

Moon Miners' Manifesto

& Moon Society Journal

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In FOCUS: 📷 Shenzhou 5 & Yang Liwei

October 14th, 2003 marks a major milestone in the brief history of the Space Age. A Chinese aviator, Yang Liwei, joins the ranks of Yuri Gagarin and John Young as the first citizen of his country to orbit Earth in a capsule produced by that country. His name will forever be associated with China's entry into the exclusive club of Manned Space operations. For Yang Liwei, it was a memorable event, and one which required some bravery - it was the first manned mission of this new breed of capsule. But for China, and "for the rest of mankind," it was a giant leap.

With the successful touchdown of the Shenzhou 5 capsule in Inner Mongolia and the safe return of its human occupant, China joins the exclusive club of spacefaring nations. Since 1961 only the U.S. and Russia have exercised this capacity.

What about the future? China plans a slow but steady increase in its capabilities with a future two-person launch, orbital docking, and its own mini-space station. Ambitions include lunar orbiter missions, a first manned lunar landing and a permanent lunar outpost.

Unlike the proliferation of nuclear weapons technology, the proliferation of spacefaring technology among

a giant leap “for the rest of mankind”

other nations is most welcome. This accomplishment marks the coming of age of a huge nation once regarded as “Third World.”

While almost equally populous India is also actively pursuing space exploration, that nation has no manned space ambitions. Will China or India become International Space Station partners? India perhaps. It has nothing to gain from a delay. It seems more likely that China will wait until it has demonstrated docking and spacewalking technologies to pursue ISS involvement, so that it can negotiate on a more equal footing with the U.S. and Russia.

Even then, China's participation does not seem a certain eventuality. China's announced space program milestones appear to be destination-driven, a mindset that NASA abandoned with the end of the Apollo 17 mission. If that read of China's intentions is correct, it is most welcome. The ISS is like an unfinished freeway ramp that leads nowhere, its scientific achievements no more than answers to trivia questions.

China's traditional name for itself, in translation, means “The Middle Kingdom.” And it is clear that China wants to be in the middle of any human push [➡ p. 2, col. 2]

RV Campgrounds & Marinas on the Moon?

Why not? While the bulk of lunar pioneers may live in the settlements, there will surely be room, if not a need, for people who are mobile. And there are those who enjoy the mobile lifestyle, yet are attached to their homes. Business people, construction contractors, retirees; Read more on the nomadic lifestyle, and lunar analogues of motorhomes and houseboats, pages 4-5.



Moon Miners' Manifesto

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=> IN FOCUS Editorial continued from p. 1.

out into the Solar System at large, its dreams piercing the high skies following the lead of the incredible new skyscrapers of Shanghai's Pudong district.

More importantly, China's economy is in a dynamic growth mode, while Russia's seems to be stalled. China may be in a better position to spend big bucks on space than the Russians who pioneered the way.

While it seems quite unrealistic that China's recent feat could reignite the long-dormant "Space Race," we welcome this spread of the spacefaring capacity and spacefaring ambitions. It bodes well for the prospects of multinational efforts to open planetary frontiers. It bodes well, indeed, for the future of homo solaris. With three nations now in space big time, the prospect of the collapse of any one nation's space program is suddenly less ominous and depressing. It is humanity that must expand into its circumsolar hinterland, not the destiny of any one nation. A broad international front promises to be the most enduring, and the least susceptible to sidetracking by individual and temporary political insanities. - PK

The December 17th that Could Have Been

This coming December 17th marks the 100th anniversary of the Wright Brothers historic first powered human flight on the sands of Kitty Hawk, North Carolina. Many groups and communities are planning big celebrations to mark the century of flight. We've come a long way in that 100 years, disproportionately and disappointingly less so in the 42 years since Yuri Gagarin's first flight.

Burt Rutan had hoped to celebrate the day with the first flight of his Space Ship One, carried aloft by his White Knight, in an effort to win the X-Prize and prime the pump of space tourism. We do not know if he is still on schedule to pull it off.

But what clearly would have been the most exciting and dramatic celebratory feat was to have been the flight of the unpiloted drone plane KittyHawk over the great Valles Marineris canyons of Mars. Flying on Mars! We've known it was possible for some time now, based on real knowledge of Mars atmosphere, not on the word of Edgar Rice Burroughs! Currently there is much effort to get the nation to commit to a destination-driven agenda for NASA with a manned Mars mission as its crowning achievement. (We're of the firm opinion that opening the Lunar frontier should be entrusted to private enterprise, not NASA.) What could have aroused as much interest and as strong a groundswell of public enthusiasm for Mars as such a flight?

Alas, discouraged and defeated by a trio of Mars mission failures, NASA dropped this ambitious idea, even though the Mars plane planning and engineering was well advanced. An agency with the right stuff would have put it in the "let's hope" folder, not the "cancelled" one. - PK

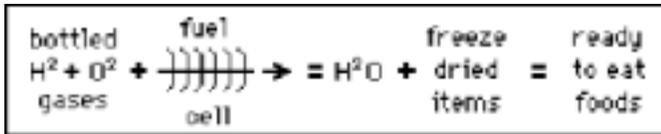
(Lunar) Food is Mostly (Lunar) Water

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

Food is mostly water!* [<http://waltonfeed.com/> see table at left.] We can supplement the diets of early pioneers by sending them everything they can't provide in the early salad stuff cabinet gardens in dehydrated form, to be rehydrated with water produced on the Moon from lunar oxygen (from the rocks) and hydrogen (scavenged from the solar wind gases adsorbed to the fine dust particles in the upper regolith layers).

* For confirmation, check the labels on freeze-dried foods packed for campers at your local outfitters supply store, and you will be surprised to see that water accounts for as much as 65-80% of the weight of ready-to-eat meals. That's real savings! Backpackers need to travel light!

Shipping supplemental food items in this weight-trimming way makes economic sense when, pending major "Cheap Access to Space" transportation cost breakthroughs, anything shipped to the Moon will cost more than its weight in gold! We already freeze-dry most foods to be used space, saving all the weight of the associated water. To rehydrate the food, we use water manufactured in space as a byproduct of the orbiter chemical fuel cell energy system which runs on hydrogen and oxygen. On the Moon we will be able someday to use locally produced water.



But just how tasty are rehydrated foods? This is important, because not only nutrition is at stake. Morale is the one single thing that has the power to make or break any effort to establish human communities on the Moon with any real permanence.

Puff-dried foods (some familiar breakfast cereals) seem to perform better in the taste department. But this process is not applicable to all foods, and has the great disadvantage of very low density, taking up too much space in a cargo hold.

Calling entrepreneurs

If this topic interests you, make a trip to your local camping supply store, and purchase a few samples of freeze-dried prepared entrees and side dishes. Campers and backpackers are a hardy lot. What they may be willing to put up with for short durations may not sit well in the stomachs of future frontier pioneers on long or indefinite tours of duty, If you can figure out how to produce more palatable results, there will be enough of a market among choosier terrestrial campers and backpackers to earn you good profits in reward for your labors. <MMM>

Water Content of Some Common Foods 1

[NOTE: Water Content of Foods Dry seeds, such as the grains and legumes were intentionally left off the following list as they should have a common moisture content of 10% or less. All pure fats and oils contain no water. The water content of each of the foods below is shown by the number following the food. After these foods have been dehydrated, their weight will be reduced by close to the following percentage:]

VEGETABLES & SALAD STUFFS

Bean Sprouts	92%	Broccoli	91%
Cabbage Raw	92%	Carrots Raw	88%
Cauliflower Raw	91%	Celery	94%
Collards boiled	91%	Corn Sweet Fresh	74%
Cucumbers Raw	96%	Eggplant Raw	92%
Kale	87%	Lettuce Head	96%
Okra Boiled	91%	Olives	80%
Onions	89%	Parsley Raw	86%
Peas Raw	81%	Peppers Green	94%
Pickles Dill	93%	Radishes Raw	95%
Rutabagas Boiled	90%	Sauerkraut Can	93%
Spinach Raw	92%	Squash Boiled	96%
Swiss Chard	94%	Tomatoes Raw	93%
Watercress Raw	90%		

FRUITS

Apples	85%	Apricots	85%
Bananas	76%	Cantaloupe	91%
Cherries raw	80%	Coconut Dried	7%
Fruit Cocktail	80%	Grapefruit Raw	88%
Grapes	82%	Oranges	86%
Pappas Raw	89%	Peaches Raw	90%
Pears Raw	82%	Pineapple Raw	85%
Plums Raw	87%	Pumkin Canned	90%
Raspberries	81%	Strawberries Raw	90%
Watermelon	93%		

