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\*\*\*Inherency\*\*\*

Private Donations will Solve SQ

A new funding program hopes to tap into SETI’s donor base

Darling, multimedia journalist, 2011

(Dylan, “SETI scours Earth for cash; donations sought to restart deep space search,” *Redding Magazine*, May 27, NS)

Since mid-April, the Allen Telescope Array, a collection of radio dishes about 75 miles east of Redding, has been in hibernation after the state and federal government steeply cut funding. To bring the array back online, the Search for Extraterrestrial Intelligence (SETI) Institute is trying to find $2.5 million a year in support, said Tom Pierson, CEO for the nonprofit organization in Mountain View. "We are basically trying to tap our donor base," he said. So far SETI has about $100,000 for the array, but it's about to launch a new fundraising program called SETI Stars in the next two weeks to a month, Pierson said. While he was tight with details, Pierson said the new program will feature social networking designed by Silicon Valley entrepreneurs. He said the idea is to have donors have a sense of personal participation and feedback. SETI already has "tens of thousands" of supporters and more than 110,000 followers on Twitter, Pierson said.

SETI will survive

Even without proper funding SETI will stay alive

ABC 4-27-11

(Australian Broadcasting Company: “SETI will survive cuts says astronomer” , http://www.abc.net.au/science/articles/2011/04/27/3201466.htm , Lexis 4-27-2011 MLF 6-24-11)

A top astronomer searching for extra-terrestrial intelligence is optimistic SETI will survive, despite its main telescope being shut down. The University of California Berkeley's Allen Telescope Array (ATA) has been placed in hibernation due to funding cuts, according to an announcement on the SETI Institute's website. The SETI (Search for Extraterrestrial Intelligence) Institute, a private organisation, built the radio telescope array at the UC Berkeley observatory site at Hat Creek. SETI operates the array in partnership with the university, and the project relies on ongoing federal and state government funding. Dr Seth Shostak, SETI senior astronomer, says that funding cuts have hit radio astronomy particularly hard, and that the SETI project is a part of the radio astronomy research being done at the UC Berkeley observatory site. "It's certainly not the end of SETI," says Shostak, "but it is an unfortunate development because while our telescope is on hold, we're not moving forward with it unless we can find some money to operate it." Shostak says it costs around US$2.5 million per annum to maintain the telescope. "For basic research, that's not a terribly expensive project," says Shostak. He says he hasn't thrown in the towel just yet. "The first thing we're going to do is try and find that money and reinstate the telescope, get it out of park and into gear. That would be the best solution because this is the best instrument for checking out some of the planets that are being found by NASA's Kepler telescope that are reckoned to be somewhat similar to Earth, planets that might be cousins of our own and might have life." "Clearly you want to know if they have intelligent life and the best instrument to answer that question would be the Allen Telescope Array," he says. Shostak says that there are still some smaller scale SETI experiments going on in different countries, searching for radio waves and laser light pulses from far off places in the universe. In the meantime, he says, there is plenty of work to be done analysing the data the ATA has already gathered. "We're proceeding with our plans to make some of the data collected by this telescope available to the public [via our] SETI Quest program, and anyone can get involved in looking at these data on the web." "The long term outlook is either get this telescope going again or think of other experiments that can take advantage of the equipment that we do have," Shostak says.

May have to use other people’s SETI equipment if the ATA can’t be funded again

Shostak, alien hunter at the SETI Institute, 11 (Rachel Saslow - Interviewer, Staff Writer for the Washington Post – specializes in Health and National issues, June 21, Washington Post, “Q-and-A with 'alien hunter' Seth Shostak Q and A with 'alien hunter' Seth Shostak,” Lexis, http://www.lexisnexis.com/hottopics/lnacademic/) KA

What happens now? If the Allen Telescope Array can't be brought back, and I think it can, then we go to Plan B, which is unclear but likely is to use other people's equipment. Do you still feel confident that you'll have success by 2025? The prediction is based on the fact that SETI keeps getting faster because the equipment gets better. If this experiment is going to succeed, then it's going to succeed during a generation, not hundreds of years. It's either going to work rather quickly or there's something wrong with the idea.

The public SETI solves

Tarter, Director of Center for SETI Research, 1

**(Jill, “The search for extraterrestrial intelligence”, p533,** <http://astro.wsu.edu/allen/courses/astr450/annurev.astro.39.1.511.pdf>**) PG**

The time had deﬁnitely come for other backyard SETI. The nonproﬁt SETI League incorporated and launched Project Argus in 1996 to coordinate the efforts of radio amateurs in an attempt to listen to the entire sky at all times (requiring about 5000 small antennas) for strong transient signals. They now have 105 stations operating in 19 countries. The public has also become involved in SETI data reduction via the UC Berkeley screensaver (SETI@home). This is by far the most successful distributed computing project ever undertaken. More than 2.9 million people in more than 226 countries have downloaded this screensaver!

\*\*\*Search Adv Answers\*\*\*

Green Bank Telescope Solves

Byrd, former senator from West Virginia, 11

(Robert, May 21, Space Daily, “Searching for Aliens on Kepler’s Planets,” Lexis, NOTE: SETI@home = a scientific experiment that uses Internet-connected computers in the Search for Extraterrestrial Intelligence (SETI). You can participate by running a free program that downloads and analyzes radio telescope data.) KA

Now that NASA's Kepler space telescope has identified 1,235 possible planets around stars in our galaxy, astronomers at the University of California, Berkeley, are aiming a radio telescope at the most Earth-like of these worlds to see if they can detect signals from an advanced civilization. The search began on Saturday, May 8, when the Robert C. Byrd Green Bank Telescope - the largest steerable radio telescope in the world - dedicated an hour to eight stars with possible planets. Once UC Berkeley astronomers acquire 24 hours of data on a total of 86 Earth-like planets, they'll initiate a coarse analysis and then, in about two months, ask an estimated 1 million SETI@home users to conduct a more detailed analysis on their home computers. "It's not absolutely certain that all of these stars have habitable planetary systems, but they're very good places to look for ET," said UC Berkeley graduate student Andrew Siemion. The Green Bank telescope will stare for about five minutes at stars in the Kepler survey that have a candidate planet in the star's habitable zone - that is, the planet has a surface temperature at which liquid water could be maintained. "We've picked out the planets with nice temperatures - between zero and 100 degrees Celsius - because they are a lot more likely to harbor life," said physicist Dan Werthimer, chief scientist for SETI@home and a veteran SETI researcher. Werthimer leads a 30-year-old SETI project on the world's largest radio telescope, the Arecibo receiver in Puerto Rico, which feeds data to SETI@home for a detailed analysis that could only be done on the world's largest distributed computer. He was involved in an early SETI project with the previous Green Bank telescope, which collapsed from structural failure in 1988, as well as with the Allen Telescope Array (ATA), which also conducted a broader search for intelligent signals from space run by the SETI Institute of Mountain View, Calif. The ATA went into hibernation mode last month after the SETI Institute and UC Berkeley ran out of money to operate it. "With Arecibo, we focus on stars like our Sun, hoping that they have planets around them that emit intelligent signals," Werthimer said. "But we've never had a list of planets like this before." The radio dish in rural West Virginia was needed for the new search because the Arecibo dish cannot view the area of the northern sky on which Kepler focuses. But the Green Bank telescope also offers advantages over Arecibo. UC Berkeley's SETI observations piggyback on other astronomical observations at Arecibo, and is limited in the wavelength range it can observe, which centers on the 21 centimeter (1420 MHz) line where hydrogen emits light. These wavelengths easily pass through the dust clouds that obscure much of the galaxy. "Searching for ET around the 21 centimeter line works if civilizations are broadcasting intentionally, but what if planets are leaking signals like 'I Love Lucy'?" Werthimer said. "With a new data recorder on the Green Bank telescope, we can scan a 800 megahertz range of frequencies simultaneously, which is 300 times the range we can get at Arecibo." Thus, one day on the Green Bank telescope provides as much data as one year's worth of observations at Arecibo: about 60 terabytes (60,000 gigabytes) in all, Siemion said. If they recorded a similar chunk of the radio spectrum from Arecibo, SETI@home would be overwhelmed with data, since the Arecibo sky survey observes nearly full time for years on end. "It's also great that we will completely span the water hole, a canonical place to look for intentional signals from intelligent civilizations," Siemion said. The water hole is a relatively quiet region of the radio spectrum in the universe and a range of wavelengths not significantly absorbed by material between the stars and galaxies. The water hole is bounded on one end by the 21 cm emissions from neutral hydrogen and on the other by the 18 cm emissions from the hydroxyl ion (OH). Because life is presumed to require the existence of liquid water, and water is composed of hydrogen and hydroxyl, this range was dubbed the water hole and seen as a natural window in which water-based life forms would signal their existence. That makes the water hole a favorite of SETI projects. "This is an interesting place, perhaps a beacon frequency, to look for signals from extraterrestrial civilizations," Siemion added. The 86 stars were chosen from the 1,235 candidate planetary systems - called Kepler Objects of Interest, or KOIs - with the help of Kepler team member Geoffrey Marcy, professor of astronomy at UC Berkeley. UC Berkeley's targets include the 54 KOIs identified by the Kepler team as being in the habitable temperature range and with sizes ranging from Earth-size to larger than Jupiter; 10 KOIs not on the Kepler team's habitable list but with orbits less than three times Earth's orbit and orbital periods greater than 50 days; and all systems with four or more possible planets. After the Green Bank telescope has targeted each star, it will scan the entire Kepler field for signals from planets other than the 86 targets. A coarse analysis of the data by Werthimer and his team will be followed by a more thorough analysis by SETI@home users, who will be able to see whether they are analyzing Green Bank data as opposed to Arecibo data. The complete analysis for intelligent signals could take a year, Werthimer said. "If you extrapolate from the Kepler data, there could be 50 billion planets in the galaxy," he said. "It's really exciting to be able to look at this first batch of Earth-like planets."

Green Bank Telescope Solves

Kepler telescope and Green Bank Telescope may have identified planets with E.T.

Sheridan, health and science reporter for AFP in D.C., 11

(Kerry, May 14, Agence France Presse, “US astronomers launch search for alien life on 86 planets, Lexis) KA

A massive radio telescope in rural West Virginia has begun listening for signs of alien life on 86 possible Earth-like planets, US astronomers said Friday. The giant dish began this week pointing toward each of the 86 planets -- culled from a list of 1,235 possible planets identified by NASA's Kepler space telescope -- and will gather 24 hours of data on each one. "It's not absolutely certain that all of these stars have habitable planetary systems, but they're very good places to look for ET," said University of California at Berkeley graduate student Andrew Siemion. The mission is part of the SETI project, which stands for Search for Extra Terrestrial Intelligence, launched in the mid 1980s. Last month the SETI Institute announced it was shuttering a major part of its efforts -- a 50 million dollar project with 42 telescope dishes known as the Allen Telescope Array (ATA) -- due to a five million dollar budget shortfall. ATA began in 2007 and was operated in partnership by the UC Berkeley Radio Astronomy Lab, which has hosted several generations of such experiments. It was funded by the SETI Institute and the National Science Foundation (NSF). With ATA's dishes in hibernation for now, astronomers hope the powerful Green Bank Telescope, a previous incarnation of which was felled in a windstorm in 1988, will provide targeted information about potential life-supporting planets. "Our search employs the largest fully steerable radio telescope on the planet, and the most sensitive radio telescope in the world capable of undertaking a SETI search of this kind," Siemion told AFP. "We will be looking at a much wider range of frequencies and signal types than has ever been possible before," he added, describing the instrumentation as "at the very cutting edge of radio astronomy technology." The surface of the telescope is 100 by 110 meters and it can record nearly one gigabyte of data per second, Siemion said. The 17 million pound (7.7 million kilogram) telescope became operational in 2000 and is a project of the NSF's National Radio Astronomy Observatory. "We've picked out the planets with nice temperatures -- between zero and 100 degrees Celsius -- because they are a lot more likely to harbor life," said physicist Dan Werthimer. Werthimer heads a three-decade long SETI project in Puerto Rico, home of the world's largest radio telescope, Arecibo. However that project could not observe the same area of the northern sky as the Green Bank telescope, he said. "With Arecibo, we focus on stars like our Sun, hoping that they have planets around them that emit intelligent signals," Werthimer said in a statement. "But we've never had a list of planets like this before." The Green Bank Telescope can scan 300 times the range of frequencies that Arecibo could, meaning that it can collect the same amount of data in one day that Arecibo could in one year. The project will likely take about a year to complete, and will be helped by a team of one million at-home astronomers, known as SETI@home users, who will help process the data on personal computers.

ETI Don’t Exist

The longtime unsuccessfulness of SETI and unique circumstances required to develop advanced lifeforms makes extraterrestrials unlikely

Schenkel, chairman of the group Prociencia and author on extraterrestrials, 2006

(Peter, “SETI Requires a Skeptical Reappraisal,” The Committee for Skeptical Inquiry, 3:3, May/June, NS).

Extensive SETI searches without results and the difficulty of developing complex life forms suggests that discovering extraterrestrial life is highly unlikely. First of all, since project OZMA I in 1959 by Frank Drake, about a hundred radio-magnetic and other searches were conducted in the U.S. and in other countries, and a considerable part of our sky was scanned thoroughly and repeatedly, but it remained disappointingly silent. In forty-six years not a single artificial intelligent signal or message from outer space was received. Some specialists try to downplay this negative result, arguing that so far only a small part of the entire spectrum has been covered, and that more time and more sophisticated equipment is required for arriving at a definite conclusion. Technological and economic criteria may thwart the possibility of extraterrestrial civilizations beaming signals into space over long stretches of time, without knowing where to direct their signals. Or, they may use communication methods unknown to us. Another explanation is that advanced ETI may lack interest in contacting other intelligences, especially those less developed. The argument of the Russian rocket expert Konstantin Tsiolkovski is often quoted: “Absence of evidence is not evidence of absence.” But neither of these arguments, which attempt to explain why we have not received a single intelligent signal from space-is convincing. True, future search projects may strike pay dirt and register the reception of a signal of verified artificial origin. But as long as no such evidence is forthcoming, the possibility of achieving success must be considered remote. If a hundred searches were unsuccessful, it is fair to deduce that estimates of a million or many thousands ETI are unsustainable propositions. As long as no breakthrough occurs, the probability of contact with ETI is near to zero. The argument that advanced extraterrestrials may not be interested in contact with other intelligences is also-as I will show-highly implausible. Second, as recent research results demonstrate, many more factors and conditions than those considered by the Drake formula need to be taken into account. The geologist Peter D. Ward and the astronomer Donald Brownlee present in their book Rare Earth a series of such aspects, which turn the optimistic estimates of ETI upside down. According to their reasoning, the old assumption that our solar system and Earth are quite common phenomena in the galaxy needs profound revision. On the contrary, the new insights suggest, we are much more special than thought. The evolution of life forms and eventually of intelligent life on Earth was due to a large number of very special conditions and developments, many of a coincidental nature. I'll mention only some that seem particularly important: The age, size, and composition of our sun, the location of Earth and inclination of its axis to it, the existence of water, a stable oxygen-rich atmosphere and temperature over long periods of time-factors considered essential for the evolution of life-and the development of a carbon-based chemistry. Furthermore an active interior and the existence of plate tectonics form the majestic mountain ridges like the Alps, the Himalayas and the Andes, creating different ecological conditions, propitious for the proliferation of a great variety of species. Also the existence of the Moon, Jupiter, and Saturn (as shields for the bombardment of comets and meteorites during the early stages of Earth). Also the repeated climatic changes, long ice ages, and especially the numerous and quite fortuitous catastrophes, causing the extinction of many species, like the one 65 millions years ago, which led to the disappearance of dinosaurs, but opened the way for more diversified and complex life forms. Though first primitive life forms on Earth, the prokaryotic bacteria, evolved relatively rapidly, only about 500 million years after the cooling off of Earth’s crust and the end of the dense bombardment of meteorites and comets, they were the only lifeforms during the first two billion years of Earth’s 4.6-billion-year history. Mammals-including apes and man-developed much later, only after the extinction of the dinosaurs 65 million years ago. The first human-like being, the Proconsul, emerged in the Miocene Period, just about 18 million years ago. The Australopithecus, our antecessor, dates only 5 to 6 million years. In other words, it took almost 4 billion years, or more than 96 percent of the age of Earth, for intelligence to evolve-an awfully long time, even on the cosmic clock. In this regard we should note also the caveat of the distinguished biologist Ernst Mayr, who underscored the enormous complexity of human DNA and RNA and their functions for the production of proteins, the basic building blocks of life. He estimated that the likelihood that similar biological developments may have occurred elsewhere in the universe was nil. The upshot of these considerations is the following: Because of the very special

geological, biological, and other conditions which propitiated the evolution of life and intelligence on Earth, similar developments in our galaxy are probably very rare. Primitive life forms, Ward and Brownlee conclude, may exist on planets of other stellar systems, but intelligent life, as ours, is probably very rare, if it exists at all. Third is the so called “Fermi Paradox” another powerful reason suggesting a skeptical evaluation of the multiplicity of intelligence in the galaxy. Italian physicist Enrico Fermi posed the annoying question, “If so many highly developed ETIs are out there, as SETI specialists claim, why haven't they contacted us?” I already expressed great doubt about some of the explanations given to this paradox. Here I need to focus on two more. The first refers to the supposed lack of interest of advanced aliens to establish contact with other intelligent beings. This argument seems to me particularly untrustworthy. I refer to a Norwegian book, which explains why the Vikings undertook dangerous voyages to far-away coasts in precarious vessels. “One reason,” it says, “is fame, another curiosity, and a third, gain!” If the Vikings, driven by the desire to discover the unknown, reached America a thousand years ago with a primitive technology, if we-furthermore-a still scientifically and technically young civilization, search for primitive life on other planets of the solar system and their moons, it is incredible that higher developed extraterrestrial intelligences would not be spurred by likewise interests and yearnings. One of the fundamental traits of intelligence is its unquenchable intellectual curiosity and urge to penetrate the unknown. Elder civilizations, our peers in every respect, must be imbued by the same daring and scrutinizing spirit, because if they are not, they could not have achieved their advanced standards.

