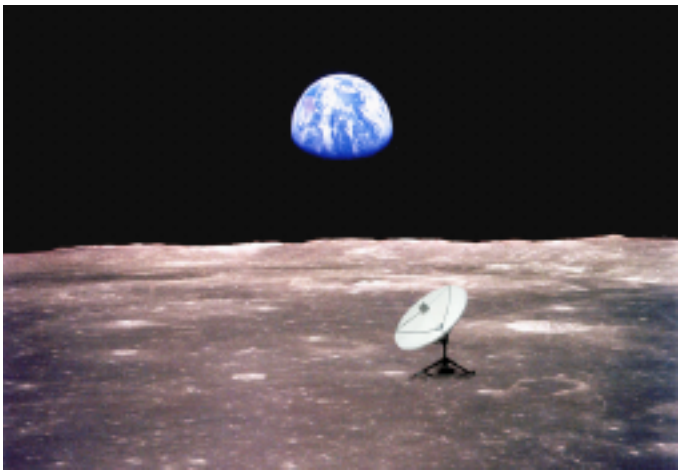
Non-profit organizations have also dabbled with projects for the Moon. The oldest venture which coordinates efforts of some ten other groups is The Artemis Project (www.asi.org.). This 1997 ambitious plan of Lunar Resources Company proposed a four-step mission: (1) crew assembles spacecraft at LEO space station, mating it with a Lunar Transfer and Descent Stack; (2) the Lunar Transfer vehicle then ferries the Descent Stack to the lunar orbit, and (3) the DS lands on the Moon, providing a habitat for spacefarers as the LTV remains in lunar orbit during the exploration period; (4) crew levels the stack as a solar power station and antenna, then spend ten days exploring before returning to Earth. It makes for a wonderful graphic, but sufficient funds were never raised for the venture, while *VSE* actually moves ahead with NASA's lunar return.

A more realistic plan was put forth in 2007 by Steve Durst on behalf of the International Lunar Observatory Association . ILOA is in the process of fundraising from sponsors, affiliates, and investors to erect a multifunctional lunar observatory at the Moon's south pole near "Malapert" Mountain, possibly before 2010. SpaceDev Inc. has been contracted to develop a lunar lander demonstrator model. The ILO lunar commercial communications center will include a power station for transmission to Earth of real-time astrophysical data and videos

EXHIBIT 7 * Planned International Lunar Observatory

In 2005, a Lunar Commerce Roundtable was held to discuss prospects for business endeavors on the Moon (www.lunarcommerceroudtable.com/) The participants examined how such enterprises could contribute to the global economic growth foreseen in the *Vision for Space Exploration* (refer to chapter 1.2). A key conclusion was that publicly-funded exploration should facilitate an open approach to lunar development that provides flexibility for private and public sector stakeholders. In lunar entry and exit, these entities need to practice both collaboration and innovation in creating a commercial market on the Moon where government is only one of the many customers. This "eighth continent" is both accessible and offers commercial opportunities in energy, transportation, mining, construction, manufacturing, entertainment, advertising, branding and sponsorship. With the assistance of robots, markets will emerge that are profitable and beneficial to human there and on the home planet!

But such cislunar undertakings are fraught with risk, both on the ground and aloft, requiring more user-friendly legal and regulatory practices, as well as helpful financial incentives and provisions if lunar partnerships are to flourish. To succeed in a bi-planetary economy, exhibit 8 predicts the activities that should be pursued. Each will require macro-thinking and micromanagement.



Planned International Lunar Observatory. Private enterprise **is** now fundraising for this non-governmental telescope on the Moon . * *Source:* International Lunar Observatory Association (480 California Ave. # 203, Palo Alto, CA 94306, USA; www.iloa.org).

EXHIBIT 8 * - Lunar Enterprise Forecasts

If a lunar macro-project is undertaken by a global government consortium or trust, then provisions should allow for participation by private enterprise. On the other hand, some lunar commercial possibilities should be left entirely to the private sector to underwrite, manage, and develop. Non-profit organizations, such as universities, professional and scientific societies, humanitarian associations, should be encouraged to become lunar sponsors in their fields of expertise. To optimise a lunar economy for the benefit of humanity, here are some areas for R & D:

- Space transportation systems to and from the Moon, including spacecraft and fuel depots;
- Lunar transportation systems across the Moon's expanse and beyond, including lunar fuel production from oxygen;
- Lunar supply systems in terms of food, water, materials, inflatables, and equipment until such can be produced on the Moon itself;
- Lunar concrete, water, and in-situ resources that will contribute to the construction of infrastructure there;
- Lunar dweller systems – habitats, regenerative life support systems, radiation shielding, food management, waste management, health services, thermal controls, et al;
- Lunar science and engineering provisions to further research by scientists, astronomers, biologists, geologists, resource mapping and analysis, behavioural science experimentation, etc.;
- Lunar communication systems for use on the Moon and with the home planet;
- Lunar energy production and distribution, especially scale-up a solar electric power system, and eventually a lunar solar power system to beam energy to Earth;

• Lunar construction systems utilizing bi-planet materials and technologies;
• Lunar mining and manufacturing systems, such as with regolith and Helium-3;
• Lunar governance and administration that encourages peaceful, commercial, and collaborative development of the Moon's resource;
• Lunar financial, real estate, insurance, liability, and legal services, etc.;
• Lunar educational and cultural systems for both *Selenians*, as well as programs to be transferred from the Moon to Earth, and vice versa;
• Lunar entertainment and performing/creative arts provisions for inhabitants and visitors;
• Lunar security and peacekeeper provisions, including conflict resolution and a justice system to deal with delinquent deviant and criminal behavior;
• Lunar tourism industry and provisions for visitors from Earth;
• Lunar design and manufacturing of spacecraft to go to Mars and the asteroids;
• Lunar manufacturing of telescopes, tools, and instruments made of Moon materials;
• Lunar resources, products, and services for the benefit of the Earth's inhabitants;
• Lunar production and deployment of free-floating structures and vehicles in outer space;
• Lunar enterprises to help create a spacefaring civilization that can be hardly imagined now, as human knowledge and potential expand offworld!

Exhibit 8 – Lunar Forecasts. Expert consensus on human development of the Moon in 21st Century. * *Source:* Drs. Lawrence L. Kavanau, DOD deputy administrator who helped forge the vision and policy that lead to the *Apollo* program that landed humans on the Moon (this aerospace engineer of rare business acumen died in 2005)….David G. Schrunk, aerospace engineer and radiologist, senior author of two editions of *The Moon: Resources, Future Development and Settlement (2008),* and founder of the Quality of Laws Institute…Philip R. Harris, behavioural scientist and management/space psychologist, author of three editions of this book, *Space Enterprise: Living and Working Offworld (2008)* and the classic *Managing Cultural Differences (7th ed., 2007).*

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[<MMM>

Books on the Moon

(not *about* the Moon)

by Peter Kokh

Back to the Future

In the early 1980s, when I decided to write a novel about where we could have been then, had we not retreated from the Moon in 1972 (on Mars, obviously!), this Mars enthusiast figured that since getting our feet wet on the Moon first would have been necessary to open a frontier on Mars, I would have to start the novel by sketching how we would do the Moon. Realizing that the Moon's deficiency in carbon and hydrogen and nitrogen would make many of the products we were used to using in our consumer economy prohibitively expensive, we started out trying to come up with ways we could substitute, or make do without, "wood, paper, plastics."

In MMM #4, April 1987, our article "Paper Chase II" attempted to tackle how we might substitute for, and do without paper, an enormous part of our everyday lives www.asi.org/adb/06/09/03/02/004/paperchase2.html This article has been reprinted in MMM Classics #1, p. 11, in PDF file format, as a free download from: www.moonsociety.org/publications/mmm_classics/

In this article, we tried to find appropriate workable substitutes for most categories of paper use. What would future lunan pioneers do for books? Producing them from lunar materials would be exorbitantly expensive, and so would importing books made on Earth.

> "Books, magazines, newspapers: electronics to the rescue, you say. Well *only if there are some quantum leap improvements over what is available today.* Cathode ray tube (CRT) eye strain is a common enough complaint to show that the final format of electronic reading media is not yet on the scene. The Lunar "EZ-Read" must not only be eye-friendly, it must be lightweight, even pocketable. Rainbow-color capacity should not be a luxury.
>
> Electronic books, magazines, and newspapers, etc. to be inserted into the reader must be quite compact especially if hydrocarbon plastics are involved so that the weight ratio to paper replaced is as high as possible. All metal alloy and/or silicon would be the best."