CARBOHYDRATES

Bread Whole Wheat	35%		
Potatoes Raw	85%	Pasta Cooked	72%
Sweet Potatoes Boiled in Skin			71%

NUTS & SWEETS

Almonds	7%	Pecans	7%
Peanuts Shelled	Trace	Peanut Butter	Trace
Walnuts	%%	Honey	15%
Jams/Preserves	30%	Molasses	25%

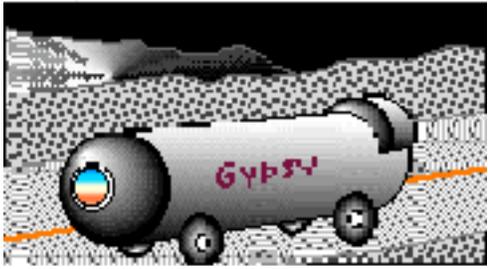
MEATS

Beef Raw Hamburger	54%	Chicken Broiled	71%
Ham Smoked Cooked		54% Pork Chops Broiled	
Turkey Roasted	62%	Veal Broiled	60%

MISCELANEOUS

Butter	20%	Cheese American	37%
Eggs Raw Whole	74%	Margarine	20%

Reference: Nutrition and Physical Fitness 9th Edition by L. Jean Bogert Ph.D., George M. Briggs, Ph.D. and Doris Howes Calloway, Ph.D., W.B. Saunders Company, Philadelphia PA ISBN 0-7216-1817-0, compiled from Table 2A, Nutritive Values of Foods in Average Servings or Common Measures



Pursuing Nomadic Lifestyles on the Lunar Frontier

by Peter Kokh < kokhmmm@aol.com >

We've talked an lot about lunar homesteads and lunar settlements in the past seventeen years of MMM. And indeed, the goal of most pioneers who leave Earth for the Moon and wherever else, will be to settle down in a place that they can call home for a long time, if not indefinitely. Yet we know from our own experience here on Earth that not everyone ends up in a home of their own.

Many persons prefer not to set down serious roots, even after establishing a family, choosing to rent here and there as fits their mood or changing job situations or finances. Surely there will be home rental and apartment type living on the Moon and elsewhere. But in this essay, we want to speak to a less common need, but one which will certainly be part of settlement life for some.

There are people whose jobs or occupations by their very nature requires a highly mobile, sometimes even nomadic lifestyle. One example is the expert whose rare talent is needed now here, now there. He or she may be a mining consultant, an architect, a corporate organizer -- you get the idea. We are not talking about people who are here one week, there the next, but those whose services may be needed here one year, there for the next six months, and so on. They will hardly be happy living out of hotel rooms, never sleeping in a bed of their own. Yes, what we now call "residence hotels" will be an option: quarters that you can settle into, somewhat, with some leeway in superficial customizing being allowed. Perhaps that solution may do well for most of these mobile persons.

But some may want to have their own homes and a permanent home to come home to between stints won't do. They want real homes that they can take them along with them as they move around to wherever business and life takes them. Yes, some analog of what we call mobile homes, motor homes, houseboats, etc. That is the life style we want to explore on the Moon, and those are the analog solutions such people have found workable on Earth.

Various Mobile Habitat Analogs

We are familiar with various types of mobile habitation. Most mobile is today's motorhome, able to go anywhere there are roads, fully self-contained, on wheels with its own engine. Less mobile are trailered and "5th wheel" homes and campers. Next there is a category which has undergone major evolution over the years: the old pick-up-and- go "house trailer" was replaced with the "mobile home"

that generally made but one journey, from factory to a fairly permanent "trailer park" site. This has evolved further into manufactured modular housing.

We'll certainly see a lot of the later on the Moon and Mars. In fact, we think manufactured modular housing will be overwhelmingly predominant. It ensures quality and safety performance, minimizes the amount of time spent by workers in space suits, and is best adapted to meet the needs of a quickly expanding population.

But it is the previously mentioned mobile habitats that are in the range of our topic, and we'll probably see analogs of all of them on the space frontier, along with one other, the house boat and the bargeable floating home. There will be such a variety for two basic reasons: to fit different situations such as expected frequency of relocation, from constant to seasonal to seldom; they need to fit the lifestyle needs and quality expectations of people with different tastes and budgets.

On Earth, many of the larger motorhomes keep personal, smaller, more maneuverable vehicles in tow, much as their waterborne equivalents are equipped with dinghies. We'll probably see something similar on the Moon, but in two basic forms: a small electric cart (think golf cart) for use in pressurized piers and likely-adjacent settlement passages; a fully pressurized out-vac rover. For scarcely mobile lunar habitats on the analogy of floating homes (Seattle's Lake Union, Sausalito) there will be contractors tol move them to new sites for a fee.

Mobility Constraints

On Earth, such movable residences must meet certain design constraints to fit the medium in which they are mobile: motor/trailer homes can only be so wide to avoid "wide-load" restraints and only so tall to slip under most bridges; houseboats, bargeboats and floating homes can be limited to where they are able to (re)locate by canal widths, lock widths, fixed bridge heights, etc. Will analogous, if more generous, constraints affect mobile homestead design on the Moon? If there standard clearance height is adopted for roadside solar flare shed shelters, and for "service station garage repair bays" these standards will tend to limit height / width. Road overpass clearances may be in line with those of flare sheds and service bays.

Mobile lunar residences will be built in all sizes, as they are on Earth - from minivan to Greyhound Bus conversions. Customer families will come in all sizes and incomes.

Marina, RV Campground Analogs

On Earth, movable residences are self-sufficient, to a point, but for long-term use need specially equipped parking or docking spaces with utility hookups as a complement. What will the lunar analog of an RV campground, a trailer park, or a houseboat marina be like? Marina/RV parks may impose set size limits, chosen to cater to most common vehicles.

Common Marina Services include: general store (groceries, miscellaneous parts and supplies); utility hookups (electricity, water, waste treatment & CELSS regeneration, cablevision); mailboxes & general delivery, fuels, commons complex (recreational/social activities); transit interface.

Deluxe marinas could offer much more. Attached to the docking portal could be additional enclosed "elbow room" space for the usage of one's choice -- for rent or lease, of course. Assuming that the dock portals all open on a pressurized pier or lane, a deck-porch area for socializing with passersby could be included. Taxi service could be provided for larger units that cannot dock directly but park at some distance at outlying utility hookup spots.

One particular service will be in high demand. A habitat may be designed to perform primary treatment of human waste water (before the effluent passes into settlement systems). It will be impractical for a mobile habitat to provide complete treatment. The marina could accept pretreated waste water in exchange for fresh water as a standard utility service. The marina would also maintain a list of reputable local contractors to meet all the servicing needs of their guests from CELSS systems to power and communications systems and more.

Such marinas could be designed and assembled in modular fashion so that they can grow with demand. To serve as movable "construction camps" a bare bones dock and pier complex could be designed of inflatable elements to be erected in the shelter of a shielded hanger / ramada. These would be especially useful for construction sites sufficiently remote from the main settlement(s) as to make worker commuting difficult.

Shielding: tortoise or hermit crab?

For any kind of frequently roving or infrequently relocated lunar frontier habitat, the question of shielding arises. On Earth our all-blanketing atmosphere provides protection from cosmic rays, solar flares, and micro-meteorites. On the Moon, we'll need a blanket of regolith or its equivalent in shielding protection.

For infrequently moved habitats, more on the analogy of mobile or floating homes, regolith shielding in place seems the logical choice. If sandbagged, this blanket could be easily removed if the need to relocate arises. For mobile habitats regularly or seasonally on the go, the hermit crab has a suggestion: borrow your shielding. Marinas can provide expansive full-shielded hangers for protecting all the vehicles docked at its pressurized piers.

But what can we provide for those who want to park in the out-vac wilds, far from any kind of marina or RV campground type facility? Presumably, they will carry a healthy reserve of water, complete with water recycling systems. While on the road, reserve water can be kept in tanks in the floor of the vehicle, to minimize the height of the center of gravity so as to maximize stability. When

parked, both reserve potable water and reserve water in process of treatment, could be pumped to roof and side-mount tanks to intercept incoming radiation. A thin sheet of metal held in place 6" or 15 cm out from the tanks would safely intercept most micro-meteorites that could puncture the tanks. Interior baffles and automatic sphincters would minimize losses should a rare breach occur.