ETI Don’t Exist – Fermi’s Paradox

The timescale of colonization and lineweaver confirm Fermi’s paradox

Cirkovic and Vukotic, scientists at the Astronomical Observatory of Belgrade, 2008

(Milan M and Branislav, “Astrobiological Phase Transition: Towards Resolution of Fermi's Paradox,” Springer Science Astrobiology, September 22, NS)

Tslolkovsky, Fermi, Viewing, Hart, and their supporters argue on the basis of two premises: the absence of extraterrestrials in the Solar System, and the fact that they have had, ceteris paribus, more than enough time in the history of the Milky Way Galaxy to visit our Solar System, either in person or through their self-replicating probes. Characteristic time for colonization of the Galaxy, according to these investigators, is what we shall call the Fermi-Hart timescale (Hart 1975; Tipler 1980): tm ~ 106 - 108 years, (1) making the fact that the Solar System is (obviously) not colonized hard to explain, if not for the total absence of extraterrestrial cultures. It is enough for our purposes to consider that this timescale is well-defined, albeit not precisely known due to our ignorance on the possibilities and modes of interstellar travel. As discussed in more detail elsewhere (Cirkovic and Bradbury 2006), there are reasons for finding Fermi's Paradox even more disturbing following recent results in astronomy, astrobiology, information theory and computer science. Particularly relevant is the result of Lineweaver (2001; see also Lineweaver et al. 2004) that the difference between the median age of Earth-like planets in the Milky Way and the age of Earth is: t-t& = 1.8±0.9Gyr. (2) Such a huge difference (and this is only the median age difference; in fact, to assess the validity of Fermi's paradox we ought to consider the oldest habitable planets where, presumably, the oldest technological civilizations emerged first) makes Fermi's question significantly more puzzling. Before Lineweaver's study it was still possible to argue that the age distribution strongly peaks near % or even at some smaller value. Coupled with the assumption of a narrow distribution of biological evolutionary timescales, it would have made the ages of hypothetical technological civilizations small enough in comparison with tea.. This "Copemican" way of addressing the paradox without introducing new elements in the overall picture is now closed. Thus, finding novel plausible explanations for the "Great Silence" is still very much a worthwhile endeavour.

SETI ≠ Contact

SETI will not lead to discovery

Shostak, Radio Astronomer at SETI Institute, 1 (Seth, April, Vol. 101, Issue 4,Sky & Telescope, EBSCO, “The Future of SETI”) PG

Planets inhabited by high technologies (if they exist at all) are surely much rarer than planets inhabited by bacteria. After all, microbes were Earth's most advanced life forms for nearly a million times longer than the span of written human history. But a tantalizing prospect fires the imagination: the rare technological worlds may actually be the easiest to find. Unlike bacteria, intelligent creatures could make themselves known across vast interstellar distances. They could do it with radio transmitters or lasers not much bigger than our own. Maybe they are doing it right now. Searches for extraterrestrial intelligence (abbreviated SETI) have no obvious hunting ground and no clear route to discovery. Instead, after 40 years researchers have amassed a mountain of speculation and only a small hill of experiment. If sentient beings exist among the stars, they have remained beyond the grasp of our instruments.

ETI not Broadcasting

Alien communicators will also be constrained by economic reasoning

Benford, astrophysicist and in the department of Physics and Astronomy at UC Irvine, Benford, expert in high powered microwaves, 2011

(Gregory, James, “Smart SETI,” Analog Science Fiction & Fact, 131:4, p.33, April, NS)

Traditional SETI research takes the point of view of receivers, not transmitters. This neglects the implications for what signals should look like in general, and especially the high emitting costs, which a receiver does not pay. 6 We shall assume, like conventional SETI, that microwaves are simpler for planetary societies, since they can easily outshine their star in microwaves. Microwaves are probably better for Beacons (Tarter, 2001). Whatever the life form, evolution will select for economy of resources. This is an established principle in evolutionary theory (Williams, 1966). Further, Minsky (1985) argues that a general feature of intelligence is that it will select for economy of effort, whatever the life form. Tullock (1994) argues that social specie evolve to an equilibrium in which each species unconsciously carries out “environmental coordination” which can follow rules like those of a market, especially among plants. He gives many such examples. Economics will matter. A SETI broadcaster will face competing claims on resources. Some will come from direct economic competition. Standing outside this, SETI beaming will be essentially altruistic, since replies will take centuries if not millennia, or else are not even an issue. SETI need not tax an advanced society’s resources. The power demands in our companion paper are for average powers ≦GW, far less than the 17 TW now produced globally (Hoffert et al., 2002) But even altruistic Beacon builders will have to contend with other competing altruistic causes, just as humans do (Lemarchand and Lomberg, 1996). They will confront arguments that the response time for SETI is millennia, and that anyway, advanced societies leak plenty of microwaves etc. into deep space already. We take up these issues below. It seems clear that for a Beacon builder, only by minimizing cost/benefit will their effort succeed. This is parsimony, meaning ‘less is better’ a concept of frugality, economy. Philosophers use this term for Occam’s Razor, but here we mean the press of economic demands in any society that contemplates long term projects like SETI. On Earth, advocates of METI (Messaging to Extraterrestrial Intelligence) will also face economic constraints (Benford et al., 2010).

No communication- Tech Gap + Language

No contact solvency, communication would be impossible

Tough, Professor Emeritus at the University of Toronto, ’00

(Allen, *Foundation for the Future*, 2000, “When SETI Succeeds: The Impact of High-Information Contact”, www.futurefoundation.org/documents/hum\_pro\_wrk1.pdf , p. 11, 21 July 2011) SW

Or, we could discover an alien probe or artifact that we could not understand. Maybe we will intercept a communication that has high information content but that is indecipherable to us. Given that our two civilizations may be separated by millions of years of evolution, translation and interpretation could be very difficult. Perhaps whole careers and institutes will be devoted to these processes, but with very little progress and very little impact on our descendants’ daily lives. How well could we communicate with humanity of the year 3000, much less with even more advanced beings from entirely different genetic and cultural backgrounds? There may be ethical as well as linguistic barriers to communication. Among the many reasons listed for our current “absence of evidence” are that ETI civilizations consider it unethical to alter the course of a developing civilization, or consider it desirable to preserve some civilizations for future study (Ball, 1973). Our ability to learn from ETI may depend on their perception of our readiness to acquire advanced information or to meet entrance-level requirements for the Galactic Club. We must be prepared for the possibility that we are not considered worth talking to, or that we will receive limited information that does not put the continuity of our physical, scientific, and moral evolution at risk. Despite the fact that we may have little or no information beyond knowledge that the other civilization exists, confirmation would have two profound implications. First, it would tell us that we are not alone in the universe, that the rise of intelligent life is not a unique event. This, by itself, could have a major impact on our philosophy, science, religion, and views of ourselves. Second, confirmation would tell us that civilizations can survive their period of technological adolescence and achieve a level of technology that makes interstellar communication possible. It would strengthen hope that we can work our way through population growth, environmental decline, war, and the other threats that cloud humanity’s future.

Contact wouldn’t solve- impractical for advanced civilization to communicate with us

Tough, Professor Emeritus at the University of Toronto, ’00

(Allen, *Foundation for the Future*, 2000, “When SETI Succeeds: The Impact of High-Information Contact”, www.futurefoundation.org/documents/hum\_pro\_wrk1.pdf , p. 15, 21 July 2011) SW

On the other hand, we might question whether or not advanced civilizations would have, or at least use, some of the technology that we impute to them. For example, Dyson spheres and omnidirectional beacons may be avoided because they constitute needless expense, squander resources, and manufacture pollution as well as being irrelevant to their life forms. Additionally, we may not be judged “ready” to receive such information. After all, would you give a child the secret code of ballistic missiles just so he or she could enjoy playing with them? Finally, information that is practical to them may or may not be practical to us, especially if they were radically different from us, such as would be the case if they were “machine intelligence.” Their ideas may seem very “academic” to us, depending on the problems that confront us at that future time. Perhaps the most exciting prospect is that we will learn how ET civilizations survived their technological adolescence. Perhaps they will have a developed empirical field of study that can define critical bottlenecks in civilizational advances and elaborate ways of navigating them (Tough, 1986). In the very long run, the challenge will be outliving one’s star, by building one’s own “world” or using giant transports to migrate to another solar system. As far as we can tell, there are no phenomena suggestive of astroengineering in the vicinity of stars about to become red giants.

There is a communication gap between humans and aliens

Folger, Editor at Discover, 11 (Tim, January, Scientific American, Volume 304, Issue 1, p40-45, EBSCO, “Contact the Day After”) PG

"**We run into an irreducible problem with communication that isn't face to face, and that is the problem of establishing a referent,**" Denning says. "If you and I speak different languages, and we're in the same room, I can point to a table, and I can say 'table,' and you infer that 'table' is my word for that thing, and then we can go from there. That's the time-honored way of learning languages. **If you're not in direct contact, if you can't do that kind of pointing exercise, there's always this question of what you're referring to in these initial communications**. Scientists--physical scientists and mathematicians in particular-tend to be more prone to thinking that because we'll be dealing with the same physical structures in the universe, we can use those as our Rosetta Stone, so to speak, and build up from there-send each other the value of pi, and then we're off to the races. But anthropologists tend not to be so comfortable with that**. Errors can take place right at the get-go. For example, if I give you a signal--beep, beep, beep--is that three or two? Are we counting the beeps or the spaces? We have fundamental assumptions built in.**"

No Communication- Ethics

Aliens don’t want to communicate with us- it’s not ethical

Tough, Professor Emeritus at the University of Toronto, ’00

(Allen, *Foundation for the Future*, 2000, “When SETI Succeeds: The Impact of High-Information Contact”, www.futurefoundation.org/documents/hum\_pro\_wrk1.pdf , p. 12, 21 July 2011) SW

Or, we could discover an alien probe or artifact that we could not understand. Maybe we will intercept a communication that has high information content but that is indecipherable to us. Given that our two civilizations may be separated by millions of years of evolution, translation and interpretation could be very difficult. Perhaps whole careers and institutes will be devoted to these processes, but with very little progress and very little impact on our descendants’ daily lives. How well could we communicate with humanity of the year 3000, much less with even more advanced beings from entirely different genetic and cultural backgrounds? There may be ethical as well as linguistic barriers to communication. Among the many reasons listed for our current “absence of evidence” are that ETI civilizations consider it unethical to alter the course of a developing civilization, or consider it desirable to preserve some civilizations for future study (Ball, 1973). Our ability to learn from ETI may depend on their perception of our readiness to acquire advanced information or to meet entrance-level requirements for the Galactic Club. We must be prepared for the possibility that we are not considered worth talking to, or that we will receive limited information that does not put the continuity of our physical, scientific, and moral evolution at risk. Despite the fact that we may have little or no information beyond knowledge that the other civilization exists, confirmation would have two profound implications. First, it would tell us that we are not alone in the universe, that the rise of intelligent life is not a unique event. This, by itself, could have a major impact on our philosophy, science, religion, and views of ourselves. Second, confirmation would tell us that civilizations can survive their period of technological adolescence and achieve a level of technology that makes interstellar communication possible. It would strengthen hope that we can work our way through population growth, environmental decline, war, and the other threats that cloud humanity’s future.

Can’t Interpret the Communication

Resources do not exist to interpret information from extraterrestrial messages

Folger, Editor at Discover, 11 (Tim, January, Scientific American, Volume 304, Issue 1, p40-45, EBSCO, “Contact the Day After”) PG

Even if the signal is confirmed as an authentic transmission from an extraterrestrial civilization, it is unlikely that astronomers would be able to extract any information from it for many years. SETI's instruments are designed to search for steady, periodic narrowband radio pulses--carrier waves powerful enough to be detectable across many light-years. The pulse itself would yield no information, other than its artificial nature. Any message content would likely be in the form of changes in amplitude or frequency buried within the pulse. Even a large radio telescope would need to repeatedly scan a small patch of sky to build up the signal pulse above background radio noise. In doing so, it would average out modulations on finer time-scales that might contain a message. Resolving the message would require an antenna far more powerful than Earth's largest, the 305-meter dish at Arecibo, Puerto Rico. "You would need something on the order of 10,000 times bigger than Arecibo," Shostak says. Rather than a single enormous dish, such a telescope would probably consist of many smaller antennas spread across a large area and linked electronically. Constructing such an instrument would require international collaboration and funding, with no guarantee that the message--if the signal contained one--could ever be deciphered. "That's not something you'd do overnight," Shostak observes. "That's a big project. I think we would do it, because--gosh darn it--we would want to know what they're saying."

Length of time takes out the impacts to contact – people lose interest

Folger, Editor at Discover, 11 (Tim, January, Scientific American, Volume 304, Issue 1, p40-45, EBSCO, “Contact the Day After”) PG

TAKING INTO ACCOUNT political debates and the time needed to build a telescope sensitive enough to analyze the signal, years would pass before astronomers or cryptographers could begin to attempt to decipher a message from the stars. S**o whereas that first contact with another intelligence would in itself be one of the most important scientific discoveries of all time, the lack of any further knowledge about the nature of that alien intelligence would limit the immediate cultural impact.** The story of the discovery would monopolize headlines for a while, but our collective attention span would inevitably move on while scientists sought to translate the message.

Not Ready for Extraterrestrials

Ethical guidelines must be established before the discovery of extraterrestrial life forms.

Daly, graduate student in the School of Life Sciences and Frodeman, Chair of the Department of Philosophy at the University of North Texas, 8

(Erin, and the Center for Science UNT and Robert, “Separated at Birth, Signs of Rapprochement: Environmental Ethics and Space Exploration,” Ethics and The Environment, 13: 1, Spring, p.142-143, NS).

