SearchLites

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The Quarterly Newsletter of The SETI League, Inc.

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SearchLites, ISSN 1096-5599, is the Quarterly Newsletter of **The SETI League, Inc**., a membership-supported, non-profit [501(c)(3)], educational and scientific corporation, dedicated to the electromagnetic Search for Extra-Terrestrial Intelligence. SETI League, Dr. SETI, and the above logo are all registered service marks of The SETI League, Inc.

Announcement of the Twelfth SETI League Annual Membership Meeting

Sunday, 23 April 2006, Little Ferry NJ

In accordance with Article IV, Section 1 of our duly approved Bylaws, the Trustees of The SETI League, Inc. hereby schedule our Twelfth Annual Membership Meeting for 1 PM Eastern time on Sunday, April 23, 2006, at SETI League Headquarters, 433 Liberty Street, Little Ferry NJ 07643. (Please note the revised date; this meeting is one week earlier than originally scheduled.) Our office is located just two blocks north of Route 46 and one mile east of the Teterboro Airport, on the northwest corner of Liberty and Kinzley Streets.

We recommend that out-of-town members and guests flying in commercially use the Newark International Airport (EWR), which is about twenty minutes South of our office. There is a wide variety of hotels available at the Newark Airport. A rental car is recommended. From Newark, drive North on the New Jersey Turnpike to US Route 46 Westbound, cross over the Hackensack River, and two long blocks after the traffic circle, turn right onto Liberty Street.

Our members and guests using General Aviation are invited to use the Teterboro Airport (there *is* a landing fee). Of the half-dozen Fixed Base Operators offering transient parking, we recommend Atlantic Aviation (ask Ground Control for parking in the Atlantic Midfield). They should be able to assist you with ground transportation. Please coordinate your schedules and needs in advance through our secretary, Heather Wood.

As attendance by one percent of the League's membership constitutes a quorum, all members in good standing are encouraged to attend. The preliminary agenda for this meeting, per Bylaws Article XII, appears below.

Per Article IV, Section 3 our Bylaws, written or electronic notice of this Meeting is being provided to all members in good standing, not less than ten days nor more than ninety days prior to the meeting date. Members are encouraged to submit additional Old Business and New Business items for inclusion in the Agenda. Please email your agenda items to n6tx@setileague.org, not later than April 1, 2006.

The annual Board of Trustees Meeting required per Bylaws Article V, Section 3 will immediately follow the Membership Meeting. All SETI League members in good standing are welcome to attend.

Preliminary Agenda

- Call to Order
- Minutes of 2005 Membership Meeting
- Financial Report
- Committee Reports
- Old Business
- New Business
- Good and Welfare
- Adjournment

Event Horizon

SearchLites' readers are apprised of the following conferences and meetings at which SETI-related information will be presented. League members are invited to check our World Wide Web site (www.setileague.org) under *Event Horizon*, or email to us at info@setileague.org, to obtain further details. Members are also encouraged to send in information about upcoming events of which we may be unaware.

