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Search Strategies : SETI Activity and Society

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Abstract

The search for extra-terrestrial intelligence (SETI) is enbedded in a much broader social discourse, and imperatives of human desires, for communication with « the other ». In this presentation, I will seek to locate the scientific SETI search strategies within the current discussions in some art communities ; these artists are seeking to develop new art forms that take advantage of the new understandings and tools being developed by the sciences of artificial life and the new emerging science of consciousness. Successful scientific SETI detections and follow up are likely to require sustained multi-decade, if not century, commitment. Examination of the political and social context of scientific SETI over the last 50 years is not encouraging. Sustained political support is contingent on the perception of the desirability, possibility and feasibility of ETI contact. This support exists within a context that shows decline in public understanding of the value of scientific research for society, and declining budgets as a % of gross national budgets. Symptomatic of this is the recent turn around in the NASA approach to SETI: within the last five years NASA has cancelled all support of SETI projects under Congressional direction based on fundamentalist religious sentiment. Yet the recent NASA strategic plan and roadmap explicitly identifies the search for extra-terrestrial life as a primary scientific goal of the agency. Such political support is likely to continue to be unstable since it depends on responding to perceived public opinion. I argue that the necessary public support of scientific SETI will come about only if the scientific community is prepared to work in concert with the broader intellectual and cultural movements which seek to explore the relationship between human life and other life forms.

1.- Introduction

I have been asked to address the topic « SETI Search strategies. SETI Activities and Society ». In my discussion I would like to bring to bear three areas of my personal experience. First as a research administrator ; I have served as an Observatory and Laboratory Director, and on a number of government advisory committees and participated in the formulation of strategic plans for space agencies. Second as a space astronomer, confronted with the technical implantations of scientific programs, and the explanation of this research to a broader public. Finally as the editor of a scholarly art journal, I am working with scientifically and technically literate artists who provide a critical and I think vital intellectual discourse relevant to the eventual success of SETI.

2.- The NASA Origins Program

I am currently a member of a NASA Advisory Committee (the Space Science Advisory Committee - Sub-Committee of the Universe). Over the past year, with the participation of these committees, NASA has prepared and released a new strategic plan for the NASA Office of Space Science (1). This plan is intended to provide a detailed roadmap for the NASA science program over the next two decades.

The NASA plan covers four themes : « Origins », « Structure and Evolution of the Universe », « Human Exploration of the Solar System », and « Sun-earth connection ». Although the four theme areas describe ambitious

roadmaps with major new missions, only the Origins program is currently funded as a line item in the NASA budget. Indeed the Origins program is now the centerpiece of the new NASA science strategy, and the cornerstone of its public relations strategy.

The Origins roadmap provides as its vision statement :

" We seek to observe the birth of the earliest galaxies in the universe, to detect all planetary systems in the solar neighborhood and find those planets that are capable of supporting life, and to learn whether life began elsewhere in the solar system. We do this in order to understand and explain the origin of galaxies, stars and planetary systems, and life";

This is a truly amazing statement and has generated much controversy in the scientific community. It specifically makes the entire NASA science enterprise a subsidiary of the search for extraterrestial life.

At the same time, the NASA origins roadmap specifically excludes the most compelling strategy for finding extraterestial life, the use of radio receivers for SETI searches. Indeed the US congress has written specific language forbidding NASA to engage in such searches , under pressure from religious fundamentist groups. The NASA ETI search strategy has been crafted in the context of current political expediency and one can only conclude that this political support is likely to be unstable in the long term.

A little reflection about the NASA Origins ETI search strategy provides a plausible explanation of why the previous SETI program aroused such political opposition , but the new Origins strategy has been adopted by the US President and approved overwhelmingly by the US Congress. The NASA Origins ETI program is intended to seek :

i) Primitive life forms, less advanced than our own.
ii) Evidence of fossil life of extinct life forms.
iii) Planetary systems that could sustain our own species.

