

Could it be that Earth-like worlds elsewhere in the Galaxy, and Universe, are all "uninhabited"?

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## In Focus "Are we alone?" is a question with many answers, depending on By Peter Kokh

From time immemorial, people everywhere have looked up at the heavens and wondered if out there somewhere there were other worlds, some like ours, some very different, with peoples like us, or quite different physically and culturally. Many cultures have traditions of having been visited by superior creatures from the skies. What nature produces once, it must be able to do again, many times.

Yet many religions insist that we are alone, the only people the "Lord" has chosen to create. Why the prophets of such religions think that they are glorifying the Maker by limiting Him to just one world, when if infinite, He should be capable of creating an infinite number of worlds, is beyond me.

It does not seem possible then that we are alone. In the articles below we take a look at a number of interrelated topics and try to throw some light on each of them.

We do not wish to offend anyone. Rather we hope that after reading these articles, you are even more filled with awe, wonder, and a desire to share life with others, elsewhere and wlsewhen.

We live in a time when we are able to explore the Solar System where we were born, and when we are beginng to find evidence of other such systems, countless numbers of them.

Isn't it wonderful!! PK
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# Understanding Light-Time ("space-time" as the "there-then") 

By Peter Kokh - Reprinted from MMM \#47, August 1991
In the ordinary theater of human affairs, it is quite practical to pretend that an absolute "now" of simultaneity exists, that distance is distance and time time. As we move out from the surface of our home/womb world, however, we find ourselves increasingly dealing with distances that can only be traversed - even in theory - at an every less commensurate rate. Distance Away becomes the equivalent of "Time Ago" or "Time not yet" To handle such "separations" or dislocations in "space-time" the term "light-year" and its derivatives have been invented.

It is 1.4 light seconds one way Earth to Moon;
500 light seconds ( 8 minutes 20 seconds) Sun to Earth.
3-14 light minutes one way Earth to Mars;
Moving out, Neptune is $1 / 6$ th of a light day "away/ago" and the round trip span across Neptune's orbit is a full light day "away/ago."

Only comets are known to inhabit reaches a light week to light months in the "there-then", and the nearest known neighboring star or star system, Alpha A-B binary system and Proxima Centauri, is so removed that it is all of 4 plus years* out of synch with solar time. (The average distance/dissynchronicity between closest neighbors in our part of the galaxy is 6.3 light years, so we are lucky! Barnard's Star also lies within that figure.)

Imagine ever more remote ranges of space as a series of ONION SKIN LAYERS. Considering the minimum time needed for round-trip travel/intercourse or for exchange of communication intercourse, we might designate these "onion skin layers" as follows:
CONTEMPORARY SPACE in the sense of Co-Generational, i.e. sharing the same generation, describes all space out to 10-13 light years. Within that range, round trip intercourse/exchange can take place within 20-25 years. The ambiguity of the "now" increases from "the instant" to "the generation" as one approaches that limit. Within "space" as so defined, lie such familiar names as Alpha Centauri, Sirius, Epsilon Eridani, Procyon, and at the extreme, Tau Ceti.
CONSECULAR SPACE, i.e. wherein the ambiguity of "the now" degrades to the sharing of the same century, lie star systems out to 50 light years. Familiar examples are Altair, Fomalhaut, Vega, Capella, and Arcturus.
CO-MILLENNIAL SPACE, i.e. wherein exchanges of information can be completed within a thousand years, include stars out to 500 LY. Stars and worlds within this range "share" our universe if we extend the unstated time element of "our" to include 1491-2491 A.D.
SUB-EPOCHAL SPACE includes the rest of our Milky Way galaxy and its satellite galaxies like the Magellanic Clouds, out to 500,000 LY. We share only the same sub-million-year relevance.
GEO-GALACTIC-EPOCH-SHARING SPACE extends out to 5 million LY, allowing affinity and connection within the same 10 million year time frame between our galaxy and the Great Galaxy in Andromeda, M31.
GEO-GALACTIC- PERIOD-SHARING galaxies lie within 50 million LY from one another.
GEO-GALACTIC- EON-SHARING galaxies within 500 million years from one another, can claim no more than sharing the same billion years.

Beyond that, BIG-BANG SHARING galaxies and what worlds they may harbor more distant = dissynchronous from one another than 500 million LY, share no more than all of time itself from the common beginning on. [So what about "Parsecs"? A parsec (about 3.258 LY ) is a unit of dislocation taken from parallax measurements that seems more sophisticated because it has no explicit reference to Earth-specific measures like the year (it does have an implicit reference to the arbitrary Earth-standard division of the circle into $360^{\circ}$ ). What astronomers with airs gain by use of the term is more than lost by the dropping any explicit reference to time.]

All of the above by way of a "reality check" for the article that follows. <<MMM >>

## EMPIRE: One Fortunate Result of the Speed-of-Light Barrier is that Multi-Star "Empires" cannot exist.

By Peter Kokh - Reprinted from MMM \#47, August 1991
"GIVENS" 1 Neither matter nor information can exceed the speed of light.
2 'Usable' shortcuts through the fabric of space-time will never be found.
You may be an incurable romantic dreamer, unwilling to accept these statements as facts-of-life with a
"big F". Self-delusion is your privilege. This discussion is for the rest of us!

* Rule of Thumb: A 6-months-round-trip time limit on information flow, sets a proven distance limit for sustained effective exercise of authority in Europe's control of settlement of the Americas.
* This figure doesn't come out of a hat, but is based on historical experience and precedent on Earth, and it is our belief that it will continue to hold valid as we move out beyond circum-solar space.
* Beyond that range, simple logistics makes it urgently practical to be totally self-reliant rather than dependent in even the slightest way on the mother civilization, no matter how advanced the parent world, no matter how crude and primitive the settlement or colony or outpost.

In effect, that would set a limit of 3 light months out MAX! to any form of centralized authority. While this is 500 -some times further out than Neptune $\&$ Triton or Pluto-Charon, it is only $1 / 17$ th the way to the nearest star system. That means that Earth=Terra=Tellus could not even establish an effective empire over the Sun's own Oort comet cloud.

Once we send out settlers (likelier in the low-maintenance travel-ready form of eggs and sperm i.e. genetic materials) to even the nearest stars, they and their progeny will be very much on their own. If it takes nearly nine years (if not much, much longer) for Earth HQ to respond to a dire outpost emergency with so much as bare advice, why bother asking, or listening for that matter? The immediate and permanent need for total self-reliance will assert itself rather quickly as we prepare to leave the immediate parochial vicinity of the home system. As a corollary, it would be foolhardy to depart, "forsaking" circumsolar civilization, with anything less than enough personnel and gene pool, seeds or seed bank, tools and information to function as if the rest of humanity no longer existed or cared (this latter a not too unlikely scenario).

