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TESTING A CLAIM OF EXTRATERRESTRIAL TECHNOLOGY

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ABSTRACT

Last December, members of The SETI League, Inc. and the Invitation to ETI group were called upon to evaluate, and ultimately perform laboratory testing of, a claim of extraterrestrial electromagnetic technology present on Earth. These tests were undertaken because, although the claims were highly questionable, the claimant himself seemed reasonably credible, and a positive outcome, though unlikely, could have tremendous payoffs. Not surprisingly, rigorous testing produced a null result. This paper explores the initial claim, our reaction to it, the evaluation process, the observed results, lessons learned, and our conclusions. Despite the outcome, we feel that all concerned showed great professionalism, and applied scientific rigor to a challenging situation.

THE PREMISE

The traditional SETI paradigm holds that extraterrestrial intelligence can be detected from its electromagnetic signature. It is assumed that signals received by SETI researchers will be distinguished by particular hallmarks of artificiality, and will be received over interstellar distances, traversing the interstellar medium to be detected by Earth's most powerful radio telescopes. This conventional SETI model has, with minor modification, held for nearly half a century, and has informed dozens of search programs around the world. None has yet provided the incontrovertible evidence we seek. Absent a positive result, many SETI experimenters, while not abandoning the classical model, have been bold enough to propose alternative search strategies, and to open their minds to new possibilities.

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THE INVITATION

One of the more innovative of those strategies, *Invitation to ETI*, posits that advanced communicative societies may have developed technologies that enable them to monitor Earth's telecommunications infrastructure. Through the mechanism of alien beings *in situ* (an admittedly controversial hypothesis), or more likely, through robotic probe technology either on or orbiting Earth, such civilizations could in principle surf the terrestrial Internet, and in so doing learn much about human civilization, technology, and (dare we say?) culture. Any discussion as to whether such anthropological research would provide extraterrestrials with a valid view of humanity is, as we academics like to say, beyond the scope of this course.

Through its highly publicized and widely indexed website <<http://ietl.org>>, *Invitation to ETI* invites contact between humanity and any beings of extraterrestrial origin finding themselves able to access it. The heart of the site is an Invitation issued

by 100 scholars from disparate disciplines, including a broad cross-section of the contemporary arts, physical sciences, and social sciences. To date, the Invitation has proved just as successful as traditional microwave SETI: it has yet to uncover clear and convincing evidence of extraterrestrial intelligence.

THE CLAIM

Which is not to say that no intelligent terrestrials have attempted to foil the system. Since the Invitation was launched in 1996, it has attracted roughly 75 responses, from correspondents claiming to be the beings we seek. Through simple and reliable methods which we will not delineate here (lest we stack the deck in favor of the next prankster), we have been able quickly and conclusively to unmask those humans who have attempted to fool those issuing the Invitation. There was, however, one claim that, though bizarre, was convincing and compelling enough to demand closer scrutiny, before it was ultimately dismissed. It is the testing of this claim with which the present paper deals.

On October 29, 2004, a man left a voicemail message in which he stated that he had "what the Invitation to ETI group is looking for" -- that is, evidence of extraterrestrial intelligence. The claimant (let us call him "Adam Adamson" to protect the inept) then emailed an assertion that, although he was most assuredly a human terrestrial, he was able to communicate with extraterrestrial beings via electromagnetic means, and was prepared to demonstrate this phenomenon under controlled conditions. A sustained dialog between Mr. Adamson and the authors convinced us that, although his claims were unlikely, the individual appeared intelligent, lucid, cooperative, and sincere. Satisfied that he was probably not a raving lunatic, we proceeded to arrange for dispassionate scrutiny of his claim, which if

verifiable could significantly alter our worldview.

THE TESTS

Among the members of the Invitation to ETI team is an industrialist who operates a successful electronics business in the US. His extensive commercial facilities include an Electromagnetic Interference (EMI) test chamber, a radiation-shielded room containing highly sensitive microwave monitoring instrumentation. The use of this facility was offered for the purposes of testing Mr. Adamson's claim. Any electromagnetic communications passing between Mr. Adamson and his alleged extraterrestrial communications partners would be clearly discernible on just such equipment. Mr. Adamson volunteered to present himself for such testing, and we readily agreed.