March 17 – 19: *Contact 2006*, NASA Ames Research Center, Mountain View CA.
March 20 - 21, 2006: Brazilian Workshop on Astrobiology, Rio de Janeiro, Brazil.
March 25, 2006: *SA AMSAT Satellite Conference*, University of KwaZulu Natal, Durban, South Africa.
March 25, 2006, 8:30 PM: Mars and Saturn in 3D, Paul Robinson Observatory, High Bridge NJ.
April 2, 2006, 1:30 PM: A Tour of our Solar System, Titusville NJ.
April 21 - 23, 2006: Eastern VHF/UHF Conference, Enfield CT.
April 22, 2006, 0000 UTC - 2359 UTC: Eighth annual SETI League *Ham Radio QSO Party*, 14.204, 21.306, and 28.408 MHz.
April 23, 2006: Twelfth SETI League *Annual Membership Meeting*, SETI League Headquarters, Little Ferry NJ.
April 28 - 29, 2006: 10th Annual Southeastern VHF Society Conference, Greenville SC.
May 6, 2006: 7°Simposio mondiale sulla esplorazione dello spazio e la vita nel cosmo sul tema: SETI e alieni, Republic of San Marino.
May 19 - 21, 2006: *Hamvention 2006*, Dayton OH.
May 26 – 29: *Baticon 40*, Hunt Valley MD.
June 18 - 21, 2006: *SETICon06 Technical Symposium*, in conjunction with *Society of Amateur Radio Astronomers* Conference, NRAO Green Bank WV.
June 21 - 24, 2006: *Green Bank Star Quest III*, NRAO Green Bank WV.
July 27 - 30, 2006: *Central States VHF Conference*, Minneapolis MN.
August 23 - 27, 2006: *L.A.Con IV* World Science Fiction Convention, Los Angeles, CA.
August 25 - 27, 2006: International Astronomical Union XXVIth General Assembly, Prague, Czech Republic.
August 25 - 27, 2006: *EME Conference 2006*, Wuerzburg Germany.
September 8 - 10, 2006: *EuroSETI06*, in conjunction with the *Fourth International Congress for Radio Astronomy*, Heideburg Germany.
October 2 - 6, 2006: *57th International Astronautical Congress*, Valencia Spain.
October 6 - 8, 2006: *AMSAT Space Symposium*, San Francisco CA.
November 17 - 19, 2006: *Philcon 2006*, Philadelphia PA.
April 21, 2007, 0000 UTC - 2359 UTC: Eighth annual SETI League *Ham Radio QSO Party*, 14.204, 21.306, and 28.408 MHz.
May 18 - 20, 2007: *Hamvention 2007*, Dayton OH.
June 2007 (dates TBA): *Society of Amateur Radio Astronomers* Conference, NRAO Green Bank WV.
July 26 - 29, 2007: *Central States VHF Conference*, San Antonio TX.
August 30 - September 3, 2007: *65th World Science Fiction Convention*, Yokohama Japan.
September 24 - 28, 2007: *58th International Astronautical Congress*, New Delhi, India.
September 30 - October 4, 2008: *59th International Astronautical Congress*, Glasgow, Scotland. ❖

Amateur Radio Astronomers Name Keynote Speaker

The Society of Amateur Radio Astronomers (SARA), a sister organization to the nonprofit, membership supported SETI League, is pleased to announce the selection of a Keynote Speaker for its 2006 Annual Meeting, to be held June 18-21, 2006, at the National Radio Astronomy Observatory (NRAO), Green Bank WV. Leading off the technical program will be Dr. Steven W. Ellingson, KI4JJN, Assistant Professor of Electrical and Computer Engineering at Virginia Polytechnic Institute, onetime SARA member, and a highly respected amateur and professional radio astronomer.

A former US Army officer, Steve Ellingson received his MS and PhD degrees in Electrical Engineering at the Ohio State University, where he was strongly influenced by the legendary radio astronomer Dr. John Kraus, W8JK, as well as Dr. Robert Dixon, W8ERD, whom he credits with "breaking him in" on radio astronomy in the late 1980s. As a Research Scientist at the OSU ElectroScience Laboratory, Steve contributed to work at the Big Ear radio observatory, and to the design of the Argus all-sky radio telescope array. He has served on several important frequency allocation and interference mitigation committees, and is currently adapting software defined radios to meet public safety requirements.

Dr. Ellingson's keynote presentation, tentatively scheduled for 10 AM on Monday, 19 June 2006, is titled "The Strange Renaissance in Low-Frequency Radio Astronomy." He will discuss his recent excitements in LF science, his current project "ETA" (an Eight-meter-wavelength Transient Array), and what helpful things amateurs might do in this area. You can read more about this work on his professional website, at http://www.ece.vt.edu/swe/eta.

At its 2006 gathering, Steve will be helping SARA to celebrate the club's 25th Anniversary. SETI League members and guests have been invited to participate in this landmark meeting. ❖

Sri Lanka Update: January 2006

by Sir Arthur C. Clarke, SETI League Technical Advisor

Friends, Earthlings, ETs-- lend me your sensory organs!

