

League Launches *Project Argus* Search for Alien Life

LITTLE FERRY, NJ., April 21, 1996 -- Amid great fanfare, the non-profit, membership-supported SETI League today kicked off its long awaited *Project Argus* survey of the heavens for microwave signals of possible intelligent extra-terrestrial origin. At 1900 hours Coordinated Universal Time on Earth Day, April 21, the first five radiotelescopes in the Argus effort went on line simultaneously in Spain, Toronto, Colorado, Hawaii, and at SETI League headquarters in New Jersey. The simultaneous "launch" of these five stations was coordinated via short-wave radio, by the participating amateur radio operators.

"This small step for humanity," commented SETI League executive director Dr. H. Paul Shuch, "represents a humble beginning for what will ultimately be a global effort. From five stations today, we can foresee 500 participants within two years, and perhaps five thousand by the year 2001. When we reach that level, there will be no direction in the sky which evades our gaze. Then we can hope to find the answer to a fundamental question which has haunted us since first we recognized that the points of light in the night sky are other suns: Are We Alone?"

Traditional research-grade radiotelescopes can view only a tiny fraction of the sky at a given time, typically on the order of one part in a million. All-sky coverage with these instruments would thus require a million telescopes, each at a cost of tens of millions of dollars. Project Argus employs a large number of much smaller, quite inexpensive amateur radiotelescopes, built and operated by amateur radio experimenters at their individual expense. The equipment, although of modest sensitivity, is capable of detecting microwave radiation from technologically advanced civilizations out to a distance of several hundred light years. There are hundreds of sun-like stars within that distance, many of which are believed to harbor their own planetary systems.



**433 Liberty Street
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SearchLites****

the Quarterly Newsletter of The SETI League, Inc. Volume 2 Number 2 Spring 1996

Radio Astronomy Pioneer John Kraus to be Honored at Dayton Hamvention

LITTLE FERRY, NJ., April 28, 1996 -- Dr. John Kraus, the engineer who helped pioneer the field of radio astronomy and built the famous Ohio State University Big Ear radio telescope, has been selected to receive the 1996 Special Achievement Award from the Dayton Amateur Radio Association. Dr. Kraus, W8JK, is well known to the amateur radio community as an innovative antenna designer and a leader in the scientific Search for Extra-Terrestrial Intelligence (SETI). The award is to be presented at the Dayton Hamvention, the largest amateur radio gathering in the US, on May 18, 1996 at the Convention Center in downtown Dayton, OH.

Dr. H. Paul Shuch, N6TX, executive director of The SETI League (in which Kraus holds life membership) will be making the presentation. Shuch, this year's Hamvention banquet speaker, is known as an engineer and educator, as well as a singer and songwriter. He has written a new song honoring Kraus, which will receive its premiere at the presentation. Unfortunately, Dr. Kraus' health will not permit him to attend the festivities. It is expected that the award will be accepted in his behalf by SETI League technical advisor and Ohio State University professor Dr. Robert Dixon, W8ERD. Dixon was a graduate student of Kraus' who went on to become deputy director of the Ohio State University Radio Observatory, which Kraus founded.

SETI scientists, of which Kraus is one of the most prominent, seek to determine through microwave measurements whether humankind is alone in the universe. Since Congress terminated NASA's SETI funding in 1993, The SETI League has been attempting to privatize the research. Experimenters interested in participating in the search for intelligent alien life, or citizens wishing to help support it, should contact The SETI League, Inc. membership hotline at 1(800) TAU-SETI. The SETI League, Inc. is a membership-supported, non-profit [501(c)(3)], educational and scientific corporation dedicated to the electromagnetic Search for Extra-Terrestrial Intelligence.

SETI Leaders Laud Argus Launch

Dear Dr. Shuch and friends,

I am delighted and admiring to hear about Project Argus on the air. I am not in a good position to come to your Launch Day; do please excuse me. After all, SETI has always put telecommunications ahead of the difficulties and hazards of travel! The new planets suggest a conservative ten million planetary systems in our Galaxy disc.