By excluding SETI radio searches , the NASA strategy avoids the possibility of detecting life forms as advanced or more advanced than our own. The strategy is finely tuned to political expediency. When the Europeans colonised South America and Africa; or the US colonised the far West it was within the prevailing myth of the "white man's burden" justifying the need to find new natural resources needed to sustain their societies material expansion. Any human life forms in the new lands had to be either primitive, and therefore under the dominion of the explorers, or ancient or dying civilisations whose artefacts could be looted and placed in treasuries and museums. As the cold war has removed political competition as a driver for space exploration, economic competition provides the search for resources as a new driver. Clearly the new NASA Origins ETI search strategy is as politically palatable as was Columbus' voyage to the new world to his funders.

This is not to argue against the scientific value of the NASA Origins program, which is undeniable, but rather to make explicit the underlying social and political context which has made in possible for NASA to obtained an increased science budget within one ETI strategy, but provoke political censure with the SETI program. The NASA Origins program, with its new ambitious missions such as the Next Generation Space Telescope and the Space Interferometry Mission will provide a wealth of new astrononomical data that will benefit all fields of astronomy . It will also provide vast increases in scientific understanding that will be essential for all SETI progams. But in terms of the SETI search strategies it focuses all its efforts on the strategy least likely to find intelligent life in order to be palatable to the social and political context.

3. The Scientific SETI Strategy

The scientific SETI strategy , the use of radio receivers to search for intelligent signals from other civilisations, is the subject of most research projects presented to this congress. It is a strategy finely tuned to find life forms that

i) Are more advanced than our own
ii) Are able to communicate with our form of life

An example of such program is the SERENDIP project at the University of California, Berkeley (under the leadership of S. Bowyer, D.Wertheimer and collaborators). A radio receiver is placed parasitically on a large radio telescope such as the Arecibo array. The radio signal is analysed to find signals that are different from radio interference from man made sources, or emission from astronomical phenomena. Once an interesting signal is found, follow on scientific investigations are launched.

Such a strategy is tuned to find distant civilisations with which communication is likely to be arduous (due to light travel times) , but with the anticipation that advanced civilisations will seek to contact us and to transmit useful information to us.

The SETI Institute in California was founded after NASA terminated funding for all its scientific SETI programs. It has been able to obtain substantial private funding from philanthropists; foundations and indviduals. This is perhaps surprising except to note that the scientific SETI search strategy falls within a spiritual or religious context in society at large; Religions, particularly theist religions,have of course been able to obtain substantial private funding over the millenia. The scientific SETI strategy connects subconsciously with the ages old spiritual quest of humanity to make contact with a superior extraterrestial intelligence; it is no surprise then that established theist religions which claim already to have a monopoly on communication with an extraterrestial intelligence would respond negatively to the scientific SETI program.

4. Currents within the arts

Within the artistic community there is a very active and lively debate about the nature of life and the possibility of contact between the human species and other life forms. These discussions have been particularly prominent in recent years within the conferences of Ars Electronica and the International Symposiun of the Electronic Arts. Two new scientific disciplines have fueled these new artistic explorations:

i) The new sciences of artificial life (2)

ii) The new emerging science of consciousness. (3)

The sophisticated use of computers by artists has allowed them to participate actively in the scientific debates. Artists such as Christa Sommerer and Jane Prophet have created artificial life forms within the virtual world of computer simulations. Their work can be seen as primitive experiments in communication with other life forms. Artists such as Stelarc seek to create symbiotic hybrids of their own body with technological systems; art theorist Donna Haraway has explored the re-invention of nature with her cyborg manifesto (4). Artists such as Ken Goldberg and Eduardo Kac have begun to explore basic questions in telepistomology as they develop artworks that use telepresence. Robotic devices are viewed not as extensions of the human but rather the incorporation of other intelligence within human being and consciousness. Eduardo Kac has created one art work which creates an electronic feedback system between a bird and a plant as an ironic commentary on inter-species communication.

The new emerging view shares a very ecological view of humans in nature, and that life needs to be seen as a spectrum from the most simple forms in clays and microbes, to the more complex forms in primates . As articulated by researcher Stuart Kauffman (5) life is viewed as a common and natural property of complex organisation of matter, under conditions "at the edge of chaos". In this view the universe is teeming with life forms of various stages of complexity. Indeed from the point of view of some artists artificial life forms within the virtual worlds of computer simulations are part of this spectrum of life. A new kind of SETI strategy emerges from this context, one which involves a strategy of entering into contact and dialogue with all forms of life. Philosopher Gregory Bateson argued for the development of what could be seen as a "global mind", through the new interconnections betzeen humans. This social context connects with the existing scientific efforts to enter into communication with other primates or with dolphins. This view would argue that a long term SETI strategy should intentionally include the interconnection of life forms and species on our planet.