An alternative, for those who expect to camp in one spot for a week or so, would be a portable ramada or hanger. A folding fiberglass fabric over glass-composite or aluminum tubing framework could travel rolled up like an awning, be automatically deployed on reaching a parking site, and covered with blown on regolith with a remotely steered and operated "blower." The trick is to design such a gizmo so that the shielding regolith can easily be dumped or shaken off when its time to break camp, We welcome reader designs. Send yours to kokhmmm@aol.com!

Road culture & the gypsy, vagabond, nomadic spirit

Here at home, there have arisen a whole suite of subcultures among those who RV/camp frequently, among over-the-road truckers, among those who live in mobile home parks, among those whose occupation has them always on the move, and among those who are nomadic by cultural descent such as gypsies. In the early days of the lunar frontier, when population is small, there may not be a critical mass of like-situated persons-on-the-move to support development of subcultures. But as population grows, we're sure to see some of this.

Such subcultures may have their own music and song genres, their own figures of SEP, characteristic pronunciations, special terms and jargon, their own myths and collections of proverbs, and even in some cases, favored fashion and furnishing styles. It is even possible that these people-on-the-go will become a distinct political constituency. And why not have a legislative representative-at-large to address their concerns?

Cultural diversity and a wide selection of lifestyle choices. Only a small percentage of settlers will adopt mobile living patterns, but their contribution to a healthy, high morale settlement population will be high. <MMM>

[As a boy in the late 40s and early 50s, the author dreamt of owning a "house trailer," and in 1969 bought a used 8x35 trailer of '55 vintage and plunked it down on a rural plot in Northern Wisconsin where it has served as his country getaway for some 34 years now. Conventional construction addition of an extra bedroom and separate dining area were added 6 years later. In 2003, thanks to a fellow retiree travel companion and his 22 foot Winnebago Rialta, he has gotten to experience "RVing" and RV Park life. He also has had a lifelong fascination with houseboats, and recently visited the major houseboat community in Lake Union in the heart of Seattle. He also has some limited familiarity with cabin sailboats and boating marinas.]

[a Classic Reprint from MMM #56, June, 1992]

Harbor (Port) & Town

by Peter Kokh

Anyone who has read science fiction stories about the Moon or Mars has come across names like Port Roris, Port Heinlein, Port Lowell, Marsport, etcetera. It seems a natural way to name a space frontier town. Indeed, won't every such burg be a port? Not really! In the first "beachhead phase" of settlement, we are likely to use vehicles like the Apollo era Lunar Excursion Module that could self-land, self-unload, and self-launch - no (space) port facilities needed, thank you!

But this sort of clean operation, efficient and necessary in opening virgin territory, also limits operations. Sooner or later the outpost/settlement-to-be will initiate genuine port functions. There'll be repair shops, fuel depots, landing beacons and paved pads, even smoothways for craft touching down with a residual horizontal velocity. There will be mobile cranes and specialized gantries. Troubleshooters will service engines and doctor ailing CELSS air and water recycling systems. And a genuine spaceport will have been born.

To avoid expensive duplication, other outposts and towns that can be provisioned overland or by suborbital hoppers may chose not to develop full port facilities. They will have their self-service landing pads and smoothways, of course, and they may see the occasional self-unloading freighter or chartered tourist craft, but nothing like the frequent, even scheduled cargo and passenger service of the "central" or "regional" spaceport. And this difference will translate into settlement lifestyles and cultures that are radically distinctive.

[In contrast, one almost never hears the word "port" as part of the name of some fictional space settlement or O'Neill colony. Perhaps that is because the word "port" naturally connotes to us the existence of some corresponding "hinterland" which the port serves. And our vision of space oases has been that each is a self-sufficient island unto itself.

How realistic is that? While each space settlement must have docking facilities, sooner or later one will offer special "port facilities" that will attract more traffic, making it a hub from which others are served by secondary craft. Indeed it seems to us more logical that one major spaceport or yard will emerge in the L5 co-orbital field, another at L4, and that a growing percentage of traffic will converge at these facilities, with cargo and passengers increasingly transshipped by barge and shuttle to "hinterspace" settlements.]

If full service spaceports emerge on the frontier, what will they offer? In addition to the facilities and services already mentioned, port city contractors will overhaul, rebuild, re-outfit, and reconfigure aging space-

craft and their systems. There will be a "junkyard" or salvage dealer, maybe even a graveyard for obsolete craft (a museum in the making!) There will be warehousing for incoming and outgoing backlog buffers of cargo. There will be tank farms for liquid and gaseous volatile storage and chemical feedstocks. There will be a fuel depot for the many kinds of fuel likely to be used: liquid Hydrogen and Oxygen, Methane and Ammonia and Silane. There will be hoppers of powdered fuel: Iron and Aluminum and their enhanced-performance powdered alloys. There will be containerized unloading and transshipment facilities.

In the nearby town will be the ship chandlers: dealers in ship supplies and equipment. Exporters of heavy equipment will find an advantage in a port city manufacturing site. The bigger transshipment firms will headquarter here. Chemical, engineering, biospherics and electronics laboratories will sprout up to serve the growing list of port service contractors.

But the port town will also see the rise of import-export banks and trading houses, of "marine" insurance firms and trade law lawyers. Stock markets and futures markets could arise. Wholesalers will cater to the distribution market, fostering hinterland growth and that of the port city with it.

[[Port cities may vie to become the "homeports" of various ships and whole merchant fleets. A sort of "Hanseatic League" of the major port cities in the Inner Solar System might arise to promote free trade, and regulations in their common interest, perhaps even footing the bill for a policing agency to counter piracy and hijacking. Such an alliance could be a forerunner of a loose Systemwide political federation.]

Port cities will tend to be socially and legally rather liberal in their mores, and noticeably more cosmopolitan in their ethnic and cultural diversity. In contrast, those town founders wishing to try some great social experiment are likely to pick settlement sites off the beaten trade track.

Goods, both import and export, will be transshipped to and from the regional spaceport and hinterland or hinterspace communities. Much of this traffic will be containerized, using space barges, overland truck trains, and suborbital hoppers or slide landers, as the case may warrant. Passengers will travel to and from the spaceport city by feeder surface coaches and suborbital craft or space-to-space shuttle taxis. Material novelties and cultural innovation will ripple outward from the spaceport centers to dependent outlying settlements.

Detachable holds of speculative trade vessels making circuit rounds between various settlements might be designed "snugline" fashion to slip into special airlocks and taxied or tugged to an in-city market berth where they could unfold for business, self-contained import shops ready-to-go. Resident hawking agents would vie for the business of visiting trader ships not so equipped to do their

own marketing. These trader craft or "circuiteers" would work to increase the amount of trade, thereby helping diversify the art-craft and manufacturing base of each city on their routes. As a result, an ever greater percentage of frontier settlement economies would be involved with mutual trade as opposed to trade with the home planet. And an ever greater portion of that trade might be speculative rather than based on direct customer order.

This trade will be in specialty foods and delicacies, in special fibers and designer apparel, in chemical and organic feedstocks, in strategic raw materials and locally deficient volatiles, in furnishings and arts and craft accessories and gifts. An emporium, for the latest usually unavailable goods hot off the "traders", may determine by lottery who'll have a privilege to purchase items too few to match the demand. There'll be barter and haggling. Dealers and galleries will take some speculatively imported art and craft items on consignment. Recognizable spacecraft parts may become fad "canvas" pieces for port artisans, much as old hand saws for country painters.

There may be trade in salvaged ship decor pieces and "architecturals" in demand by restaurants and hotels to provide space-maritime "atmosphere", or sought by individuals for their dens. Decommissioned spacecraft could find themselves resurrected as visitor centers, nightclubs, and roadside motels.

And what about visiting spacecraft personnel, the spacers and space hands of lore? The port city might offer more spacious and comfortable quarters in which to enjoy their liberty or "shore leave". There will be catering chapels and counselors, recreation clubs and sports facilities, and fast track intensive schooling. There will be medical clinics to treat postponed problems, and specially scheduled seminars to help them catch up on the latest technology in their field. The port will also be a place to receive waiting non-electronic mail.