The tests took place on December 16, 2004 in New Jersey, USA. At noon, Adam Adamson presented and explained his claim (using a whiteboard) to the authors, our facility host, and two journalists, there to document the day's tests. We then gathered outside the large shielded room used for the actual tests. The subject's manner was amiable and cooperative; after all, our goal was to help Mr. Adamson prove his claim, not to make him nervous.

Mr. Adamson asserted that radio signals (somewhere in the range of 1MHz to 1GHz) were being emitted by a "probe" controlled by alien intelligence that was somehow associated with his person. While the claims are unusual to say the least, our host, an associate of the Invitation to ETI project and a SETI enthusiast, volunteered to conduct what tests he was able to with an open mind. He expressed concerns prior to the test that he would only be able to determine whether a signal was being emitted, and had no expertise whatsoever in determining whether it might be alien,

fortuitous, fraudulent, or what. We agreed that it was worth performing the tests as a first step in any event.

Among its extensive equipment, the EMI test facility includes a Rhode and Schwartz (R&S) EMI test receiver, which is normally used to determine whether electronic equipment is compliant with various national regulations, e.g., FCC, CE, etc. Using the facility one can confirm the presence of incidental radiation, and a deliberate radiator would stand out spectacularly. We performed the following tests:

1. The R&S receiver was configured to sweep between 150KHz and 1GHz and plot signal amplitudes. We did two baseline tests, one with the door to the screen room open, and one with it closed. The facility is about 3KM from a powerful AM transmitter on 770KHz as well as other AM broadcast transmitters. With the door open, strong signals at AM broadcast frequencies were observed, and a large number of strong signals in the range of 30MHz to 1GHz were also observed. These latter signals were as much as 40dB above the receiver noise level. With the door closed, the AM leakage was greatly reduced, and no signals above 10 MHz were observed at all; the plot in this case was consonant with receiver noise.
2. Mr. Adamson then entered the screen room, the door was closed, and the sweep repeated. The sweep was identical to that without his presence: no signals at all were detected. It should be noted that the R&S receiver performs a slow sweep, so if a signal were present momentarily, it might well not be noted. Therefore, although it was clear that there was no continuous emitter in the room, there might be a sporadic source of RF. Accordingly:
3. We entered the room along with Mr. Adamson, and employed an Agilent signal analyzer to look for any possible signals. As this analyzer was physically in the screen room and produces EMI itself, we could not use it to look for low-level signals in the same manner as was done with the R&S receiver. Nonetheless, the Agilent analyzer sweeps orders of magnitude faster than does the R&S, so we used it with the same R&S measurement antenna to look for signals that might be stronger than the RF noise contributed by the analyzer. Sweeping over a range up to 2GHz produced nothing inconsistent with background.
4. Finally, we attached a "close field probe" to the analyzer and did a number of sweeps, both wide range 0 - 2GHz, and narrow, including a number with center frequencies and ranges suggested by Mr. Adamson. In no case was any signal found that was inconsistent with background noise. For a good portion of the test period, Mr. Adamson held the probe near areas that he thought might be emitting signals, with uniformly negative results. (With the close field probe the RF noise produced by the analyzer is negligible as the probe's range is only a centimeter or so.)
5. To assure all that the equipment and probe was functional, to explain the results to Mr. Adamson, and to get an idea of the magnitude of the signals involved, we tested the system by activating three different automobile key-tag remote control transmitters. The three keys immediately and unambiguously registered spikes on the analyzer/probe combination of about 40, 45, and 50dB above the noise. Note that these car keys, under normal circumstances, have a range of perhaps 10-20 meters.

THE RESULTS

The owner and operator of the EMI test facility, himself an experienced engineer, offered the following report:

Mr. Adamson and/or any associated probe was not radiating any discernible electromagnetic signal in the 1MHz-1GHz range.