Happy hunting among the channels.

Yours,

Dr. Philip Morrison
Professor Emeritus of Astronomy and Physics
Massachusetts Institute of Technology

Dear Paul,

Thanks for your letter of 13 March and the fact sheet on Project Argus.

I wish you the best of luck -- but you might mention that I coined the name back in 1976, but for a rather more ambitious system, in *Imperial Earth!*

All good wishes,
Arthur C. Clarke
Colombo, Sri Lanka

Indeed you did, Arthur. Carl Sagan also used the Argus name in his novel Contact, and the Project Cyclops team had considered using it for their giant phased array in 1971. At Ohio State University, Bob Dixon chose the name for his upcoming Sky Camera, which will replace the Big Ear radiotelescope in the near future. So in usurping the Argus name, we are honoring four pioneers. We thank you!

Paul --

Thanks for the invitation to the Launch. I would have loved to attend, and I even would have brought a bottle of champagne to smash on the bow. But, my schedule for April has been filled up already for several months . . . Maybe next time.

I surfed your web site, hitting a few high points. You can see from my email to the students in Science B17 that I thought it was worth some attention.

Dr. David W. Latham
Harvard-Smithsonian Center for Astrophysics

Dear Dr. Shuch,

Thank you for your kind invitation for April 21. Although I will not be able to attend, I send my best wishes for the success of the happening.

Prof. Ronald N. Bracewell
Department of Electrical Engineering
Stanford University

Dear Dr. Shuch,

Thank you for the invitation to attend the inauguration of Project Argus. I am unable to attend because of prior commitments. I wish you the best of luck in this endeavor.

Dr. Samuel Gulakis
NASA Jet Propulsion Laboratory
Pasadena CA

Dear Paul,

Thanks for the invite to the festivities on the 21st. Alas, I won't be in the Little Ferry area (except, I suppose, on a cosmic scale), so I won't be able to come. Good luck with the event!

Cheers,

Dr. Seth Shostak
SETI Institute
Mountain View, CA

Hi Paul --

Congratulations on the upcoming big kick-off!

Thanks for inviting me to your inaugural celebration. Unfortunately, I can't attend -- as you know, there's not much money for travel these days.

Have a fun time at the ceremonies. I hope Argus is successful some day.

Happy searching, Dan

Dr. Daniel Werthimer
Astronomy Department
University of California, Berkeley

Dear Dr. Shuch,

Thanks for your invitation. May I have a little information on "Project Argus"?

With Best Wishes,

Cordially,
Carl Sagan
Cornell University
Center for Radiophysics and Space Research

Dr. Sagan,

I hope this issue of SearchLites provides you with the information you need. You (and our readers) may find more details on our Web site, www.setileague.org/

I am not able to attend the Launch Ceremonies on April 21, but I do appreciate the invitation.

It was fun to be part of the beginning with Cyclops. I look forward to future developments from the League and I wish you all much success.

Dr. Douglas B. Brumm
Department of Electrical Engineering
Michigan Technological University

Dear Paul,

Many thanks for your invitation to the inauguration of Project Argus. Unfortunately I will not be able to attend, but I would like to offer my good wishes for the experiment.

If at any time I can contribute as a journalist, please let me know. You may be aware I help run SETI Australia, which in turn has links to the SETI Institute.

Kind regards,

Carol Oliver, Science Journalist
University of Western Sydney Macarthur
Campbeltown, NSW Australia

Thanks, Carol. I was aware of that affiliation, and now, so are our members. And you have just made a journalistic contribution!

**Minutes of The SETI League, Inc.
Second Annual Membership Meeting**

The meeting was called to order by Executive Director Dr. H. Paul Shuch at 1540 hours EDT on Sunday, 21 April 1996, following the *Project Argus* launch ceremonies, at SETI League Headquarters, 433 Liberty Street, Little Ferry NJ. Members present:

Richard Factor, President
H. Paul Shuch, Executive Director
Mark Arnold, Trustee
Heather Wood, Administrator
Gloria Albasi
Brian Earle
Tom Gilbert
Orville Greene
Ricky & Janet Kagan
Pamela Pinali
Debra Poenisch
Joe Shapiro
Debra Spencer

Plus nine invited guests. Our Bylaws requiring one percent of the current membership to be in attendance for the conduct of SETI League business, the above represents a quorum.