Married space hands may keep their families in the port city, their children in its schools. The Moon and space settlements offering lunar standard 1/6th gravity will be the favored homeports for spacefarers, as adjustment to and from zero-gravity will be much easier. Space-craft providing artificial gravity are far likelier to offer the lower lunar standard as it is much less structurally taxing, and means either slower rates of rotation, a shorter radius or both. Few spacefarers will call Earth home, or even Mars. "Sixthweight" rules! For the same reason, spacer guilds and guild halls are likely to be quartered in sixth-weight ports. Here too will be the favored communal resting places for space hands who do not prefer consign-ment of their remains to the so lonely "depths" of space.

And for the legally or behaviorally footloose there will be the usual spacefront dives and flophouses and dance halls: places where they can get quick fixes of whatever they found themselves lacking on the long journeys between

ports. And there'll be unscrupulous town merchants seeking to trade worthless baubles for shore wages. Tattoo parlors? why not! But also prisons and brigs where needed. Which brings us to the subject of salutary outlets for people who don't find themselves fitting in. The port city will be a place for tired spacefolk to settle down. And the roster vacancies aboard visiting craft will be a siren for the town's restless. The port town's young will be drawn to the spaceport to watch the incoming and outgoing traffic, feeding their wanderlust. It is from their ranks preferen-tially, as opposed to the young of hinterland and hinterspace frontier towns and outposts, that the next wave of volun-teer settlers will come when some new world or worldlet is about to be opened.

Yet this dose of reality for would-be surface ports on the Moon and Mars! Increasingly, larger spacecraft, including all those using fixed booms rather than winchable tethers to provide artificial gravity in cruise mode, will be forever confined to space, unable to make planetfall. Only zero-G spacecraft and shuttles will come down to the surface, plus the unique class of smaller circuit-making trader ships that are designed to separate in space into winch-tethered components for spin-up to sixthweight mode. [Description of aerobrake Earth-Moon ferry "Jules Verne" in "Lunar Overflight TOURS," MMM # 21, Dec '88 www.asi.org/adb/06/09/03/02/021/lunar_overflight.html].

If this is so, then THE lunar spaceport may be a space depot in low-lunar-orbit, "LLO", or, if the station-keeping challenge can be met, at the L1 gateway. Here the large fixed-configuration cargo and passenger ships will dock, their wares taken down or brought up by "lighters," passengers by shuttle taxis. Here in the environs of "Port Lunagate" will be the big shipyards for big craft and their even larger successors. But, if this is only a transfer hub and not a population center, as seems the likelier eventuality (to this incorrigible planetary chauvinist) then the surface port cities that it serves will still hoard the bulk of the port-typical features discussed above.

Still, even if the really big ships never swoop down out of the starry lunar skies, the comings and goings of smaller craft will be the talk of the town. Reporters will interview inveterate old spacers, thirsty for the latest yarns. Newspapers will advertise the sudden manna of trader-brought goods. Restaurants will advertise the sudden availability of rare delicacies and savory delights. The port's bars will be enlivened by the company of the visiting spacefarers. Art and literature in the town will mirror this opening to the larger world. And among all the settlements on the frontier, those that are port cities will be the liveliest, most colorful, most memorable.

Yet for every Yin there must be a Yang. There will always be those who prefer the quieter, more relaxed, less quick-changing "best kept secrets" of hinterland non-port towns in which to live, and raise their families. <MMM>

LUNA CITY YELLOW PAGES

EDITOR'S NOTE: When rendering web addresses for lunar enterprises, we have been using the domain extension **.lu** for **Luna**. It has come to our attention that this extension is taken (= **Luxembourg**) as is **.la** (= **Laos**.) The Greek name. Selene suggests **.se** but that extension taken (=Sweden) as well. The only option, pending an international agreement on a convention for extending the Internet to other bodies in the Solar System, is the unused extension **.ln**, i.e. **Luna**, so we will now begin using this. - PK

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- To examine our products visit our showrooms at 207 Amundsen Road, North Junction *3-467-4355
385 Heinlein Trail, Luna City *1-467-4355

Spacer Salvage & ReOutfitters

We salvage retired manned spacecraft cabins and convert them to personal motor coaches to be outfitted per customer request. To view our available coaches, suggested floor plans & outfitting options, or to get directions to our Luna City shops, visit our website: www.spacerconversions.com.ln

INTERSETTLEMENT MARKETS

Southgate Emporium - famed market of the Gypsy Traders Association at Frigoris Horizons Marina in North Junction — 3,000 Southgate Road

Open Daily for 3 hours after each shift change
Information: *3-497-7892

Gypsy Market- Gypsy Traders Association market adjacent to Bennett Field Marina in Luna City — 7,000 Spaceport Road — *always open*



<http://www.moonsociety.org>

Please make NEWS submissions to KokhMMM@aol.com

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

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

PROJECTS:

- The Artemis Project™** <http://www.asi.org/>
 - Artemis Reference Mission
 - Artemis Data Book

Project LETO™
<http://www.projectleto.org/>

Moon Society DUES include Moon Miners' Manifesto

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

Join/Renew Online at
www.moonsociety.org/register/

Or mail check or money order to:
PO Box 940825, Plano, TX 75094-0825, USA

Please send all mail related to Memberships to:
The Moon Society Membership Services
at address above.

Moon Society Elections 2003 Results

From Peter Kokh, Moon Society Elections 2003 Chair
October 15, 2003

Uncontested Positions: Elected to a 2nd Term were:

- ☑ Vice-President: **David Wetnight**
- ☑ Secretary: **Amy McGovern**

3 Contested Directors Directors Positions: It was clear from the outset that Randall Severy had been reelected and that John R. Schrock had also been elected. But the race was very close between Ian Randal Strock and Dana Carson for the third directors slot. When the last of the ballots had been counted we had a tie!

A decision was made to find a way to resolve the election at the Leadership Council meeting on Wednesday, October 15th. At this meeting, it was proposed to flip an "electronic coin." Both candidates felt that this method was acceptable. The random number generator gave the "nod" to Dana. But we retain the wisdom and insight of Ian as well, as he remains a member of the Leadership Council which helps prepare "issues" for Board action.

- ☐ **Ian Randal Strock** - remains on Leadership Council
- ☑ **Dana Carson** - won toss for 3rd seat
- ☑ **Randall Severy** - elected
- ☑ **John R. Schrock** - elected

There was nothing in the society bylaws to act as a guide in resolving issues of this sort. That was an oversight which we will soon correct.

Thanks to all members who took the time to vote. It is important to lay the foundations of democracy in the society. We are gratified that the percentage of members who participated was substantially greater than in the much larger National Space Society. 🌐

Welcome to groups.yahoo.com/group/moonsociety/

<http://groups.yahoo.com/group/moonsociety/>

Last month we introduced a new, members only, discussion list: moon-discuss@moonsociety.org. Members may join this list by going to the moonsociety.org/teams page and following the links. You will need a user name and password which you can select at moonsociety.org/teamdir or by following the login prompt on the teams page.

Now you will have another options with many more features, familiar to many who already belong to one or more Yahoo Groups.

Choose one, choose both, as you like to increase the level of your participation in the deliberations of the Moon Society. Meanwhile, the Leadership Council is looking into ways to make it easier for new members to get aboard with a Team Director user name and password.

Of course, participation is voluntary! 🌐

What should the Moon Society be Doing?

Or better

“What should the Moon Society be doing that would get you involved?”

by Peter Kokh < kokhmmm@aol.com > - write me!

Question Background

Currently, the Moon Society Membership appears to be a “box.” The prevailing sentiment seems to be that while our dreams have no limits, what we can effectively do is limited to the size of our membership and the amount of active participation by members. These days, membership in all space societies is declining. The reasons include real frustration with slow progress, the sad state of the world economy and the swift reversal of brief budget surpluses. In another article, I will talk about the critical need of Society leaders to think “outside the membership box” when it comes to taking on projects and seeking ways to make things happen. But let’s first talk about the box.

The box: external and internal limit

Our membership roster generates a limited amount of funds that we can leverage to do projects. That creates an external limit to the box, a limit that looks at members principally as dues payers -- that’s a self-limiting attitude common in most nominally “grass roots societies” that are actually run in a “top-down” fashion.

But there is an internal limit that is potentially much larger, capable of supporting exciting things: the vast untapped talent pool that the membership embodies. From this point of view, the limits imposed by the collective collected dues are the answer to a trivia question, no more!