While many people appreciate the vastness of space in some inadequate way, very few have any sense of the equally vast, equally distancing effect of time dissynchronization with distance. The further removed in interstellar space-time, the less relevancy to one another can any two oases of intelligent resource-using life share or maintain. [See the previous article.]

* Extra-solar settlement will be only weakly self-repeating. It'll take each newly settled system perhaps one to several centuries to fully mature as a center of civilization in its own right with enough divertible, discretionary resources and energy to support interstellar repeater forays on its own.
* Mature off -shoot pockets of Humanity and Gaia-Humanity (where Earth-native or Earth-derived vegetation and animal life form the imported cradle for settlement in the absence of given suitable indigenous varieties) will effect one another in a totally multi-centric fashion, each being the center of out-spreading ripples of information: history, culture, science, art.
* Living languages are ever being regenerated by their speakers and drift too rapidly to serve as a means of communications between Alma Mater Earth and Alumnae worlds, light-generations or lightcenturies apart, the likely spacing of suitable settlement worlds. Either some frozen dead language, such as Latin, or some totally new construct especially tailored for efficient and unambiguous radiotransmission - in either case with absolutely prefixed vocabularies would work best. Such an immutable Lingua Franca must be agreed upon before the first starbound settler ship leaves our Sol's system, and be treated as sacred, in effect "revealed," set forevermore. New terms must be transmitted as cumbersome paraphrases of the originally agreed upon vocabulary. Otherwise communication will break down irretrievably, progressively becoming mutual gibberish.
* All this means that there can be no interstellar "empires" in the sense of structured constituencies in which authority spreads out from a center - other than the 'authority' of the common petrified language. The Mother System might be tempted to reserve to itself a sole and privileged right to add new terms to the unifying tongue, but such terms would have to be transmitted along with periphrastic definitions for as long as needed to reach the furthest offspring communities.

Being "Keeper of the Language", however, is as far as the the mother world's authority could possibly extend. Even this quasi-priestly prerogative could be a bad precedent, one inviting challenge. Those alumni pockets furthest from the home-worlds would have the least reason for confidence that the parent civilization "yet" survives, and would be the most tempted to start rival papacies, thus beginning a slide into a communications anarchy from which there might be no recovery. Alas, if language is to unify, is must be a standard equally respected by all, mother worlds included.

* The good side of these rather dim prospects for "interstellar and galactic empires" is that, to the extent even benevolent, i.e. paternalistic "empires" are necessarily wicked, we won't have to worry about fighting them, about throwing off the yoke of some "Imperial Authority". There can be no "Wicked Emperor of the Zenith". Alas, such a wealth of dramatic and exiting "space opera" is forever fantasy - however much fun it may be to read!
* [Gaia-]Humanity may yet spread as "Reaches" or "Diaspora" [discrete autonomous scatterings] rather than as true structured Empires. Each daughter system will be a unique "alternate continuation of Earth history" and of the mother civilization and heritage - each with its own flavor unique blend of unrepeated possibilities. Leaving the vicinity of old Sol will establish an Epoch of Divergence.

For a weak parallel, consider the many English-speaking nations of Earth, all with a very definite feeling of kinship, yet each fully independent and self-guiding. Out among the stars, only the feeblest analog of such a commonwealth could be maintained. Yet the affinity of common origins and predivergence cultural wealth will be cultivated as a treasured heritage.

* It follows from all this that in any contacts with the "reaches" or "diaspora" of other intelligent resourcetransforming races, neither "side" will be able to act, or react, as a unit in any fashion at all. Rather it must be pre-agreed that each settled system is an equally responsible representative of the entire "family of human [or other] civilizations".

Nor would the "diasporas" of various 'neighboring' species necessarily compete for the same cubic or square real estate. One might prefer G-type suns with planets already sporting indigenous flora and fauna, like Pleistocene Earth. Another might prefer raw pre-Cambrian worlds around hotter yellow-white F-type suns, or seek out endowed but sterile worlds to transform to suit from scratch. Another may prefer systems in which there is ample debris to use as building blocks for space colonies, but without "distracting" planets. Another may prefer the ice-firmamented oceanic Europa-like moons of gas giant planets around feeble M-type red dwarfs or even around isolated brown dwarf substars, etc. etc. Thus it is possible that one or more separately originating diaspora could peaceably interpenetrate the same space-time and be only vaguely aware of one another's existence. But more likely, different families of civilizations are not likely to be neighbors in both space and time at once.

Social, political, economic, and ethnic injustices may persist in all inhabited solar systems anywhere. But whatever the evils lurking within each, relations between systems at interstellar levels are likely to be limited to an "angelic" plane. The virtual quarantine imposed by the vastness of space-time allows little opportunity for anything else. Contact between independently arisen civilizations will seldom go beyond the most tenuous awareness of the other's existence, with the skimpiest of (rather worthless) surmises about mutual similarities and differences.

* The one exciting exception to all this is the possibility of "Twin Civilizations" in well-separated binary G-star systems (say a few light weeks apart) such as Zeta Reticuli.
https://en.wikipedia.org/wiki/Zeta_Reticuli - (follow link at bottom to Zeta Reticuli in Fiction)
* However unlikely in any given case, separate races could arise around each sun in such systems at least somewhere in this vast multibillion-galaxied Universe. But that they would be near-contemporary to one another, even within a hundred million years or so, is demanding a lot of parallel evolution or compensating divergences. That possibility aside, even a solitary race spreading to a favorable and fertile planet around the other luminary of such a wide twin sun system, would probably be greatly advantaged by having such a sheltered interstellar springboard opportunity, and find itself the more highly motivated to become a truly Starfaring species.

We of Earth are given a great 1-2 boost first by an uncommonly large natural satellite, the Moon, and second by a resource-rich Asteroid Belt - assets that not all otherwise equivalent civilizations may enjoy. If we fail to become truly System-faring despite these handy stepping stones, it would reflect poorly on our species' character.

We have no such handy "training ground" for extrasolar adventures, discounting the Oort Cloud of comets. In this regard, it is statistically more than likely that some few other civilizations will have a natural edge on us.

In other words, even such gossamer, ghostlike interstellar networks as might arise rarely here and there throughout the Universe, are unlikely ever to count among their number one spreading out from Earth. If we beat those odds, it will certainly be to our credit. <<<MMM>>>


## Are we alone, in our Milky Way Galaxy? at least at this time?

By Peter Kokh

We have been a broadcasting civilization for about a century, peanuts. The chance that there would be another "contemporary" civilization nearby is also peanuts. Space is huge, huge, huge, huge, Time is long, very very very very long. Civilizations may have come and gone "nearby." Civilizations broadcasting "now (on our receiving end) are less likely to be nearby than far away. Do check out the first article in this issue, in case you passed it by. The further away a "current" civilization is from us, the longer -doubly long - would be the time to receive a response, and the less likely that civilization is likely to still thriving when the response arrives.