Election of Officers:

Richard Factor, to continue as President: nominated by Heather Wood, seconded by Gloria Albasi, elected by acclamation.

Diana Davidson (not present) was unanimously re-elected as secretary.

Treasurer's Report:

In the absence of treasurer Marty Schreiber, summarized by Richard Factor. We have enough money to continue operations, and are working to achieve more in memberships, donations, and sale of merchandise.

Membership:

We have 309 members in good standing, including 8 Life Members, in 39 states and 15 other countries. Our goal for the first full year was 150 memberships, including 15 life memberships.

Correspondence:

A fax from Alfred Mosser, member in Switzerland, was read. Several other greetings from dignitaries and members were posted on the wall for all to read.

Fifteen *Project Argus* participant survey forms have been returned to date.

Our World Wide Web site has been continuously operational on a UNIX server for 16 months. Through the Internet we have received around 1,000 membership inquiries. Many others have been received by mail and phone.

Tax Status:

Trustee Mark Arnold reminded us that The SETI League is a [501(c)(3)] non-profit educational and scientific corporation, and therefore contributions are tax-deductible to the extent allowed by law.

Personnel:

H. Paul Shuch, our Executive Director, has joined us on a one-year sabbatical from Pennsylvania College of Technology. The College has graciously extended his leave for a second year, through 15 August 1997, that he might continue his service to The SETI League.

Technical:

The low-noise microwave preamplifier designed by Dr. Shuch is being manufactured by Down East Microwave, with royalties being paid to The SETI League for each unit sold.

The Technical Manual (explaining how to set up your own SETI station) is available in printed form, although the most up-to-date version is available on The SETI League's web pages.

Publications:

Twenty-five years ago, NASA convened a summer study group and designed Project Cyclops, the blueprint for a SETI search of unprecedented magnitude. In cooperation with The SETI Institute, we are reprinting this original historic document in facsimile edition, which will be available in June for \$20. The head of the Project Cyclops group, Bernard M. Oliver, who went from being Vice President of Engineering at Hewlett Packard to heading the NASA SETI program, wrote an introduction to the second edition of Project Cyclops just before he died. The new edition also includes a tribute to Dr. Oliver by Dr. John Billingham, plus some introductory material by Richard Factor and Dr. H. Paul Shuch.

Conferences:

We had to cancel the projected conference in Trenton because of scheduling difficulties with the BioAstronomy Conference in Capri.

Dr. Shuch reported on his travels: he has attended 42 conferences, from scientific to ham radio to science fiction. The expenses of attending these conferences is just about covered by the new members we attract, merchandise we sell, and Dr. Shuch's honoraria as guest speaker, which he turns back to The SETI League.

The first BioAstronomy Conference took place in 1961, at NRAO Green Bank. Frank Drake, Barney Oliver, Otto Struve, Carl Sagan, John Lilly, Philip Morrison, Dana Atchley Jr., J. Peter Pearman, Su Shu Huang, and Melvin Calvin were present. The second of these Conferences was held in Byurakan, Soviet Armenia in 1971, the third in Montreal, Canada in 1979, the fourth in 1991 at U. C. Santa Cruz. Since we now know how to detect planets orbiting faraway stars, the conference will now be held every five years. Dr. Shuch's paper on Project Argus has been accepted for this year's Conference, to be held in Capri in July. Only six SETI papers were accepted out of 300 total abstracts.

Publicity:

We have received quite a lot of press attention, including articles in the Philadelphia Inquirer, Williamsport Sun-Gazette, Morris County Daily Record, Newark Star-Ledger, the Daily Telegraph and Evening Gazette (UK), Outside magazine and Air and Space Smithsonian. Dr. Shuch has also been interviewed on radio and television in the US, the UK, and Canada, and authored articles for QST and Analog.