To be fair, the Moon Society has done far more than other space societies to empower members to get involved. Yet, in doing so, the leadership struggles within the field of view of its own particular pair of horse blinders. To paraphrase a well known proverb, “if your only tool is a website, all problems look like web problems.” I’d say that we have done very well, with much progress of late, within that self-limiting field of view. But it is not enough!

Re-asking the question:

While many members are computer buffs and may share the perspective that dominates the deliberations of the Leadership Council, most of us have other talents and abilities and interests as well. Some of these are actively engaged in our assorted day jobs. Other abilities might see action only in hobby and other free time activities. It may take some imagination to see how we could apply these talents and interests to furthering the goal of establishing a human frontier on the Moon, but that is the challenge I put to each of you. Re-put the question:

“What could the Moon Society be doing that would get me involved?”

For example, I like to imagine and to brainstorm and to write, and MMM has been the outlet for those interests over the past seventeen years. I also like to make things with my hands, and many displays, fully and easily replicated by others, with complete instructions on the web, have been an outlet for these energies. I could do more, with more free time, and I’ve just freed up a bunch.

I keep trying to figure out what else I could do with the abilities and energies I have. I’ve always been radically pro private entrepreneurship, but if you look at my personal income-earning record, you’ll see right a way, I haven’t a clue as to how to make a red cent.

We all have talents and interests, some of them in areas that do not seem germane to the vision and mission of the Moon Society. Some of these talents and interests we exercise and indulge in various other ways. Some of our talents are only neglected potential. Other more urgent concerns that have demanded priority have shoved their exercise to the back burner.

“What could the Moon Society be doing that would get me involved?”

Your talents and interests are your personal buttons. What buttons could the Moon Society push that would get you involved? At first, this may seem an impossible question. You may not be a rocket scientist. You may not know anything about space hardware, remote sensing instruments, or any of the other things that come to mind that seem pertinent to a mission to establish a permanent human lunar frontier. But we have been brainwashed to think this way by those who have been part of efforts to date, a victim of the restricted field of vision of their own talents and abilities.

NASA has been mostly about hardware. We’ll need hardware to go back to the Moon, to set up a first outpost, and to expand its scope of operations. But hardware alone cannot guarantee our success. The gray sciences can only go so far. We’ll need the green sciences too: creating and growing modular mini-biospheres that support food and fiber production and pharmaceutical feed stocks, and guarantee a varied and interesting diet, fresh air and drinkable water, and “reencradle” our existence in a cocoon of life against the sterile barrenness outside the airlocks.

We’ll need to produce a lot of goods and services that have nothing to do with transportation and lifesupport systems, but everything to do with making the lives of pioneers comfortable while at the same time, earning credits from exports with which to pay for needed imports. Enterprises and entrepreneurs of all sorts are a must.

Spin-up Enterprises, anyone?

Of course none of us is in a position to be a lunar entrepreneur! We aren't there yet! But consider that many forms of future lunar frontier enterprises may involve expertise and/or technologies which, if we had them now, could earn a guy a good buck here on Earth from various terrestrial applications. Doing the R&D for such endeavors with the view of pioneering these enterprises, processes, and technologies now for their potentially profitable terrestrial applications (putting them "on-the-shelf" and ready-to-adapt for future frontier pioneers) is what we have called "Spin -up." We don't wait for NASA to expensively develop a new technology at taxpayer expense and then help entrepreneurs to develop "spin -offs." We develop business plans that will allow us to develop them now, at consumer expense so as not to be hurdles for the pioneers. Yes, taxpayers and consumers are one and the same, materially. But in one case, the expense is born reluctantly at best, in the other, with full individual consent.

What are the possibilities for spin-up businesses? I can see some, illuminated by the lamp of my own talents and interests. But that will only provide a limited and slanted list. I'll list some ideas below. But first you must realize that the lamp of your own personal interests and abilities and experiences will bring to light other possibilities that I am too horse-blinded to see. What are your interests and talents and expertise? If no possibilities come to mind, that's okay. The point is that you now be on the lookout for such possibilities, aware that someone like you may have something to contribute in this way.

A starter list, incomplete & slanted of "spin-up" endeavors:

- develop ways to leach nutrients for hydroponic application from regolith-like basaltic soils so as to marry the best of hydroponic and soil-farming advantages
- pioneer a glass-glass composites industry - for ideas: www.lunar-reclamation.org/glass_composites_paper.htm
- start a cast basalt industry (one for tiles already exists) and see what useful items you can produce (and sell!)
- develop technologies to produce needed elements from poor, unenriched ores (of use to nations with few so-called "mineral resources")
- develop teleoperable equipment and software useful in construction and mining operations
- become a consultant on phased industrial and manufacturing operations cycling between energy-intensive/manpower-light and energy-light/manpower-intensive steps (useful in budgeting available nightspan energy)
- develop a ceramics media that starts with soils that simulate the various regolith soils available on the Moon
- develop musical instruments that do not depend on copper or brass or other lunar-deficient elements

"You should ..." >>>> "I will ..."

The Moon Society is currently a rather small "rag tag" band of volunteers. You can't order volunteers to do anything. A volunteer can always "take his football and go home." So the first thing for members to realize is that we must each individually switch gears in their expectations of the Society. We must each scratch and bannish the "you should" mentality, and in its place cultivate an "I will" mentality. "What could the Society do that would push my buttons and get me to apply my talents and energies in a way that will further the dream of a permanent human frontier on the Moon?" Only you can answer that question. But be patient. The answer may not light up your brain right away. The thing to do now is to drum that question into your subconsciousness, so that when your own personal "eureka" comes, you will be able to recognize it and explore it in detail. We are planting seeds here. -- we, that is all of us. We are planting seeds within ourselves that on sprouting and cultivation to harvest could make us lunar pioneers in an ancestral sort of way. Isn't that worth something?

The lunar frontier society will be as many-faceted as any other. We will have executives, project managers, technicians, factory workers, farmers -- sure, all of those. But we will also have teachers, lawyers, businessmen, cooks, barbers, artists and craftsmen, sports athletes, actors, song writers - the list is endless. It will take all kinds of talents to make lunar society tick. It will most probably take some, if not all, of your own personal talents.

But not every occupation, profession, or avocation will translate literally to lunar application. Circumstances that are rooted in the lunar environment, and those that come from simply being in a frontier situation, will require changes and adaptations. If you don't see how your talent bag would or could fit in on the frontier, write us, and we'll try to suggest some avenues to explore.

Meanwhile, back to some more obvious applications

The Moon Society has not run any contests or design/engineering competitions, because the present number of volunteer leaders is already overly committed to other projects. We need project managers. We need contest and competition organizers. We need people who can rustle up prizes, judges, etc. Money is a limiting factor but nowhere near as limiting as most of us think. Come up with a sufficiently exciting project and advertise it. The money will come out of the woodwork. No need to tap limited general funds.

We need artists, model-makers, cartoonists. We need brochure makers, presentation makers, and speakers. The needs are enormous, and the small percentage of current volunteers is, as we noted, already heavily overcommitted. *What can you do?* "Call home!" <PK>

The Moon Society in Motion Chapters/Outposts Frontier Report

Brigham Young University Student Outpost

Now operating as: **BYU Space Development Club**

<http://www.et.byu.edu/groups/sdc/>

from Jonathan Goff < jag42@et.byu.edu >

Kickoff Meeting:

The BYU* Space Development Club scheduled its kickoff meeting for Thursday evening, October 30th at 6pm. [* Brigham Young University, Provo, Utah] This meeting was an introduction to the Space Development Club, what we're about, what we would like to do this semester, and who we are. In spite of the BYU game, we still had a surprisingly strong turnout (nearly two dozen by my count). There was significant amount of interest, with several people who either joined or who plan on officially joining next time.

Next Meeting Agenda:

We will be having our next meeting this Thursday, November 6th, same room, same time (6-7pm in room 250 of the Crabtree). We will be having Jared Haslem from the BYU Business Plan Competition coming to give a short explanation about the competition, prizes, deadlines, and most importantly, he'll be going over some simple steps to evaluate a business idea to see if it is a real business opportunity or not. If time permits, we'll also talk a bit more about projects for the club (both technical projects as well as business plan entries). So, bring any ideas you have, and we'll get some feedback.

Elections:

Afterwards, we'll have some elections for general club officers (Pres, VP, Secretary, Treasurer, Webmaster). To vote in the elections or run for office, you will need to have already paid dues (\$10/year) at the start of the meeting. Copies of the official club charter can be found at: <http://www.et.byu.edu/groups/sdc/charter.doc> in case you are interested in running for office and want to know what it entails.