Now, some 21 years later, it appears such a "reader" is available. Amazon.com, looking for a cheaper way to sell more books, has come up with such a device, the **Kindle**. You can now download whole books, newspapers, and magazines, for a fraction of the cost of a physical copy, even at Amazon.com's bargain prices.

About Kindle

There is probably little we can do to prevent this article being interpreted as a sales pitch to go out and by your own Kindle. But there is no other way to clarify the enormous possibilities. Keep in mind that Kindle is the first product in a new genre. Competitors are sure to introduce their own "improved" versions.

By the time we have pioneers on the lunar frontier, the Kindle will be remembered as a crude start, and you will be able to see one in the Luna City Museum. Kindle is a glimpse of things to come.

Here is the very long link:

http://www.amazon.com/gp/product/B000FI73MA/ref=amb_link_6369712_3?pf_rd_m=ATVPDKIKX0DER&pf_rd_s=center-1&pf_rd_r=09NM5ARC30040T722137&pf_rd_t=101&pf_rd_p=441946601&pf_rd_i=507846

For the rest of you, *a picture is worth a thousand words.*

Product Description

"Three years in the *making, Kindle™ is an entirely new class of device—a convenient, portable reading device with the ability to wirelessly download books, blogs, magazines, and newspapers."*

Paper-like Screen

"Utilizing a new high-resolution display technology called electronic paper, Kindle provides a crisp black-and-white screen that resembles the appearance and readability of printed paper. The screen works using ink, just like books and newspapers, but displays the ink particles electronically. It reflects light like ordinary paper and uses no backlighting, eliminating the glare associated with other electronic displays. As a result, Kindle can be read as easily in bright sunlight as in your living room.

Ergonomic Design

"At 10.3 ounces, Kindle is lighter and thinner than typical paperbacks, and fits easily in one hand. Its built-in memory stores hundreds of titles. An optional SD memory card lets you hold even more.

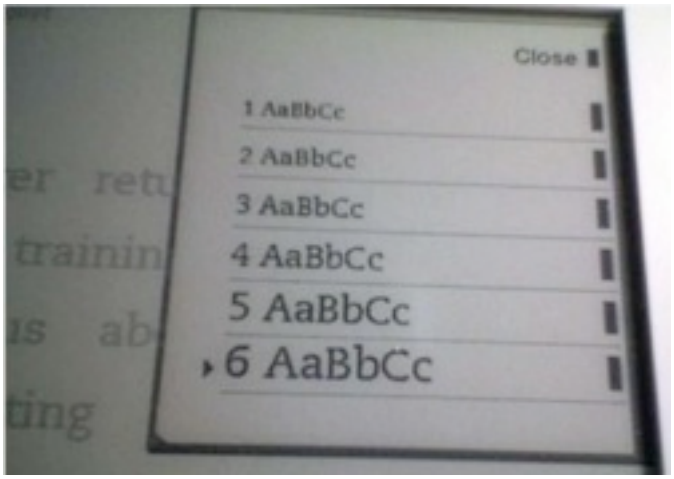
"We wanted Kindle to be as easy to hold and use as a book, so we designed it with long-form reading in mind. When reading for long periods of time, people naturally shift positions often. Kindle's full-length, vertical page-turning buttons are located on either side, allowing you to read and turn pages comfortably from any position. Navigation on both sides means both lefties and righties" can easily use Kindle with one hand.

"You can be anywhere, think of a book, and get it in one minute. Paperback size and expandable memory let you travel light with your library. With the freedom to download what you want, when you want."

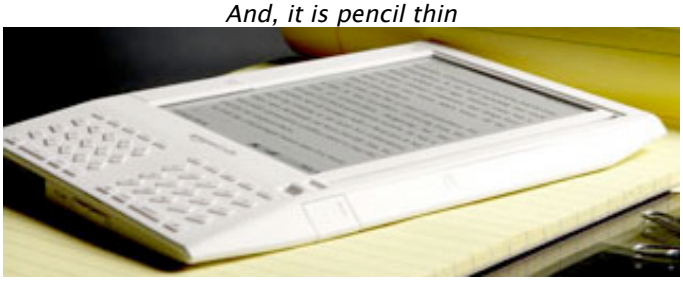
More, and the bottom line

Kindle uses a long-life battery, comes with a USB cable and a protective cover. It stores "hundreds" of books at a time, even more with a memory card.

And it costs $400. But we all know how introductory prices come down the minute a competitor surfaces. As always, if you have to be the first in your block to own something, you will pay a premium price. But as it costs only $9.95 to download a whole book, it will soon pay for itself if you are an avid reader.



Oh, yes! It does something no conventional book can do.
It let's you change the font size! (even the font??)
And, it is pencil thin



Looking ahead to the lunar frontier

While the product seems to be well-developed, it is of the nature of competition that new and improved features will be added. It may already display color photos, but how about embedded videos? Could you one day switch "channels" to a monitor view of sleeping children? It already includes Wikipedia, and a full-size, full-feature dictionary.

Will future models let you edit, write? It should be a small step to develop larger even flater versions to replace color posters and billboards.

Kindle-available books already include those in other languages. In the future will a new version translate them for you, giving you access to foreign as well as ancient libraries?

Substitutions for paper books is just the start. There are many other paper products and uses that will be a challenge to replace on the Moon. Do read our original article mentioned above for a long list of these and for our 21 year old proposed strategies.

Kindle is an example of developing a product needed on the Moon, because it was also needed on Earth as well, as we become more environmentally aware.

Back to the past

Oh yes, about that novel – I was still in the research stage (though I did have a plot and a developed list of key characters) when L5 Society members from the Chicago and Minnesota L5 chapters descended on a Science-Fiction Convention (Triangulum 2) in Milwaukee on August 15, 1986 to talk to invited local members. I was one of those, and when it came to choose officers, I preemptively volunteered to do a newsletter (intending to use the research already produced for the novel.) I decided to call it **Moon Miners' Manifesto.** MMM would take all my time and energies, and as you may have guessed, I never did finish that novel. *And now you know the rest of the story!* **<MMM>**

ART FROM MOONDUST

An idea for Public Art in Luna City

By Charles F. Radley charles@stratowave.com
Comments and discussions by several persons on artemis-list@asi.com edited by Peter Kokh

Colored sand art called "Mandala" is a sacred art form in Tantratic Buddhism. The monks of Tibet do this. Some beautiful photos on the wikipedia page:

http://en.wikipedia.org/wiki/Mandala
http://community.berea.edu/galleryv/mandinfo.html

From Wikipedia, *loc. cit.* "Chenrezig Sand Mandala created at the House of Commons of the United Kingdom on the occasion of the Dalai Lama's visit in May 2008

A mandala is sometimes called a "cosmogram", appropriate term for cosmos-exposed art on the lunar surface!

Would the Moon be a cool location to practice this.? It could be a bit difficult to craft the fine intricacies wearing a clumsy EVA suit, with stiff gloves. Maybe they will have to be created indoors, and wheeled out through an airlock. But the air movements during depressurization could disturb the sand particles. Air trapped between the sand particles would need to be gently vented. We may have to depress very slowly, over a few days, to avoid unwanted air currents and churning of the sand.

Out on the lunar surface, it is mostly micrometeoroids which would churn up the surface. Also, at the terminator, static electricity causes dust storms every dawn and dusk on the Moon. Would they erode any moondust surface art? How quickly?

It might be an interesting experiment to see how long a Mandala would endure.

Comments: From: Dale Amon amon@vnl.com

While reading some old MMM I was struck by an idea for city areas in vacuum. Since there is no wind or rain, if you spread colorful dust on to a surface it should stay for decades at least. It would slowly be turned over by the changing temperature day/night cycle, but even that could be dealt with by making the layer deeper or just tidying it up every 50 years or so.

Folks with truly bad taste could create a front lawn that looked just like an Elvis on Velvet painting... those with a bit more artistic taste might do something more of value. An industrial area might make the entire site into their logo as seen from above. One of the high rise lunar hotels could have an area around the base done as an artistic continuation of the hotel interior that creates a transition between hotel interior and lunar grey.

I'm sure kids would eventually find it fun to make changes, but a little bit of dust by the building maintenance folk in the morning would sort that out.