Notably, there are no corresponding guidelines for addressing the detection of non-intelligent life forms, nor is there any NASA or international policy for the proper handling of extraterrestrial life.7 Detection by SETI of radio signals light years away poses no immediate risk, but would still raise culturally portentous ethical, philosophical, and theological questions. Even the discovery of microbial life would be a shock. Evidence of microbial life on another planet in our solar system would also require immediate decisions about safe handling, biological risk, experimentation procedures, scientific, legal, and societal ownership, and the proper means of communication to governmental agencies, the scientific community, and the public. These policies should be developed now, before anything is found, for the excitement incurred by such a significant discovery and the need for immediate action will likely affect our ability to formulate appropriate responses (how, for instance, would NASA break the news? How might the news be introduced to school children? [End Page 143] How would NASA engage and respond to religious communities?) These are humanities policy as much as science policy questions. With an aggressive NASA agenda for future life-detection missions, the space science and policy communities will need to develop thoughtful strategies regarding biological and/or political risk of the discovery of life. Philosophical, psychological and theological issues (the possibility, for instance, of sudden societal unrest or greatly increased cult activity), in addition to ethical considerations, will necessarily play a central role in any such thinking. The development of a comprehensive strategy for addressing this discoverywill require interdisciplinary work that includes philosophers, theologians, and social scientists, as well as space scientists and policy makers.8

No Impact to Contact- Nobody Cares

No social impact of contact- only the geeky folk care

Tough, Professor Emeritus at the University of Toronto, ’00

(Allen, *Foundation for the Future*, 2000, “When SETI Succeeds: The Impact of High-Information Contact”, www.futurefoundation.org/documents/hum\_pro\_wrk1.pdf , p. 13, 21 July 2011) SW

Short-term effects of contact will be measured in days, weeks, and months. Long-term effects will be measured in decades, centuries, and perhaps millennia. Short-term effects will be evident in sharp and intense focus in the media, organizations scrambling to redefine themselves and cope with a new reality, and collective behavior. Long-term effects could permeate all aspects of our culture and its institutions. Yet we should not take “an assumption of maximum impact” (White, 1990) for granted, because major scientific discoveries have not necessarily impacted average people who are grappling with the problems of everyday life. It may be that the only people who are really interested are academics and the intellectual descendants of those who are now involved in SETI. If contact is delayed for centuries, it will impact people who may be very different from us. Recent years have seen enormous changes in philosophy, science, and popular beliefs. Certainly, we expect that, compared to people who believed that the Sun circles the Earth, who never heard of evolution, and who never read science fiction, the people of today would respond very differently to ETI. Similarly, the people of tomorrow may have values, interests, and technologies that differ substantially from our own and for this reason react to ETI in ways that we cannot imagine.

Can’t Predict Contact Impact

ETI findings are unpredictable—there are no guarantees

Harrison Professor Emeritus, Psychology, University of California, Davis 2k (Albert A., When SETI Succeeds: The Impact of High-Information Contact, p9, Google Books) PG

Despite widespread expectations that the discovery of ETI will have an enormous impact on humanity in AD 3000, only with very broad strokes can we paint a picture of the future. The consequences of contact for our descendants will depend upon the nature of ETI culture; the speciﬁcs of the contact scenario; and human psychology, institutions, and cultures. Perhaps the greatest deterrent to accurate predictions is that since scientists have yet to observe ETI we can only guess what it will be like**.** Furthermore, attempts to make such guesses are fraught with haz-ard**.** We are sensitive to cross-species and cross-cultural variability on Earth. How much greater could this variability be if we were to extend our observations to biological entities whose genetic and cultural backgrounds have nothing in common with our own? Another risk is our tendency to anthropomorphize, that is, wrongly impute human characteristics to nonhumans and even inanimate objects. There are many hypotheses about ETI, but until we actually make contact, we will not know which (if any) of these hypotheses are correct**.**

AT: Contact = Sweet Tech

We overestimate the technological capabilities of extraterrestrials

Harrison Professor Emeritus, Psychology, University of California, Davis 2k (Albert A., When SETI Succeeds: The Impact of High-Information Contact,, p11, Google Books) PG

In our attempts to envision ETI science and technology **we must be wary of slipping from science to science ﬁction.** As we look into the future, we should ask if our projection conﬂicts with known theories and facts. **Years of conditioning by science ﬁction may lead us to expect technologies that are not only beyond our own current grasp, but are forever beyond anyone’s grasp.**

ETI will have either no effect or a detrimental effect on humans

Chaisson, Research Associate, Director's Office, Smithsonian Astrophysical Observatory, 2k (Eric J., “When SETI Succeeds: The Impact of High-Information Contact”, p75, Google Books) PG

My hypotheses are that there will likely be no positive effect from contact with ETI during the next thousand years. Yes, it would be nice to know if ETIs exist in space; the “commission” that astronomers have from the public to keep an eye on the universe demands that we strive to inventory cosmic life in all its forms, just as we do for matter and radiation. However, in the long run, electromagnetic (indirect) contact will probably have negligible effect on us, and physical (direct) contact will probably be harmful to us**.** Should contact with ETI be limited to electromag- netic means, and there be little chance of ETI travel- ing to Earth (or us to their home) within the next millennium (owing largely to light-speed restrictions), then the impact of ETI on our civilization will be minimal, perhaps virtually zero, given the steady stream of “in-house” global problems inevitably confronting humankind while pushing out along the arrow of time**.** Of course, we shall study ETIs’ signals, decipher their messages, perhaps even learn some things from them (since any ETI initiating contact with us will be, essentially by deﬁnition, more advanced and knowledgeable than we). Earth’s academics will publish scholarly analyses of ETI data in the specialized cyberspace journals; commentators will propagate opinions among the bits and bytes of the new Net; and the media hype of each new ETI ﬁnding and its cultural vicissitudes will cause the mainstream press of the third millennium to resemble the tabloid press of the late-second millennium. But indirect contact alone will likely be of meaningful concern only to a small minority of Earth’s citizens—essentially an ensemble of future people statistically indistinguishable from those currently interested in SETI. As long as contact remains solely electromagnetic, Earth-based global issues of (mostly) our own making will dominate our lives, indeed drive our future evolution during the next thousand years.

Contact Bad – Culture Shock

Extraterrestrials could cause culture shock and a cultural divide

Squeri, professor of history at East Stroudsburg University, 2004

(Lawrence, “When ET Calls: SETI Is Ready,” Journal of Popular Culture, 37:3, p. 478, February, NS)

SETI activists assume that extraterrestrials have the best of human traits, especially altruism, and have outgrown the negatives. The reality may not be so sanguine. Creatures that have evolved in different physical contexts may have different body chemistries and modes of thinking. Contact with these creatures may not be pleasant. How will humanity react if extraterrestrials inform us that their religion mandates the eating of first-born children? Even a gentle extraterrestrial culture may cause problems. Earth's history shows that technologically superior people can inflict enormous culture shock on backward societies. Contact between the West and non-Western peoples have resulted in loss of confidence, enervation, and cultural despair. Will the knowledge that human science and medical knowledge are clearly inferior to ET's make us feel that our culture is also inferior? Will humans split between those who wish to adopt "alien" ways and those who believe in traditional culture? The different forms of stress that contact can precipitate are endless.

If ETI’s are discovered humans will go through a huge culture shock and might not be able to adjust

Tough PhD Professor at the University of Toronto 2000

(Allen PhD Professor at the University of Toronto: When SETI Succeeds: The Impact of High-Information Contact Edited by Allen Tough “An Extraordinary Event” p. 4 <http://ieti.org/tough/books/succeeds/sectI.pdf> MLF 6-21-11)

If we incorporate extraterrestrial knowledge and advice into our human society, we may experience severe disruption, at least for a short time. We might suffer from enormous culture shock, temporarily feel inferior, or lose conﬁdence in our own culture. Massive and rapid change could occur in the sciences if extraterrestrial science is deeply different, in business and industry if we learn about new processes and products, in the legal system if we move toward cosmic or universal laws,and in the armed forces and their suppliers if we eliminate the threat of war. Probably all of this should be regarded as simply the major cost we have to pay for incorporating new knowledge and possibilities. But will the short-term chaos and conﬂict be so severe that the negative consequences continue for decades or centuries?

Detection of ETI’s bad – leads to panic of the human race

Tough PhD Professor at the University of Toronto 2000

(Allen PhD Professor at the University of Toronto: When SETI Succeeds: The Impact of High-

Information Contact Edited by Allen Tough “The Role of the Social Sciences in SETI” p.74 MLF 6-21-11)

Social scientists can help us forecast, understand, and guide human reaction to contact. As Mary Connors was the ﬁrst to point out, very different issues are likely to come to the fore right after detection and then later on (Connors, 1976). Short-term impact begins as soon as news is released. It is measured in minutes, hours, and days. Short-term impact includes initial reactions to the news, ﬁrst impressions of the extraterrestrials, attitude perseverance and change, rumor, and collective behavior, including possible panic. Here, expertise on demographic and cultural differences, human information processing, social inﬂuence processes, and collective behavior will help.

Communication TimeFrame too Long

Wouldn’t matter if we had contact, the timeframe for communication too long to solve impacts

Tough, Professor Emeritus at the University of Toronto, ’00

(Allen, *Foundation for the Future*, 2000, “When SETI Succeeds: The Impact of High-Information Contact”, www.futurefoundation.org/documents/hum\_pro\_wrk1.pdf , p. 22, 21 July 2011) SW

Closely related to the issue of reply policy is that of active SETI: deliberately proclaiming our presence to an unknown civilization. As a result of our use of energy or powerful radar broadcasts, another civilization may be aware of us already. However, deliberate action on our part should increase our visibility. If our current passive strategy is successful, we can allay lingering insecurities by simply not responding. If active SETI is successful, we may find ourselves drawing the attention of an unwelcome acquaintance. Another concern with active SETI is that hundreds of years (or more) may pass between the time that we make our presence known and the time that we receive a response. A response that would delight us today may be less welcome to humanity in the year 3000.

Harrison Professor Emeritus, Psychology, University of California, Davis 2k (Albert A., “When SETI Succeeds: The Impact of High-Information Contact”, p12, Google Books) PG

Maybe **we will intercept a communication that has high information content but that is indecipherable to us. Given that our two civilizations may be separated by millions of years of evolution, translation and interpretation could be very difﬁcult.** Perhaps **whole careers and institutes will be devoted to these processes, but with very little progress and very little**

**impact on our descendants’ daily lives.** How well could we communicate with humanity of the year 3000, much less with even more advanced beings from entirely different genetic and cultural backgrounds? **There may be ethical as well as linguistic barriers to communication.** Among the many reasons listed for our current “absence of evidence” are that **ETI civilizations consider it unethical to alter the course of a developing civilization, or consider it desirable to preserve some civilizations for future study** (Ball, 1973). Our ability to learn from ETI may depend on their perception of our readiness to acquire advanced information or to meet entrance-level requirements for the Galactic Club. **We must be prepared for the possibility that we are not considered worth talking to, or that we will receive limited information that does not put the continuity of our physical, scientiﬁc, and moral evolution at risk**.

Messages to and from E.T. take a long to time

Highfield, Editor of New Scientist, 5

(Roger, October 5, The Daily Telegraph, “’The greatest discovery of all time’ The chances are there’s life out there, but any message could be thousands of years old and indecipherable. Roger Highfield reports, Lexis) KA

There is, of course, a chance, that an incoming message may be sent in response to messages extraterrestrials have already received from Earth. Some of our radio and television from the Thirties and Forties is just now reaching some of the nearer stars. What would aliens make of news of Neville Chamberlain's return from his Munich meeting with Adolf Hitler? The problem is, however, that these signals have only travelled around 80 light years, too little for even the most optimistic Seti sage to raise the chance of meeting up with another civilisation. We may have to wait millennia for a reply, and Prof Davies speculates that it would probably come from an "information processor" that will blur the distinctions we make today between living organisms and artificial non-living machines.

Secrecy of SETI Signal

Likely that a SETI signal would be kept secret

Tough, founder and chief scientist of *Invitation to ETI*, 1990

(Allen, “A CRITICAL EXAMINATION OF FACTORS THAT MIGHT ENCOURAGE SECRECY,” Acta Astronautic, Vol. 21, No. 2, pp. 97-102, http://www.ieti.org/articles/acta2102.pdf) KA

Search efforts to detect a beacon, signal, or message from an intelligent extraterrestrial source are already underway, or soon will be, in about six countries[l]. If one of these efforts is successful someday, several factors may strongly encourage complete and immediate secrecy. As a result, there is some risk that the location, channel, and content of the signal (and even the fact of its existence-) may be withheld from all SETI scientists and bioastronomers except those at the receiving facility. (SETI is the search for extraterrestrial intelligence.) The data might be classified or impounded by the national government or security agencies in the receiving country, for instance, instead of being shared promptly with scientists around the world. The urge for secrecy can be a major obstacle in formulating and implementing an international protocol for activities following detection of a SETI signal, beacon, or message. At the present stage, therefore, it is useful to focus additional attention and thought on the various fears, pressures, urges, beliefs and other factors that might encourage secrecy. By facing and examining them carefully, one can understand and assess them better. It then becomes possible to plan more effective and creative strategies to be followed before and immediately after the detection of a signal. Seven factors seem particularly likely to exert a strong pressure toward immediately keeping secret any signal that might come from extraterrestrial intelligence. Each of these seven factors in turn will be spelled out and then examined critically.

Government might hide the discovery of E.T. from the public at first

Tough, founder and chief scientist of *Invitation to ETI*, 1990

(Allen, “A CRITICAL EXAMINATION OF FACTORS THAT MIGHT ENCOURAGE SECRECY,” Acta Astronautic, Vol. 21, No. 2, pp. 97-102, http://www.ieti.org/articles/acta2102.pdf) KA

2 PANIC If a national government is afraid that people will panic at the news of an extraterrestrial signal, it might try to keep that news a secret, at least for a few weeks or months. Secrecy would be imposed in order to avoid panic and riots in the streets, mass refusal to work, and personal emotional upheaval. Information would probably be kept secret from all but a few scientists (with a high-level security clearance) because of the fear of leaks to the press and the public.

E.T. discovery could be kept secret by project director – embarrassment

Tough, founder and chief scientist of *Invitation to ETI*, 1990

(Allen, “A CRITICAL EXAMINATION OF FACTORS THAT MIGHT ENCOURAGE SECRECY,” Acta Astronautic, Vol. 21, No. 2, pp. 97-102, http://www.ieti.org/articles/acta2102.pdf) KA

4 EMBARRASSMENT The project director who detects an apparent beacon, signal, or message may be tempted to keep it secret in order to avoid embarrassment and ridicule. The signal could turn out to be a hoax, a coded message from a human satellite, or some other mundane phenomenon. Also, the form, pattern, channel, or location of a genuine signal may be quite unexpected, inexplicable, even bizarre. As a result, the project director may feel baffled, insecure, upset - and reluctant to share the data with even one other observing facility.

Secrecy of SETI Signal

Likely that a SETI signal would be kept secret – competitiveness

Tough, founder and chief scientist of *Invitation to ETI*, 1990

(Allen, “A CRITICAL EXAMINATION OF FACTORS THAT MIGHT ENCOURAGE SECRECY,” Acta Astronautic, Vol. 21, No. 2, pp. 97-102, http://www.ieti.org/articles/acta2102.pdf) KA

5. COMPETITIONThe competitive desire to win, to be first, to be the best, can often be seen at the national level as well as the individual level. This is the fourth factor that might encourage secrecy. The competitive urge often produces a narrow geographical perspective and a shortened time perspective. 5.1 Critical Examination of Competition If the team that detects the first genuine signal thinks only in the very short term, the competitive urge might propel them to reveal their discovery immediately. A medium-term perspective, though, may propel the team or their national government toward secrecy. Thus they would enhance their chances of being the first to discover additional signals (carried within the original signal or nearby, for example, or located through its instructions), the first to decode or interpret the signal, and (see next section) the first to send a reply. Any one of these three achievements could produce more fame and impact than merely detecting a puzzling beacon. Examining the situation from a long-term global perspective, however, is more appropriate. One hopes that the SETI community adopts this perspective: a very long-term perspective on all of humanity and its future is crucial for our survival and continued flourishing [7]. Extraterrestrial contact will be an extraordinarily significant event in humankind's history and should be treated as part of human history, not just one nation's history. The signal or message will be aimed at all humankind, not at one nation or group. On the practical level, the effort to locate and decipher the various dimensions of the signal will likely be more thorough, creative and successful if a variety of teams and nations arc looking for imbedded and nearby signals and their possible interpretations.