Those still not sure if they want to join, are invited to come anyway and check us out.

Thanks for all the help and support,

Jonathan Goff < jag42@et.byu.edu >

Bay Area Moon Society Outpost Stirs

www.moonsociety.org/chapters/bams/

Tim Cadell <tcadell@savageresearch.com> (Oakland) and Bill Clawson <billclawson@yahoo.com> (Fremont) are looking for others in the San Francisco-Oakland Bay Area of California to get things going in this area. Bill may be able to host meetings.

If you live in the Bay area, give them a shout!

Chapter & Outpost Resources Online

The Moon Society Chapters Coordinator keeps a log (with active links) to resources appropriate for use by Moon Society Chapters and Outposts on the Space Chapters Hub website. This log is online at:

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

Moon Society St. Louis

www.moonsociety.org/chapters/stlouis/

MS SL Upcoming Meetings

Host: kawetzel@swbell.net
Next Dates: Thursday November 20, 2003
Thursday December 18, 2003
Time: 7:30 pm - 9:00 pm U.S. Central

This event repeats on the third Thursday of every month.

Location: Border's Books in Brentwood
Street: 1519 S. Brentwood Blvd
City/State/Zip: St. Louis, MO 63144

Currently, 28 persons, not all of them local, are subscribed to the MS SL email announcements/discussion list!

Calling all Joint Moon Society / NSS members New NSS Lunar-Frontier at large Chapter

from Peter Kokh < kokhmmm@aol.com >

Some Moon Society Members, who also happen to be members of the National Space Society, are exploring the idea of starting a Moon Projects Special Interest Group or "at large" chapter in NSS. The idea promises these advantages:

- access to a much larger pool of Moon-interested persons
- access to a larger talent pool
- access to greater financial resources for projects

As of print time, seven Moon Society members have expressed interest. We need more! If you are a joint TMS/NSS member and are interested, please contact me.

First order of business is creation of a new discussion list at LunarFrontier-discuss@nsschapters.org and then announce it on Artemis Discuss, Moon Society Discuss, and NSS Chapters Discuss in a wide early appeal for more interested persons. These steps are now underway.

Then on the list, those participating can talk about a mission and vision statement for the new SIG or Special Interest Group, and lay out some short term and longer term goals and action items.

Then we can decide dues, if any, and pick initial officers so we can apply for an NSS charter.

Planetary Society Newsletter
October 2003 - [Selected Portions]

SOLAR SAIL UPDATE: Launch planned for early 2004

The launch of Cosmos 1, our solar sail, has been moved from Fall 2003 until the Spring of 2004. The team has had good test results on hardware and software and is taking extra time to test as many operations as possible.

Over the summer, all flight hardware was delivered to the Babakin Space Center, except for one part of the on-board radio system. A complete engineering model of the spacecraft was assembled with all elements in flight configuration.

Project Director Louis Friedman's update is at:

http://www.planetary.org/solarsail/update_20030919.html

NEW & IMPROVED SETI@HOME to form the backbone of distributed computing network

The remarkable success of SETI@home, which quickly became the most powerful computing network ever assembled, made it clear that distributed computing could be used for many other computing-intensive scientific projects.

BOINC - the "Berkeley Open Infrastructure for Network Computing" - is moving through its development phases, and a new version of SETI@home is being tested right along with it. The backbone of the new system will be a new and improved SETI@home, designed to fit the BOINC platform.

The development of BOINC will make it possible for researchers in areas as diverse as molecular biology, climatology, and astrophysics to tap into the enormous but under-utilized calculating power of personal computers world-wide.

The Planetary Society continues to be the primary sponsor of the groundbreaking SETI@home project and we thank you, our members, for making it happen. Find out how the new SETI@home will differ from the old, and how BOINC and SETI@home benefit each other at:

<http://www.planetary.org/setiindex.html>

SpaceDev e-Newsletter

November, 2003 - [Selected Portions]

International Lunar Conference 2003 - November 16-22:

Jim Benson will present the results of SpaceDev's Lunar Dish Observatory mission design, including an animation, at the International Lunar Conference 2003 in Hawaii, November 20, 2003. He is also scheduled to give a presentation on "Property Rights in Space."

Air Force Research Lab:

SpaceDev continues test firings the week of Nov. 3, 2003 of its Air Force "space tug" hybrid rocket motor at SpaceDev's Poway, CA facility

GREAT BROWSING !

Finding Clear Dark Skies

Where to go in your area for great dark sky observing
<http://cleardarksky.com/csk/>

Space Exploration Act of 2003

<http://www.theorator.com/bills108/hr3057.html>

Luna Lodge, Design for 1st Lunar Hotel

<http://members.aol.com/beanstalkr/LunarHotel/>

2004 Lavatube Base Design Competition

http://cem.www.ecn.purdue.edu/CEM/Dunston/lunar_competition/

Logarithmic Maps of the Universe

www.astro.princeton.edu/%7Emjuric/universe/

Goldin's Cheap Return to the Moon Plan

www.abo.fi/%7Emlindroo/Station/Slides/sld051x.htm

Mars Base Simulation Game

<http://perso.wanadoo.fr/salotti/marsbase.htm>

Testimony of Dr. Robert Zubrin at Senate Commerce, Science, and Transportation Committee Hearings: "Future of NASA"

<http://www.marssociety.org/content/Zubrin102903.PDF>

"To Touch the Stars"

71 Minute CD - Various Artists

Reviews: Buzz Aldrin, Brian Chase (NSS), Robert Zubrin
<http://www.prometheus-music.com/space.html>

Voodoo Medical Science on ISS?

a scathing report in the Houston Chronicle
www.chron.com/cs/CDA/ssistory.mpl/space/2181642

Space Library: Magnificent Mars

http://www.space.com/spacelibrary/books/library_magnificent_031104.html

"Large format, superb images, compelling text ... the next best thing to standing on the red planet itself".

A Comparison of Lunar Atlases

<http://www.otterdad.dynip.com/als/page205.html>



Finding "Sudburys" on the Moon

10/12/03 - Peter, you wrote in MMM 169, pp. 1-2

"And while the Moon appears to us as the more heavily cratered, Earth, with its much more powerful gravity well, attracts eight times as many passing bodies into its maw. ...

True, and the Earth could yank them right into the Moon also, could it not? If the Moon were all alone, the chance of a Sudbury impact would be low, but the Earth's superior gravity makes such an impact even more likely because it attracts so many bodies "into its maw." And how many Cu-Ni-Co-Pt-Pd-Au rich asteroids have disappeared into the oceans? How many smaller but rich impacts have been erased by erosion and other geological processes? We do not know. If SMART-1 confirms the ice, we have to urge a search for these Cu-Ni-etc. rich impacts, along with some lava tube searches and mapping. Now, what about a kerogen rich carbonaceous impact? The kerogen would probably vaporize I guess.

Dave Dietzler < Dietz37@msn.com >

Only Private Enterprise will get us to the Moon

In reply to [remark made on artemis-list]: "There is no profit in going to the Moon, so anything sent to the Moon will be an expense for people on Earth. It's obvious that people here don't want to spend money now on space exploration. So I'm thinking any money spent on getting pounds to the Moon should be spent on material that will jump start an economy there."

I just wanted to make a minor nit here. Publicly funded lunar bases just aren't going to happen any time in the foreseeable future. NASA and ESA are all tied up for the next decade or two with ISS obligations. Not to mention all the money they plan on using to keep running the shuttle, develop the OSP, etc, etc. Basically, the soonest they'd have money to even start pursuing such a goal would likely be 20 years from now. So, IMO, even if they were still competent enough to do such a project, I feel Publicly Funded projects can be ruled out.

That really only leaves privately funded projects. While a rich investor might be able to fund such a thing out of pocket, for kicks and grins, that isn't very likely. If we go back to the moon, there must be some potential of making profits (or we must reduce the cost of going to the moon to the point that getting a mission funded without profit motive could be funded). I think that there are several potentially useful markets, such as shipping LOX to LEO for transfer stages, life support, etc. Also, as various metals become available (as per what Peter Kokh was talking

about), some of those could be sent as the frames for on-orbit assembled sat farms, space hotels, etc. If done wisely, incrementally, and quickly, there *can* be a market for lunar products (even more so if we strike a gas pocket, PGM crater, or something else of interest).