As 2005 drew to an end, I couldn't help contrasting it with the last few days of 2004 when all Hell broke loose with the devastating Asian Tsunami. Much of 2005 was spent on recovering from this massive blow from the sea, and as we noted on the first anniversary, the recovery will take more time, effort and resources.

Although the tsunami struck coastal areas even a few kilometres away from Colombo, I didn't visit any of the affected areas for several weeks I just couldn't bear to look at what had happened to my favourite coastal towns like Unawatuna and Hikkaduwa on Sri Lanka's southern coast. It was in early March that I finally ventured out on a quick trip. By then, a semblance of normalcy was beginning to return, but there were many tell-tale signs of the trail of destruction left behind by the power-packed waves.

The tsunami united the Global Family twice -- first in grief, and then in solidarity. The unprecedented outpouring of donations from all over the world was largely inspired by the live television coverage of the disaster's aftermath. I would personally have preferred a more benign reminder on how communications satellites bring us all together.

Indeed, the 60th anniversary of my inventing the communications satellite (in Wireless World, October 1945) was a key theme for myself during the year. To mark this, the Arthur C Clarke Foundation (www.clarkefoundation.org) organised a series of events on both sides of the Atlantic including a gathering at the Cosmos Club in Washington DC (which coincided with the Arthur Clarke Award), and another at the IEE in London. These events drew many of comsat industry's leaders from public, private and academic sectors, some good friends among them.

Although it would have been highly appropriate to join these events live via satellite, I chose to send video greetings instead. That was easier for me to accommodate as I am now very limited in time and energy owing to my Post Polio. But this didn't stop me from making encouraging noises from the sidelines for exciting new ventures that the Clarke Foundation embarked on during the year.

The most ambitious among them is the Arthur C. Clarke Center "to investigate the reach and impact of human imagination and put opportunity in its path". To be built in Las Vegas in partnership with the University of Nevada, Las Vegas, the Center will focus especially on young people whose imaginations prove more robust than their peers, and to try to understand just why that happens. (Can't imagine why the Foundation and the University had me in mind.) The project, which had been under discussion for sometime, went public in the Summer, with a student competition for its design and supportive coverage in the media. All that now remains is for US$ 60 million to be raised for actually putting it up -- which is the challenge that the Foundation's dynamic Board of Directors has taken up. I have every confidence that they will meet this goal. (After all, that's practically petty cash for the comsats business -- the industry that I helped found with my 6-page paper for which I was paid the princely sum of £15 at the time. I can't remember what I squandered it on…)

I also had good fun doing some major media interviews looking back at the last six decades and how comsats have become central nodes in the nervous system of humankind. In October, BBC Radio 4 ran a half-hour special while BBC Focus magazine did a 10-page supplement. They also reissued my 1945 paper in a new, attractive colour format.

While I have had to seriously curtail my activities in recent years, I still get involved in a few interesting projects and worthy causes. I enjoyed visits by some of my project collaborators including actor/director Morgan Freeman, who is adapting Rendezvous with Rama, and producer Susan Philips who plans to film Fountains of Paradise, a good part of which will take place in Sri Lanka, hopefully in 2006.

I didn't write any new fiction in the past year, and my last novel The Last Theorem still remains half-written. Although I have mapped out the whole story, I just don't seem to have the energy to finish it: my agents are still looking for a co-author who can complete it. Meanwhile, Stephen Baxter continues to develop our collaborative Time Odyssey series, and its second novel Sunstorm came out in 2005. During the year, I did produce some two dozen pieces of non-fiction of my own for a range of print and online publications.

On the awards front, my adopted homeland honoured me twice during the year. First, the State Literary Council presented me its Sahithyaratna Award (literally, 'Gem of Literature') for lifetime achievements in English literature. Then, President Chandrika Kumaratunga gave me the Lankabhimanya ('Pride of Lanka') -- the highest civilian honour from the government of Sri Lanka. In December, I received an honorary doctorate from the International Space University, which was presented at a special ceremony at its central campus in Strasbourg, France. While I accepted the first two in person in Colombo, a co-founder of the ISU (Bob Richards) accepted the last one.