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## Practical Tactics

We need to be looking for worlds like ours, big enough but not too big, with active plate tectonics so the surface is a mix of ocean and continents, the poles inclined to its ecliptic, but not too inclined, old enough to go through the many stages of the deveopment of life - it has taken 4.5 million years for Earth to "flower" - give rise to an intelligent species. Is this typical? Unusually long? Unusually short? How long has our civilization been a "broadcasting and listening" one?

## The Megapolicene Era (a new term for a newly identified geological era)

The way our civilization is proceding, we will be short-lived. Taking care of our environment comes way down the list of priorities of those who run our economies. Earth is now entering the Megapolicene era, the era when megacities "move" more rock and soil per period of time than do natural geological processes.

Unless those interested only in "profits NOW" correct their extreme nearsightedness - and the outlook for that does not look good - our time as a broadcasting species may prove quite short. Hopefully, in time, a future generation will pick up the pieces, rebuild the economy on less myopic principles, and remain a broadcasting one.

## What kind of worlds around what kind of Suns?

Currently, the astronomers out there looking for other "Earth-like" worlds are taking the term too loosely a "rocky" planet "roughly" in the size and mass bracket as Earth. Hey, it takes a lot more than size and location to make a planet "Earthlike!." Readers who followed the Star Trek TV Series, will be familiar with the term "M-Class Planet." Here is my definition in the MMM Glossary -
http://moonsociety.org/publications/m3glossary.htm|\#hydro_tectonic
Hydrotectonic Worlds - "Earth-like planet", "M-Class Planet" - We've all heard these phrases but no one seems to have tried to get at the essence of what they mean. "Hydrotectonic" is our definition: active tectonic processes in the presence of water, i.e. continents and oceans. Mars does not even come close. Any tectonic activities on Mars had ground to a halt long ago, probably due to insufficient water and too swift an internal cooling.

In other words, "rocky planet give or take half the mass to double the mass of Earth" does not cut it What kind of Sun should a truly "Earth-Like" (i.e. "M-Class") could host a spacefaring civilization?

Suns significantly more massive suns and thus hotter than ours - type F and beyond - do not live long enough to have a properly located and sized planet evolve advanced mammals, much less intelligent ones. "FClass" suns may have planets where life has begun, but will not last long enough to see life reach the stage it has on Earth. Planets around F-Class Suns, are thus ripe for coloniization.

Suns significantly cooler and less massive than ours - the so called Red Dwarts - tend to be unruly beasts giving off wave after wave of life-squelching radiation. An otherwise "Earth-like" planet would tend to be locked in its rotation, one side always facing its sun, subjected to wave after wave of radiation outburrsts, one side always facing away, frozen. Scenarios have been put forth in which a few such worlds might still develop life - but advanced life? Give me a break!

The planet hunters have deemed that planets up to three times Earth's in mass, could still be "Earth-Like" We are quite skeptical.

## Another Kind of Life Bearing Planet: "Europids"

Most readers wiill be familiar with scientists' keen interest in Europa and other moons (and possibly planets in other systems) that have an ice crust covering a substantial ocean below, kept liquid by the host planet's (Jupiter's) gravitational flux as the moon, in an elliptical orbit, gets a bit closer then a bit farther from its planet in each orbit. Could there be life in that ocean? If so, Europids, not other Earths, could be by far the most numerous class of life-bearing worlds in the universe. And we will find them around all types of stars, including "Brown Dwarfs" not quite massive enough to trigger fusion in its core.

That said, there would seem to be no "route to intelligence" in these oceans under their icy "firmaments."

## The Search to Date

The Kepler Space Telescope, looking at a very small, presumably typical, area of the sky, has yet to find "Earth's Twin." So if other Earth's, "M-Class" ones, are only one in ten thousand, there must still be 30 million ones in our Milky Way Galazy alone. And if we weed out those "too young" or "too old" we might still have thousands of other truly Earthlike planets in our galaxy at the stage of evolution that Earth enjoys.

Their distances from us? Anywhere from a "few" light years to 200,000 light years away.
If we are looking for another world hosting a civilization at our stage, and nearby, we are asking a lot. And maybe that Is all for the better. We will sooner or later, find worlds with clear signs of thriving life. That will be an achievement. But finding a world at our stage (we have been "broaccasting" for only a century or so) nearby, are astronomical. Here and there in the galaxy, we may find neighboring contemporary civilizations. The odds are low. But what then?

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Returning to the Star Trek Television series: Fans of the series will be familiar with the "Prime Directive" principle of not etablishing contact with civilizations at a lower stage. Why? Because our showing up on their world or in their media would interfere with their natural cultural evolution. No one can argue with that, and a civilization which did interfere with the natural development of one at a lower stage.

## The more distant another Civilization, the less possible any "Conversation."

All of these considerations suggest that "establishing 2 -way contact" with another civilization will be something that happens exceedingly rarely. Our chances of winning such a lottery, are not good.

But that should not interfere with our expectation that here and there and now and then there are other civilizations at our stage or higher throughout the Galaxy and throughout Time.

Multiply that by the number of other Galaxies in our universe.
The Milky Way may host millions of civilizations, throughout its reaches, throughout its lifetime.
This becomes a matter of "intelligent faith" - and we should be surprised if ever we "make contact" or pick up a message that has not been garbled by static and other interference as it passes through thousands of light years of time-distance.

And if a message is more than " Hi , we are doing well and are blessed, and we hope you are too. Bye now!" - then we should be worried.

## Messages? Maybe, Conversation? Forget about it.

The Speed of Light - science fiction aside - is an absolutel. "Tunnels" through space time? Bah Humbug! It would be an extremely lucky throw of the dice, if we found a contemporary civilization within say 50 light years, enablign a limited exchange of information over a 100 year (round trip) period.

## Physical Evidence? Implied Messages?

Recently, there has been some speculation that we may have found "signs" of an advanced civilization that has constructed a network of solar power systems surrounding its home star. We should soon know whether or not this "tell tale evidence" is for real or not. But if so, the only "message" we could get from it is "Hey, you can do this too! Good luck!"

Some other suggestions have been put forth about the detectability of physical energy-harvesting systems an advanced race has errected. The betting odds are that we will find some natural explanation for what we are seeing, or think we are seeing. But even if it is for real, the only "message" will be, "Hey, you can do this too, if you don't trash your home planet first!"

Both the enormity of space, even within our own Galaxy - a speck of dust in the universe at large - and the enormity of time, billions of years - suggest that if ever two civilizations make contact, it will be exceedingly rare, and very limited. "Hi There, we're trying to make civilization work here, and expect that you are doing the same." The Upshot - Yes there are other civilizations out there, probably milllions if not billions in our own galaxy throughout its reaches and throughout its lifespan, and likewise in billions of other galaxies in our universe - not to forget other universes, each in their own space and time.