Autarchy just really doesn't work in the real world. Obviously with the cost of shipping, the market will favor a lot more self-sufficiency, but some interplanetary division of labor is going to be necessary, even in the long run.

The best way IMO is through the market. If you provide a service someone wants, it becomes much easier to get them to pay you. Trying to get donations from hundreds of thousands of people with no expectation of return is not likely to happen (once again IMO). However, getting thousands of people to buy a product is far more likely. Which is why I think commercial approaches are superior for large capital projects to clubs and charitable donations.

Companies in other industries routinely get millions of people to give them chunks of money (in return for some good or service). I think your approach may work just fine for smaller projects, but once you get past needing about \$50-100k, I think you'll be far better off using normal business practices. Anyhow, that's just my 2¢.

~Jonathan Goff

On early lunar roads -- or railroads!

Dear MMM: I'm now up to my third copy of MMM, and I am blown away! I was especially taken by the items that Peter Kokh wrote about, around building early lunar habitats and highways. These have got my brain spinning off in an interesting direction: designing a first lunar railroad. As a long time rail fan and model railroader, I believe that a lunar railroad would offer some distinct advantages to an early settlement, with benefits often well exceeding highways.

[Lunar railroads] will not be as "dirty" -- Regolith is deeply dusty, so that I don't go along with the idea of "highway building" as described in Peter's articles. Building a highway roadbed would seem to take a lot of work before it's clean, and you would need Kim Stanley Robinson kinds of machines to do the work. A rail bed would get the traffic up out of the dirt, and could be put together by a couple of guys in their spare time.

Railroads were the first real "rapid transit". The Old West frontier basically ended with the completion of the first transcontinental railroad, and the ability to quickly bring quantities of goods and people anywhere. It is not beyond imagination for this to apply to the lunar frontier as well. I would look forward to the joining of rails between the first two lunar colonies.

Bob Wilcox < ramgwilcox@earthlink.net >

EDITOR: I am a RR buff also, and Lunar RRs will be part of the transport mix -- "part." Dust can be managed. - PK-

"To Touch The Stars"

<http://www.prometheus-music.com/space.html>

New CD a packed 71 minutes of classic and new songs:

1. Witnesses' Waltz (3:43) written by Leslie Fish; sung by Kristoph Klover
2. Big Blue Sky (3:58) written and sung by Stan Clardy
3. Fire in the Sky (4:37) written by Jordin Kare; sung by Kristoph Klover
4. Now's the Time to Touch a Star (3:48) written by Michael Penkava; sung by Karl Franzen
5. Hope Eyrie (4:14) written by Leslie Fish; sung by Julia Ecklar
6. Surprise! (3:07) written by Leslie Fish; sung by Gunnar Madsen
7. The Pioneers of Mars (3:03) written by Karen Linsle and Lloyd Landa; sung by Karen Linsley
8. If We Had No Moon (8:00) written and sung by Christine Lavin
9. I Want to Go to Mars (3:36) written and sung by The Birdwatchers
10. Star Fire (3:35) written by Cynthia McQuillin; sung by Julia Ecklar
11. Others Standing By (5:00) written and sung by Kristoph Klover
12. The Challenge (3:50) written by Karen Linsley and Lloyd Landa; sung by Karen Linsley
13. Dog on the Moon (5:22) written and sung by Garry Novikoff
14. Beyond the Sky (4:58) written by Judy Collins; sung by Margaret Davis
15. Queen Isabella (3:09) written by Leslie Fish; sung by Kristoph Klover
16. Legends (3:47) written by Bill Roper; sung by Julia Ecklar
17. Dance on the Ceiling (3:16) written by Leslie Fish; sung by Gunnar Madsen

Rave Reviews:

"As someone who has actually set foot on the threshold of space and experienced firsthand its majesty and the incredible potential it holds for the human race, I am thrilled by this new collection of original songs celebra-ting the beginnings of our great endeavor to reach for the stars." -- Buzz Aldrin

"I am confident that music and songs -- perhaps from this very album -- will make an impact on a future explorer and inspire him or her to reach for the stars." - Brian Chase (Exec. Dir., National Space Society)

"If we are to win the hearts& souls of humanity to the vision of a spacefaring future, the space exploration movement must also develop its songs...it is my hope that this album will begin a tradition whereby our most powerful language, music, will help rally the souls of the present to the cause of the future." R. Zubrin

Showcase your NSS Chapter Project

from G. B. Leatherwood < gblrel@elko-nv.com >
November 9, 2003

As Director of Projects- Chapters, one of my objectives is to publicize the projects you have underway, completed, or in the planning stages. The enclosure is a page from the monthly journal of the Good Sam Club that shows what can be done with good information from chapters, especially with pictures.

As you have probably seen, chapter projects have been given a special place in each issue of our magazine, Ad Astra. Further issues will have a similar page 3/4 but only if you send in the stories and pictures of what your chapter is doing. In this way we will all be able to see what each other is doing, get ideas for our own projects, and make information available to each other.

Send the stories about your project, especially with reproducible photographs, directly to me at this e-mail address. I will do whatever editing may be necessary and see that all information gets to Brian Chase in time for each issue. The best photographs are action shots, but group photos will work too.

A word to our international chapters: We know you are doing good things, so let us see what you're doing. If you have any questions or need more information, please let me know.

Looking forward to making this page helpful, informative, and rewarding!

Ad Astra!

G. B. Leatherwood

NSS Director of Projects- Chapters

Resources for Chapter Projects

The Space Chapter Hub - <http://nsschapters.org/hub/>
specifically

Project Menus Unlimited - </hub/projects.htm>

Space Chapter Merchandise - </hub/merchandise.htm>

Do explore the whole Space Chapter Hub site

The Foundry - <http://www.nsschapters.org/foundry/>

- The Foundry is a project incubator workshop.
- The Foundry helps participants turn good ideas into doable projects.
- The Foundry brings together those who are willing to work for a project of their choice and (or those who want to help), the necessary expertise, and the resources all in one place.
- The Foundry is open to anyone who wants to participate.

[Heads up to NSS Chapters!]

PBS Special Presentation Event Opportunity

From Jim Plaxco, NSS Vice President of Chapter Affairs

There has been in the works a television program production for PBS stations that features the activities of the National Space Society. The program, produced by the Teaching Learning Network, was just made available to PBS stations across the country.

NSS, in cooperation with Lockheed Martin and Raytheon, sponsored the production of "No Boundaries: Our Future in Space" as part of the Voices of Vision series airing on PBS affiliates around the nation. Voices of Vision is a television documentary series that profiles locations, institutions and organizations that are changing the world. By exploring cultures and institutions from around the globe, each 30-minute episode takes us on a journey through time. Voices of Vision unfolds the past, explores the present and looks into the future of fascinating institutions and organizations that help shape the world we share.

Program Information: Voices of Vision Episode Number 201

Program Title: No Boundaries: Our Future in Space

Program Description: When man first walked on the moon in 1969, the world was rapt with curiosity. But even then, we had no idea of the potential that space exploration holds for the human race. From space tourism to mining asteroids for essential minerals to new sources of electrical power, the possibilities are nearly endless.

The National Space Society promotes the social, economic, technical and political agendas for the exploration of space in order to meet the challenges of this final frontier. Additional funding for this episode was provided by Lockheed Martin and Raytheon. Please visit www.nss.org

Source: <http://www.voicesofvision.org/people.php>

Additional information is available in the Oct. '03 issue of NOR, # "NSS Show Airing Nationally on PBS."

What is Needed: At this time we do not know what stations will be airing the program or when individual stations will show the program. The decision on airing is entirely at the discretion of the individual PBS stations.

Chapter activists should contact your local PBS television station and inquire as to whether the station will be airing the program and when. Once you have this information, please contact me with the following details:

* City Name, * Chapter Name, * Station Name, * Yes or No as to whether the station will air the program, * Air Date and Time if applicable.

Once your chapter has this information, you may want to consider scheduling a chapter event to watch the program.