Concluding Remarks and Adjournment:

Richard Factor then spoke, thanking Dr. Shuch for his endeavors on behalf of the League. We watched a videotape of Dr. Shuch's interview on WNEP-TV, then he sang his latest composition, "Jansky's Song," and the meeting adjourned at 1615 hours EDT.

Respectfully submitted, A. Heather Wood, Administrator

Conference Calendar

SearchLites' readers are apprised of the following conferences at which SETI-related information will be presented. League members are invited to check our Web site (www.setileague.org), call headquarters at (201) 641-1770, or email info@setileague.org, to obtain further details. Members are also encouraged to send in information about upcoming events of which we may be unaware.

May 17 - 19, 1996: *Dayton Hamvention*, Dayton OH.

May 23 - 27, 1996: *International Space Development Conference*, New York NY.

May 31- June 2, 1996: *ARRL Atlantic Division Convention*, Rochester NY.

June 14 - 16, 1996: *Jersey Starquest 96*, Beemerville NJ.

June 17 - 21, 1996: *IEEE International Microwave Symposium*, San Francisco CA.

July 1 - 5, 1996: *Fifth International BioAstronomy Symposium*, Capri Italy.

July 13 - 17, 1996: *Society of Amateur Radio Astronomers Annual Meeting*, NRAO, Green Bank WV.

July 25 - 28, 1996: *Central States VHF Conference*, Bloomington MN.

August 5 - 10, 1996: *American Association of Physics Teachers*, University of Maryland, College Park MD.

August 15 - 18, 1996: *International EME Conference*, Bowie MD.

August 26 - 28, 1996: *22nd Eastern VHF/UHF Society Conference*, Vernon CT.

August 28, 1996: SETI Lecture at *Simi Settlers Amateur Radio Club*, CA.

August 29 - September 2, 1996: *L.A. Con III / 1996 Worldcon*, Anaheim CA.

September 13 - 15, 1996: *ARRL National Convention*, Peoria IL.

September 21, 1996: *Long Island Astronomy Forum*, New York Institute of Technology, Greenvale NY.

October 5, 1996: *Mid-Atlantic VHF Conference*, Horsham PA, sponsored by Mt. Airy VHF Radio Club.

October 18 - 20, 1996: *Grove Enterprise Expo*, Atlanta GA.

November 8 - 10, 1996: *1996 AMSAT Annual Meeting and Space Symposium*, Tucson AZ.

July 24 - 27, 1997: *Central States VHF Conference*, Hot Springs AR.

August 28 - September 1, 1997: *Lonestarcon 2 / 1997 Worldcon*, San Antonio TX.

August 5 - 9, 1998: *BucCONeer / 1998 Worldcon*, Baltimore MD.

Guest Editorial

The "L" Paradox

by Dr. Charles T. Rubin, Duquesne University

As Frank Drake tells it, the number N of detectable civilizations in space is highly correlated with the longevity L of civilizations capable of interstellar communication: $N \propto L$. But we know no more about the value of L today than Drake did at Green Bank 35 years ago. SETI scientists have always hoped for a very large L , not only because they are well wishers of intelligent civilizations, including our own, but because it appears to improve the chances of ETI contact. Yet as L grows, it poses a problem for SETI.

A short L reduces the odds that civilizations will overlap in time. If Planet A is "on the air" for 100 years, how likely is it that Planet B, with a correspondingly short L , will be in a receiving mode for the 100 years in which A's signal will pass by? Longer L s increase the odds that multiple senders and multiple receivers will overlap. As L gets very long, should we not expect an ever increasing accumulation of broadcasting or leaking civilizations, hence an ever artificially brighter radio sky?