All we can do is be humbled by all this, try our best to get our own Megapolicene civilization from crashing in on itself through economic greed and environmental indifference.

## Are We Alone? Not by a long shot?

Some people have a dogmatic or emotional need to believe we are alone and misweigh or misinterpret every shred of evidence accordingly. But "they," our counterparts, must be everywhere -- granted too far apart in both space and time to be contemporary neighbors, though all averages include exceptions.

But it is enough to know they are there, that however different we may be physiologically or culturally, we all share the same creative condition. We are born, we struggle to make sense of it all, we die. I look up there and say "Hi all of you!" knowing that in all corners of the universe others are looking up into their star-filled skies, realizing this very commonality as well, and saying "hi" in return.

Who needs words? Who needs messages? Who needs proof?
Meanwhile we all give glory to the wondrous creative forces that have brought us into being and nourished us to the point where we are aware of one another even if only in such a mystical way.

Everywhere, life must be hard, full of hardships and tribulations, joys and suffering, yet eminently worth the struggle. And are we not all, wherever and whoever we are, made of stardust? Stardust from brighter stars that have lived fast and hot and then strewn their fusion dust into the void to become the stuff of new stars, planets and plants and creatures?

## Travei Faster than the Speed of Light? - No way!

## By Peter Kokh

Let me start by saying that we "can" travel at the speed of light, in the sense that we are getting better and better at extracting unsuspected information from the light that comes our way from distant stars. That is quite clear from all we are learning, well beyond first analysis, more and more about the stars and star systems we have been looking at. It is like getting to know a person better and better.

This is quite clear from ever-continuing "information-digging" into the starlight coming our way from the stars being investigated via the Kepler Space Telescope. We can hope that the working lifetime of this space telescope can be extended indefinitely, or at least "as long as feasible" - well beyond the original expectations.
Worm Holes anybody? - Help yourself, not for me! And they are likely to be one-way only.
One-way "Arks?"
If these are populated with generartion after generation of humans, upon arrival at a suitable "farmable" world, the generation of "pioneers" arriving, will have no feel for living on a real much vaster, open-sky world and may be most reluctant to debark from their self-limited "worldcule" of generations.

## Seed and Gene Ark Ships

On the other hand, an ark of stored genetic material of persons of many talents, operated by machines and robots through a journey of indefinite length, might work. Upon approaching (20-30 years away) a suitable, colonizable worldl, one "uninhabited" by intelligent beings, human eggs could be fertilized - picking male-female gene pairs that will provide the kind of pioneers that will have a chance on the new world ahead - with these fertilized eggs incubated till birth, then raised and educated by nanny robots, so that on arrival, a freah adult generation with perfectly matched talents can debark and begin settlement and taming of a new world, populated by animals of various kinds, with farmable areas to plant with seeds from Earth to complement any edible native plants.

Thus our Terrestrial Civilization can give birth to offspring on worlds far far away, the distance and time being irrelevant. The culture and kinowledge of the home planet will be available as reference material. But even the "bad stuff" from Earth can be educational, lest this brave new world fall into any of the pits that we have.

## Could Earth have been so seeded?

All the evidence is that humans are indigenous, evolved from native stock at every point.

## Would such settlement derail natural evolution of "people" on such planets?

These Arks should be programmed to pass over worlds on their own way to someday evolve indigenous intelligent beings. One way to be sure that we are not derailing an evolutionary sequence that could evolve its own intelligent populations, is to target $F$ spectrum Suns that are not likely to survive long enough to give birth to native intelligent beings. F spectrum stars live a couple of billion years at best - it has taken Earth four and a half billion years to evolve intelligent beings - us. The shorter life span of F-spectrum stars thus makes any otherwise suitable and fertile planet suitable forcolonization without aborting any native evolution of sentient beings.

The upshot of this scenario is that we just may stumble on advanced civilizations on planets around Fspectrum stars, planets not old enough to have given birth to life of its own. If we do, we will know that at least one civilization has succeeded in replicating itself among the stars.

## Could Earth have been visited by people from other worlds?

If so, and if the visitors took pains not to be noticed and not to interfere with the natural cutural evolution of native humans. Anything more than that would go against "The Prime Directive" not to interfere with evolving cultures, a rule that should suggest itself to spaefaring peoples anywhere, anywhen.

The legends we have in various Earth cultures of visitors from the skies, if ever found to be true, would suggest that the visitors saw some need to interfere with a culture "on a wrong track." We can only speculatea about that. It does make great science fiction, and does sell books. No doubt about that.

## Nature never does anything just once.

There must be other peoples, who evolved and struggled as we do, elsewhere and elsewhen - throughout most galaxies and the universe at large. There has to come a point in all cultures that people realize this. Without having to know "where" or "when" or "how" we can look up at the stars and say "hi, you our there. We share your chalenges, your struggles, your setbacks, your achievements. We too live and strive and struggle, sometimes succeeding, sometimes failing. Isn't it wonderful. In this, as different as we may be physiologically, in our appearance, our histories, our cultures, we share the wonders of being alive, of having the chance to strive for better futures. We share this universe. Isn't it wonderful!

So why should we have a need to "discoveer" other races of beings, to find their leavings, even to meet them. We know that we all share the same "creatural conditions and challenges" and are driven by the same mysitcap forces within. To all of you peoples, we say, "Live long and prosper." PK

## THE MOON SOCIETY - LUNAR FRONTIER SETTLEMENT - WWWW.MOONSOCIETY.ORG

From Africa to the Moon, the Human Epic, told in footprints, Continues to the Stars!


## The Moon Society Journal Section (pages 9-12)

## Objectives of the Moon Society include, but are not limited to:

- Creation of a spacefaring civilization, which will establish communities on the Moon involving large-scale industrialization and private enterprise.
- 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 and utilizing the Moon.
- Informing the public on matters related to the Moon
- Provision of suitable recognition and honor to individuals and organizations that have contributed to the advancement of the exploration, research, development, and habitation of the Moon, as well as scientific and technological developments related thereto.
Our Vision says it all - "Who We Are and What We Do" - www.moonsociety.org/spreadtheword/whowhat.html 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: to inspire and involve people everywhere, from all walks of life, to create an expanded Earth-Moon economy that contributes solutions to the major problems that challenge our home world.
Moon Society Strategy: We seek to address these goals through education, outreach to young people and to people in general, competitions \& contests, workshops, ground level research and technology experiments, private entrepreneurial ventures, moonbase simulation exercises, tourist centers, and other means.
Interested in having input? Any member may ask to join the Leadership Committee and attend our Management Committee meetings held twice monthly. You may even express opinions. Decisions are often made by consensus, so this input has value. Write president@moonsociety.org


## From Moon Society President Ken Murphy

As we close out another year, it's time to pause and take stock of where The Moon Society will head in the next year. That mean's it's time for the annual town hall meeting with the membership.