I also lent my name to a new awards scheme in the UK that recognises excellence in space industry and space education. I hope 'Arthur Clarke Space Awards' or Arthurs -- will become a regular feature in the coming years. I had great pleasure announcing a special award to the British Interplanetary Society during the first ceremony held in April.

Cataract surgery in September considerably improved sight in my right eye, which allows me to read again. I plan to have a lens implanted in my other eye too in the coming months. Meanwhile, I once again ended the year amidst a flood of birthday and Seasonal good wishes from all over the world, when I had my 88th birthday surrounded by family and staff.

Finally, I hope my long-standing wish for lasting peace in Sri Lanka would become a reality in 2006. ❖

Don't Get Hung Up On Frequency Assignments

by Charles Osborne, President, SARA

I often hear comments about observing in the so called "protected frequency assignments"; 408 MHz, 610 MHz, and 1420 MHz being the most commonly referenced. It's worthy of mention just what "protected" means.

"Protected" means that by international convention of governing organizations like the World Administrative Radio Conference (WARC) or the International Telecommunications Union (ITU) these frequencies receive special treatment to attempt and keep them clear of harmful interference. Generally this just means that no transmitters are allowed in the particular band. What isn't widely understood is that interference protection ends well above the levels which might prove useful to us as amateur radio astronomers. And in most instances these governing bodies work like the United Nations, exerting only limited influence and recommendations to the FCC.

The power of money is often a much more influential power than the deterrent of government consortiums. As a result we have several satellite systems which blind radio telescopes as they pass over, particularly in the 1665 MHz frequency band. This, and many other spurious signals contribute to the radio equivalent of "optical sky glow".

Most SETI League members' hydrogen line observations are galactic, meaning in our Milky Way galaxy. This limits the Doppler shift to around +/-2 MHz from the 1420.405 MHz rest frequency, staying well inside the 1420 assignment. But professional observatories look at highly red shifted extragalactic emissions. These can be shifted down into unprotected airport radar and even cell phone frequencies where interference avoidance is nearly impossible.

More importantly, the fact that high power transmitting may be allowed right up to the band edge of a "protected assignment" makes radio astronomy signal corruption inevitable. It's nearly impossible to design a system that's immune to the effects of a +90dBm TV transmitter adjacent to a -200 dBm radio astronomy signal (610 MHz), no matter how good we filter. Even when a TV transmitter is perfectly legal, all it takes is a rusty fence joint a few miles from the transmitter, acting as a diode multiplier, to double and triple signals and noise into the microwave range. Multiple transmitters impinging on these crude "mixers" cause a multitude of new "unregulated" multiplied frequencies to contend with.

Other subtle effects involve the RF on a frequency many hundreds of MHz from your desired frequency still influencing the gain compression of your low noise amplifier, in effect AM modulating it with the out of band signal. Notch filters on the transmitter frequency will help with this problem.

But if the noise or spurious signal is actually on your receive frequency, there is little one can do to separate desired from undesired signals. Phase noise and modulation sidebands extend out to infinity around these transmitters. Sometimes you are far enough away for this to be below your own galactic noise floor, other times not. This is a case where a good antenna pattern can be your best defense against interference.

Now for the good news… much of the spectrum is seemingly unused. Recent frequency surveys show that only perhaps 6.5 % of the RF commercial spectrum is used, even in a large city like Atlanta, at any given location. For most of us, that still provides filtering challenges that are unmanageable. But in suburban or rural settings, the remaining, mostly TV and radio station frequencies, can be avoided with careful engineering.

Picking one's neighbors. You can't always pick your neighbors. But some radio services make good cohabitants. Ham radio has long enjoyed a close relationship with military co-users in the UHF frequency range, because military use of the frequencies is transient and typically benign. Even high powered radars can be dealt with effectively by noise blanking (similar to the techniques mentioned in my article on the effects of new digital techniques in radio astronomy).