SETI results thus far do not suggest that such a bright sky exists. Thus Fermi's Paradox takes on meaning not just for interstellar travel, but also for communication. If L is very large, where are their signals? The explanation might be purely technical. Even very large L s produce a small number of civilizations relative to interstellar distances. Speed of light lag and signal attenuation reduce the chance that, at any moment, one civilization will get wind of another.

Another possibility is conceptually more interesting, for it has important implications for SETI even if the technical explanation is correct. The assumption of mediocrity is essential to the plausibility of SETI. Yet routine assertions that civilizations to be contacted are likely far in advance of ours violate that assumption. It is true we could hardly contact a civilization much less advanced than ours. Still, thinking this point through in connection with mediocrity produces bad news for SETI. Are we standing at one tail of the L distribution, expecting to contact somebody at the other tail? Then we lose the advantage of the large L , because we are saying we are only likely to hear from a small fraction of N .

Is it not more consistent with the assumption of mediocrity to say that (terrible thought) our present age is the mean for L , i.e., life spans are extremely short? Or, assuming a different scale for mediocrity, perhaps life and intelligence developed on roughly the same schedule everywhere, so that cosmically speaking intelligence and technical civilizations are mostly as young as we are. Are we close to the mean for the universe's current technological level?

Practically speaking, these considerations point in the same direction. SETI had best plan for the long term--assuming we have a long term. The evidence for ETI is not yet obvious. This should remind us what a big place the universe is, or perhaps suggest that most of our prospective partners are about as new to SETI as we are.

Full Text of *Project Argus* Dedication Speech delivered 21 April 1996 at SETI League HQ by H. Paul Shuch, Ph.D., Executive Director

We are here to launch a new Search for Extra-Terrestrial Intelligence. We seek to determine whether humankind is alone, the sole sentient species in the vast cosmos. The late NASA SETI program, terminated by Congress two and a half years ago, involved a two-pronged approach to answering that question. A targeted search of nearby Suns was designed to offer prompt results -- if we happen to guess right as to what constitutes a suitable star. But just in case we don't, a methodical survey of the entire sky was also begun. Our SETI Institute colleagues in California have very ably resurrected the targeted search component, under the Project Phoenix banner. Today, we begin *Project Argus*, our continuation of the sky survey. But we are attempting something which NASA had never contemplated: real-time, all-sky coverage.

You see, the world's giant radio telescopes, the type which NASA used, can only see about a millionth of the sky at a time. Which means if you have one turned on, tuned to exactly the right frequency, at the very instant when The Call comes in, there's still a 99.9999% chance you'll be pointed the wrong way! One possible solution is to build a million such instruments, and cover the entire sky, all at once. At maybe fifty million dollars apiece, we'd very quickly exceed the Gross Planetary Product. But small radio telescopes such as this one can see 200 times as much sky as more traditional research instruments. Only five thousand of these systems, each priced at just a few thousand dollars, can be coordinated to see in all directions at once.

It's true that these small telescopes have limited sensitivity. Thus at this time we can only hope to capture those highly intermittent, extremely powerful radio emissions which we hypothesize might be emanating from relatively nearby technological civilizations. But our microwave and computer technologies are evolving at a dizzying pace. Within just a few years, we can envision technological advances which would allow instruments like this one to hear all the way to the edge of the Galaxy. The SETI League hopes to promote just such advances. If we do, then our mission is successful, even if we never hear a peep from the stars.

During the last half-century, SETI has emerged out of the realm of science fiction, and into the scientific mainstream. Every month we read about the discovery of yet another planetary system in space. We are beginning to learn about how life might have developed on other worlds. And we have completed the Copernican Revolution, finally realizing that we are not the center of all creation. Yet SETI programs continue to yield negative results. We are not discouraged. Not only have we not yet scratched the surface, we haven't even found the itch.