Members are requested to gather in the MOO - see for details: http://www.asi.org/adb/09/08/04/moo.html) on Wednesday, December 23rd at 9pm EST, 8 Central, 7 Mountain, 6 Pacific to discuss our plans for the year ahead, and to take direction from our membership.

It is important that all members who can show up please do so. We face many challenges moving forward, at a time when interest in our Moon as a destination is increasing. The next several years, leading up to the 50th anniversary of the first Moon landing, will see more attention focused not only on the achievements of decades ago, but also how the Moon can support not just Earth but also future space-faring endeavors in the Solar System. We at The Moon Society recognize this importance. It's our responsibility to educate others about this better path forward that leads through our Moon.

You will soon receive a copy of The State of The Moon Society outlining our challenges and our initiatives. Please review this to get a better sense of where things stand, and to generate ideas for new future projects.

For past articles, Visit http://www.moonsociety.org/publications/mmm classics/ or /mmm_themes/

## The Moon Society - Lunar Frontier Settlement - www.moonsociety.org p. 2

If you need help with your online access, please e-mail one of the officers with a request for a reset and we'll be sure you can get online. You can reach me at president@moonsociety.org.

Ahead of the event, I will be on The Space Show on Tuesday night, the 22 nd from $7-8: 30 \mathrm{pm}$ PST ( $10-11: 30 \mathrm{pm}$ EST) to discuss things lunar. Monday night the 21 st is of course, the Winter Solstice, the real reason for the seasonal celebrations, as the waning daylight hours slowly begin to get longer. One way to help promote space exploration in the upcoming holiday season is to donate a space toy to a local toy drive. Not a franchise (i.e. Star Wars/Trek) toy, but a generic rockets/spacemen/satellites playset. Good space toys tend to be hard to find, but are always treasured.

Much commentary has been expressed about the passage and signing of the newest space commercialisation Act. While the legistation itself is marginal in its changes, more interesting may be the interest it has received. The perception that it 'legalizes' asteroid mining is seen as an important step towards getting businesses out looking for resources. That possibility isn't denied under existing treaty law, but having confidence that a government entity will support chattel claims (though not real property claims, obviously) is a big factor in attracting more than speculative capital for investment.

At the same time, there is an increasing realization that the Moon is abundant in many of the things that will be needed to expand the human presence into space, and that the science to be done there is directly relevant to life here on Earth.

This is an exciting time for our Moon. I look forward to seeing all of you at the Town Hall. KM

## Milwaukee Chapter Donates Homestead Model to St. Louis Chapter

By Peter Kokh


Original photo: http://freemars.org/mnfan/ISDC/2010-Chicago/2010-05-28-101.jpg
At the bottom of page 1 in this issue is a photo of a model of what a large family home in an early lunar settlement might look like. It shows the benefits of modular construction, Built on a 36 " $\mathrm{X} 80^{\prime \prime}$ hollow core door as a stable lighweight platform, with a second door as the lid, PVC componets are used to illustrtate the modular construction, including the homes entry onto a settlement street.

Styrofoam sheets $3 / 4$ " thick were sculpted to model moondust shielding, painted with a latex primer, then sprayed with multi-shade gray tone "fleck paint" to give it the moondust look.

There is a lighting system to light up the exposed interior of the home and a residential street.
Built by Peter Kokh for the 1998 International Space Development Conference in Milwaukee, it has been displayed at a number of air shows and science fiction conventions in the Wisconsin, Minnesota, and Illinois area, most recently at ISDC 2010 in Chicago.

On Sunday, November 8, 2015, it was turned over to Dave Dietzler of the St. Louis NSS/Moon Society chapter. This chapter is currently very vigorous and St. Louis will be hosting ISDC 2017 at the famous Union Station in St. Louis. We hope that this transfer, will give the display much more exposure than it has had in recent years, tucked away in Peter's basement.

Meanwhile, the Milwaukee Chapter still has a much more portable, lightweight, smaller version on an 18 " $\times 23$ " frame that can be carried by hand on a city bus. \#\#

## Flyers that accompany the exhibit

http://www.moonsociety.org/reports/mars_conv2004/Moon_Mars_homestead_plan.pdf
http://www.moonsociety.org/reports/mars_conv2004/Moon_Mars_homestead_flyer.pdf
Trivia - At a small science fiction convention in Janesville, Wisconsin, (year?) where the exhibit was placed in the hotel lobby, the desk notified me that the con "guest of honor" wanted to talk to me about the exhibit. Richard Hatch, "Captain Apollo" in the TV Series Battlestar Galactica, spent a full half hour with me discussing the exhibit layout and incorporated features. He was very fascinated by it. \#\#

For past articles, Visit http://www.moonsociety.org/publications/mmm classics/ or /mmm_themes/

## The Moon Society - Lunar Frontier Settlement - www.moonsociety.org p. 3

## Suggestions to Rejuvenate the Moon Society, blockbuster style!

By Peter Kokh

We recently sent a letter to the members of the Moon Society Leaders Committee with some suggestions that might help us attract members from the younger generations. It is a troubling fact that all traditional organizations, not just those involved with space, but in every topic area, are experiencing an "aging of the membership." Every year the "mean age" (half above, half below) is creeping upwards. Older members are lost through death and younger persons are not joining.

Two years ago, I searched our membership data base and found that, at that time, the medium age for Moon Society members was 56.5 - that is half our members are younger than that, half older. And it is likely that the bulk of the younger ones are in their 30 s and 40 s . We are not reaching young people and that seems to be true these days, not only of all spae organizations, fut of organizations in all fields.

We suspect tat we are not reaching younger generations for several reasons, not all addressable. They are much more likely to be absorbed in social media like Facebook, and smart phones. As a population, they seem to suffere ADD - Attention Deficit Disorder. Most younger persons are totally interested in "the here and now", and not too much in "the future."

## Some Suggestions

The Moon Society's publications (Moon Miners' Manifesto) are in print and pdf file formats - not where young folk spend there time. We also co-publish To The Stars International Quarterly along with the National Space Society. While this publication;s goal is to reach young people and students around the world, we have no reason to believe it is doing so.

## E-Publishing for reading on Smart Phones and Tablets

- I have suggested to the TMS Leaders committe that we republish the $\mathbf{1 7} \mathbf{~ M M M}$ Theme Issues in e-pub format at no cost or membership requirement - so that they can be read (or perused, flipped through) on smart phones and tablets. This is not hard to do, but requires me to re-edit them in a flowing, "non-paginated (no pages) format." It is far more important for us to get young folk interested in our off-planet future than to make money in the process.
- We might try doing the same with To The Stars International Quarterly which has been recently re-formated with short blurbs on all the latest news in the space area: near space and orbit; space tourism; the Moon, Mars, other planets; the stars. Our partner in this publication, the National Space Society, may be interested in this idea.