Likely that a SETI signal would be kept secret – fear of inappropriate first reply

Tough, founder and chief scientist of *Invitation to ETI*, 1990

(Allen, “A CRITICAL EXAMINATION OF FACTORS THAT MIGHT ENCOURAGE SECRECY,” Acta Astronautic, Vol. 21, No. 2, pp. 97-102, http://www.ieti.org/articles/acta2102.pdf) KA

6. THE FIRST REPLY As soon as the location, channel, and other technical characteristics of the signal are revealed, several countries and organizations may be tempted to send the first reply, even before the message is deciphered. Such a reply might present one particular political ideology, religious doctrine, military stance, or world view. Extremely serious consequences could result. Michael Michaud has emphasized that the tone and content of our first message will be "crucial" and he has urged "extreme caution in diplomacy[8]." A tone that is too aggressive or too weak could invite attack. Donald Goldsmith has pointed out that if a civilization receives jumbled, contradictory, or incoherent replies from us, they may not bother to answer. If so, "there is a high price that a civilization such as ours will pay for not concentrating on a single, high-power message[9]." To avoid inappropriate replies, therefore, the recipient country may classify the channel and location of the signal as "top secret" instead of sharing this information with relevant scientists in other countries.

Secrecy Bad

E.T. discovery should be released immediately to scientists to avoid public disruption with assumptions

Tough, founder and chief scientist of *Invitation to ETI*, 1990

(Allen, “A CRITICAL EXAMINATION OF FACTORS THAT MIGHT ENCOURAGE SECRECY,” Acta Astronautic, Vol. 21, No. 2, pp. 97-102, http://www.ieti.org/articles/acta2102.pdf) KA

Fourth, if partial information or even a strong hint leaks out, then the amount of fear, panic, and disruption in a society is often reduced if reporters and the general public are given complete and immediate answers to all questions for which answers are available. Kendrick Frazier has pointed out that "the worst thing that can happen in a situation where a major news event with enormous possibilities for disruption of people's values and beliefs occurs is for there to be no reliable continuing source of accurate and complete information [3]." He urges the full and quick release of all scientific details to the world scientific community so that scientists everywhere can evaluate the technical data right away. Their assessments can help the news media avoid distorted and hysterical stories and rumors.

\*\*\*Space Debris Adv. Answers\*\*\*

SQ Tracking Solves

SETI isn’t needed for space debris detection – technique to monitor debris already exists

Asian News International 4-28-11

(Asian News International: “Technique to trace space junk with help of stars developed” Lexis 4-28-11 MLF 6-25-11)

Washington, May 27 (ANI): A team of researchers have developed a method to track the movement of geostationary objects using the position of the stars, which could help to monitor space debris. The technique of researchers from the Royal Institute and Observatory of the Navy (ROA) in Cadiz (Spain) can be used with small telescopes and in places that are not very dark. Objects or satellites in geostationary orbit (GEO) can always be found above the same point on the Equator, meaning that they appear immobile when observed from Earth. By night, the stars appear to move around them, a feature that scientists have taken advantage of for decades in order to work out the orbit of these objects, using images captured by telescopes, as long as these images contain stars to act as a reference point. "Against this backdrop, we developed optical techniques to precisely observe and position GEO satellites using small and cheap telescopes, and which could be used in places that are not particularly dark, such as cities", Francisco Javier Montojo, a member of the ROA and lead author of the study, told SINC. The method can be used for directly detecting and monitoring passive objects, such as the space junk in the geostationary ring, where nearly all communications satellites are located. At low orbits (up to around 10,000 km) these remains can be tracked by radar, but above this level the optical technique is more suitable. The team has created software that can precisely locate the centre of the traces or lines that stars leave in images (due to photograph time exposure). The study is detailed in the journal Advances in Space Research.

SETI not needed for space debris – laser technology

SP Aviation 10 (SP Aviation: “Laser System to Track Space Debris” 8-1-2010 Lexis MLF 6-25-11)

An Australian company, Electric Optic Systems claimed recently that it had developed a laser tracking system that will stop chunks of space debris colliding with spacecraft and satellites in the Earth's orbit. According to the company's CEO, Craig Smith, lasers fired from ground would locate and track debris as small as 1 cm across and help prevent collisions between them and manned spacecrafts or unmanned satellites. "We can track them to very high precision so that we can predict whether there are going to be collisions with other objects or not," said Smith. The company has developed the technology with the help of $4 million grant from the Australian government.

NASA is already tracking space debris

Eugene, NASA’s orbital debris program manager, 2009

(Stansbery, “Orbital Debris Optical Measurements,” September 21, <http://orbitaldebris.jsc.nasa.gov/measure/optical.html>, accessed June 23, 2011, NS)

Optical telescopes and radar are tools used to obtain a more complete picture of the orbital debris environment. Each of these tools sees a somewhat different debris environment. Some debris objects will reflect radar well, but sunlight poorly; while some will reflect sunlight well, but radar poorly. An advantage to using an optical telescope rather than radar is that telescopes can more easily detect debris objects in higher altitudes, such as geosynchronous orbit. NASA has previously used two optical telescopes for measuring orbital debris: a 3-m-diameter liquid mirror telescope, which is referred to as the Liquid Mirror Telescope (LMT), and a charge-coupled device (CCD) equipped 0.3 m Schmidt camera, which is referred to as the CCD Debris Telescope (CDT). Currently optical measurement research of orbital debris continues with the MODEST, MCAT and NASS projects, and the OMC Laboratory, which are explained below.

Laser Tracking Solves

Laser tech will take care of space debris

Thai Press Reports 10

(A Thai Newspaper: “AUSTRALIA AUSTRALIAN COMPANY DEVELOPS JUNK-TRACKING SPACE LASER” 7-26-2011 Lexis MLF 6-25-11)

Australian researchers say they have developed a laser tracking system that will stop chunks of space debris colliding with spacecraft and satellites in the Earth's orbit. The team at Electro Optic Systems, a company based in Canberra, claims their technology will help reduce the dangers posed by fast-moving pieces of man-made space junk that are hurtling at speeds over 35,000 kilometers per hour. An estimated 500,000 pieces of debris litter the Earth's orbit as a result of man's exploration of space. Some satellites have been hit by fast-moving pieces of junk. The remains of old rockets can be the size of a bus, while other fragments are simply tiny flecks of paint. An Australian company, Electro Optic Systems, has received a $3.5 million government grant to develop the world's first automated, high-precision, laser tracking technology. It would replace existing radar networks that currently monitor that part of space. The goal is to track small objects with great accuracy. Dr. Craig Smith, the chief executive of Electro Optic Systems, says laser beams fired from the ground could protect astronauts and satellites by targeting space junk that travels at potentially devastating speeds. "They are all hurtling around in space at 36,000 kilometers per hour and so even a 1mm piece of space junk can destroy or damage a satellite because it all comes from either dead satellites, satellites which have broken up, satellites which had fuel left in them and exploded," noted Smith. "It is really pollution from our own use of space. Over the last 50 years we have been a bit careless, just as we have been careless with our oceans and rivers over centuries and polluted them. Now we have done it to space as well and created our own problem because all this stuff is man-made." The laser tracking system would work by giving space craft and satellites, which are able to be maneuvered, time to move out of the way of an incoming chunk of debris. The Australian government said the technology was part of the country's "proud history" in space science and research. The Canberra-based team says it has received interest from around the world. Its ultimate aim is to build a series of laser tracking stations in various countries to provide a defensive shield for activity in space. They warn that the amount of junk in Earth's orbit is increasing and, as it does, the risks to satellites and space vehicles, also rise. The project is part of an international consortium. Other members of the consortium include the Australian National University and other institutions in Germany and the United States.

Telescopes will take care of space debris

Hatmaker Senior Associate Editor of Tecca 11

(Taylor Her work has been featured on MSNBC, Today.com, Gawker Media, Yahoo! News, My Life Scoop, and more: “New super-agile telescopes help the Pentagon hunt space junk” 4-15-2011 <http://www.tecca.com/news/2011/04/15/darpa-telescope-space-junk/> MLF 6-25-11)

The cloud of debris drifting around our planet isn't just a space mess — it's a danger to satellites, too. Assorted space flotsam can careen into our orbiting satellites, harming the sophisticated equipment and rendering satellites damaged and in need of costly repairs. Past proposals have called for tungsten dust clouds or earthbound lasers to take care of the space junk problem, but DARPA wants to go on the defensive instead with a new set of super-sophisticated telescopes. The new ground-based telescopes would tackle the problem by spotting even tiny clusters of galactic debris before it can smash into satellites out in orbit. Of course, leave it to the Pentagon's so-called "mad science" division to develop a telescope that blows our existing technology out of the water. The new telescopes could collect as much data over the course of a few nights that could take existing equipment months to gather up. By combining a more agile movable mount with an extra high-speed shutter, the telescopes can scan space extremely quickly, tracking even tiny chunks of space debris before they can cause damage.

Only Manual Removal Solves

SETI not needed for space debris – net strategy

Kirkpatrick Freelance Writer 10 (David Freelance writer for many publications: “Trawling for space junk” 8-17-2010 Lexis MLF 6-25-11)

A dozen space vehicles, equipped with 200 nets each, could scoop up the space debris floating in low Earth orbit, clearing the way for a future space elevator. Thats the idea described last Friday at the annual Space Elevator conference by Star Inc., a company that is receiving funding for the project from DARPA.

The only way to avoid space debris is to remove it

The Economist , 10

(The Economist , “Scientists are increasingly worried about the amount of debris orbiting the Earth,” 8-19 , <http://www.economist.com/node/16843825> , 6-24-11 , GJV)

The real threat now comes from collisions between things that are already up there—so much so that since the demise of Iridium 33, the normally secretive Strategic Command (Stratcom) of America’s Defence Department has become rather helpful. Brian Weeden, an expert on space debris at the Secure World Foundation, a think-tank, says Stratcom now screens every operational satellite, every day, looking for close approaches, and notifies all operators. Even the Chinese? “Everybody,” he says, “the Russians, the Chinese, even the Nigerians.” This means that satellites’ owners have better information with which to decide whether to use a small amount of their precious fuel reserves to avoid a collision. But even this would not be enough. What is needed is a way to clean up the junk so that it is no longer a problem. Ideas for doing this are growing almost as fast as space debris. One proposal, originally made a decade ago by the American armed forces, would be to use ground-based lasers to change the orbits of pieces between 1cm and 10cm across by vaporising parts of their surfaces. This would produce enough thrust to cause the debris to re-enter the atmosphere. The proposal suggested a single laser facility would be enough to remove all junk of this size in three years. Another way of slowing junk down, and thus causing it to burn up in the atmosphere, was proposed this month by Alliant Techsystems, a firm based in Minneapolis. Alliant suggests building special satellites enclosed in multiple spheres of strong, lightweight materials. Debris hitting such a satellite would give up momentum—and thus velocity—with each collision. As a bonus, many objects large enough to cause damage would be shattered by the collisions into fragments too small to cause serious harm. However, many space agencies are considering a third option: robot missions that would dock with dead satellites and fire rockets either to boost them into “graveyard” orbits or to deorbit them completely, so they crashed into the sea. Jer-Chyi Liou, an expert on orbital debris at NASA, estimates that if such a mission started in 2020, and removed the five objects most likely to create future debris, it would more or less solve the space-junk problem.

Only Manual Removal Solves

We can only remove space debris manually

Ansdell , Graduate Student in the Master in International Science and Technology Policy program In Washington , 10

(Megan , Princeton University , “Active Space Debris Removal: Needs, Implications, And Recommendations For Today’s Geopolitical Enviorment,” <http://www.princeton.edu/jpia/past-issues-1/2010/Space-Debris-Removal.pdf>, 6-25-11 , GJV)

There is currently no man-made space debris removal system in operation, nor have there been any serious attempts to develop one. However, common concepts include electrodynamic tethers, solar sails, drag augmentation devices, orbital transfer vehicles, and space-based lasers. All of these have their own beneﬁts and drawbacks, making it difﬁcult to ﬁnd a single system that fulﬁlls all of the above requirements. For example, twelve electrodynamic tethers weighing only one hundred kilograms each could be launched as secondary payloads to stabilize the space debris population in low-Earth’s orbit within ﬁve years (Foust 2009). However, tethers only work on objects greater than ten centimeters and attaching them to debris using conventional robotics would “incur excessive costs for the beneﬁt gained” (Liou and Johnson 2006, 340-341). In contrast, a constellation of space-based lasers using photoablation to guide debris out of critical orbits could reach further than low-Earth’s orbit, but would only work on debris smaller than ten centimeters. Moreover, the required laser technology is currently unavailable and launching a satellite constellation costs up to billions of dollars, making the development and deployment of such a system extremely expensive.

No Space Debris Impact

Space debris has threatened satellites before

Moore , a research fellow with the Independent Institute , 09

(Mike , Post-Gazette.com , “Sunday Forum: Space Junk,” 2-22 , <http://www.post-gazette.com/pg/09053/950576-109.stm> , 6-24-11 , GJV)

When satellites collide in space, should ordinary people be worried? Here's a scenario for global doom that should have your hair standing on end. News reports on Feb. 12 that two satellites had collided some 491 miles above the Earth were compelling. There was a whiff of Cold War intrigue about them. A defunct Russian communications relay satellite and an American commercial satellite had met abruptly in space with a closing speed of more than 22,000 miles per hour. They were shattered into many hundreds of pieces, creating an ever-expanding debris cloud. In turn, that cloud threatened the satellites of other countries in similar orbits.

AT: Int’l Space Station Scenario

No tech innovation - ISS only performs redundant research

Legacey, Montreal Centre, 2001

(Denis, “Is The International Space Station Really Worth It?”, March, <http://www.irpp.org/po/archive/mar01/legacey.pdf>,)

Another often-hoped-for benefit of the ISS is that it can be used to grow large protein crystals, the study of which could lead to new medicines. Yet Francis Slakey, associate director of public affairs for the American Physical Society, wrote in a 1999 Scientific American article on the future of space exploration that “... in July 1998 the American Society for Cell Biology bluntly called for the cancellation of the crystallography program,” saying that “proposed experiments were not likely to make any serious contributions to the knowledge of protein structure.” Despite the scientific community’s disapproval, NASA plans to go ahead with the experiments. NASA’s slow, even ponderous development of the Space Station seems intended to remove the risks of exploring space and to make accessing this new environment completely safe for humans. Despite the project’s internal identity conflict over whether to be a commercial venture or a scientific endeavour, it is hoped that life-science experiments will help solve important health problems of long-term exposure to zero gravity (e.g., bone loss and muscle atrophy) and to solar radiation. The utility of these goals is questionable however. Muscle atrophy can be minimized or eliminated by artificial gravity and exercise. In his widely read book The Case for Mars, Robert Zubrin, an astronautical engineer and former senior engineer at Lockheed Martin, described the use of artificial gravity in detail and characterized the “continued experimentation on humans with long-duration, zero-gravity health effects as unethical and worthless.” In the 1999 Scientific American issue on the future of space exploration mentioned earlier, staff writer Tim Beardsley wrote that “... a vehicle designed to go to Mars could easily be furnished with artificial gravity by separating it into two connected sections and slowing spinning them.” On the solar radiation issue, Beardsley noted that “... the space] station’s orbit is too low to experience the full fury of solar storms.” On some of the most critical research issues it will be involved in, the $60- to $100-billion ISS evidently will be generating redundant or inconclusive experimental results.