A spaceport could have the surrounding areas modified to act as landing approach aids. A simple concrete pad in the middle of nowhere might be difficult to spot. Some would say the computers will handle the landing so it does not matter... but pilots do like to fly their own craft or at least know that they can if something goes wrong.

I am sure there are materials that could provide bright colours. Titanium dust should be able to provide a lot of pastels. Peter has talked about a painter's palette in the past. How about a simple colored dust palette?

It's an art form little used on Earth because it can only be done at great expense with mosaic tiles. On the moon the artist just sprinkles the color onto the surface.

If you take the surface painting idea and include rocks as in some of Peter's lunar Zen garden ideas and then mix in junk sculptures made from odd bits of rockets and technological detritus, you may have the beginnings of a real formal garden art form.

There are such gardens in Mexico and the southwest where plants are merely one element of the palette.

Then add in some of the old English Garden ideas with greco-roman buildings, grottoes, stone stair cases and meandering walk ways and view lines and you start to get really, really interesting. **<DA>**

Comments: From: Peter Kokh kokhmmm@aol.com

Now there are two approaches: near term options longer term options. Near term, we could collect regolith samples in various graytone ranges. (It would be difficult to sort moondust particles by color, but we could collect gross samples of different shades) Highland moondust is generally lightest Mare moondust is generally darker Ilmenite (titanium-Iron oxide) rich moondust is perhaps the darkest Plus there are the "orangish" samples from old volcanic fire fountains

Once we begin processing, the easiest addition by far is ochre: Just take any moondust sample, steam it in a tumbler, and the included iron fines will rust. Samples with highest iron content produce deepest color.

Isolating compounds: Calcium Oxide (Lime) & Titanium Dioxide are white (the latter being the basis of most white paints) Pure sulfur powder is a pale yellow Mixing rusted regolith with sulfur produces orange tones.

Chromium oxide is green (isolate chromium first, that's the catch.) Cobaltous Aluminate is the most perfect stunning blue (isolate the cobalt first, that's the catch.) Manganese Dioxide is black (must isolate the manganese.)

You can get shades (towards the black) and tints (towards the white) by mixing with manganese dioxide (or titanium oxide) and calcium. Rusted regolith plus calcium oxide produces pinks. By and large we are dealing with metal oxide pigments.

There does not seem to be a close good red without lead, which is only present in parts per billion, so ocher & rust are as good as we are going to get. Sulfur pale yellow was the best I could do in the yellow area.

Mixing sulfur or lime with chromium oxide green gives a whole family of greens. Could try mixing chromium oxide with cobaltous aluminate to get aqua and turquoise. *These powders are going to be expensive to produce early on, so we will want to dust them on the surface rather than mix them in for best effect.* **<PK>**

The Moon Society www.moonsociety.org

An international nonprofit 501(c)3 educational and scientific organization formed to further the creation of communities on the Moon involving large scale industrialization and private enterprise

Objectives of the Moon Society

include, but are not limited to:

- Creation of a spacefaring civilization which will establish communities on the Moon
- Promotion of large-scale industrialization and private enterprise on the Moon
- Promotion of interest in the exploration, research, development, and habitation of the Moon, through the media of conferences, the press, library and museum exhibits, and other literary and educational means
- Support, by funding or otherwise, of scholarships, libraries, museums and other means of encouraging the study of the Moon and related technologies
- Stimulation of the advancement and development of applications of space and related technologies and encouragement their entrepreneurial development
- Bringing together persons from government, industry, educational institutions, the press, and other walks of life for the exchange of information about the Moon
- Promoting collaboration between various societies and groups interested in developing & utilizing the Moon.
- Informing the public on matters related to the Moon
- Provision of suitable recognition and honor to indivi-duals and organizations which have contributed to the advancement of the exploration, research, develop-ment, and habitation of the Moon, as well as scientific and technological developments related thereto.

Our Vision says Who We Are

We envision a future in which the free enterprise human economy has expanded to include settlements on the Moon and elsewhere, contributing products and services that will foster a better life for all humanity on Earth and beyond, inspiring our youth, and fostering hope in an open-ended positive future for humankind.

Moon Society Mission

Our Mission is to inspire and involve people everywhere, and from all walks of life, in the effort to create an expanded Earth-Moon economy that will contribute solutions to the major problems that continue to challenge our home world.

Moon Society Strategy

We seek to address these goals through education, outreach to young people and to people in general, contests & competitions, workshops, ground level research and technology experiments, private entrepreneurial ventures, moonbase simulation exercises, tourist centers, and other legitimate means.

Our Full Moon 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!

Masthead Design: Charles F. Radley, Society Vice-president\

Our Solar Power Beaming Demonstrator Unit Heads to Florida

By Peter Kokh, President

From the very start, the Society leadership commitment to the Desktop Solar Power Beaming Demonstration project was a long term one. We wanted our unit to debut at ISDC 2008 at the end of this past May, *and we did it!* But we have always been looking at an open-ended series of showings whenever and wherever it was practical for us to ship it in care of a society member who was attending an event.

Our first encore opportunity came just a seven weekends later, at the Space Frontier Foundation's "New Space 2008" conference in Crystal City, VA, just across the Potomac Rvier from the ISDC 2008 location in downtown Washington DC, where it was shown by Paul Blasé.

Now Moon Society Director of Project Development, and newly elected member of the Board, as well as our unofficial roving ambassador, David A. Dunlop of Green Bay, WI (which is about more than the Packers!) has found two more opportunities in the Metro Orlando, FL area, both in October. Dave arranged for Paul Blasé, who had been storing the unit, to ship it to Orlando, and he headed south by car on September 28th:

(1) **The Workshop on the State of SBSP Technology by the Air Force Research Laboratory**,
October 2-3, 2008 in Lake Buena Vista (Orlando
www.upcomingevents.ctc.com/sbsp/sbsp.html

(2) **The 10th ILEWG International Conference on Exploration and Utilization of the Moon**,
October 27-31, 2008 in Orlando.
www.lpi.usra.edu/meetings/leagilewg2008/

Dave has arranged for the unit to be left with Chair of ISDC 2009 until that event in May 2009.

Status of our project to produce another two units for paying customers

We have had to get cost and labor estimates for elements and work donated for our initial demo unit. This has now been done. As soon as we get confirmation that at least one of the customers still wants to move ahead, work will begin.

The parts list, parts sources, diagrams and blueprints, and instructions that we need for our Online Kit may be revised and upgraded as these new units are produced. The stress will be on reduced fragility, especially with shipping stress in mind.

So we are following up on our successful project, with the aim of promoting maximum exposure and better understanding of the possibilities of Space Solar Power technology. We are also producing new outreach materials about Space Solar Power. **<TMS>**

Attracting more Women to the Society

(Currently women make up only 3% of our membership)
Ideas we have been looking at:

Moon Miners' Manifesto:

We are working on a special list of past articles that might be of special interest to women. We will publicize this list in several places including the Membership Benefits section of our registration page, on our Visitors' page, and in our Welcome Packet.

Board of Advisors:

If you know of a well-known who is interested in space or has been involved in space activities, it may be helpful to nominate her to our Board of Advisors. Contact president@moonsociety.org - Some possibilities: Nichelle Nichols (Star Trek's "Uhuru"); astronauts Mae Jemison, Sally Ride, Eileen Collins, Shannon Lucid.

Outside the astronaut corp.: Bonnie Cooper (co-author of "The Moon: Resources, Future Development, and Settlement), Lonnie Schorer (NSS) who is a naval architect with strong interest in Analog Station design, Linda Plush (Executive Director Space Nursing Society)

What else can we do to attract more women?

Ads in specific magazines? (a funding issue)

Attracting more Young People to the Society

(Currently young constitute only 5% of our membership)
Ideas we have been looking at:

Moon Miners' Manifesto:

We are working on a special list of past articles that might be of special interest to young people, including students. We will publicize this list in several places including the Membership Benefits section of our registration page, on our Visitors' page, and in our Welcome Packet.

Board of Advisors:

Know of someone well-known to young people who is interested in space? *Contact us!* It may be helpful to nominate him/her to our Board of Advisors. Lance Bass, who had been trying fro a $20 million tourist seat on a Space Station-bound Soyuz, is one possibility.