## APPS for Smart Phones

- There are already quite a few Smart Phone APPs aimed at Amateur Astronomers.
- What would be the content areas for APPs about Space Exploration? If you have some ideas, and importantly, any experience in maing APPS in any topic area, we could use your help.


## Conventions and Conferences?

- In general, these kind of events do not attract young people, at least not from North America
- We need to reach them in events they are likely to attend such as state fairs and ethnic fairs
- That said, the National Space Society's annual International Space Development Conference does sponsor annual Space Settlement Design Competitions which draw a lot of foreign students. But the very subject of these design competitions lies far in the future, and does little to get them interested in the Moon, Mars, Europa, etc.
- Our suggestion is Art and Design Competitions for Settler Homes on the Moon and Mars - much nearer term and more practical, and much more usefull in attracting the attention of other young people - the winning design to be built and featured at next ISDC for walk thru (and afterwards featured at local or state fairs, even for Dinseyworld? Etc.)


## All of these suggestions will take some work

- We are willing to reformat and republish in e-pub format the 17 Theme Issues (updating them to include articles from later isssues)
- We need volunteers, or volunteer teams to start brainstorming how to realize any of these other ideas
- We also want your constructive input on all of the above.


## We must do this or die

- Our median age is creeping up. Soon it will be 60 - we (and most other traditional type organizations) are on a path to extinction unless we thoroughly re-invent ourselves in a form that reaches and keeps the interest of the genertions to follow ours.
- Suggestions: kokhmmm@aol.com We will share them with the Moon Socierty Leaders and NSS \#\#


# ORGANIZING "OUTPOSTS" 

Bay Area Moon Society, CA Outpost - South San Francisco Bay - http://www.moonsociety.org/chapters/bams/ Contact: Henry Cates hcate2@pacbell.net Meeting the $1^{\text {st }}$ Tuesday of the Month at Henry's home

Moon Society Nashville Outpost - Contact: Chuck Schlemm - cschlemm@comcast.net

## ORGANIZED CHAPTERS

Milwaukee Lunar Reclamation Soc. NSS/Moon Society - www.moonsociety.org/chapters/milwaukee/ http://www.meetup.com/Milwaukee-Space-Exploration-Meetup/ - http://www.space-Mlwaukee.com Contact: Peter Kokh - kokhmmm@aol.com - MEETINGs, 2nd Sat 1-4 pm monthly except July, August, At Mayfair Mall lower level Community room G150 for all meetings except December, in G110: Upcoming Meetings: DEC 12, JAN 9, FEB 13, MAR 12, APR 9, MAY14, JUN 11, SEP 10, OCT 8, NOV 12 November 14 ${ }^{\text {th }}$ Meeting Report: We planned our December 12th Anniversary Banquet (\#29). The DEC 12th ${ }^{\text {th }}$ fEATURE FILM will be "Guardians of the Galaxy" http://www.imdb.com/title/tt2015381/ https://en.wikipedia.org/wiki/Guardians_of_the_Galaxy_film) https://www.youtube.com/watch?v=B16Bo47KS2g

St. Louis Chapter NSS/Moon Society - http://www.moonsociety.org/chapters/stlouis/ http://www.meetup.com/Saint-Louis-Space-Frontier-Meetup/
Contact: Robert Perry surfer_bob@charter.net - Meetings 4th Saturday of the month in room 162 of McDonnell Hall of Washington Univ. 2016 JAN 23, FEB 27, MAR 26, APR 23, MAY 28, JUN 25, JUL 23, AUG 27, SEP 24
Flash: On Sunday, November 8, 2015, The Milwaukee Lunar Reclamation Society's 80 lb . "Moon Manor" display ( 36 " $\times 80$ " $\times 12$ ") was turned over to Dave Dietzler who brought it safely to St. Louis where it will have more display opportunities, notably at the St. Louis-hosted 2017 International Space Development Conference, See Page 10 above.

Phoenix Chapter NSS/Moon Society - http://nssphoenix.wordpress.com/ - c/o Mike Mackowski, http://www.meetup.com/NSSPhoenix/events/161939572/
Meeting 3rd Saturdays monthly at Humanist Community Center, Mesa, 627 W. Rio Salado Parkway. The Nov. 21, 2015 meeting of the Phoenix Chapters of the National Space Society and the Moon Society featured AI Anzaldua, very active in the Tucson chapter and currently NSS regional director for the southwest region includiing Arizona. Al talked about the challenge of orbital debris and how it threatens today's valuable space resources, but also how it could affect mega-structures like solar power satellites and space settlements. 17 attended.
December 19th meeting / Christmas/Holidays party (or whatever politically correct winter holiday you wish to celebrate) at the home of Mike and Maura Mackowski in Gilbert. Stay tuned for more details as the date gets closer.

Tucson L5 Space Society NSS/Moon Society www.tucsonspacesociety.org/ (not updated) www.meetup.com/NSSPhoenix/events/161939572/ (not updated) Contact: AI Anzaldua - Meets monthly, every 2nd Saturday, 6:30 PM - 2016 JAN 9, FEB 13, MAR 12, APR 9, MAY14, JUN 11, SEP 10

Clear Lake Chapter (Houston) NSS/Moon Society -http://www.moonsociety.org/chapters/houston/ Contact: Eric Bowen eric@streamlinerschedules.com - Meeting 7 pm $3^{\text {rd }}$ Mondays of even \# months in the conference room of the Bay Area Community Center at Clear Lake Park: (2016) FEB 18, APR 18, JUN 20

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## students



# In MMM，from the very start，we have insisted on capitalizing＂Moon＂ WHEN it refers to Earth＇s satellite．Read why： <br> http：／／www．moonsociety．org／info／capiltal－M－for－Moon．htmlcapiltal－M－for－Moon．html 

## Capital＂M＂for Moon

Originally printed in Moon Miners＇Manifesto \＃31，December 1989
By Peter Kokh
A recent letter in Ad Astra［October 1989］took exception to this writer＇s insistence that＂Moon＂be capitalized， resting his argument on several all too common misconceptions．Perhaps it would be helpful to discuss the salient facts．
Like the Moon，Julius Caesar is an original．
First，from time immemorial up until 1610，when Galileo first trained a telescope upon Jupiter and discovered it had four＂moons＂only one＂moon＂was known to mankind．Similarly，until even more recent times when it became apparent that the Sun and the stars were members of the same class of celestial objects，we knew of only one ＂Sun＂．Until these recent discoveries，Moon and Sun had perhaps never been used in the plural．In one language version or another，since the dawn of language，these were their names．When we suddenly needed＂class＂names we borrowed these names from the sole objects we had ever known of each class．Ganymede，Titan，Phobos and company are thus＂moons＂only and simply by analogy or by extension．The Moon remains the original，the satellite of Earth．