Thank you all very much in advance for your help. If you have any questions, please contact me at:

< jplaxco@astrodigital.org >

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U.S. CHAPTER =====



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

Solar System Ambassadors

PASA - Princeton, NJ/Philadelphia, PA

Michelle Baker - chaos@cybernet.net

CSFS - Chicago, IL

Bill Higgins - higgins@fnal.gov

SSS - Sheboygan, WI

Harald Schenk - hschenk@excel.net

MINNESOTA =====



Minnesota Space Frontier Society

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

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

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

Email: tomg@mnsfs.org

[www.mnsfs.org/]

• **Relaxacon Report:** The ConSume "relaxacon" was relaxing. MAS and MN SFS ran a 'science table' rather than a full blown sci rm. We wanted to relax too. Here are some pics. www.freemars.org/mnfan/relaxacon/Relaxacon-2003/

• **October Public Meeting:** Another excellent meeting. Ben Huset presented a timely talk on the Chinese Space Program which made it's first manned launch that evening. Congratulations to China on a successful mission.

• **November 11th Public Meeting:** Tuesday, 7-9 PM, Univ. of Minnesota, Coffman Union, Room 324.

Presentation: "Mars Exploration: Past, Present and Future" by Tom Greenwalt. The four different missions due to arrive at Mars during December and January next year should provide a wealth of new data about Mars.

Also at this meeting the election of new board members for 2004 will be held. If you can't make the meeting and would like an absentee ballot let us know (info@mnsfs.org).

• **December 9th Public Meeting:** Tuesday. The presentation will be on the X-Prize. It sounds like there is a strong possibility that an attempt may be made to collect in December.

CALIFORNIA =====



OASIS: Organization for the Advancement of Space Industrialization and Settlement

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

Events Hotline/Answering Machine: (310) 364-2290

Odyssey Ed: Craig Ward - cew@acm.org

E-mail: oasis-leaders@netcom.com

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

Odyssey Newsletter Online

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

Regular Meeting 3 pm 3rd Sat. each month

Microcosm, 401 Coral Circle, El Segundo.

Information: OASIS Hotline, 310/364-2290

- **NOV. 15th, 3:00 p.m.** -- OASIS Monthly Business Meeting at Microcosm, address above.
- **DEC. 20th, 3:00 p.m.** -- OASIS Monthly Business Meeting, location TBD.

Looking Ahead

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

Recurring Events

- **Fridays** - "Mike Hodel's Hour 25" webcast. The world of science fact/fiction: interviews, news, radio dramas, artists, writers, stories, reviews www.hour25online.com/

OREGON =====



Oregon L5 Society, Inc.

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

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

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

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

Bryce Walden <moonbase@comcast.net>

(LBRT - Oregon Moonbase) moonbase@comcast.net

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

Bourne Plaza, 1441 SE 122nd, Portland, downstairs

NEXT MEETINGS: NOV. 15th, DEC. 20th, JAN. 17th

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 <hshenk@excel.net>

>>> **DUES:** "SSS" c/o B. P. Knier

22608 County Line Rd, Elkhart Lake WI 53020

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

- We now meet the **3rd Tuesday** of the month at 7-9pm

NOVEMBER 18th: Sheboygan, location to be announced

DECEMBER 15th: Stoelting House, Kiel

JANUARY 20th: Sheboygan, location to be announced

PENNSYLVANIA =====



Philadelphia Area Space Alliance

PO Box 1715, Philadelphia, PA 19105

c/o Earl Bennett, EarlBennett@erols.com

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

[<http://pasa01.tripod.com/>]

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

Meeting Dates: NOV 15th, DEC 20th, JAN 17th

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

- **Meeting Location:** We will meet at the Food Court at Liberty One on November 15th, but will be at Philcon in December on the 12-14th (see below). Elections in January!
- **Special Events Notes:** Thanks to Mitch Gordon, our Public Outreach Coordinator, we were able to host the visit of author Robert Zimmerman at a local Barnes & Noble in center city Philadelphia. This happened on October 16th with ~ 30 people in attendance, only 5 being our members. Mr. Zimmerman's new book is "Leaving Earth" by Joseph Henry Press. More later.

Gary Fisher invited members of the Mars Society, Independence Chapter to help with an event in Grovers Mill, New Jersey (sound familiar?) to help with outreach for the Nov. 1st anniversary of "The War of the Worlds" special broadcast. Its hard to believe that was 65 years ago. Penny Glackman and her husband are volunteering for this.

Hank Smith has enlisted our members help as participants at the Philcon Science Fiction Convention, in December. Due to the upcoming landings by NASA explorer robots on Mars we expect good attendance for member Gary Fisher's and former member Michelle Baker's talks for the Mars Society and Jet Propulsion Lab respectively.

The New Jersey State Museum has asked us to exhibit and present again at Super Science Weekend in January. And yet more in individual report areas: Dotti Kurtz reports on material in both The Planetary Report and The Smithsonian Air & Space with "Propelling Humans Beyond Earth Orbit" from the former being the first item of interest. This is more of a preview of what will be presented to NASA Administrator Sean O'Keefe. The preparers include The Planetary Society, The American Astronautical Society and The Association of Space Explorers among others. Paul Allen, a great backer of technologic problem solving (see "Allen Array" for example), was associated with the project as well. There was also an article on The Gene Shoemaker Near Earth Orbit Program dedicated to N.E.O discovery and tracking. This was via a specially outfitted F-18B Hornet with I.R. etc. instruments. In addition Michelle passed around The Smithsonian Air & Space with "Backgrounder on the State of the Station" on progress and future expansion problems (fiscal & political) of the project. In addition there was a report by James Oberg, longtime space consultant and author, with "Pod People," which is about escape vehicles over the decades including recent possibilities that seem to be resurrections of older designs using improved technology & analysis tools.

Mitch Gordon did a recap of bringing in the author Robert Zimmerman to our local Barnes & Noble in Center City Philadelphia. Mitch started planning for this October event in August after we received a notice in our mail box about the new book "Entering Space". Mitch is our public outreach co-ordinator, a job he developed from his personal interest in making the city a great place to be in for the future. As a consequence Mitch will work with Hank Smith to see if Mr. Zimmerman can speak at Philcon in December. Mitch was very effusive about Robert's presentation and I must agree. The possibility of the Chinese Space Program being a stimulus to our increasingly reticent efforts was a welcome addition to the talk on the book (most of us bought it on the strength of the presentation) and Mitch is to be congratulated for bringing Mr. Zimmerman here. Mitch will also try to introduce him to several national forums as well.

Continuing, Mitch also reported on the current The Futurist with the topic "Our Molecular Future" by Douglas Mulhall which included the eventual use of nanorobots as hazardous waste disassemblers. We also talked of fund raising ideas in the area of jewelry which is a subject Mitch thinks could help us improve our chronic cash short state. Lastly, Mitch will speak at Temple U. in Philadelphia in

January. Contact him for details (215-625-0670).

Earl Bennett gave reports in several areas and chaired a discussion on a topic brought up by visitor Janet. The topic of activity by other groups came up, especially after Gary Fishers' Mars Greenhab work was mentioned, and this led to Oregon L-5 work on looking for Lunar Lava Tubes. As the military say, Feet on the Ground was what Janet supported, with some back and forth on the techniques used on Earth applying remote sensing technology and image analysis as well as a proposal from Oregon L-5 for a "Radar Light Bulb" method to find sub surface cavities and openings (MMM #118, May 1998.)

There were a number of interesting articles from The Industrial Physicist but not being directly space related, with "Plasma Self Organization" being the closest. This short subject, from work done by Scott C. Hsu of Los Alamos and P.M. Bellan of Cal Tech which involved examining the causes of Plasma instability formation that can defeat the control necessary in creating a stable fusion source. This has been a most vexing problem for us who are interested in moving civilization into the solar system. The authors and a team of researchers used a very high speed (a frame per microsecond) camera to examine the build up of the instabilities. This was in the October/November issue of the publication.

In the October issue of Photonics Spectra is an editorial by Francis Laurin who is President of Laurin Publishing and is on the space program. Entitled "Reveille for the Space Program" he goes into the results of the Columbia Accident Report and the background problems that may be responsible for this and other space program failings. There is a possible bright spot in this from the recommendations of the Columbia Accident Board which is the phasing out of the present Shuttle by about 2010. His final comment indicates he may have read the entire report He quotes retired Admiral Harold W Gehman Jr. "We shouldn't start by designing the next vehicle. That is a trap we've fallen into several times." My comment: we do have a working system that needs fix up first and we have to watch for the clever financial end runners who would divert the funds (or try to delete them if they can't do that) and possibly vote against the politicians and their staff that may try to go along with that.

Much additional literature was also brought in for discussion. Submitted by Earl Bennett.

~~Amateurs Built the Ark.~~
~~~~~  
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~~~~~  
Titanic

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