Directors:

For the 2009 Society Elections, James A. Rogers, 26, our one man dynamo from Longview (TX), will be eligible to run for a Board seat. James has been active in the Leadership Council from the day he joined the Society at ISDC 2007 in Dallas, in May of last year. He has taken a strong interest in our Moon Colony Video production project, in Lunarpedia.org, in our MySpace page, and in Public Relations & Outreach. While not a voting member (all officers and board members), his input has shaped many a recent decision.

Moon Society Phoenix Discussion: Sept. 20th meeting:

Craig Porter reports: "We had a productive and long discussion on how to get the younger people interested in participating in the Moon Society. Discussed were sponsoring Science Fairs, design competitions, involvement of Sponsors. This ideas will of necessity begin as small events and hopefully develop into something larger and productive to gaining the interest of America's youth. We agreed to keep kicking this around by e-mail and an on-line think tank."

Other chapters are invited to participate in this discussion. Chapters and Outposts out in the field should take the lead in experimenting with ways to involve young people whom they meet personally. In comparison, the Society deals with individuals *remotely.*

What else can we do to attract more young people?

Ads in specific magazines? (a funding issue)

Attracting more Expertise to the Society

We deeply appreciate the time and efforts of the 15% of our current membership actively involved in one way ore another in supporting Moon Society projects and goals, or in supporting space in personal projects of their own. That percentage is already phenomenally high in comparison with other space activist organizations.

At the same time, we appreciate that many, if not most members, have little discretionary free time, energy left over after their day job, or discretionary money, to get involved in projects and activities that support the Society's vision and mission.

What we need to do, both as a society, and as invividual members, is to be on the lookout for people with special expertise that may be of value to the Society, and who have expressed some interest in space. We can talk to them, give them an old issue of MMM, and/or give them a one-year gift membership, or the address to the MMM free archives:

http://www.moonsociety.org/publications/mmm_classics/
http://www.lunar-reclamation.org/mmm_samples/

What kind(s) of Expertise?

If you visit our Project Teams Page, and do a bit of exploring the various links, you will get a good idea of the kinds of expertise we need to accomplish our current list of concrete projects.

http://www.moonsociety.org/projects/projectteams/

In general, we need Team Leaders, Project Managers, Grant Proposal Writers, Fundraisers, Event Organizers, Public Relations people, advanced web expertise, assistant editors, public speakers, and more.

In particular, for just the current list of projects, we need people with experience or expertise in video production, writing, illustration and artistic renderings of proposed habitats, vehicles, systems, etc. Experience in experimental agriculture, logistics, architecture, creating educational materials and curricula, and more.

Know someone interested in space and with a special talent but not sure if that talent or expertise would be helpful? You can run it by us, but that individual may be able to think of ways he/she can be helpful that we have not thought of! president@moonsociety.org

The Bottom Line

The Moon Society has a newly earned reputation as "The Little Engine That Could!" Now that is a reputation that will be hard to keep, one that must be re-earned, over and over again. We happened to have the in house expertise needed for Moon Colony Video production Project and for our PBB-Demo Project. But for many of our other listed projects, we have barely enough expertise and experience and leadership to define the project, but not enough to carry it through. We need help! - *your help!* **<TMS>**

Our 1st Student/Campus Chapter!

Our New Green Bay (WI) Outpost becomes College of the Menominee Nation (CMN) Student/Campus Chapter

Contacts: Dan B. Hawk <>
David A. Dunlop dunlop712@yahoo.com

Background: Dave Dunlop has had a strong high priority interest in starting campus/student chapters, and is currently working with two faculty persons at the Milwaukee School of Engineering (MSOE) and with one faculty member at the University of Wisconsin main campus in Madison (UW).

Enter Dan Hawk, both a student and a staff person at the Green Bay campus of the College of the Menominee Nation, with a personal interest in Experimental Lunar Agriculture as well as being the organizer of CMN's "Five Clans Rocket Club." [*more at right*]

www.menominee.edu/RocketWebsite/5clans/home.htm

When a third person became a Moon Society member, the basic qualification for full Chapter Status was met. CMN has now also picked temporary officers. A Chapter Certificate will be on the way shortly.

The College of the Menominee Nation has campuses in Keshena, WI and Green Bay, WI, and special programs. Its new Green Bay campus has 168 students mostly from the Oneida tribe of Wisconsin. With more classrooms, a vastly expanded computer lab and a commons area,CMN-GB students have expressed pride in the new campus.

Native based, the culture and the local people are here, not dispersed to larger institutions far away. Many students are "first-generation" ones from families with no higher education traditon. On the plus side their is a high faculty/students ratio, favoring a better education.

How the Outpost was created and how we reached full Student/Campus Chapter Status

By David A. Dunlop

This has developed as a result of an unexpected contact from a woman in Colorado who read about LUNAX [LUnar National Agricultural eXperiment corp [www.lunax.org] and contacted her collaborator in Green Bay, Dan Hawk, to see if he know me or about LUNAX.

Dan is a student as well as staff member at the College of Menominee Nation [www.menominee.edu/]. He has been active in creating the "5 Clans Rocket Club" www.menominee.edu/RocketWebsite/5clans/home.htm and participating in the competition developed by the WI Space Grant Consortium that grew out of the Rockets for Schools initiative. Dan contacted me and we began to meet and discuss doing some of the LUNAX experiments using a lunar lighting schedule. He is also interested in the effect of pyrogenic carbon materials that were used by Native American farmers.

I took the club up to the Michigan Upper Peninsula the weekend of September 27, 2008 for a rocket launch. The Vice President of the Green Bay campus has been very supportive of this work as well. The College of Menominee Nation also has a strong interest in Sustainable Development and that ties in with the Space and Environment issues that concern the Moon Society.

This is a matter of getting to know people I shared some of the Moon Colony videos with the faculty and and Director of the Sustainability Institute. They had no idea that there was this strong environmental initiative with space advocates and organizations. I hope that we can build on these interests and connections with work at the ISDC and the Mother Earth Father Sky initiative. I have already mentioned this to Dr. Peter Schubert.

How the Student/Campus Chapter works

I am not sure if everyone realizes how we have set up the student chapter. Dan Hawk and Norbert Hill, VP of CMN's Green Bay Campus, have joined the Moon Society. We will involve the student members of the rocket club as student members of the Moon Society. The hardcopy of MMM will be sent to Norbert Hill who will put it in their library for the chapter. We will also share the e-version (PDF file) with the students at no cost. The students have very limited funds so we have tried to create a base of three Green Bay memberships to provide a no cost initiative for the students. We have a lab that we can use to grown our plant experiments which is also used for the construction of rockets.

Dan Hark is the key initial contact here. However I am building relationships with other people at the college so that the climate of encouraging students o become involved as a variety of support.

A prior Moon Society Campus Chapter

Four years ago, the first Moon Society Student Chapter was formed by Jonathan Goff, at the Provo, Utah campus of Brigham Young University. They had a chapter project, designing a rocket chamber. But when Jonathan graduated and left the area to join Masten Space Systems, no student chapter member rose to the occasion to take the lead, and the chapter disappeared. This is a common fate for student organizations, and it points out the stress that must be put on grooming successor leaders.

With strong faculty involvement, we hope the new CMN chapter is long lived! **<TMS>**

Chapters & Outposts

Moon Society St. Louis Chapter

http://www.moonsociety.org/chapters/stlouis/
Contact: Keith Wetzel kawetzel@swbell.net

Meetings **2nd Thursday** monthly, Buder Branch Library 4401 S. Hampton, in the basement conference room

Next meetings Oct. 9th, Nov. 13th, Dec. 11th

Moon Society Phoenix Chapter

http://www.moonsocphx.blogspot.com/
Contact: Craig Porter portercd@msn.com

Meeting the 3rd Saturday of the month

Moon Society Phoenix' next meetings are on Saturdays **Oct. 18th, Nov. 15th, Dec. 20th** at 1056 S Country Club Dr, Mesa, AZ at 3: PM.

September 20th Meeting Report:
1) MSP gave out our **first annual "Outstanding Service Awards"** for the past year, for member efforts to make the Phoenix Chapter successful.
2) **Report on CopperCon 28** – This was the first time MSP has been at this con., and we played a large part: three presentations; participation in four Discussion Panels;, two members autographing their books; and two members giving readings. Presentations were by:
- Charles Lesher: "Space Based Solar Power System
- Dr. Bonnie Ann Burgard-Ross: returning to the Moon.
- Craig Porter: the "University of Luna Project".