Certainly，in such a phrase as＂the innermost moon of Mars＂，＂moon＂is a common noun．But it is transparent nonsense to say that even when referring to the original and privileged bearer of that appellation，＂Moon＂is a common noun．It would be just as silly to insist that since there have been dozens of＂caesars＂（and＂kaisers＂and ＂czars＂，all the same word）besides Julius，we should decapitalize Julius＇surname．

That＇s nonesense！Like the Moon（capitalized，Julius Caesar（capitalized）is an original．There are many more instances of a Proper Name being used as a common noun，but we don＇t decapitalize the original．

It is a pity that English Language gurus can＇t tell the difference．The＂experts＇are the fakes！PK
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- James Schroeter (414) 333-3679 - james_schroeter@yahoo.com TREASURER/Database • Robert Bialecki (414) 372-9613 - bobriverwest@yahoo.com (•Current Members of the MLRS Board of Directors)

Meetings: Mayfair Mall lower level room G150 for all meetings except December, in G110: 2016 Schedule JAN 9 - FEB 13 - MAR 12 - APR 9 - MAY14-JUN 11 - SEP 10 - OCT 8 - NOV 12


## SSS - Sheboygan Space Society

728 Center St. Kiel, WI 54042-1034
www.sheboyganspacesociety.org c/o Will Foerster 920-894-1344 (h) astrowill@frontier.com SSS Sec./Tres. c/o B.Pat Knier dcnpatknier@gmail.org
DUES: "SSS" c/o B. P. Knier, 22608 County Line Rd, Elkhart Lake WI 53020

> 3rd Thur even \# months: Call for location (920) 894-1344
"

## CALIFORNIA

## OnsIS

OASIS: Organization for the Advancement of Space Industrialization \& Settlement Greater Los Angeles Chapter of the National Space Society

PO Box 1231, Redondo Beach, CA 902
Events Hotline/Answering Machine: 310-364-2290 - Odyssey Ed: Kat Tanaka odyssey editor@yahoo.com oasis@oasis-nss.org - Odyssey Newsletter www.oasis-nss.org/articles.html
Meeting 3 pm 3rd SAT monthly: 2016 Jan 16, Feb 20, Mar 19, Apr 16, May 20, Jun 18, Sep 17, Oct 15, Nov 19

## COLORADO

Denvers SpaceSociety
DSS: Denver Space Society fka Front Range L5
1 Cherry Hills Farm Drive, Englewood, CO 80133 http://www.denverspacesociety.blogspot.com/
James W. Barnard 303-781-0800 trailrdr@ecentral.com - Monthly Meetings every 3rd Thursdays, 7 pm Englewood Public Library, Englewood, CO 80110-1000 Englewood Parkway, 1st Flr Civic Center 2016 Schedule: Jan 21, Feb 18, Mar 17, Apr 21, May 19, Jun 16, Jul 21, Aug 18, Sep 15, Oct 20, Nov 17, Dec 15

## ILLINOIS



LDAhean@aol.com
CSFL5: Chicago Space Frontier L5 - 610 West 47th Place, Chicago, IL 60609


MSFS: Minnesota Space Frontier Society - http://www.mnsfs.org c/o Dave Buth, 433 South 7th St. \#1808, Minneapolis, MN 55415 c/o Dave Buth, 433 South 7th St. \#1808, Minneapolis, MN 55415
MNSFS monthly meetings are held on the first Thursday of each month at the Fairview Community Center (Great Room), 1910 County Road B West, in Roseville, MN 55113 Meetings usually start at 7:00 p.m, 2016 Schedule Jan 7 - Feb 4 - Mar 3 - Apr 7 - May 5 - Jun 2 - Jul 7 - Aug 4 - Sep 1 - Oct 7 - Nov 4 - Dec 1

REGON


Oregon L5 Society - http://www.OregonL5.org PO Box 86, Oregon City, OR 97045

## PENNSYLVANIA

# NSS-PASA: NSS Philadelphia Area Space Alliance 

928 Clinton Street, Philadephia, PA, 19107 http://pasa01.tripod.com/ - http://phillypasa.blogspot.com c/o Earl Bennett, Earlisat@verizon.net - 856/261-8032 (h), 215/698-26

Meetings $3^{\text {rd }}$ Thursday monthly; Jan 15, Feb 19, Mar 18, Apr 21, May 19, Jun 16, Jul 24
Meeting times and locations: our annual election meeting will be held on December 19 (snow date, the $23^{\text {rd }}$ ) with no 2016 dates selected yet. We had a rather casual November meeting and just enjoyed each others' company. Earls' technical report and Philcon notes: since we had no formal meeting this month this will be a mostly Earl centric. Some material on our NSS connection will be saved till the end.

From Make Magazine for October/November: most of the magazine! This was a special "Space Issue". I would recommend finding this issue, or, subscribing to the publication (makezine.com) for access to issues and much material on amking fun and useful things. This issue included sections on the movie "The Martian" with Andy Weir being interviewed by Adam Savage of Myth Busters fame (and the West Coast Maker Faire star). A good read. Some material describes NASA contests and the ability of d.i.y. creators to build space craft elements and try designs they have come up with. One designer has even built a space suit! We have a lot of talented people in the world and this publication brings a number of things that cross fertilize between artists and crafts people and the tech oriented creators. They are melding their talents to create art and socially useful "things" (software is a thing in this context). The December/January issue includes fabrication tool reviews (3D printers in several families, C.N.C. machines etc). Small satellites are not a problem anymore. Launching them is at present.

NASA has several publications including one on medical developments and the original Tech Briefs: from Medical Briefs: NASA has the Create The Future Contest" with various categories of invention. The grand prize winner had a rather long title " Development of a Non Surgical Circulatory Support Device for the Treatment of Chronic Heart Failure". Why would this be interest to us and interplanetary travelers? If we are going to be subject to zero gee for long periods of time and then are subject to relatively high accelerations we may have developed coronary problems that will need this type of assistance. This grand prize winner was for the overall contest both in the medical and other categories. From NASA Tech Briefs: Conformal Nanotube Baffle for a Compact Coronagraph: this component of a space telescope, designed for planet hunting around other stars. Separating the the image of an extra solar planet from the parent star requires very high quality in the blocking device used to occult that body. Nanotubes may improve the ability to see the planets by cutting down on light scattered around the obscurer from 10 to 100 times over a "conventional" device. Marvelous devices! And in "Whose Who at NASA": Al Bowers, Chief Scientist at the Armstrong Flight Research Center, Edwards, California interviewed about a new wing design. Dr. Bowers is working on gathering data on designs that can work on Mars if the future. There is an interesting description of the deployment of a foldable flyer that could be used in the place of ballast which is ejected as part of descent, or, as described, packing such a device into a CubeSat size package that can be inserted into the atmosphere from space somehow. The initial descent could be fairly conventional, but, somewhere high above the surface the package would be deployed and opened with ten or twenty thousand feet of separation above the surface ( 12 to 15000 in the article). A glider design could travel a long distance, gathering data and sending it to other systems for relaying it back to us ultimately, and could be part of a swarm released from the descending main vehicle. Both publications are November issues.