We launch our search on Earth Day, and fly the Flag of Earth, because SETI is an enterprise which belongs not just to one country, government or organization, but rather to all humankind. Like Argus, the guard-beast of Greek mythology who had a hundred eyes, we seek to see in all directions at once, that we might capture those photons from distant worlds which may well be falling on our heads even as we speak. Today, Project Argus stations go on the air in Spain, Toronto, Colorado, Hawaii, and here in New Jersey. This small step for humanity represents a humble beginning for what will ultimately be a global effort. From five stations today, we can foresee 500 participants within two years, and perhaps five thousand by the year 2001. When we reach that level, there will be no direction in the sky which evades our gaze. Then we can hope to find the answer to a fundamental question which has haunted humankind since first we realized that the points of light in the night sky are other suns: Are We Alone?

Special Event Station Only Moderately Successful

Marginal propagation conditions conspired to frustrate The SETI League's attempt to contact a large number of our members via Amateur Radio during our Project Argus launch ceremonies. A special-event station was set up on the lawn of our headquarters building on April 21, operated under the call of SETI League president Richard Factor, WA2IKL (that's "I Keep Listening"). The operating frequency of 14.204 kHz was chosen as exactly one percent of the precession frequency of neutral hydrogen, the most abundant element in interstellar space.

Although only six stations were contacted during the two hours of operation, we did manage to communicate with two of our most active members, Daniel Fox (KF9ET) and Dr. Malcolm Raff (WA2UNP). Several other members reported hearing our station but being unable to establish contact.

The SETI League thanks volunteers Tom Gilbert, WA2CAI, Tadd Torborg, KA2DEW, and Gerry Fleming, KE2RC, for setting up and operating the 20 meter transceiver and three-element beam. Despite the marginal results, other on-the-air activities are planned.

Surveys, Photos, URLs Sought

SETI League members who plan to participate in our Project Argus sky survey, either now or in the future, are urged to return the Participant Survey forms included in the last *SearchLites*. As we go to press, only 19 members have responded. Although an encouraging 9 of those forms indicate systems either now operational or very soon to go on the air, we will be needing a significantly greater participation level if we are to achieve our goal of 5,000 operational stations, and full sky coverage, by 2001.

We also ask those members with stations operational or under construction to supply photos for posting to the Members' Photos page of our World Wide Web site. And any member with a personal Home Page on the Web is invited to supply us with his or her URL (Uniform Resource Locator, or Web address) for linking from our site. This information may be emailed to n6tx@setileague.org.

***Argus* Launch Buttons, Pioneer Certificates Offered**

Members and guests attending our *Project Argus* launch ceremonies on April 21 received buttons commemorating the event. While supplies last, members may obtain these prized collectibles for a small contribution (see the back page of this *SearchLites* for details). And those members with SETI systems operational on Earth Day are entitled to receive distinctive *Argus Pioneer* certificates. To claim yours, simply write or email with your station description, frequency monitored, and the coordinates to which your antenna was aimed. Pioneers will be acknowledged in the next issue of *SearchLites*.

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Who's Who in The SETI League

Founder and President	Richard C. Factor
Executive Director	H. Paul Shuch, Ph.D.
Secretary	Diana Davidson
Treasurer	Martin Schreiber, CPA
Administrator	A. Heather Wood
Registered Agent	Marc Arnold, Esq.
Trustees:	Marc Arnold Richard Factor Martin Schreiber
Advisory Board:	Anthony Agnello Poul Anderson Arthur C. Clarke, CBE Robert S. Dixon, Ph.D. Frank D. Drake, Ph.D. Malcolm I. Raff, Ph.D. Clifford Stoll, Ph.D.



To:

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Full Member	\$50
Life Member (until we make contact)	\$1,000
Patron (priority use of The SETI League's radiotelescope)	\$10,000
Director (Patron membership plus seat on advisory board)	\$100,000
Benefactor (a major radiotelescope named for you)	\$1,000,000

Tax Deductible gifts are always welcome!

Payment in US Dollars only, please
Foreign checks must be payable through a US bank

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	(u)	(o)
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<i>Sing a Song of SETI</i> (Songbook)	\$10	\$12
<i>SETI League Technical Manual</i>	\$10	\$12
<i>Project Cyclops 2nd Printing</i>	\$20	\$24

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