Our Outreach table was manned by Stuart Scott & David Isley who also videotaped our presentations.
3) Treasurer Mike Mackowski told us about our **new Chapter account** at Arizona Federal Credit Union and presented us with a marked up copy of **Chapter By-Laws** that we then further modified and approved.
www.moonsociety.org/chapters/phoenix/ByLawsPhx.html
4) We unanimously passed a motion to have **$5/yr dues**
5) 5 regular Members, 2 Non-affiliated local members.
6) A productive **discussion on how to get the younger people interested** in the Society. See page 10, column A

Moon Society Houston Chapter

http://www.moonsociety.org/chapters/houston/
Contact: Eric Bowen eric@streamlinerschedules.com

Next Meeting Place & time: Monday, Dec 1, 7pm

Park Place Regional Library, 8145 Park Place, just east of the Gulf Freeway at the Broadway/Park Place exit.

On Sept 19th, member Larry J. Friesen was elected to be an Associate Fellow of the American Institute of the Aeronautics and Astronautics (AIAA) – Kudos, Larry!

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/

Moon Society Mail Box Destinations:
Checks, Money Orders, Membership Questions
Moon Society Membership Services:
PO Box 940825, Plano, TX 75094-0825, USA

Projects, Chapters, Volunteers, and Information
Moon Society Program Services,
PO Box 080395, Milwaukee, WI 53208

Green Bay (WI) Outpost becomes College of the Menominee Nation Student/Campus Chapter

Contacts: Dan B. Hawk <>
David A. Dunlop dunlop712@yahoo.com
Meeting some Friday afternoons at the College of the Menominee Nation, 2733 South Ridge Rd, Green Bay, WI
See Article page 11, this issue.

Bay Area Moon Society Outpost

http://www.moonsociety.org/chapters/bams/
Contact: Henry Cates hcate2@pacbell.net

At the Thursday, Sept. 24th meeting we talked about the upcoming 4th launch test of the Falcon 1 module.

Moon Society Tucson Outpost

Contact: Ben Nault bnault@comcast.net

Milwaukee Outpost (MSMO)

http://www.moonsociety.org/chapters/milwaukee/
Contact: Peter Kokh kokhmmm@aol.com

The Milwaukee Outpost has created much of the exhibit and outreach material for the Society, and is now working on materials supporting Space Solar Power, as well as reconditioning our newly acquired Nimlok exhibit System. See:
http://www.moonsociety.org/chapters/milwaukee/msmo_output.html

Currently, in the US, we have 3 regular chapters, 1 Student/Campus Chapter, and 3 Outposts.

Why not start a Moon Society Outpost in Your area?

All it takes is one person – you!

Write: ***chapters-coordinator@moonsociety.org***

Moon Society Chapter Photo Gallery

CMN Photo – Dan Hawk with CMN 5 Clan Rocket Team

For news of our NSS Partner Chapters in Portland, Milwaukee, Minneapolis/St. Paul, see p. 17

< End Moon Society Journal Section >

GREAT BROWSING

China to mass produce Shenzhou spaceship
www.netindia123.com/showdetails.asp?id=1063697&cat=Science&head=China+to+mass+produce+Shenzhou+spaceship

Sunlight agent that produces asteroid moons
www.astronomy.com/asy/default.aspx?c=a&id=7156

Printable Moon Map from space.com
www.space.com/images/skywatchers_moon_map.gif

Entrepreneur role in opening the space frontier
http://www.thespacereview.com/article/1216/1

A step forward for space solar power
http://www.thespacereview.com/article/1210/1

photo of planet 11x further than Neptune from its sun
http://www.gemini.edu/sunstarplanet

Energiya PowerPoint on Russian Manned Space Plans
http://www.novosti-kosmonavtiki.ru/phpBB2/viewtopic.php?t=8347&start=0

Awesome Astronomy Photo Gallery
http://www.noao.edu/image_gallery/

Volcanoes on Mercury Solve 30-year problem
http://www.space.com/scienceastronomy/080703-mercury-messenger.html

Saturn's Rings May be Ancient
http://www.space.com/scienceastronomy/080922-saturns-rings.html

Portal for China Space News Updates
http://www.spacedaily.com/dragonspace.html

Barack Obama & John McCain answer top 14 science questions facing America
www.sciencedebate2008.com/www/index.php?id=42

Ground-based radio-beacon navigation system for use on the lunar surface
http://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/19890009072_1989009072.pdf

NASA delays Hubble repair mission to next year
http://www.msnbc.msn.com/id/26943359/

Japan to invest in Space Elevator technology
http://www.timesonline.co.uk/tol/news/uk/science/article4799369.ece

Introducing dwarf planet #5 - Haumea
http://www.iau.org/public_press/news/release/iau0807/

New Internet Sci-Fi Series about Venus in 2050
http://www.venusrises.com/

Size of the Universe Cosmology Lecture
http://freemars.org/mnfan/MAS/2008-09-Finding-the-Big-Bang/

Large & heavy "Earth-like" ET planet found?
http://www.sciam.com/article.cfm?id=all-wet-astronomers-claim

38 reservations for "Space Hotel"
http://www.techradar.com/news/world-of-tech/thirty-eight-reservations-for-space-hotel-457593

Photos of Baikonur Cosmodrome
http://www.boston.com/bigpicture/2008/09/the_baikonur_cosmodrome.html

Space-X' Falcon 1 reaches orbit on 4th try
http://www.physorg.com/news141877869.html

Water vapor found in Mercury's thin atmosphere
http://planetary.org/news/2008/0703_MESSENGER_Scientists_Astonished_to.html

GREAT SPACE VIDEOS

MOON COLONY VIDEOS - The Moon Society

30 plus thought-provoking videos, produced for the Moon Society by Chip Proser (Celestial Mechanics, Inc.) can be found at.
http://www.moonsociety.org/video/
or at:
http://www.mooncolony.tv/
http://www.stickymedia.com/

ASSORTED SPACE VIDEOS

Shenzhou Launch
http://news.bbc.co.uk/2/hi/science/nature/7636114.stm

Chinese Astronaut walks in space
http://news.bbc.co.uk/2/hi/science/nature/7637818.stm

McCain, Obama Answer Science Policy Questions
http://sharp.sefora.org/innovation2008/compare/race/president/2008/

Video Sept. 12 space solar power press conference
http://www.nss.org/news/releases/pc20080912.html

Falcon 1 Flight 4 successful launch at last
http://spacex.com/multimedia/videos.php?id=30
http://www.youtube.com/watch?v=eATJS-aKrD8 (short)
http://www.youtube.com/watch?v=8FQhtMrUQlE (long)

ISS Assembly Movie
www.tietronix.com/anim/movies/assembly640x360.swf

NASA Space Solar Power DVD online:
www.nss.org/settlement/ssp/library/index.htm#video

Help us put MMM in a Library near You!

Whether you are a member of an NSS Chapter or of a Moon Society Chapter or Outpost, or a Moon Society member at large, you all get Moon Miners' Manifesto as a membership benefit.

A library subscription to a library in your community will help spread the word, whether about local or national or international Moon-focused programs and projects.

For chapters and outposts such subscriptions will be good advertising for your local efforts.

For Moon Society members, as all copies of MMM include the Moon Society Journal centerfold section, community library or school library copies of MMM will help grow name recognition and invite readers to join.

As no membership services are not involved, the cheapest way we can do this is by submitting these subscriptions directly to the publisher at a cost-minus rate of $10 a year, available for libraries only.