\*\*\*Int’l Cooperation Adv\*\*\*

Cooperation Doesn’t Solve

India Will Not Cut Carbon Emissions

News Post India, 2008

(June 5, “India Wont Cut Greenhouse Gas Emissions Against Development”, (http://www.newspostindia.com/report-59039)

India will not reduce greenhouse gas emission at the cost of development and poverty alleviation, Minister of State for Environment and Forests Namo Narain Meena said Thursday. India is struggling to bring millions of people out of poverty. We cannot accept binding commitments to cut down greenhouse gas emission,' Meena said at a function to mark the World Environment Day. hough India has no commitment to reduce the global warming gases under the Kyoto Protocol, in recent climate change conferences many developed countries have said India needs to reduce the greenhouse burden.

Developing nations will not cooperate on climate change

Rep. Joe Barton, April 23 2007, “What To Do About Global Warming (Hint It Isn’t Cap And Trade Policy)”, Barton is ranking member of the House Energy and Commerce Committee, (http://thehill.com /leading-the-news/what-to-do-about-global-warming-hint--it-isnt-cap-and-trade-policy-2007-04-23.html)

The irony is that when U.S. environmental policies chase companies out of America, the global environment doesn’t prosper. Developing countries always swap clean air for economic growth. China’s coal production, for example, is as explosive as its economic growth, and the Chinese add a 500-megawatt coal-fired powerplant every week. We also heard that decisions in China about where and what kind of power plants to build are decentralized, effectively uncontrolled, and we learned that less than 5 percent of China’s coal-fired electricity plants are even fitted with ordinary sulfur dioxide control equipment. Even for the ones with SO2 scrubbers, it’s an open question whether those with the equipment actually use it. Some say if America just sets the example, everybody else will follow. But a real pollutant, sulfur dioxide, is a fine indicator of how good-example strategy doesn’t work at all. America has been scrubbing sulfur dioxide out of smokestacks for more than 20 years because it’s a real pollutant, but China still refuses.

No Warming Impact

The earth has shown no sign of anthropogenic warming from greenhouse gases

Bast, Heartland Institute - President, 3

(Jay, Feb. “Eight Reasons Why ‘Global Warming’ Is a Scam”, http://www.heartland.org/policybot/results/11548/February\_2003\_Eight\_Reasons\_Why\_Global\_Warming\_Is\_a\_Scam.html)

Concern over “global warming” is overblown and misdirected. What follows are eight reasons why we should pull the plug on this scam before it destroys billions of dollars of wealth and millions of jobs.

1. Most scientists do not believe human activities threaten to disrupt the Earth’s climate. More than 17,000 scientists have signed a petition circulated by the Oregon Institute of Science and Medicine saying, in part, “there is no convincing scientific evidence that human release of carbon dioxide, methane, or other greenhouse gases is causing or will, in the foreseeable future, cause catastrophic heating of the Earth’s atmosphere and disruption of the Earth’s climate.” (Go to www.oism.org for the complete petition and names of signers.) Surveys of climatologists show similar skepticism.

2. Our most reliable sources of temperature data show no global warming trend. Satellite readings of temperatures in the lower troposphere (an area scientists predict would immediately reflect any global warming) show no warming since readings began 23 years ago. These readings are accurate to within 0.01ºC, and are consistent with data from weather balloons. Only land-based temperature stations show a warming trend, and these stations do not cover the entire globe, are often contaminated by heat generated by nearby urban development, and are subject to human error.

3. Global climate computer models are too crude to predict future climate changes. All predictions of global warming are based on computer models, not historical data. In order to get their models to produce predictions that are close to their designers’ expectations, modelers resort to “flux adjustments” that can be 25 times larger than the effect of doubling carbon dioxide concentrations, the supposed trigger for global warming. Richard A. Kerr, a writer for Science, says “climate modelers have been ‘cheating’ for so long it’s almost become respectable.”

4. The IPCC did not prove that human activities are causing global warming. Alarmists frequently quote the executive summaries of reports from the Intergovernmental Panel on Climate Change (IPCC), a United Nations organization, to support their predictions. But here is what the IPCC’s latest report, Climate Change 2001, actually says about predicting the future climate: “The Earth’s atmosphere-ocean dynamics is chaotic: its evolution is sensitive to small perturbations in initial conditions. This sensitivity limits our ability to predict the detailed evolution of weather; inevitable errors and uncertainties in the starting conditions of a weather forecast amplify through the forecast. As well as uncertainty in initial conditions, such predictions are also degraded by errors and uncertainties in our ability to represent accurately the significant climate processes.”

\*\*\*Additional Advantages\*\*\*

AT: Competitiveness

Not linked to economy or hegemony

Krugman, Professor of Economics – MIT, 94

Paul, Competitiveness: A Dangerous Obsession, Foreign Affairs, March/April)

Unfortunately, his diagnosis was deeply misleading as a guide to what ails Europe, and similar diagnoses in the United States are equally misleading. The idea that a country's economic fortunes are largely determined by its success on world markets is a hypothesis, not a necessary truth; and as a practical, empirical matter, that hypothesis is flatly wrong. That is, it is simply not the case that the world's leading nations are to any important degree in economic competition with each other, or that any of their major economic problems can be attributed to failures to compete on world markets. The growing obsession in most advanced nations with international competitiveness should be seen, not as a well-founded concern, but as a view held in the face of overwhelming contrary evidence. And yet it is clearly a view that people very much want to hold—a desire to believe that is reflected in a remarkable tendency of those who preach the doctrine of competitiveness to support their case with careless, flawed arithmetic.

Focus on competitiveness risks trade wars

Krugman, Professor of Economics – MIT, 94

Paul, Competitiveness: A Dangerous Obsession, Foreign Affairs, March/April)

A much more serious risk is that the obsession with competitiveness will lead to trade conflict, perhaps even to a world trade war. Most of those who have preached the doctrine of competitiveness have not heen old-fashioned protectionists. They want their countries to win the glohal trade game, not drop out. But what if, despite its hest efforts, a country does not seem to he winning, or lacks confidence that it can? Then the competitive diagnosis inevitably suggests that to close the horders is hetter than to risk having foreigners take away high-wage johs and high-value sectors. At the very least, the focus on the supposedly competitive nature of international economic relations greases the rails for those who want confrontational if not frankly protectionist policies.

AT: Public Engagement Adv.

Democracy doesn’t solve wars

Kaloudis, Ph.D, 3

(George, *International Journal on World Peace*, March v20 i1 p93(2))

Professor Henderson, in this excellent work, examines the impact of democracy on war. More specifically, in Chapter I he provides an overview of the democratic peace proposition, the argument that democratic states are more peaceful than non-democratic states. In Chapter II, Dr. Henderson examines the extent to which democracies are less likely to fight each other by replicating one of the most compelling studies, Oneal and Russett (1997), of the democratic peace proposition. The results suggest that Oneal and Russett's conclusions are "the result of several questionable research design choices" that seriously undermines their thesis. In Chapter III, Dr. Henderson examines the proposition "that democracies are more peaceful, in general, than non-democracies." Professor Henderson concludes that these studies also rely "on faulty research design." In Chapter IV, Dr. Henderson "focuses on the role of democracy in extrastate wars." He finds that "democracies are less likely to become involved in these wars; however, the Western democracies are more likely to become involved in them." In Chapter V, Dr. Henderson examines the extent to which the democratic peace proposition applies to civil wars. He concludes that the democratic peace proposition "does not seem to be operative for international or civil wars." In Chapter VI, Dr. Henderson suggests "an alternative explanation of the postwar absence of interstate war between democratic states." He argues that "a combination of factors including bipolarity, alliance membership, and trade links reduced conflict among many jointly democratic and jointly autocratic states."

AT: Colonization Adv.

Colonization technically infeasible

American Institute of Aeronautics and Astronautics 2

[“Space Colonization—Benefits for the World,” http://www.aiaa.org/participate/uploads/acf628b.pdf]

Space colonization must have low-water, low-pesticide plant growth and waste and water purity control Two of the items listed here represent major concerns of most developed nations and are emerging concerns in developing nations. A technological revolution is needed to address food shortages to allow adequate nutrition for our exploding world population in concert with ever-growing water shortages, and a growing realization that our current pesticide methods are polluting our planet. While previous short-duration human space programs have depended on open-loop life support systems, Space Colonization cannot. Development of a closed-cycle bio-regenerative controlled ecological life support system (CELSS) would lead to world benefits. Areas of CELSS development are listed in Table 2. Many long-term (and pressing short-term) world problem solutions can be approached by reaching for the stars. For example, Shimizu Corporation is most interested in bio-regenerative systems as a path toward solution of Tokyo’s waste management problems.

It will be hundreds of millions of years before the earth is no longer inhabitable

Universe Today 9

(online space guide, cites studies done by several universities, “How Long Will Life Survive on Earth?” February 13th, 2009 http://www.universetoday.com/25367/how-long-will-life-survive-on-earth/)

It feels like the Earth is forever. But we know it formed around 4.5 billion years ago, and it will last another 7.5 billion years or so, when the Sun becomes a red giant, and probably destroying the Earth.

But our climate will become unlivable long before that. According to Peter Ward and Robert Brownlee, in their book, The Life and Death of Planet Earth, things are going to heat up much, much earlier.

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That’s because the energy output coming the Sun is gradually increasing. Not enough to change the climate in our lifetimes, or even millions of years. But in the span of hundreds of millions of years, things are going to heat up.

The direct imaging method can be used to find “Earth-like” planets

Doyle SETI Institute Principal Investigator 02

(Laurance , The SETI Institute, “Detecting Other Worlds VII: Direct Imaging” ,2-7, <http://www.seti.org/page.aspx?pid=793>,6-21-11,GJV)

**Everyone would like to see an image of an extrasolar planet.** So far, the radial velocity detection method has only detected giant planets indirectly by measuring the wobble of the planet's parent star toward or away from us. Astrometry also measures the wobble of the star in the other two directions not covered by the radial velocity method. The pulsar and eclipsing binary methods also measure the offset of stars by timing the "clocks" of pulsar pulses or binary eclipses at minimum, respectively. While the phase variation method measures light directly from a planet, the light is mixed in with the much greater light contribution from the planets star. Finally, though the photometric transit method also is an indirect detection technique, it actually measures the shadow of the planet. **Direct imaging of extrasolar planets, then, is highly desirable because one could separate the light from the star and the planet. One could then spectroscopically measure the chemical constituents of the planet by itself, independent of its star's light. However, such imaging is extremely difficult. For example, if Jupiter was as bright as the Sun, it might be visible from the nearest star, Alpha Centauri. But Jupiter is only one-billionth as bright as the Sun, so, viewed from that distance, it would be lost in the Suns glare. To distinguish Jupiter from the Sun at the distance of Alpha Centauri would require at least a 40-meter telescope. So what can be done? There are plans for two missions within the next decade: the Stellar Interferometry Mission (SIM) and the Terrestrial Planet Finder (TPF). These missions propose using interferometry to very accurately measure the positions of stars, and find planets around them. They plan to fly multiple telescopes at different distances and, like a pair of binoculars, combine the light incident on each telescope to synthesize an equivalent aperture the size of their distances. While the mirror area of a telescope determines how much light it gathers, it is the baseline size of the telescope that determines its resolving power (i.e. ability to render visible objects that are far away). Extensions of present plans for such systems include concepts for a series of 25 40-meter telescopes that would be separated in orbit by hundreds of kilometers. They would nevertheless have to "know" each others positions within microns to re-construct images of even giant planets around other stars.** But such second-generation systems should be able to image an "Earth" around another star system within 15 parsecs (about 50 light years away).

\*\*\*Solvency\*\*\*

Allen Telescope Array Bad

Uses single star survey technique - Scanning fields of stars is more beneficial than star-by-star targeting

Shostak, Radio Astronomer at SETI Institute, 1 (Seth, April, Vol. 101, Issue 4,Sky & Telescope, EBSCO, “The Future of SETI”) PG

They are not. **Recent work confirms long-standing suspicions that star-by-star targeting should be abandoned in favor of scanning the richest star fields to encompass very large numbers of stars, even if most of them are very far away.** To see why, we flash back 30 years to when Frank Drake did the basic mathematics that still governs the field. He showed that **finding an ET signal is similar to certain problems in surveying natural radio sources. Some sources are intrinsically strong; a greater number are intrinsically weak. The steepness of the ratio between them determines which category will dominate our sky.** For instance, many of the early sources found by the first, primitive radio telescopes are at extreme, cosmological distances**. This is because inherently strong radio sources (such as quasars and radio galaxies) are powerful enough to more than make up for their rarity compared to weak ones** (such as the coronas of stars).

SETI Lacks Credibility

Due to the nature of its program, it will always be difficult for SETI to maintain credibility

Squeri, professor of history at East Stroudsburg University, 2004

(Lawrence, “When ET Calls: SETI Is Ready,” Journal of Popular Culture, 37:3, p. 478, February, NS)

SETI has always had to fight for respect. Unlike traditional scientific research, SETI cannot promise results, not even incremental discoveries that give the impression of imminent success. SETI is an all or nothing proposition. Either extraterrestrial life exists or it doesn't, and if it does exist it may not be intelligent. SETI could turn out to be like the alchemy of the Middle Ages, a discipline that sought to convert base metals into gold and failed. Considered nonsense today, alchemy seemed sensible in the context of its time, as does SETI in our age. If ET is never found, future generations will recall SETI with the same condescension that alchemy has long endured. The search for extraterrestrials also has suffered from the bad memories the scientific community has of the nineteenth-century astronomers Giovanni Schiaparelli and Percival Lowell. In 1877, the Italian astronomer Schiaparelli announced having seen "canali" on the surface of Mars. Although "canali" also means "channels" in Italian, the possibility of an irrigation system on Mars, an obvious indication of intelligent life, entered astronomical discussions. Beginning in the 189Os, the American Lowell claimed that observations from his Arizona observatory revealed not only canals but also strips of vegetation. Lowell was convinced that Martian life was older and more advanced than its terrestrial counterpart but doomed to extinction because of the cooling of the Red Planet. Although new powerful telescopes convinced astronomers that Mars was probably lifeless, Lowell had inspired a legion of science fiction writers, most notably H. G. Wells, whose War of the Worlds described a Martian invasion. As late as 1938, over twenty years after Lowell's death, Orson Welles in his infamous radio broadcast convinced a gullible public that a Martian invasion was taking place in New Jersey. After World War II, when flying saucers were allegedly sighted, the modern UFO (unidentified flying object) era began. Although scientists insisted that UFOs could be explained away as natural phenomena, the public did not share this skepticism. According to polls taken in the 1990s, over half the American population believed that UFOs are spaceships piloted by extraterrestrials. SETI scientists have demanded hard evidence of alien visitations. According to Albert Harrison, a psychologist at the University of California at Davis, who has written extensively on SETI, there must be "(a) skepticism, verification, peer review, and the scientific method, (b) strict safeguards against hoaxes, self-delusion, and erroneous data, and (c) protocols to avoid premature and immodest claims." This scientific rigor may give academic respectability to SETI but is simply ignored by much of the public. Like all elites with professional credentials, SETI has to suffer the existence of self-styled experts. Ufologists who write and lecture on alleged human contacts with extraterrestrials have captivated much of the public. These ufologists do not write and speak with the precision of the scientific community; they do not use its specialized jargon, nor do they have the facility with mathematical formulae-and they do not care. By insisting that extraterrestrials have visited the Earth, they proclaim a greater insight into the cosmos than SETI, whose admission of not having contacted extraterrestrials can be seen as an admission of failure. In our nonjudgmental, postmodern culture, ufologists even manage to share the spotlight with SETI. Popular documentaries on television pay attention to alleged government cover-ups of flying saucer crashes, autopsies of alien visitors, abductions into spaceships, and other strange tales.