Satellite uplink bands are an underutilized frequency resource. With very few transmitters to avoid, the 5850-6425MHz , 14-14.5GHz, and other uplink bands make good potential receive frequencies for us. Arecibo, NRAO Green Bank, and the VLA have long used the spectrum around 327 MHz as a radio astronomy frequency, not because it's a protected assignment, but because it's a military satellite uplink range relatively far from high power transmitters. 408 MHz on the other hand is much closer to high power transmitters and harder to work in than 327 MHz. At PARI we suffer the effects of a legal 410 MHz transmitter on a nearby mountaintop. Its been there causing problems for decades. So a move down to 327 MHz helped improve the situation, and also brought us into frequency alignment with Green Bank where we could use a borrowed feed off the old 300 foot dish.

SARSAT. I've heard SETI League members complaining about a new satellite rescue service called SARSAT. I must say that for me this falls in the category of good neighbors. The lost hiker or downed aircraft transmitters are likely to be few and far between, causing little interference to 408 MHz operations. And they will be more quickly located and shut down than almost any kind of alternate user for the spectrum, since every signal will be treated as an emergency search and rescue operation.

UltraWideband digital may prove to be one of the more problematic new services to watch. Digital signals generally already spread out to cover wider swaths of spectrum than their basic frequency ranges might imply. But UltraWideband is supposed to cover many GHz of spectrum as a means of avoiding localized interference sources. Thin but wide is the way to visualize this one. It means to cause a small amount of interference to everyone. In the radio services, small enough interference to go unnoticed generally. But for us users of noise, it may be a different situation.

UltraWideband is one of a group of new services called "Cognitive Radio". This implies that if it finds a user of the spectrum, it will try to avoid that user. Conversely, if it sees a blank spot of spectrum, it will try to use it. As receive only users, we are invisible to such systems and will not be avoided. Transmitting to run the UWB system off your frequency is not only illegal, it could potentially cause more interference to other users.

My recommendation, in summary, is to borrow a scanner and do a spectrum survey of your location before you invest a large amount of money in a radio astronomy system that is not flexible enough to move away from interference. Join the professional trend toward finding those unused blocks of spectrum and using them. You may well find that they are much more radio astronomy friendly than so called "protected assignments". ❖

SETI League 2005
Program Service Accomplishments

a) Science Programs:

- Coordinated 130 Project Argus radio telescopes in 22 countries, built and operated by our members on all seven continents, in their SETI and astrophysical observations. Argus stations analyzed and cataloged several new candidate signals during 2005.
- Members' stations monitored telemetry signals and science beacons from eight NASA and ESA interplanetary space probes, including Venus Express, Mars Reconnaissance Orbiter, Mars Odyssey, Mars Express, Deep Impact, Rosetta, SMART 1, and Advanced Composition Explorer.
- Provided Committee leadership (as co-chairman) to the SETI Permanent Study Group of the International Academy of Astronautics.
- 248 members upgraded their software to the Berkeley Open Infrastructure for Networked Computing (BOINC), in support of the SETI@home distributed computing experiment.

(b) Technology Programs:

- Designed and tested a new analog phase shifter circuit for the Very Small Array radio telescope prototype.
- Upgraded the W2ETI Moonbounce Beacon through the acquisition of a new high power amplifier, improving microwave calibration signals provided to the world's amateur and professional radio telescopes.
- Provided ongoing design consultation and proposal assistance to the Montecorvino SETI Telescope Array (MStar).
- Coordinated and archived four closed technical email lists.
- Inducted one additional amateur radio astronomer into the Extra-Terrestrial Century Club, for a total of twelve ETCC honorees.

(c) Public Education Programs:

- Executive Director delivered ten public lectures in five countries on three continents, dealing with radio astronomy techniques and related SETI science.
- Executive Director published ten SETI technical articles in the popular and scientific press.
- SETI League webmaster provided webmastering services to the Society of Amateur Radio Astronomers, the International Academy of Astronautics SETI Permanent Study Group, and Invitation to ETI.
- Distributed 22 CD copies of "Tune In The Universe!", a radio amateur's guide to the Search for Extra-Terrestrial Intelligence.
- Distributed 16 print and CD copies of "The SETI League Technical Manual."
- Distributed several print and CD copies of various SETI League Conference Proceedings.