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- With the complete name and address of the Library,
- Made out to

"Lunar Reclamation Society"
Attn: Library Subscriptions
PO Box 2102
Milwaukee, WI 53201

MMM PHOTO GALLERY

Above: Schenzhou 7 ready for launch

Below: China's first Spacewalk

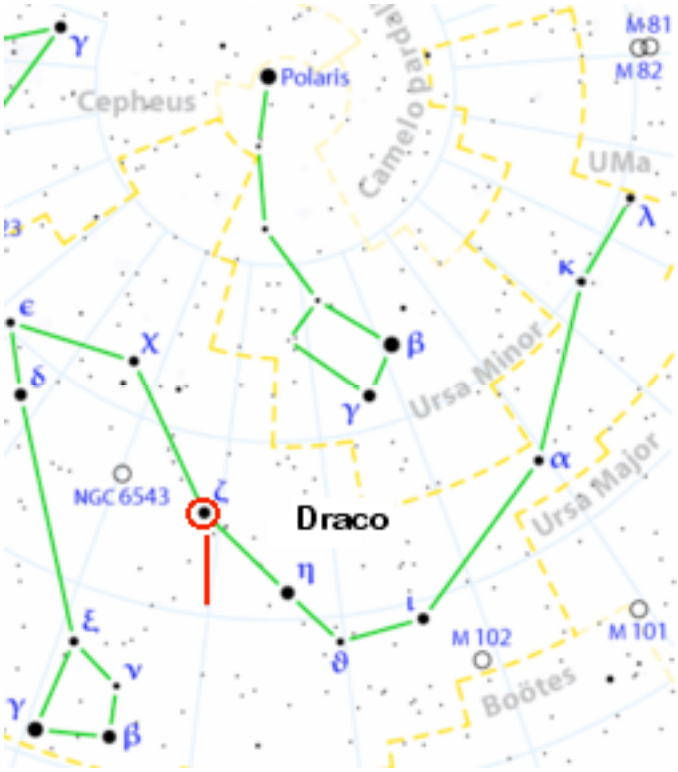
The Large Magallenic Cloud (Milky Way Satellite Galaxy) dominates the Moon's South Celestial Skies

http://en.wikipedia.org/wiki/Large_Magellanic_Cloud

For The LMC's location relative to the Moon's South Polar Star see chart at right

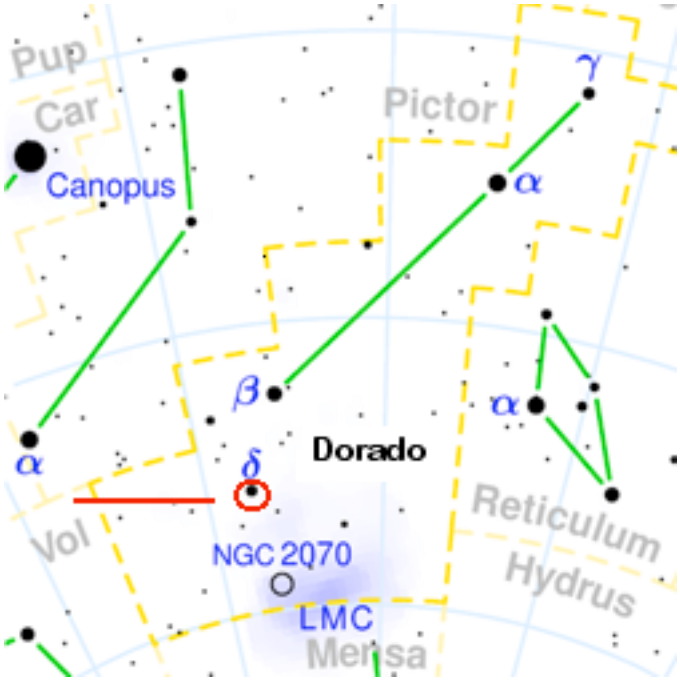
What is the Moon's North Polar Star?

The nearest bright star to the lunar north celestial pole is Zeta Draconis, a 3.6 magnitude star about 5.5 degrees from the pole. For comparison, our own north polar star, **Polaris,** lies 1.5 degrees from the true north pole location



What is the Moon's South Polar Star?

Delta Dorado, a fourth magnitude star, is approximately 2 degrees from the south celestial pole (of the Moon). More interestingly, the Large Magallenic cloud (LMC), the Milky Way's largest satellite galaxy, some 160,000 light years distant, is very near the lunar celestial south pole and easy to see in dark skies. A dedicated telescope at the proposed South Pole Station could investigate that nearby galaxy 24/7/365. See below & bottom left.



Mars Seismic Penetrator:

A Low-Cost mission to study the Seismology and Internal Structure of the Red Planet

by James A. Rogers <jarogers2001@aim.com>

The Mars Seismic Penetrator (MSP) mission is a design for a "cheaper, faster, better" mission using mature technology to gather data about residual seismic, tectonic, and volcanic activity on the planet Mars. At this time, we do not have any of this information. At best, our theories about the geologic activity and internal structure of the Red Planet are "educated guesses." Our best guesses have often been proven wrong, and this has changed the way we view the world around us. (I.e. disproving the theory of Ether led to the development of Relativity)

MSP will be integrated with a version of the Mars Aerial Platform mission, and will the super-pressure balloons and deployment systems (Zubrin et al). A delta class booster will launch 8 capsules towards the red planet, and 10 days prior to arrival the spinning spacecraft will deploy the capsules, allowing a wide area of dispersal across the Martian surface. Each capsule will enter the atmosphere where parachutes will deploy to slow the capsule down. At this point the heat shield will be ejected and the penetrator will acquire a target in an area free of large flat rocks and boulders before being released. Targeting a specific location on the surface will be unnecessary as the objective is to acquire seismic data. Wide dispersal of penetrators will ensure a sufficient distance to extrapolate the coordinates of a seismic event using three or more seismic accelerometers (seismometers). As in the MAP mission, once each penetrator is released, a 3kg meteorological package will be deployed to the surface via the remaining hardware and parachutes.

Removal of the balloon and associated systems from an entry capsule provides 48.6 kg of unused mass, some or all of which may be used for the penetrator or split between it and additional instruments deployed via soft landing (Zubrin et al).

The penetrator portion of MSP consists of a dart shaped projectile ranging from one to two meters in length. The tip of the penetrator will be mounted with a plastic cover containing two cameras for stereo vision, allowing the dart to recognize large boulders in real-time and change course, as well as a laser range finder. As these instruments are only needed for guidance, it is unnecessary for them to be used after impact and they will likely be crushed, their cables being severed internally.

Beneath the camera system cover will the true tip of the projectile, a conical steel penetrator mass mounted on the end of a carbon fiber tube. The entire assembly will be coated in a low friction polymer, such as Teflon, aiding it to punch up to a meter into the Martian soil much like a Teflon coated bullet. (Note: Teflon addition may be unnecessary, and will require testing.)

Behind the steel tip will be solid-state seismic accelerometers which will be used to detect any seismic waves below the surface. As it will be necessary to ensure the survival of this instrument during impact, it and all other circuit boards are to be designed using the lessons learned during development of the Excalibur precision-guided, 155mm artillery shell (Excalibur). Additional impact absorbing material, such as a metal foam, may be required to spread the deceleration out over a longer period of time.

The fins of the projectile will incorporate guidance technology similar to that used Joint Direct Attack Munition (or JDAM) currently in use by the Unites States military. The JDAM kit can be placed on a variety of bombs, allowing each to steer itself to a pre-designated target position via adjustable tail fins (USAF).

Within the carbon fiber core of the dart will be central processor, flash memory, battery, transmitter, and antenna. The battery will be charged during the day by solar cells embedded in the fins of the dart, and will maintain power to the device at night and during sandstorms. (Note that if the guidance system remains intact, minus cameras and altimeter, these fins can be repositioned for better angle relative to the sun.)

Data storage for the mission will be accomplished using the same technology available in commercial USB storage devices. After impact the system will automatically cut an internal cable, deploying a spring loaded half or quarter wave antenna from the rear of the projectile and locking it in place. At this point the dart will begin listening for orbital craft using a solid-state transceiver. Like in the MAP mission, the transceiver will establish two-way communications and begin uploading once contacted by the mother-ship or another craft operating on a specified frequency. Upon the loss of two-way communications, or once upload has been completed, the transmission will cease in order to conserve power (Cantrell et al).

In the event of loss of communications between an orbiting craft and earth, data may be transferred from the satellite to the flash memory of a penetrator until it can be relayed via an operable link on another vehicle. In this fashion each MSP acts as an emergency server/router, providing a secondary path of communications for future missions. Each penetrator is designed to collect and store seismic and other data indefinitely, allowing the mission to continue until an irrecoverable error takes place.