SETI Ineffective

The dogmatism and ineffectiveness of SETI searches precludes the possibility of expanding the search for extraterrestrials

(Davis=physicist and astrobiologist at the University of Arizona)

Gardener, widely published complexity theorist and science essayist, 2011

(James N., “The Eerie Silence,” EnlightenNext, 47:106, p. 2, NS)

The traditional method used by SETI scientists is to deploy giant radio telescopes to listen for narrow-band signals that betray evidence of an artificial origin. But according to Davies, the "central dogma" of SETI - the belief that alien civilizations are targeting Earth with narrow-band radio messages - simply isn't credible. The reasons are various, including the strong possibility that clearly artificial radio signals may be a transient phenomenon around the cosmos. As Davies puts it, traditional SETI is constrained by "an inbuilt bias towards anthropocentrism." That bias has not been lost on Frank Drake, the father of

SETI research, who has admitted that "our [electromagnetic] signals of today are very different from the signals of 40 years ago, which we then felt were perfect models of what might be radiated from other worlds of any state of advancement. We were wrong. If technology can change that much in 40 years, how much might it change in thousands or millions of years?" Arguing persuasively that scientists need to think outside the box of SETI's central dogma, Davies offers a dizzying array of nontraditional SETI search strategies - for instance, seeking signatures of distant super-technologies like the so-called Dyson sphere (named after physicist Freeman Dyson), which would completely encircle a star in order to capture all of its radiated energy. Theoretically, a Dyson sphere would alter the light output of an entombed star, creating a noticeable infrared glow that could be identified across the length of an entire galaxy. Searches for Dyson spheres have actually been conducted by astronomers, so far without success. Another imagined super-technology, a kind of cosmic electricity generator dreamed up by Princeton physicist John Wheeler, would harness the rotational energy of a spinning black hole. No black-hole searches for Wheeler generators have been conducted, probably because such theoretical contraptions don't seem to throw off predictable optical or radio signatures. Closer to home, Davies suggests that we should begin looking fora "shadow biosphere" that would provide evidence of a second genesis of life on Earth. The implications of such a discovery would be profound. In Davies' words, "If life started more than once on Earth, we could be virtually certain that the universe is teeming with it." Evidence of a shadow biosphere and a second genesis might be found in habitats favored by so-called extremophile microbes, which have been discovered inhabiting an astonishing array of hostile environments, including undersea ranges adjacent to "black smokers" - mineral chimneys in the seabed spewing forth dusky fluid at temperatures up to 350" C- and the highly radioactive waste pools of nuclear reactors.

SETI’s techniques have been useless for over half a century

Shostak, PhD astronomy, 9 (Seth, Theology and Science, EBSCO, “Closing on ET”) PG

**DESPITE A HALF-CENTURY OF SETI EXPERIMENTS, we still don’t know if there’s anyone out there as clever as we are**. That sounds discouraging until you examine the context. Frankly, **modern SETI (the search for extraterrestrial intelligence) has barely scratched the celestial surface**. While it’s true that radio reconnaissance of broad regions of space have been made, **these sky surveys have spent little time observing in any given direction**. The consequence is that they’re often considerably less sensitive than targeted searches, in which stars are checked out individually. **The number of star systems deliberately examined by SETI, looking for very weak transmissions over a wide swath of the radio dial, is only about 750, and they only received brief looks at any given frequency. Optical searches, which hunt for very short, very bright ﬂ ashes of light, have checked out roughly 5,000 stars, also brieﬂy. Clearly, in a galaxy of several hundred billion stars, those are skimpy samples.** The failure so far to trip across any evidence for E.T. is akin to a search for kangaroos in Australia that gives up after examining one acre of the Outback. So **the lack of SETI success tells us a lot about the limitations of our experiments**, but says virtually nothing about the galaxy’s population of sentient beings. Fortunately, the SETI game is changing, and there’s reason to hope we might pick up a signal in no more than a few dozen years. Runners in the race to ﬁnd the aliens could be closer to the finish than the starting line.

SETI Ineffective

SETI’s “beacon strategy” is too limiting, we should search for other signs of extraterrestrial presence

Freitas, researcher at the institute for molecular manufacturing, 1980

(Robert H., “INTERSTELLAR PROBES:A NEW APPROACH TO SETI,” p. 95, <http://www.rfreitas.com/Astro/InterstellarProbesJBIS1980.htm>, August 6, Accessed June 21, 2011, NS)

Ever since Cocconi and Morrison's seminal paper [2] on hydrogen-line signalling was published in 1959, classical SETI work has proceeded on the basis of a "beacon strategy." In this model [3-4], searchers assume that intelligent alien cultures are actively trying to make contact with other similar societies across the Galaxy using radio photons which are easy to generate and which suffer little absorption upon passage through the interstellar medium. ET signals may be broadcast omnidirectionally, or might be aimed at specific stars most likely to harbour sentient lifeforms resembling the transmitting race. Elaborate timing techniques [5-11] and other specific search stratagems [3-4, 6, 12-20] have been suggested. In each case the potential recipient is required to erect and maintain suitable detection apparatus, tuned to receive the alien messages on such frequencies and at such times as both races might agree are "preferred" [3-4, 6, 21-24]. To date, the great majority of actual SETI research has concentrated on beacon strategies. Probably about $106 and 105 observing hours have been expended worldwide on this approach. The "eavesdropping strategy" also originated in 1959 with Dyson's discussion of the observable characteristics of advanced technological civilizations [25]. Dyson insisted that Malthusian pressures ultimately might drive an intelligent species to exploit all the mass and energy available in their entire solar system, resulting in a huge shell of artifacts orbiting the central star. No matter how efficiently the energy was used, eventually it would have to emerge as waste heat. Dyson recommended a search for these infrared emissions at about 10 microns. Besides evidence of large-scale astroengineering [6, 26-27], internal communication leakage radiation might be detectable across interstellar distances [3, 12, 28-29]. Infact, the electromagnetic signature of the Earth at radio frequencies has recently been analyzed from the viewpoint of alien observers attempting to discover intelligent technological civilization in our Solar System [30-31] To date, perhaps $105 and 103 hours of observation have been spent worldwide on extraterrestrial eavesdropping. The remaining SETI strategies, each involving matter markers, were first suggested in the modern scientific literature by Bracewell as early as 1960 [29, 32-34]. Assuming sentient life is reasonably rare throughout the Galaxy, Bracewell believed that it might be more economical to send highly sophisticated messenger probes to other star systems in search of new members for the "Galactic Club." Both the "probe strategy" and the "artifact strategy" would involve looking in appropriate locations (moons, asteroids, Trojan Points) for evidence of alien devices right here in our own Solar System. Except for a few modest investigations of the curious but only quasi-SETI Long-Delayed Echo (LDE) phenomenon [35-46], essentially $0 and 0 observing hours have been invested in these approaches to SETI. The imbalance of funding and effort appears to derive from the natural tech no-chauvinistic perspectives held by many radioastronomers doing research in this field. Since mankind now has the technical expertise to send out radio messages, the traditional argument goes, then must not ETs as well find radio the optimum medium for interstellar communication? Beacon searches frequently are justified on the grounds that such signals are all we are capable of looking for at this time. Fortunately, this simply is not the case.

Optical SETI Solves Better

Optical SETI helps identify habitable planets and space debris

Fogan, professor at the Scottish Universities Physics Alliance Institute for Astronomy and Ellis, professor of astrobiology at the Harvard Smithsonian, 2011

(Duncan H., Martin, “Extrasolar Asteroid Mining as Forensic Evidence for Extraterrestrial Intelligence,” p. 2-3, March 29, NS)

The search for extraterrestrial intelligence (SETI) has been primarily concerned with detecting artificial radio signals as a means of confirming the presence of extraterrestrial intelligences (ETIs). While a necessary and obvious search method, the science of SETI can only benefit from developing a multi-wavelength, multi-signal approach, such as optical SETI (Mead & Horowitz, 2010; Werthimer et al., 2010), the search for extraterrestrial artifacts such as Dyson spheres (Dyson, 1960), and the more mainstream searches for potentially habitable planets such as the Kepler (Borucki et al., 2010) and Mearth missions (Nutzman et

al., 2009). Artificial signals derived from well-studied astrophysical objects are particularly desirable, as they provide fertile ground for so-called “piggy-back” searches, which are in general easier to justify than dedicated searches which have more limited secondary science goals. One class of astrophysical object currently enjoying significant attention is the debris discs surrounding evolved stars. The remnants of more massive, gaseous discs that encircle young stars during their formation and initial evolution, they are composed of rocky/icy debris in a distribution of sizes. Like the belts of asteroids, comets and other bodies found in our own Solar System, such debris may be the “leftovers” from planet formation, and is expected to be common in planetary systems, with lifetimes of order tens of millions of years after the star’s formation. Debris discs are typically detected in the infrared (IR) and sub-millimetre regimes, using photometry, spectroscopy or imaging (Wyatt 2008; Krivov 2010 and references within). Therefore, they have been ideal candidates for study using space-based and ground-based telescopes over the past 30 or so years, beginning with the first detection of a debris disc around Vega (Aumann et al., 1984). They can be used as forensic Asteroid Mining as Evidence for ETI 3 evidence of earlier planet formation, and they may even confirm the presence of planets due to dynamical features such as clumping and resonances (e.g. Wyatt & Dent 2002; Greaves et al. 2005, 2008). With new data arriving from the recently commissioned Herschel Space Telescope (e.g. Vandenbussche et al. 2010), and the wealth of data generated from its predecessor, Spitzer, it would be advantageous for SETI researchers if debris discs could provide artificial signals indicating extraterrestrial intelligence.

Communication through light beams is a viable and accurate option

Wilson, senior researcher at Microsoft’s Bay Area Research Center 2005

(Ron, “Tech trends will topple tradition,” Electronic Engineering Times, 1315, p.2, NS)

The idea of using visible light as a signaling device is an old one. Even 19thcentury scientists considered building mirrors and lanterns to establish connections with clever creatures supposedly residing on the Moon or Mars. More recently, the development of high-powered lasers, able to produce blindingly intense pulses of light for a billionth of a second, has revived this idea. If such a laser were to be coupled to a telescope mirror, it would be capable of pouring into someone else's solar system more photons than our Sun does - at least during the nanosecond flash. Clearly, if we have technology sufficient for interstellar light communication, then so should advanced aliens. All that may be required to detect the extraterrestrials in this way is to connect high-speed photomultipliers to our telescopes and scan for far-off flashes. One of the difficulties with such a search is that the photomultipliers frequently "light up" with pulses that could be extraterrestrial in origin but most likely are just cosmic rays, radioactive decays, and other instrumental effects. The optical SETI experiment at Lick Observatory, which is a collaborative effort with the SETI Institute and Berkeley's Space Sciences Lab, uses three photomultipliers in parallel to reduce the number of false alarms drastically. At Harvard University, Paul Horowitz and his team have concocted a different scheme for eliminating false alarms. They've inspired an enthusiastic team of faculty and volunteers at Princeton University to renovate a mothballed 36inch telescope to help sort out which signals are real. If a burst of photons from an alien broadcaster lands in the Harvard telescope, then the instrument at Princeton, which is about 300 miles away, should light up roughly a millisecond earlier or later, depending on the transmitter's sky position. That slight difference in arrival time is measured easily, and it is a gold-plated guarantee that the signal really comes from deep space.

Optical SETI Solves Better

Optical SETI efforts might establish contact and are perfectly feasible

Wilson, senior researcher at Microsoft’s Bay Area Research Center 2005

(Ron, “Tech trends will topple tradition,” Electronic Engineering Times, 1315,p. 2, NS)

Even back in 1961, Townes asked, "What other methods are we overlooking that might appear natural to some other civilization?" Townes speculates that aliens might be sending particles of some form or x-ray lasers that we're not presently equipped to search for. But we are capable of both sending and detecting infrared lasers, which might be a reasonable way to communicate. Infrared lasers can penetrate dust clouds better than optical lasers and would be easier to distinguish from starlight. An infrared detector would have to be cooled to about 7 Kelvins, which is expensive though perfectly feasible. Both Horowitz and Werthimer see this approach as SETI'S next frontier and hope to get in on the act.

Optical experiments are better than radio experiments—and a lot fewer of them would be needed

Shostak, Radio Astronomer at SETI Institute, 1 (Seth, April, Vol. 101, Issue 4,Sky & Telescope, EBSCO, “The Future of SETI”) PG

In the past, this argument convinced most SETI scientists that any alien society attempting to broadcast a "hailing" or "beacon" signal would use radio. But just a few decades of advances in our own engineering have altered this picture**. A laser, if attached to a big optical telescope, can easily produce a beam that is exquisitely well focused. Either of the two 10-meter Keck Telescopes, for instance, if used as a transmitter, could concentrate laser light into a beam a billion times tighter than a 100-meter radio dish could do. So even though optical photons are energetically expensive, a lot fewer of them would be needed** -- if the aliens know where to aim. Optical SETI is gaining adherents. **Part of the appeal is that the telescope doesn't have to make good images.** Paul Horowitz is building a 72-inch (1.8-meter) optical SETI telescope around a cheap "light bucket" of a mirror. The light will go through a beamsplitter to two arrays of 1,024 pulse detectors, each with nanosecond speed, covering a 1.6 degrees-by-0.2 degrees rectangle of sky. Only recently have such arrays become available. **This instrument**, says Horowitz, **will be able to examine every point on more than half the celestial sphere** (not just selected stars) for at least 48 seconds every 200 clear nights --roughly once a year, considering the weather. It will sweep the whole sky from declination +60 degrees to -20 degrees, a region that includes more than half the visible Milky Way. If all goes well it should start work in early 2002.

Photometric Transit Method Solves

We can use the photometric transit method to find “Earth-like” planets

Doyle SETI Institute Principal Investigator 01

(Laurance , The SETI Institute ,”Detecting Other Worlds: The Photometric Transit or ‘Wink’ Method” , 8-9, <http://www.seti.org/page.aspx?pid=795>,6-21-11)

Its fortunate for exobiologists and those who study circum stellar habitable zones that most stars do not much vary in their brightness. **One particular brightness variation a sort of "wink" of the star provides the only present means for detecting and studying Earth-sized extrasolar planets. This is known as the photometric transit method, and it relies upon a planet orbiting across the disc of its parent star in our line of sight.** When big things move across little things, we call it an "occultation." When little things move in front of big things we call it a "transit." And when two things about the same size move in front of each other, we call it an "eclipse." **The transit method records a drop in brightness when a planet moves across the disc of its star. Since stars are far away, one cannot directly see a planetary transit. Rather, astronomers measure the decrease and increase in the stars brightness with respect to time. The result is called the star's "light curve." Since our Sun is much closer, we can see a planet transit across it. Mercury recently transited the Sun. A rare eventobservable from Europe on June 8, 2004will be the first transit of Venus across the disc of the Sun since 1882.** Such transits (as the Venus transit that Captain Cook was sent to observe from the South Pacific in 1769) allowed for a better determination of the scale of our Solar System and the distance of the Earth from the Sun. **The main limitation of the photometric transit method is the small likelihood that a planet's orbit will be correctly aligned to pass between us and its star. The probability that this occurs is less than 1%. To overcome this, one can either observe stars that are known to be "edge-on," or observe several stars at once.** The first approach is being done by a group called the TEP (Transits of Extrasolar Planets) Network, and the second is slated for future spacecraft missions, such as NASAs Kepler Mission and the ESAs Eddington Mission. To see how small a planet one could detect, the TEP Network used 1-meter telescopes in California, Russia, Greece, France, the Canary Islands, New York, and New Mexico to observe a small double star system, called CM Draconis, for over 1000 hours. (This took about 6 years due to weather conditions, observing time, and culling data that wasnt good enough for their purposes). The special characteristic of CM Draconis is that its two stars orbit each other, with a period of about 1 1/4 days, across our line of sight. That is, they eclipse each other in what is known as an "eclipsing binary" system (Ill discuss these systems in my next planet detection essay.) What is also special about CM Dra is that together the two stellar discs are about 12% the size of the Sun's single disc area. This is because the two stars that comprise CM Dra are tiny, red stars. This system has the observational advantage of being edge-on to Earth, so planets can be expected to transit both stars. Also, since the system is small, a transiting planet will yield a bigger drop in relative brightness. After observing CM Dra for many years, several candidate planets were discovered. The candidates were selected by generating all possible planetary transits that could occur and then matching the possible light curves with the observed light curve, which was obtained by measuring CM Dra images and comparing its brightness to other, more constant "standard" stars in the same images. Of the candidates, only one persisted until recently when its apparent transits did not show up at the predicted time. One explanation is that we may have detected a planet that is not quite along our line of sight and so might only precess across the stars' discs. What we were able to prove is that this method can be used to detect very small planets. The candidate had a predicted size of 2.3 Earth radii, which is smaller than 1% the size of Jupiter! It has a period of about 21-days, which puts it in the circumstellar habitable zone of the CM Dra system (see previous articles on circumstellar habitable zones). We had at least accomplished the first search for potentially habitable planets. As the first effort was nearing its completion, two groups (one led by Tim Brown of the High Altitude Observatory in Colorado, and the other by Greg Henry of the University of Tennessee) detected the transit of a giant planet with a period of about 3 days across the disc of a solar type star named HD209458. From the amount of light blocked during the transit (about 1.8%!), the planet's size was determined. This was the first time that the size of an extrasolar planet was measured, and it was a whopperabout 2.7 times the size of Jupiter! It was all puffed up from being so close to its star. The planet was predicted to be there by Geoff Marcy and his radial velocity group (see the "wobble" method) but this planet actually crossed the star. Near future missions that will use the photometric transit method are expected to look at 100,000 stars continuously. Hundreds of Earth-size planets could be found soon after <CONTINUED>

Pulse Method Solves

We can use the pulse method to find “Earth-like” planets.