(d) Media and Outreach Programs:

- Published four issues of SearchLites, the quarterly newsletter of The SETI League, Inc.
- Coordinated and archived two open public email lists.
- Distributed nine Press Releases and twelve Editorials to over 700 media outlets worldwide.
- Filed 52 weekly updates to The SETI League's extensive website, bringing its total document count to over 2900 pages.
- Several of our 65 volunteer Regional Coordinators in 49 countries conducted print and broadcast media briefings and interviews.
- Executive Director granted print media and broadcast interviews in the US, Japan, Canada, San Marino, and Italy.
- Presented the eleventh annual Giordano Bruno Memorial Award, the fourth annual Orville N. Greene Service Award, three Best Ideas Awards, and twelve SETI SuperStar Awards.

2005 Financial Statement

990 Line	REVENUES:	2005 (filed)
1d	Dues, Grants & Contributions	24,914
4	Interest & Investments	117
11	Other revenue	1,130
12	**Total Revenues:**	26,161
	EXPENSES:	
13	Educ. and Scientific Programs	13,919
14	Management & General	5,637
15	Fundraising	5,209
17	**Total Expenses:**	24,765
18	**Excess or (Deficit) for the year**	1,396
	BALANCE SHEET:	
19	Beginning Net Assets	7,166
21	Ending Net Assets	8,562

2006 SETI League Budget

990 Line	REVENUES:	2006 (anticipated)
1d	Dues, Grants & Contributions	25,000
4	Interest & Investments	150
12	**Total Revenues:**	25,150
	EXPENSES:	
13	Educ. and Scientific Programs	15,000
14	Management & General	5,000
15	Fundraising	5,000
17	**Total Expenses:**	25,000
18	**Excess or (Deficit) for the year**	150
	BALANCE SHEET:	
19	Beginning Net Assets	8,562
21	Ending Net Assets	8,712

SETI League Confirms Space Radio Contact

NIKISKI, ALASKA.., February 2006 -- The SETI League, nonprofit leaders in the privatized Search for Extra-Terrestrial Intelligence, is pleased to confirm that on Jan. 21, 2006 at 2142 UTC, its volunteer Regional Coordinator for Alaska, ham radio operator Ed Cole (licensed with the amateur radio callsign KL7UW), made two-way first contact with a space citizen. That entity's name is "Bill," and he currently lives in orbit around the Earth. The contact took place in the 144 MHz amateur radio band, using a standard FM transceiver and simple base-whip antenna.

Bill is, of course, US astronaut Cmdr. Bill McArthur, residing on the International Space Station orbiting Earth in a nominal 200-mile orbit. Bill is also ham radio operator KC5ACR. For months, he has been actively trying to become the first radio amateur to earn the Worked All States (WAS) award, issued to radio amateurs making two-way radio contact with hams in all 50 US states, as well as the challenging Worked All Continents (WAC) and 100 countries (DXCC) awards, from space. He had contacted radio amateurs in 49 states, but number 50, Alaska, had eluded him. Through coordination with several hams, including Kenneth Ransom, N5VHO, at the Johnson Space Center in Houston TX, Bill and Ed made the final contact enabling Bill to achieve WAS. The space station's orbital pass reached an elevation of 14 degrees at a range of about 2000-km as viewed from Alaska, and lasted about ten minutes.

During the pass two other Alaska radio amateurs, Dale, KL7XJ and Ken, KL0RG, also talked with Bill. "Now that we have succeeded in establishing contact beyond Earth," adds Ed Cole, "we can get back to work trying to achieve an even greater challenge, detecting credible scientific evidence of other civilizations outside our solar system." ❖

Ask Dr. SETI:

They're Dead, Jim!

Dear Dr. SETI:

I'm trying to understand how even places that are no longer sustaining life can continue to give off some sort of signal. Is that right? Can we really listen to parts of the universe that are not currently sustaining life, but may perhaps still transmit something detectable, and of intelligent origin?

Chong, San Francisco

The Doctor Responds:

In a word, yes. The civilizations in question may have died out hundreds, thousands, or even millions of years ago, while their messages are reaching us only now. That is because it may take hundreds, thousands, or even millions of years for electromagnetic messages-in-a-bottle to wash up on our terrestrial shores.