Works Cited:

Zubrin, Cantrell, Clark, Gamber, and Price. "**The Mars Aerial Platform Mission: A Global Reconnaissance of the Red Planet Using Super-Pressure Balloons."** AIAA 93-4741 (1993). Marssociety.org. 21 Feb. 2008. <http://www.marssociety.org/portal/TMS_Library/Zubrin_1993/view?>

USAF Factsheet: Joint Direct Attack Munition GBU - 31/32/38 <http://www.af.mil/factsheets/factsheet.asp?fsID=108>

Excalibur Precision-Guided, Long-Range, 155mm Artillery Projectile: Product Data Sheet<http://www.raytheon.com/products/stellent/groups/public/documents/content/cms01_054624.pdf>

China's Space Station – *When?*

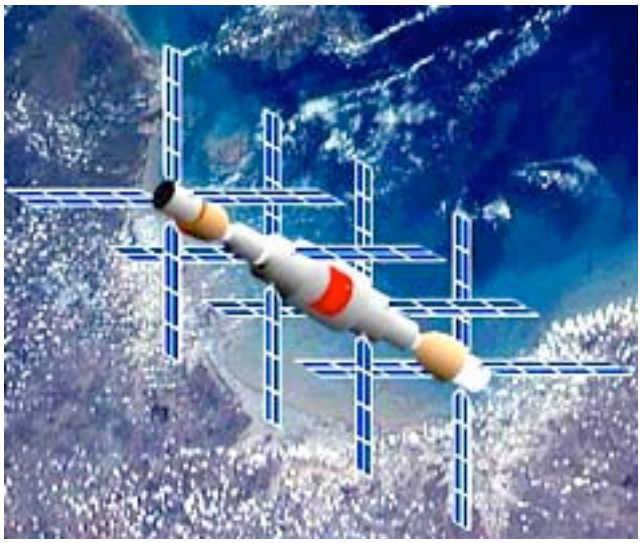
MMM Editor Speculation & Commentary

We have seen dates "by 2020" for the in-orbit assembly of China's planned space station. Personally, this seems a fake date to depress expectations, so that there will be more surprise and admiration for China's space program when the station does appear much sooner, perhaps a decade sooner, by 2010. Granted that China's steady progress in space has been very deliberate. But the plan the Chinese seem to be following, accoding to a NASA Spacewatch report on September 17, seems to indicate that the earlier date is quite realistic.

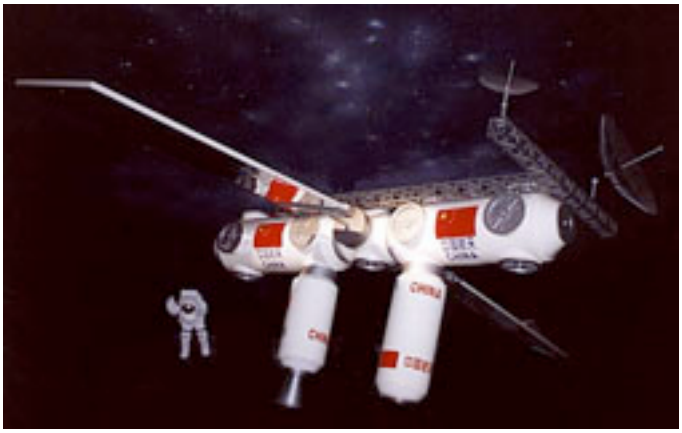
www.nasawatch.com/archives/2008/09/chinas_space_st.html

"It would seem that Shenzhou 7 will leave its free-flying Orbital Module in orbit as has been the case recent flights. Then, over the next several years, two unmanned Shenzhou flights 8 and 9 will be launched and will dock with the Shenzhou 7 orbital module. After that Shenzhou 10 will be launched with a crew and dock with the mini-space station. This would be a human-tended facility – not one with permanent inhabitants."

A check of Google Images (what a wonderful resource!) shows a number of designs and concepts that have been floating around for almost a decade. Below are some of these.

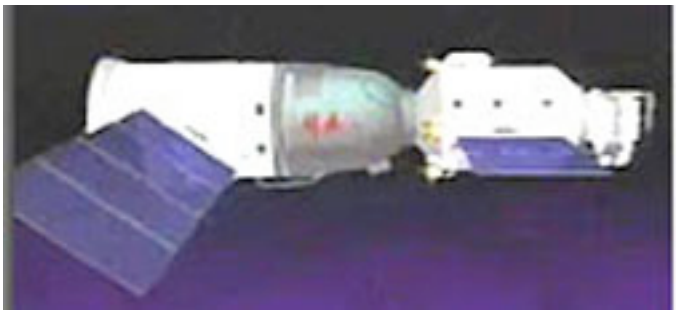


This design appeared as early as 2000



A more likely design, given NASA Watch report above

The simple, minimal design below, consisting of a Shenzhou capsule adopted to a Hab module, does not seem to represent what the Chinese are looking at now.



China's station and the ISS

China has made it clear that it would like to be invited to join the International Space Station partnership on an equal footing with Europe and Japan. But the US has been resisting that idea, which seems appropriate to those still stuck in a cold war mentality.

So where do China's plans for a decade earlier than previously announced minimal 4-module "visitable" space station come in? The Chinese see to be prepared to demonstrate to the world that they are ready to participate in ISS on an equal footing. By flying this 4-module assembly, they would have surpassed what either Europe or Japan have done, and to have earned membership in the more exclusive club that currently consists of the US and Russia (former USSR.)

How realistic is this four-module plan? Well, it builds on two modules that China has already built, including one of them, the Shenzhou capsule, a much-enhanced, enlarged, and updated version of Russia's Salyut, is being planned for mass production, an ambitious scheme to make China the world's foremost supplier of manned access to space modules.

If the NASA-led ISS partnership continues to snub its nose at China, China along (but not necessarily partnering with) Bigelow Aerospace, could bypass ISS, at least for commercial orbital operations.

From the point of view that we reach this level – vigorous commercial in-orbit activity – is more important than under whose aegis or flag it is reached, this would be a development to applaud. But it is not the only scenario by which ISS could be bypassed. Space-X Dragon modules teamed up with a Bigelow Aerospace inflatable multi-module space station is a scenario that many space advocates would be overjoyed to see become a reality. And is it not better to have multiple irons in the fire? After decades of space-stagnation, we are once again living through exciting times, not just for planetary exploration (Mercury, Venus, Mars, Cassini-Saturn-Titan-Encelydus, Vesta-Ceres, Pluto) but we are also on the verge of a new era of Near Earth Orbit operations.

Not to far behind is a great expansion in GEO, made possible by large platforms into which many geo-synchronous satellites can plug for power, communications, and station-keeping, along with the determined pursuit of space solar power technologies, for which perhaps the most promising scenario is lunar-sourcing of components, involving the establishment of a thriving civilian industrial lunar frontier.

To the Stars! **<PK/MMM>**

4Frontiers Corporation to Investigate Mars Greenhouse Materials

August 4, 2008

www.4frontierscorp.com/medianews/pr-2008-08-04.php

TAMPA, FL– 4Frontiers Corporation, a NewSpace technology, entertainment & education company, has been awarded a $25,000 research grant from the Florida Space Grant Consortium (FSGC), as part of the Florida Space Research & Education Grant Program.

This grant will assist 4Frontiers in pursuing its **technology roadmap for Mars settlement technologies**. The project's goal is to study **the performance of various transparent materials** which have been selected as potential candidates for use in future Mars greenhouses. The research will involve the construction of small chambers that incorporate these materials, simulating a Mars greenhouse. The chambers will then be placed within a larger chamber which will simulate the environ-mental conditions found on the Martian surface. The project will investigate heat transfer and stress performance of these materials under the unique conditions specific to the red planet.

"The selection of appropriate materials, allowing maximum transmission of PAR (photosynthetically active radiation) while minimizing materials mass and maximizing longevity under Mars conditions is a key element of greenhouse design," said 4Frontiers Vice President and co-Principal Investigator, Joseph E. Palaia, IV.

"Physical stress is one aspect. However, there are different factors on the surface of Mars, the effects of which we need to understand. UV radiation, lower gravity and the atmospheric gases on Mars are very different compared to Earth," said Alexander Stimpson, a graduate of the U. Florida's Bioengineering Department and a summer intern at 4Frontiers,assisting with this research.

The research apparatus will be designed and constructed by students in the Department of Agricultural & Biological Engineering at the University of Florida (UF) in Gainesville. Following initial testing there, the apparatus will be moved to an environmental chamber in the Space Life Sciences Lab (SLSL) at NASA's Kennedy Space Center. This chamber is capable of replicating many of the conditions found on the Martian surface including temperature, pressure and incident sunlight.

"If we think that we are going to go to Mars sometime in the future, we must start being realistic about the actual ways people might live there," said Dr. Ray Bucklin, professor of agricultural and biological engineering at the University of Florida and a Principal Investigator on the project.