Doyle, SETI Institute Principal Investigator 01

(Laurance , The SETI Institute,” Detecting Other Worlds: The ‘Pulse’ Method”,7-19, <http://www.seti.org/page.aspx?pid=796>,6-21-11)

There is a story of a man looking for his car keys under a lamppost at night. When asked where he dropped them he indicated that they were over in the dark by his car. Why then was he looking under the lamppost? "Because I could see them here**." Astronomers who study pulsars use giant radio telescopes. Pulsars are the remnants of huge supernova explosionsthe results of a giant star running out of nuclear fuel to support it. Stars are giant balancing acts between gravity, which pulls them inward and nuclear explosions, which push them outward. When a giant star (several to a dozen times the Sun's mass or more) runs out of nuclear fuel, its core collapses. The collapse is so jarring that there is a huge explosion, and the material from the star's last reaction spreads through the galaxy.** The star becomes brighter than 100 billion normal stars! This happened about 64,000 years ago in the Large Magellanic Cloud Galaxy, but the light did not reach us until 1987. A more recent explosion occurred about 5,000 years ago. It was closer (in the constellation of Taurus) so the light arrived around 1054 AD (Light travel time requires that one qualify the question "How old is that?" whether the question is for the astronomical object itself or when it was first seen on Earth.) **What is left after these explosions is a neutron stara star so dense that in its constituent atoms the electrons dont have enough room to "orbit" their protons.** Consequently, they combine to form neutrons and the star's mass becomes a giant, super-dense neutron star. A tablespoon of neutron star stuff would weight as much as a good-sized mountain range. Sometimes these neutron stars have huge magnetic fields that direct radio pulses in our direction from one pulse every few seconds up to a thousand pulses per second. **We call these "pulsars," and they are extremely interesting star types to study. (The Crab Nebulae pulsar, left from the supernova explosion in Taurus, pulses several times per second.) Given such a huge, violent explosion of the star (enough to vaporize any planets that might have been there), why would anyone look for planets around a pulsar? Because they might be detected most easily there! The pulses can be so precisely timed that if the star moved just a bit toward or away from us, the recorded pulses would be altered immediately. Moving a constant pulsar away, for example, would make the received pulse rate slower because each pulse would have farther to travel. The reverse occurs when the pulsar moves toward us. Measuring the radio signals coming from a distant pulsar can help determine whether the star has any orbiting planets. In 1993 the very first "planets" found around another star system were discovered around a pulsar named PSR B1257+12, pulsing over 1000 times per second** (a millisecond pulsar) by an astronomer named Alexander Wolszczan and his collaborators. They discovered two "planets" with masses of 2.8 and 3.4 times that of the Earth! These "planets" are not like the giants found around Sun-like stars today, but more like Earth-mass bodies. Most theorists think that these "planets" formed after the supernova explosion, but they are nevertheless encouraging signs that planet formation is likely, given the available materials around a star. Who says you can't teach an old star new tricks?

The Flash Method Solves

We can use the flash method to find “Earth-like” planets

Doyle SETI Institute Principal Investigator 01

(Laurance, The SETI Institute, “Detecting Other Worlds: The ‘Flash’ (Gravitational Lens) Method” ,6-21, <http://www.seti.org/page.aspx?pid=794>,6-21-11)

Albert Einstein predicted that the suns gravity should bend the light of background stars, so they would appear to move outward during a solar eclipse. This deflection -- about 1/1000th the width of a full moon -- was first measured by the famous British astronomer, Sir Arthur Eddington in 1919. Several years later a group from the Lick Observatory proved that Einstein was correct, by measuring to the required accuracy. As a result, we now believe gravity is not some "magical" force that pulls on a mass -- as Newton theorized -- but simply the bending of spacetime, and this, in turn, led to the acceptance of relativity, upon which our contemporary cosmological ideas are built. It's a good thing that the moon, which is 1/400th the size of the sun, is also 1/400th the distance. If Einstein had been born about 20,000 years sooner or later, astronomers could not test his theory with a solar eclipse, because then the moon would appear either too large or too big to exactly "fit" over the sun. Nice of the universe to have been so accommodating! **Einstein also theorized that stars and other masses such as galaxies should also bend light to form points, arcs, and even halos around the intervening masses. Dozens of such "gravitational lenses," mostly images of quasars deflected by the gravitational fields of whole galaxies, have been discovered to date. Using gravity to find planets These lenses also provide us with a one-in-a-million opportunity to see evidence of planets orbiting stars. If a planet deflects light precisely in our direction, we would see its star brighten as the deflected light is concentrated toward us. This brightening can last from 15 minutes to a month, depending on the mass of the planet and how far it is from its star. The brightening can be about one magnitude in extent (i.e. the star can become almost 3 times brighter). To date, finding this "flash" is the only technique (other than photometric transits, which I'll discuss in a future article) by which we can detect terrestrial-type planets around Sun-like stars or close double star systems. (A pulsar timing method can also detect terrestrial-mass objects, but that's also a topic for another future article.) Gravitational lens experiments have been very successful in determining how many small stars there are vis--vis larger ones in our own and other galaxies. Unfortunately, determining the same thing for planets is much more difficult. The main snag is that the star system must be distant: on the order of at least 5,000 light years away. Also, since the alignment will essentially never repeat itself again, all the data have to be obtained at once by several observatories. Luckily, various projects such as MACHO and OGLE are already looking at crowded star fields to determine the mass distribution of our own Milky Way galaxy as well as some of our "next door" neighbors: the Large Magellanic Cloud, Small Magellanic Cloud, and the globular cluster Omega Centauri. When these projects spot a stellar brightening, a group known as the PLANET collaboration leaps into action and starts sampling at a higher time resolution --the key to detecting smaller masses. Essentially, this "flash" method uses planets themselves -- with their stars in the background** -- as telescopes that focus light towards us. I bet Einstein himself would have said "Wahoo!"

\*\*\*Counterplans\*\*\*

METI CP

Short beam signals are the most cost effective means of extraterrestrial detection

Benford, astrophysicist and in the department of Physics and Astronomy at UC Irvine, Benford, expert in high powered microwaves, 2011

(Gregory, James, “Smart SETI,” Analog Science Fiction & Fact, 131:4, p.33, April, NS)

Counting Costs Since the early SETI era of the 1960s, microwave emission powers have increased orders of magnitude and new technologies have altered our ways of emitting very powerful signals. The highest peak power systems on Earth (peak powers over 1 GW) trade peak power for average power in order to get to a much stronger signal at distance at the lowest cost. Most of these high power devices operate in bursts of short pulses and for fundamental reasons are not extremely narrow band, having bandwidths ? f/f, with f the frequency) of 0.01-1% of the beaming frequency. Economical beacons are also likely to be pulsed. Frank Drake, who started SFTT in I960, remarked in 1990, "The most rational ET signal would be a series of pulses that would be evidence of intelligent design." This would be similar to the strategy of the lighthouse, pulsing and swinging the beam to get noticed. To minimize cost, we wrote down the cost scaling of two major terms: the electrical power needed and antenna building cost, which depends on the antenna area. Quite generally, we found that minimum capital cost occurs when the cost is equally divided between antenna gain and radiated power. High power Earth systems show this general feature, no matter the application. How could we send a broadcast? Arrays of antennas are the only means of producing the large radiating areas (~km2) that interstellar beacons require. They also have high reliability and degrade gracefully, as loss of a few antennas does not mean failure. Arrays are widely used in radio astronomy receiving and are being planned for the new Deep Space Network refit. A typical case SETI broadcaster, by our calculations, has parameters that scale like in Figure 1. This basic approach gives us many implications: To attract attention, beam in pulses, not steadily. It's cheaper. Steady signals are vastly more expensive. High powers demand broadband emission. At very high voltage and currents, the electrical breakdown threshold is much higher for short pulses, so a machine of a given size can radiate much more powerfully.

Private CP

SETI is an easy target for budget cuts and its best hope is in the private sector

Cokinos, professor of English at the University of Arizona researching SETI, 2011

(Christopher, “Funding cut to the Search for Extraterrestrial Intelligence and the death of curiosity,” *The Republic*, June 20, NS)

News that the Allen Telescope Array is "hibernating" — a curiously biological term for shutting down 42 radio telescopes designed to listen for signs of life from other worlds — raises questions about our true commitment to the search for extraterrestrial intelligence. The National Science Foundation recently slashed the University of California's budgets for the Allen array by 90 percent. This, along with state cuts, has left UC Berkeley, which operates the Hat Creek, Calif., array in the Cascade Mountains, and the private SETI Institute, which conducts searches, in the lurch. For now, the phone is off the hook — as it was in 1994 when Sen. Richard Bryan, D-Nev., derided NASA's "Martian chase" and successfully shut down its SETI — "Search for Extraterrestrial Intelligence" — program. It would cost each U.S. taxpayer just 3 cents a year to fund the Allen array, according to SETI Institute Senior Astronomer Seth Shostak. But in this political environment, direct taxpayer support is unlikely, so the SETI Institute is trying to raise $5 million to reboot the array. Donors such as Microsoft's Paul Allen stepped up after NASA's project died; it's for him that the array is named. In fact, SETI's best hope may be the private sector. Privately financed astronomy is nothing new. In the 18th and 19th centuries — the heyday of private observatory building — such work was in part spurred by interest in alien life. It's an interest that, despite present budget tribulations, runs deep. As scholars Steven Dick and Michael Crowe have shown, we can trace the idea of an infinite universe full of other worlds to pre-Socratics like Democritus. This view was marginalized by more famous philosophers, such as Aristotle, and later, by a church fearful of anything that threatened the notion of a unique God-Earth relationship. But by the Victorian era, there were serious discussions not only about a lively universe — which was widely assumed — but about whether Christ might have to be endlessly reincarnated on a "plurality of worlds." That thorny issue eventually faded from view and new takes on the question of cosmic life emerged, such as whether there were canals on Mars. Arguably, the first organized SETI took place in the 1920s when astronomer David Todd persuaded the U.S. military to observe radio silence across North America while he and others listened to the Red Planet. More famously, pioneering radio astronomer Frank Drake turned a big dish in West Virginia toward the stars in 1960. SETI has

continued, in fits and starts, ever since. Still, while the public imagines a universe of star cruisers and galactic cyberwebs, budget-cutting bureaucrats find even partial grants for SETI an easy target. Did you write your representative or senator when the SETI funding was slashed? I guess we prefer our aliens to announce themselves without effort on Netflix.

Private CP

Private sector SETI helps develop peer computing techniques

Wilson, senior researcher at Microsoft’s Bay Area Research Center 2005

(Ron, “Tech trends will topple tradition,” Electronic Engineering Times, 1315, p.2, NS)

The concept is disarmingly simple. There are millions of PCs, workstations and servers in the world, most of which sit unconscionably idle most of the time. If pieces of an enormous computing task could be dispatched over the Internet to some of these machines-say, a few tens of thousands-and if the pieces ran in the background, so that the users weren't inconvenienced, a lot of computing work could be done essentially for free. This is exactly the way the Search for Extraterrestrial Intelligence (SETI) at Home project works. Most of the people who run SETI are volunteers. But there are also commercial uses of grid networks, as such Internet-linked communities of computers are known. United Devices (Austin, Texas), which provided the supervisory software for SETI, is a commercial enterprise that sells grid-computing systems to commercial clients. Of course, there is fine print in the tale, too. One obvious issue is that massive networks of loosely coupled computers are useful only if the application lends itself to massive parallelism. These are the applications that Gordon Bell, senior researcher at Microsoft Corp.'s Bay Area Research Center, calls "embarrassingly parallel." In the SETI program, for instance, essentially the same relatively simple calculations are being performed on enormous numbers of relatively small data sets. The only communication necessary between the peer computer and the supervisor, once the data is delivered to the peer, is a simple "Yes, this one is interesting" or "Nope." The application is ideal for a loosely coupled network of peers. Stray from that ideal situation, though, and things start to get complicated. Bell pointed out that bandwidth is so limited in wide-area networks, and latency so large and unpredictable, that any need for tight coupling between the peers renders the approach impractical. And of course, the individual task size has to fit in the background on the individual peer systems. Is it possible to work around these limitations? Bell was guardedly pessimistic. "After two decades of building multicomputers-aka clusters that have relatively long latency among the nodes-the programming problem appears to be as difficult as ever," Bell wrote in an e-mail interview. The only progress, he said, has been to standardize on Beowulf-which specifies the minimum hardware and software requirements for Linux-based computer clusters-and MPI, a standard message-passing interface for them, "as a way to write portable programs that help get applications going, and help to establish a platform for ISVs [independent software vendors]." Will we find ways to make a wider class of problems highly parallel? "I'm not optimistic about a silver bullet here," Bell replied. "To steal a phrase, it's hard work-really hard work." But Bell does point to a few areas of interest. One is the observation that peer networks can work as pipelined systems just as well as parallel systems, providing that the traffic through the pipeline is not too high in bandwidth and the pipeline is tolerant of the WAN's latencies. Will peer networks replace supercomputers? In the general case, Bell believes not. Technology consultant and architecture guru of long standing John Mashey agrees. "Anybody who's ever done serious high-performance computing knows that getting enough bandwidth to the data is an issue for lots of real problems," Mashey wrote. In some cases, creating a private network may be the only way to get the bandwidth and latency necessary to keep the computation under control. But that of course limits the number of peers that can be added to the system. And there are also issues of trust, security and organization to be faced. But even within these limitations, it seems likely that peer computing on a massive scale will play an increasing role in the attack on certain types of problems. It may well be that our understanding of proteins, modeling of stars and galaxies, and synthesis of human thought may all depend on the use of peer networks to go where no individual computer or server farm can take us.