Another element in the arts discussion is represented by the artwork of Jean Marc Philippe. His work has included sending out messages through the French minitel system, and then transmitted into space through a radio telescope, from thousands of interested membes of the public. He is currently working on a project to create an orbiting monument intended to be a depository that will survive the human species, an orbiting monument, that is designed to survive at least 100,000 years. In a sense these projects connect to the age old desire to create monuments that will speak to future generations or civilisations.

A recent conference on "Art and Consciousness" held at the Center for Interactive Inquiry and the Arts in Wales, has laid out a long term agenda to connect the arts with the new emerging science of consciousness - a confluence of research in the cognitive sciences, neurobiology, artificial intelligence, psychology and philosophy. This debate within the artworld is an important new development that should be connected with the long term SETI strategy.

5. SETI Strategies within the search for the "other"

When we discuss SETI strategies in a broader cultural context we need to understand that the scientific SETI programs are embedded within a much larger social discourse. These discourses are driven by deep seated human desires, desires recorded in the arts and literature and in all the mythologies that continue to flourish, motivate ane contextualise human actions.

I would argue that the cultural context for SETI needs to be viewed as a continuum that can be schematised as:

i) The search for heightened self awareness and consciousness; This search has been manifest through a number of eastern religions, but also connects to current interest in the new science of consciousness.

ii) Search for heightened or enhanced inter-personal relationships. The phenomena of romantic love, spiritual communities and virtual communities are manifestations of this drive.

iii) Search for contact with other life forms on earth, inter-species communication. The "green" interest in the concept of Gaia; the earth as a system in communication and equilibrium.

iv) Search for communication with future generations or civilisations. This is one of the drives underlying the western arts (monuments, cathedrals, pyramids).

v) Search for extra-terrestial primitive or fossil life forms. This is the thrust of the new NASA Origins program. It

provides a rationale for space exploration within the politicial context of economic competiveness; the human race needs extraterrestial resources for survival; alien life forms must be primitive or extinct.

vi) The search for extraterrestial life forms that are more advanced than our own. Connects to spiritual drives for supra human beings.

6. SETI and Society

If we are to address SETI and the media, education and the public, I want to argue that our goal is not to communicate our scientific programs. Rather it is to enter into dialogue with those outside the scientific community interested in the agenda that begins with enhancing our own consciousness and connects to communication with extra-terrestial intelligences. If indeed SETI is a program that will require decades if not centuries of sustained effort , then the issue is not communicating facts and dispelling misunderstandings. Rather it is building a cultural concensus that SETI is a basic part of the human agenda. From my contacts with artists, I am painfully aware that many are very scientifically literate, but that the cultural awareness of scientists and engineers makes them ill equipped to enter into a dialogue that will help build this cultural support for the SETI program. The International Academy of Astranautics has been working to create such dialogue through the activities of its Committee on Space and Society, and subcommittee on Art and Literature. The SETI Committee of the International Academy of Astronautics has recently created a subcommittee on the Media and Education. Such groups create mechanisms where scientists; engineers and cultural professionals can work together as colleagues. In the long run such efforts are likely to be important elements in the creation of the necessary dialogue and support of common agendas.

References

1. Roadmap for the Office of Space Science Origins Theme, NASA Document JPL-400-700 7/1997. See also the web site at http://origins.jpl.nasa.gov.

2. The seminal text is Christopher G. Langton, ed., Artificial Life, Santa Fe Institute studies in the Sciences of Complexity, Vol 6 (Reading, Ma: Addison Wesley, 1989).

3. The key journal is the Journal of Consciousness Studies, Imprint Academic, PO Box 1, Thorventon EX5 5YX, UK.

4. D. J.Haraway, Simians, Cyborgs and Women, (London: Free Association Books, 1991)

5. S. Kauffman, At Home in the Universe: The search for the laws of self organisation (New York/ Oxford University Press, 1995)