Analogy: the speed of sound. If lightning strikes a mile away, the thunder doesn't reach your ears for about five seconds. That's because sound travels at a speed of about 1000 feet per second. So, by the time you receive the audio message (thunder), the transmitting entity (lightning) is already dead!

Well, light (and radio waves, which are a form of light) travel much faster than sound, but they are not instantaneous. The speed of light (and SETI signals) is about a million times faster than the speed of sound (or roughly a billion feet per second). So, a signal from the nearest star would take four years to reach us. Echoes off the Moon (such as from The SETI League's moonbounce beacon) take a couple of seconds. And signals reaching us from the far side of the Milky Way have been travelling tens of thousands of years. Certainly, if we receive such signals from planets orbiting distant stars, we can assume that the individual sender (if not its whole civilization) may be long dead.

So, SETI is really not about communications, but rather about interstellar archaeology. What we expect to unearth will be artifacts, that will tell us something about a (possibly) long-gone civilization. ❖

SETI League Board Emeritizes Executive Director

Dr. H. Paul Shuch, longtime Executive Director of The SETI League, Inc., has retired twice. His first effort, in 2004, was short lived: he left the fulltime employ of The SETI League on a Friday, and was put on payroll by one of his consulting clients the following Monday. Having completed a two-year NASA contract for that particular commercial enterprise, Dr. Shuch began his second attempt at retirement this past January. The following month, the Board of Trustees of The SETI League, Inc. elevated him to the honorary position of Executive Director Emeritus, in recognition of his ongoing volunteer service to our nonprofit organization.

"Like a Professor Emeritus," comments Shuch, "a Director Emeritus has a title, and an office, and no assigned duties – and receives no salary. In my case, the office is in my home, where I have done the brunt of my SETI League work for the past dozen years. 'No assigned duties' means I am free to continue performing those same SETI League tasks I once did for pay, and I will continue doing so, for as long as my health and mental capacity permit. The title, however, allows me to continue representing our grass-roots organization, to the public and the press, in a more or less official capacity."

Emeritus status also means that Dr. Shuch will continue to have a voting seat on The SETI League's Board of Trustees, for life. Thus, he can be expected to continue shaping policy for the organization he helped to form in 1994 – in his words, "at least until we make Contact." He continues as Editor of this newsletter, Webmaster for www.setileague.org, and author of many articles and editorials appearing therein. He assures us that in his public persona, Dr. SETI ®, he will continue with his eclectic performances of SETI science and song, for as long as an audience exists. ❖

Their Past; Our Future

by H. Paul Shuch, Ph.D.

Often, SETI critics (and even some its supporters) ask why an alien civilization would bother to beam messages our way. After all, we on Earth have generally not chosen to announce our presence to our cosmic companions. Social scientists tell us that only two possibilities motivate all human actions: altruism and self-interest (although some argue that even seemingly altruistic acts are performed with an underlying selfish motive). Can we imagine selfish or altruistic reasons why another civilization would expend considerable resources on the deliberate transmission of electromagnetic signals over interstellar distances?

Successful altruistic civilizations, it has been theorized, harbor an innate desire to share their cultural wealth with those less fortunate. Such civilizations may consider it a cosmic imperative to undertake the transmission of their accumulated knowledge and experience to younger, emerging species. If this theory holds, we stand on the brink of reception of Encyclopaedia Galactica, a knowledge base that can transform human existence in ways we cannot begin to imagine. This justification for human SETI endeavors is only warranted if our cosmic companions are disposed to such generosity.

But what of the other possibility, that our galactic neighbors might choose to transmit in our direction, strictly out of self interest? Of what possible benefit could such a transmission be to civilizations presumed older, wiser, and more capable than we? It's easy to concoct scenarios whereby the very act of reception of interstellar signals is somehow damaging to humanity and advantageous to the transmitting species. Competition rules the jungle, so why not the cosmos? And as Earth is, in essence, a paranoid planet, any such scenario that you can imagine will easily attract a host of followers willing to embrace it. I believe this says far more about the human condition than it does the alien. Further, such speculations have served to inhibit the acceptance and growth of SETI science on Earth as though, somehow, one can believe that turning a deaf ear to the universe can somehow protect us from harm.