"This grant allows us to get our feet wet in this critical area of research, and, more importantly, gives us the opportunity to work with some highly skilled colleagues at UF and at the SLSL," said Palaia. "We're excited and ready to move forward."

The proposal for this research is titled, "**Heat Transfer and Stress Investigations of Transparent Material Subjected to Internal Greenhouse Conditions in a Simulated Mars Surface Environment**."

[**MMM applauds this research** and suggests that 4FF follow up with "**Redhousing**" Experiments. Cf. pp. 25-27: http://www.moonsociety.org/publications/mmm_classics/mmmc10_Jan2006.pdf

Results of Planetary Society Poll

Show unexpected strong support for Moon initiative

Planetary Society Release October 2, 2008

1. What should be the driving goal of future space exploration?

41% Building a permanent, human-occupied Moonbase

48% Sending human expeditions to Mars.
17% Using only robots to explore our solar system.

2. If you could advise the next president about the U.S. space program, what would you say?

8% Build the shuttle replacement, but do not commit to future human exploration beyond the Space Station.

60% Seek international cooperation for lunar landings and Mars exploration.
35% Build a U.S. lunar base as a stepping-stone to Mars.

Note: The Planetary Society is the largest membership space advocacy organization in both the USA and world wide. These results are definitely not what TPS Executive Director Louis Friedman wanted to hear! **<MMM>**

Jim Benson, Gone at age 63

Commercial Space Advocates lose an Ambitious, Pioneering Visionary

October 10, 2008. Jim Benson, founder of SpaceDev, died in his sleep. He was suffering from a brain tumor that had been diagnosed last year.

This small space is not enough to begin to say how much we have lost. But the glass is only half empty. What he left behind in his work, his dreams, and his vision will "power" the achievements of many of us who were inspired and encouraged by his bold "can do" efforts. Many of us have met him at iSDCs and elsewhere.

Among many achievements: he built the rocket engine that powered Space Ship One; he came up with a plan for a tended lunar outpost that would enable major astronomy from the Moon with a price of under $10 B.

There was no challenge to great for him. May we all be powered by his spirit which remains among us. **PK**

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!

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TREAS./ Database – *Robert Bialecki
<bobriverwest@yahoo.com>..... 414-372-9613

LRS News

• **October 11th meeting:** Bob Bialecki brought along a DVD: an episode from the "Mars Rising" series that stressed the need for artificial gravity and radiation protection for crews en route to Mars and back. We had 10 people on hand, a record in recent years if you exclude our annual holiday special in December.

• **Dave Dunlop** (Green Bay, where he has just started a Moon Society student chapter at the College of the Menominee Nation) joined us for the first part of the meeting.

LRS Upcoming Events – November & December

Saturdays: November 15th, December 13th, 1-4 pm

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

November 15th

Bob Bialecki will bring another DVD from the Mars Rising series

December 13th
Annual pre-Holiday Potluck & Classic Sci-Fi Film

• **Joint event** of LRS and the Wisconsin Mars Society with former members and NSS members invited

• **Exhibit** materials on hand (hopefully something new!)

• **Pot luck** 1-2 pm: no guidelines, bring something to share, home made or purchased, hot or cold, solid or liquid, your choice.

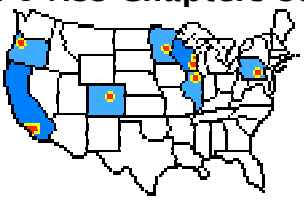
Our Feature Film 2-4 pm

MOON ZERO TWO

(1969) A space salvage expert and his partner become involved with a group of criminals intent on hijacking a small asteroid made of sapphire and crashing it into the moon for later recovery.

Stars: James Olson, Catherine Schell (Space 1999), Warren Mitchell. – We've never heard of this one, but new member Peter Wember says it's good.

MMM 8 NSS Chapters Strong



NSS Chapter Events

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

COLORADO

Denver Space Society
(formerly Front Range L5 Society)

1 Cherry Hills Farm Drive
Englewood, CO 80113

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

Eric Boethin 303-781-0800 eric@boethin.com
Monthly Meetings, every 2nd Monday, 7 PM
Next: November 10th, December 8th, January 12th
Englewood Public Library, Englewood, CO 80110
1000 Englewood Parkway, First Floor Civic Center

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
Oct 18 – Nov 15 – Dec 20 – Jan 17

Chicago Space Frontier L5

610 West 47th Place, Chicago, IL 60609

INFORMATION: Larry Ahearn: 773/373-0349

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As MMM carries your chapter contact, meeting, and event information, such a subscription may help more potential members find you!

Library subscriptions are available at a cost-minus rate of just **$10 a year**, direct from the publisher, the "Lunar Reclamation Society" PO Box 2102, Milwaukee, WI 53201 – *sorry, checks and money orders only.*

MINNESOTA

Minnesota Space Frontier Society
c/o Dave Buth 433 South 7th St. #1808
Minneapolis, MN 55415
David Buth (w) (612) 333-1872, (h) (612) 529-9871
Email: info@mnsfs.org
[www.mnsfs.org/]

MN SFS News & Pictures
Info on past/future Events
Ben's Mars Convention Photos
http://freemars.org/mnfan/MarsSociety/2008/Mars-Soc-Conf-2008/index-thurs.html
http://freemars.org/mnfan/MarsSociety/2008/Mars-Soc-Conf-2008
Ben's Convergence Photos
http://www.freemars.org/mnfan/Convergence/2008/

WISCONSIN

Sheboygan Space Society
728 Center St., Kiel WI 54042-1034
c/o Will Foerster 920-894-2376/h <astrowill@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**

Oct 16th - The Stoelting House, **Kiel**
Nov 20th - UW-Sheboygan, Sheboygan, @room 6101
Dec 18th - The Stoelting House, **Kiel**
Jan 15th - UW-Sheboygan, Sheboygan, @room 6101

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://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: Oct 18 - Nov 15 - Dec 20 - Jan 17
No Meeting Notes have been received

CALIFORNIA

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

Greater Los Angeles Chapter of NSS
P.O. Box 1231, Redondo Beach, CA 90278

Creating a spacefaring civilization with communities beyond Earth through education, political action, and chapter projects.

Events Hotline/Answering Machine:(310) 364-2290
Odyssey Ed: Kat Tanaka - odyssey_editor@yahoo.com

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

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

Regular Meeting 3 pm 3rd Sat. each month
Next Meetings Oct 18 - Nov 15 - Dec 20 - Jan 17
Information: OASIS Hotline, 310/364-2290; website.

Saturday, October 18, 2008 - 3:00 pm

OASIS Board Meeting at the home of Craig & Karin Ward, 1914 concon Ave., Redondo Beach, CA 90278

Monthly Star Parties

LAAS (los Angeles Astronomical Society maintains an active calendar of Public Star Parties in front of Griffith Observatory Satellite.

We do this on average, once a month, and add additional activities, whenever special events occur. We arrange the regular calendar a year in advance with the observatory staff, and respond to unplanned surprises as we can.

Griffith Observatory
2800 East Observatory Road
Los Angeles, CA 90027

Email outreach@laas.org

http://www.laas.org/Events_StarParties-Public.htm

LosCon 2008 - Nov 28-30th

http://www.lodvon.org/35/index.html

OASIS will be providing space programming hosting a room party and a fan table. Volunteers needed to help email us at convention_liaison@oasis-nss.org

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- **$45 National Space Society dues** include ***Ad Astra***
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Electronic MMM (pdf) **$35** Students/Seniors: **$20**
Hardcopy MMM: U.S. & Canada **$35** – Elsewhere: **$60**
P.O. Box 940825, Plano, TX 75094-0825, USA

INDEX to #219 OCT 2008

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Send proper dues to address in chapter news section

=> *For those outside participating chapter areas* <=

- **$12 USA** MMM Subscriptions; • US **$22** Canada;
- US **$50** Surface Mail Outside North America

Payable to "LRS", PO Box 2102, Milwaukee WI 53201

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- $15 annual dues

LUNAR RECLAMATION SOC. (NSS-Milwaukee)

- $12 low "one rate"

MINNESOTA SPACE FRONTIER SOCIETY

- $25 Regular Dues

OREGON L5 SOCIETY

- $25 for all members

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

- $28 Supporter level 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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