Private CP

SETI relies on private funding

Berger Staff Writer for Space.com 06

(Brian Berger Staff Writer for Space.com: “With NASA Budget Cuts Looming: SETI Eyes Private Funding 10-23-2006 <http://www.space.com/3031-nasa-budget-cuts-looming-seti-eyes-private-funding.html> MLF 6-21-11)

With NASA expected to reduce expenditures on astrobiology by half in the year ahead, the SETI Institute--a major recipient of that funding--is seeking private money to help support the nearly 50 scientists it has on staff studying the origin, evolution and distribution of life in the universe. Officials at the Mountain View, Calif.-based nonprofit announced the fund-raising drive Oct. 17 as part of a broader effort to sustain its astrobiology endeavors over the long haul by establishing the Carl Sagan Center for the Study of Life in the Universe to eventually establish more endowed chairs and create additional laboratory capabilities. But the center's immediate goal, according to Scott Hubbard, a visiting scholar at Stanford University and the Carl Sagan chair at SETI, is raising $4 million to $6 million over the next three years to sustain its top astrobiology researchers. Hubbard, the former director of NASA Ames Research Center, said about half of the institute's $14 million annual budget comes from NASA in the form of competitively awarded, peer-reviewed research grants. NASA's astrobiology budget, the source of most of that grant money, is facing a steep decline. Under NASA's 2007 budget proposal, currently before Congress, the U.S. space agency would spend $32.5 billion on astrobiology in the year ahead--half of what it spent on astrobiology in 2005.Hubbard said in an interview that if NASA goes through with the proposed cut, SETI would expect to see its NASA grant funding reduced by about 20 percent--making it impossible to sustain without outside help the nearly 50 astrobiology researchers it has on staff. Astrobiology, a discipline NASA has been funding for about 10 years, is the hardest hit in NASA's proposal to reduce its overall scientific research and analysis spending by about 15 percent in the year ahead. NASA is under pressure from the hundreds of research scientists it funds and their allies in Congress to reverse course on the proposed reductions, and the SETI Institute is part of that fight. But Hubbard said SETI's intent in establishing the Carl Sagan Center for the Study of Life in the Universe is to introduce a measure of long-term stability to the astrobiology community, not protest the current proposed cuts. "Cleary [SETI Chief Executive Officer] Tom Pierson and [SETI trustee] Barry Blumberg and the entire science community are working the political process to try to get the funds restored," Hubbard said. "But federal funding for anything can go up and down, so let's try to broaden our portfolio and be here for the long haul and not just wring our hands about it." SETI is no stranger to seeking private funding to sustain its activities. The institute's well-known radio searches for signals from other intelligent life in the universe has been entirely funded by about $6 million a year in private donations since Congress cut off federal funding for the efforts in 1993.

SETI can use private funding

David, professor at the School of International Relations and Pacific Studies, 2009

(Victor, “SETI at 50,” Nature, 461: 316, September 16, p.324, NS).

Nonetheless, a small SETI effort is well worth supporting, especially given the enormous implications if it did succeed. And happily, a handful of wealthy technologists and other private donors have proved willing to provide that support. This summer, the Allen Telescope Array, funded mainly by Microsoft billionaire Paul Allen, has begun to sweep the skies with its 42 dishes in the California high country (see page 324). The sophistication of this array, which it is hoped will grow even larger, shows just how far SETI has come. Whereas the first search in 1960 used a single radio channel, the Allen array can potentially monitor hundreds of millions of radio channels at once. With advances such as this, the speed of the searches — the rate at which star systems can be checked over multiple parts of the radio spectrum — has increased roughly as fast as the exponential growth in computer power described by a law named after yet another SETI supporter, Intel founder Gordon Moore. Moreover, the researchers at the Allen array are solving the immense computing challenges of operating large, multi-dish arrays, an expertise that will benefit the whole of radio astronomy when the time comes to build the huge arrays of the future. Meanwhile, one of SETI's main missions — finding other worlds like our own — has become much more feasible than it was five decades ago. Very soon, probably within a few years, astronomers will find an Earth-sized planet orbiting another star. The next step will be to characterize it by studying spectroscopic signatures in the light from its atmosphere. Is there a fingerprint for life, in the form of oxygen or methane? How long is its day? What is its weather like? Does it have continents and oceans? For the 'Earths' orbiting nearby stars, answers to all of these questions should be within the reach of telescopes planned for the next decade.

Private CP

SETI needs private donations to run now

Poeter Senior Writer at PC Magazine 6-21-11

(Damon Poeter is a Senior Writer at PC Magazine: “SETI Seeks Funds to Resume Search for Alien Life” <http://www.pcmag.com/article2/0,2817,2387372,00.asp> MLF 6-21-11)

The SETI Institute took its Alien Telescope Array (ATA) offline in April due to lack of funding, but a core group of alien seekers is trying to raise money to help re-launch the quest for signs of extraterrestrial intelligence.

The ATA comprises 42 telescopes located in Northern California that scan outer space for deliberate, non-naturally occurring radio signals that if discovered would indicate the presence of other intelligence life in the universe.

The institute recently launched SETIstars.org in an effort to get enough private donations to bring the array back online, one volunteer in the fundraising effort told Boing Boing on Monday.

The ATA went offline "at the exact worst possible moment," according to Boing Boing's source, "just as we're discovering dozens of planets in the habitable zones around their respective stars by the month.

"For the first time in its existence, SETI knows exactly where to point its telescopes if—it had the money."

SETIstars.org is seeking $200,000 in funding by July 29 and as of Tuesday morning had raised $3,476 from 59 "Stars."

The SETI Institute was founded in November 1984 and began operations on February 1, 1985. The institute still employs more than 150 scientists, educators, and support staff, but funding cuts have made it impossible to continue to operate the ATA, one of the most critical components in its search for extraterrestrial life.

The institute further explains its fundraising goals on SETIstars.org:

"At the SETI Institute, we've made a name for ourselves exploring space. But it's our community here on Earth—passionate, science-minded and creative—that truly defines us. That's why we're launching SETIstars, an initiative to connect us more closely than ever with the constellation of visionaries and supporters that make our work possible.

"Priority one is getting the Allen Telescope Array (ATA) back online as soon as possible and once again fixing our gaze on the stars. The ATA is a powerful field of linked radio telescopes that enable countless avenues of astronomical study, chief among them the search for evidence of extraterrestrial civilizations and insight into the nature of our cosmic origins. In the wake of a recent funding shortfall, however, this invaluable tool lies dormant and our vision of the universe around us has gone dark. With your help, we can change that.

"But like any worthwhile endeavor, the first challenge is unlikely to be the last. This is a journey that will last our lifetimes, as we continually strive to get closer to answering the kinds of questions that may one day change everything about our world. It won't happen overnight, but with your support, it will happen.

"We here at SETI are making an appeal to the power of human collaboration, and now is the time to get involved. Join us

United Nations CP

SETI should be left up to the UN and speak on behalf of the international community

The Associated Press, 1992

(P. A2, September 15, NS)

Radio astronomers and engineers involved in the Search for Extraterrestrial Intelligence, commonly called SETI, this month began consulting with their colleagues in all scientific disciplines for suggestions on what the reply to aliens should be. After sifting and winnowing their own ideas, the scientists plan to seek a decision from the U.N. General Assembly's Committee on the Peaceful Uses of Outer Space. "The basic thinking all along is that this decision ought to be put into the hands of the United Nations," said John Billingham, head of the SETI project at NASA's Ames Research Center in Mountain View, Calif. In a "white paper" being circulated to scientists worldwide, one key principle is that Earth should reply with one voice, on behalf of all humanity, rather than individual states sending a response, according to scientists familiar with the document. "We have always considered this not just a U.S. question, but an international question," Billingham said. "Everybody, in some way or another, should be involved in it." Officials at the U.S. State Department, speaking on condition of anonymity, say they are leaving this initiative to the scientists. The space scientists plan to refine their ideas at international meetings in April and October of 1993, and then bring them to the U.N. space committee. The 53-nation Committee of the Peaceful Uses of Outer Space has in the past drafted five international treaties on the peaceful use of outer space.

International organizations check unethical reactions

Zaitsev, chief scientist at the Russian Academy of Science, 07

(Aleksandr Leonidovich, “SENDING AND SEARCHING FOR INTERSTELLAR MESSAGES,” International Astronautical Congress, 4:2, p. 3-4, September 24, fire.relarn.ru/126/docs/iac\_07\_a4\_2.02.pdf NS)

Quite often one can hear cautions to those who under own initiative, without a sanction of the United Nations or a similar international organization, sends IMs. The argument of opponents of sending initiative IMs is well-known, it can be found, for example, in [5] and there is no need here once again to repeat it. However, to be consistent, it is necessary to agree that uncontrolled searches are also unsafe. If a country receives a certain “premature knowledge” as a result of a search not controlled by the United Nations or a similar international organization and this country is not ready from the moral-ethical point of view, this country (or a coalition of the countries) may use it to harm the rest of the mankind. Imagine that some morally ugly creature or a religious fanatic with the ideas on the level of the Stone Age suddenly receives the secrets of a terrible and powerful weapon! Thus, it is necessary to keep SETI under some effective international control. In other words, in case of using the concept 4 “Sending and searching for IMs”, the shift from a specific question “Is METI dangerous?” to more general question “Is such human activity as sending and searching for intelligence signals in the Universe dangerous in principle?” is quite reasonable.

\*\*\*Disadvantages\*\*\*

Impact Calculus – DA O/W

Possible achievements though SETI do not justify its cost

Benford, astrophysicist and in the department of Physics and Astronomy at UC Irvine, Benford, expert in high powered microwaves, 2011

(Gregory, James, “Smart SETI,” Analog Science Fiction & Fact, 131:4, p.33, April, NS)

But are there any galactic social universals? Possibly, there are none in common between aliens and us, so why should any arguments inspiring SETI have any weight? SETI assumes the opposite—that we can have similar motives. Are aliens unknowable, and beyond economic arguments? We’ll call this the Altruistic Alien argument -- that aliens of great ability, near-infinite resources and benign intent will transmit to us without taking any consideration to the cost (which would be high in our terms). Even if Earth economics generally works similarly in other technological societies, why should it apply to their transmitting beacons? Even on Earth, larger goals often override economic dictates, such as military security, aesthetics, religion, et cetera. But two aspects of SETI undermine this intuition: 1. SETI assumes long time scales for sender and receiver. Still, while cultural passions can set goals, economics determines how they get done. Many momentary, spectacular projects such as the pyramids of Egypt lasted only a century or two, then met economic limits. The Taj Mahal so taxed its province that the second, black Taj was never built. The grand cathedrals of medieval Europe suffered cost constraints and so, to avoid swamping local economies, took several centuries of large effort. Passion is temporary; costs remain. 2. We found that the optimum cost strategy leads directly to a remarkable cost insensitivity to the details of economic scaling. The ratio of costs for antenna area and transmitter power is about one. The two costs are usually equal and their ratio does not depend on the details of the technology and varies on Earth by only a factor of two. Both these costs may well be related principally to labor cost; if so, labor cost cancels out. This means fashions in underlying technology will matter little, and our experience may robustly represent that of other technological societies. Our quantifying approach is sobering, as it forces trad-offs on otherwise open-ended speculations. But it also advances the subject, which many beacon ideas do not do. It's simply much clearer to pick a major organizing principle - economics - than generalize from a special design, or guess at alien ideas. What if we suppose, for example, that aliens have very low cost labor, i.e., slaves or automata? With a finite number of automata, you can use them to do a finite number of tasks. And so you pick and choose by assigning value to the tasks, balancing the equivalent value of the labor used to prosecute those tasks. So choices are still made on the basis of available labor. The only case where labor has no value is where labor has no limit. That might be if aliens may live forever or have limitless armies of self-replicating automata. But even such labor costs something, because to support it demands resources, materials and energy, which are not free. Smart SETI, we feel, should take account of this basic constraint.

Politics - SETI Unpopular

Risks losing overall support for NASA

Triplett, Washington reporter, 2001

(William, “Search for alien life reasserts its credibility,” Nature, July 8, 412:19, p. 260, NS)

Michael Meyer, a senior scientist at NASA’s astrobiology programme, says that as a result of the congressional language used in removing SETI from the federal budget, the agency is effectively prohibited from funding SETI-specific activities even through grants, which are awarded only to proposals involving “good science”. SETI critics have argued in the past that SETI does not constitute good science. But Lamar Smith (Republican, Texas), whose enthusiasm for the project led to the hearing taking place, noted that SETI’s track record has improved markedly in recent years. Indeed, Chyba points out that successive decadal reviews of astronomy by the National Academy of Sciences have endorsed SETI. The most recent one singled out the project for pioneering new technology that will have other useful applications. But whether NASA is ready to offer astrobiology grants to SETI is another matter. “The SETI Institute has been very successful and they do some good stuff,” says Meyer. “But there’s the issue of once burnt, twice shy. We’re growing an astrobiology programme that seems to be fantastically popular with not only the public but with the White House Office of Management and Budget and with Congress and even within NASA. But there could be concern that if we include SETI in this, while intellectually it fits within the programme, all of a sudden the enthusiasm you had gets turned back into why are we looking for little green men?”

International Brain Drain Link

1. Allen Telescope Array crucial to astrobiology research

Welch, former director of the Radio Astronomy Lab at U.C. Berkeley, 10

(William J., “The allen telescope array as a tool for seti and astrobiology research”, Astrobiology Science Conference 2010, http://www.lpi.usra.edu/meetings/abscicon2010/pdf/5437.pdf)

The ATA [1] is a multielement array of radio telescope antennas which is especially well suited for surveys such as for SETI and for important biomolecuules. The individual antennas are small, which provides a very large instantaneous field of view. It operates over a very large bandwidth, covering most of the transparent window in the earth’s atmosphere at radio wavelengths. As an extended array, it is effective in rejecting man-made interference. Multiple beams within the field of the individual antennas can be formed, enabling searches toward multiple target stars. The large number of antennas provides high sensitivity for the search. It is designed to operate in a commensal mode so that SETI searaches can be conducted at the same time as other astronomy searches. This makes essentially full time available for the SETI searches.

1. Astrobiology draws global talent to the US

DeVore, Deputy CEO of SETI, 6

(Edna, “Astrobiology research threatened at nasa”, March 30, SETI Institute, <http://www.seti.org/page.aspx?pid=777>) PG

Astrobiology is exciting science that engages the public, and is drawing many young people to study science, engineering and technology to prepare to explore our solar system and beyond. Senior scientists at AbSciCon say that their **astrobiology graduate programs are attracting some of the best graduate students they have ever seen from both the US and internationally.** There are many young scientists here at AbSciCon: undergraduates, graduates and post-docs**. They are simultaneously excited about their science and very concerned about their future careers.** At the NASA Town Hall Meeting, graduate student Kevin Hand of Princeton University asked pointedly “When I complete my PhD, will I need to look for a job in China? Post-docs and young scientists are supported by R & A funding. **Cuts to science research programs will drive us to pursue our scientific careers outside of the US.”** Ironically, Hand is one of three young scientists featured in James Cameron’s IMAX astrobiology-themed film, [Aliens of the Deep](http://www.space.com/entertainment/aliensofthedeep_050128.html). Cameron produced this film to inspire young people to pursue scientific careers that are now threatened by cuts to the entire R & A program and to the robotic space missions.

China Relations Link

China pursuing SETI now

Trei, 6/15/11

(Michael, dvice Staff Writer, “China starts construction on the world's largest”, http://dvice.com/archives/2011/06/china-starts-co.php, 6/22/11, SW)

If you want to search the universe for extraterrestrial radio signals, you're going to need a pretty big antenna, so China has just broken ground on what will become the world's largest radio telescope. The Five-Hundred-Meter Aperture Spherical Radio Telescope (FAST) will have nearly three times the surface area of the dish at Puerto Rico's Arecibo Observatory, the current record holder, and will be capable of receiving signals from as far as 1000 light years away. While FAST will be joining SETI in the search for ET and his pals, China's main goal is to check out pulsars, supernovas, and other interesting things happening in deep space. Building something this freakin' huge takes time (FAST is 1,640 feet across), so China says they won't be firing this sucker up until 2016. That means they will be right on time to pick up some hot signals that started their journey way back in 1016.

Europe

Europe pursuing SETI now

Holden, professor of environmental policy on leave science, 2011

(John, “Space telescope on the trail of ET,” Science Today, p.13, June 23, NS)

Seti has also become the umbrella term for any activity people engage in to search for evidence of extraterrestrial life. The Seti Institute in California was first established to consolidate this activity by taking a more structured and scientific approach. Microsoft co-founder Paul Allen has donated around $30 million (EUR 20.87m) to the project over the years, but US government spending cuts earlier this year have made it impossible to keep the search for ET alive. Yet even as Seti activity in the US declines, interest is building across Europe thanks to the development of some kick-ass science and public interest in space exploration.