From the Amsat Journal: Amatuer Radio, Amsat and Stem Events: A Great Partnership. This report, by Tom Schuessler, N5HYP, is about how the ham and Stem groups can interact to produce great educational activities and opportunities for young people who are eager to learn the sciences and the technology that is the physical embodiment of the understanding we have of the operations of the universe. What we make is embodied knowledge. The particular article is about a Moon Day celebration in Dallas. And who should be mentioned as founder of this? Ken Murphy, who readers of the Moon Miners will know. Bruce Bleackley of the Frontiers of Flight Museum, "Moon Day is now the now the largest annual celebration of space exploration in the state of Texas". It is bigger than even Houston events. 1600 attendees this year! Hams have been asked to be part of this for several years. It's a natural collaboration: hams are constantly trying to communicated under extreme conditions and over long distances and improving the technical capabilities of themselves and posterity. Kids are posterity! There is also an ElNA article in this September/October issue.

For past articles, Visit http://www.moonsociety.org/publications/mmm classics/ or /mmm_themes/

Speaking of Moon Miners: see the October issue for a number of good articles including the Moon Society part and the retirement of Peter Kokh next year. The Moon Society has offered a number of suggestions pointing to projects that Moon Society local chapters and affiliates (hint) could use to promote involvement of members and the tech oriented public in joining. See page 9 of the October issue. In the same issue is the countdown for Peter Kokhs' retirement and a discussion of how this might be handled, including possible merger with NSS. There is also a special report on The Kepler Spaceport and The Kepler Space Probe (unrelated operations). The Telescope has found a number of planets and has possibly missed some per the article. The problem is orbital inclination. Having just been reading a 1970s Science Fact piece in Analog ( on how we should start preparing now! For the Halley's Comet flyby in 1985 in 1975) on the high inclination of Halley's comet, I can appreciate the limitation described in the Moon Miners. Page 7. And much more. And there is Medical Design Technology for October with "The Smart Fabric of Our Lives" (editorial) where medical and space applications can compliment each other, and Microwaves and RF with "Hurricane-Tracking Microsatellites" harness G.P.S. Signals. This is based on the analysis of the effect of atmospheric fluctuations on the signals from the satellites. Good science.

And then there was Philcon! A week before Thanksgiving there is a moderate sized Sci-Fi convention sponsored by the P.S.F.S.. There are several thousand attendees at the three day event with fantasy, horror and other genre presented as well as science and technology tracks. These range from kids stuff (legos are modern nerd kids toys thanks to Lego's creators expanding the "toys" capabilities)to a 3D printer demo. Several of our people appeared on panels as experts and educated laymen (me). Our members helping us, or, the Con, included Dotty and Larry, Hank Smith, Mitch Gordon, Frank O'Brien, and Earl. Other membersattended including Mike Fisher and Dennis Pearson. Parenthetically: Mike reminded us of the upcoming Carver Science Fair activities, and Dennis detailed the possible change in NSS rules that may affect our chapter.

Several panels Earl and Frank were part of included talks on Mars and "The Martian" and the commercial and private space exploration activities of a number of groups. Several space exploration activities where discussed including the grand scheme (and maybe "scheme") for going to Mars: Mars One was debated at the Mars Society conference and was also criticized on the private space program panel. The problem, as described by Frank in an expanded discussion after the nmain talk, is a lack of a number of critical elements required for a real effort: viable plans, a detailed roadmap with delineated achievement date goals and the personnel required to do them. And that means the need for large amounts of money ( several billion dollars and companies willing to put the project together with a shrinking, very short now, time windo presented or empaneled although you may not personallyw) from somewhere. One other group had tried to do a pioneering project to Mars in the last few years. Gone. We also did discussed "The Martian" and the possibility of someone really "Sciencing the Crap" out of the problems of keeping alive under terrible circumstances. There was also a talk on using 3D printers for prosthetics for those in need around the world and how the audience members could help, and one entitled "Kidneys' Don't Grow on Trees..Yet". Both topics are about things that explorers might have need for eventually during their trips to, and exploration of, Mars and the Moon primarily (I am of the opinion that asteroid and comet exploration and mining will primarily be robotic and tele-operations enabled). Many interesting talks and some nice space related art as well. There was also more philosophical panels including "What We Don't Know" which was on things that future research may, or may not, resolve or point the way to using. Could we build artificial beings (intelligent beings we made), or transfer our personalities into such structures and into virtual settings. I may have melded material from another panel into this one. It was very wide ranging in, composition thus giving the "unknowns" a wide distribution in physics, biology, and, S.E.T.I. And also: Mitch was part of the "Why Aliens Won’t Look Like Us" panel which also included why they won't think like us either. A very diverse panel.
If you go to such an event, or plan to go, consider suggesting panels or stand alone presentations. I am considering going to LunaCon or other $\mathrm{Sci}-\mathrm{Fi}$ venue and presenting on the small satellite revolution. If you plan ahead you might get what you want, but, may not personally be asked to do the activity.

Comment: Just how far have we come from the optimistic ideas of our young adult hood? I have picked up several Analog Science fact, Fiction magazines from the early and mid 1970s with a few things we thought could be done by now: the visit (not fly by) of Halley's Comet was one (1975 start with 1985 event date) and the construction of star probes and star ships about 15 years ago. The article, by Harry Stine, a great space advocate of the 60s to his death in the 90 s , reported on a conference on this topic from the late 60 s and early 70 s that used known technologies of that time. Nuclear pulse rockets for the engines, multi generational crews, and the building of a space infrastructure to create the fleet(s). We were supposed to be sending out manned ships to Alpha Centauri by now. We also were supposed to have moon mining and an in place infrastructure to utilize the mined material to achieve these plans. In comparison: we see the abdication of most future planning by inward turning peoples to those who think they could make profits from some limited areas of space development with mid term profits foremost. Now that is better than some periods, where only government put up the quantities of money necessary, but not in the same ballpark (region?) as these post Apollo plans. Harry does talk about profits from this job and the decrease in costs over time as more and more ships and probes where launched. Remember: the cash stays here, a point apparently ignored by a number of nay sayers and anti elite factions. If you see "Elysium" you will see what they suspect will happen. We hope to do better. Submitted by Earl Bennett, President, NSSPASA, KD2CYA.

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