There is a third possibility, little discussed in the literature, as to why we might someday find ourselves on the receiving end of an interstellar CQ. We believe that time and space are finite. Civilizations, as far as we understand the laws of nature, can be long-lived but not eternal. Imagine a technologically advanced civilization facing its own inevitable demise. Might it not wish to put its whole history and culture into an electromagnetic time capsule - a modern message in a bottle - in hopes that someone else (maybe us) might pluck it out of the cosmic pond, and simply know that they were? Might not they transmit in the hopes of achieving a degree of immortality? Might not we?

Given the above possibility, I can envision someday receiving a beamed transmission from a civilization long dead. It would seek to inform us about their art, culture, society, history, spirituality, hopes, dreams, and aspirations. Such a transmission could be an unparalleled look into a neighboring civilization's past - and humanity's future. ❖

Transforming SETI to METI

by Dr. Alexander Zaitsev, IRE (alzaitsev @ yahoo.com)

Those who propose, or oppose, sending Messages to Extra-Terrestrial Intelligence (METI) must contemplate the Hamlet-like question: "To send or not to send?" The science known as SETI deals with searching for messages *from* aliens. METI science deals with creation of messages *to* aliens. Thus, SETI and METI proponents have quite different perspectives. SETI scientists are in a position to address only the local question "does Active SETI make sense?" In other words, would it be reasonable, for SETI success, to transmit with the object of attracting ETI's attention?

In contrast to Active SETI, METI pursues not a local, but a more global purpose - to overcome the Great Silence in the Universe, bringing to our extraterrestrial neighbors the long-expected annunciation "you are not alone!" Thus, it follows that in the context of METI, the answer to the general question of transmissions from Earth requires competence beyond that found within the highly specialized, traditional SETI establishment. We therefore propose that, for solution to the various current METI problems, we consider transforming the familiar SETI search space to a METI search space.

The respected SETI Institute has identified the following 7-dimensional space of unknown quantities for SETI consideration (see, for example: Jill Tarter, 1986. The Cosmic Haystack and Recent US SETI Programs):

1. Where to search?
2. When to search?
3. At what wavelength?
4. Type of polarization?
5. Power of radiation received?
6. How to demodulate the detected signals?
7. How to decode the received information?

This list can be adapted to aid in decisions regarding transmissions from Earth of our own radio messages to possible extraterrestrial civilizations. Transmission of interstellar radio messages (IRMs) is essentially a new kind of human activity, involving radiation of coherent signals from the Earth into space, addressed to other reasoning beings. Humans have always peered at the sky, in the hope of finding there intelligences beyond our own. METI thus implies a special and purposeful transmission. We can thus replace the terms connected with a search for radio signals, with terms associated with the transmission of same. In a more general treatment, a transformation from SETI to METI can occur as a transition from the science of merely separating those messages that already exist in nature from artificial ones - namely Their reasonable radio signals -- to the art of creating messages that do *not* exist in nature -- namely our deliberate radio signals directed toward Them.

It would seem that there are two more new measurements in METI-space than there were in the case of SETI. Thus, the METI search space is a 9-dimensional one. We are compelled to consider such questions as "Why is it necessary to transmit and what we shall gain from doing so?" and "Is it dangerous to transmit messages to ETI?". In view of these two additional questions, we suggest that the SETI community (as well as the small but growing METI community) should embrace the following 9-dimensional space of questions for consideration:

1. Where to transmit?
2. When to transmit?
3. At what wavelength?
4. What polarization to use?
5. What energy for the transmitted radio signal?
6. What modulation to apply?
7. What optimum structure for transmitted messages?
8. Why should we transmit interstellar radio messages?
9. What are the dangers of pursuing METI?

SETI League members should seek answers to all of the above questions. It is important to note that any such answers will be not final, but only preliminary in nature. As we have already emphasized, METI is a new, emerging human activity, and nothing that it implies is yet settled. Therefore, we all have a rare opportunity to join in discussions leading to a wholly new scientific endeavor. ❖

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