1. *No "noise signal" of any significant amplitude existed.* Given that an ordinary car key showed up to a 50dB signal, even a pure noise emitter, had one been present, would have easily increased the noise baseline and been immediately obvious.
2. *No pulse signal of any reasonable repetition rate existed.* Although such might have been missed on the R&S, the balance of the analysis spent sufficient time at all frequencies to have picked it up. (Car keys are pulsed emitters, in fact, and they showed up instantly.)
3. *No continuous signal of any significant amplitude existed.* If it had been present it would have been detected immediately by both analyzers.

The authors concur with these analyses. The test subject appeared intelligent, coherent and cooperative. He explained prior to the shield-room tests that ETI had chosen to disguise its communications signals so as to look like noise. In fact, during several different tests, nothing was observed that bore any statistical difference from thermal background plus internal equipment noise. During the alleged transmissions, nothing substantive was observed on the EMI test system or on the spectrum analyzer. The subject's explanation was that the transmissions did indeed look like noise, which is a bit reminiscent of the old joke about the Invisible Man: "of course you

can't see him. He's invisible, and that proves it!"

The subject pointed out several noise spikes and alleged they were "the signal." These were intermittent amplitude deviations, aperiodic, randomly distributed, and perhaps 10 dB out of the mean background noise. If we assume (as we have every reason to expect) that the system noise is Gaussian, then it appears (visually) that its standard deviation is on the order of 3 dB. One can compute that a 10 dB deviation from the mean in this case represents five standard deviations (considering that decibels are a logarithmic scale). Such an outcome has a high probability of random occurrence. We have frequently seen 10 dB spikes in the noise every time we turn on spectrum analyzers of this type. Thus, the observed phenomena (if indeed any were observed) were 5-sigma events, not statistically significant as being distinguishable from noise.

In the absence of repeatability, those in the SETI community tend to set a more rigorous decision rule in determining significance. For example, the tantalizing Ohio State University "Wow!" event of 15 August 1977, though by no means conclusively identified as an extraterrestrial emission, was considered credible and worthy of further study in part because its amplitude exceeded the mean background noise by thirty (30!) standard deviations, a level with a vanishingly small probability of random occurrence.

The subject indicated that extensive further study and testing, lasting perhaps several months, would be required to "verify and analyze the signals." Considering the cost (several hundreds of dollars per hour) of renting and operating a commercial EMI test facility, such testing is beyond the resources of most SETI organizations. We are unwilling to commit *Invitation to ETI* or SETI League resources to further testing of

this claimed phenomenon. Based upon the initial null result, do we do not recommend that any other organizations pursue this claim, but of course we realize this decision is up to them.

THE NEXT STEP

Upon conclusion of our testing and data analysis, we furnished the above reports to Mr. Adamson, and invited his comments. That was more than six months ago; he as yet to respond, which we think speaks volumes. We therefore consider tests of Mr. Adamson's claims to be concluded.

The Invitation to ETI project is based on the likelihood that a highly advanced society will send super-smart nano-probes to study other civilizations, or will monitor our telecommunications in some other way. We have chosen a web-based invitation as our best bet for contact. Every scientific project has to make choices about what to focus on. Given that we cannot do everything, we seek a highly articulate response from a super-smart alien intelligence. We lack the expertise and (given that we cannot do everything) the motivation to pursue research into UFOs, orbs, abductions, ancient astronauts, and many other fascinating claims and reports of anomalous phenomena.

There are many organizations devoted to the study of various anomalous phenomena. Anyone with anomalous experiences to report can search for a compatible organization on the Internet, in various periodicals devoted to these topics, and through networks of informed people.

CONCLUSIONS

For whatever reason, an apparently intelligent and reasonably convincing individual had come to believe that he was a conduit for communications with extraterrestrial intelligence. As SETI scientists, it would have been easy for us to

dismiss these claims out of hand. UFOlogy is generally acknowledged to be tainted by pseudoscience and the lack of sophisticated skepticism. The SETI community goes to great pains to disassociate itself from UFOlogy, in the interest of preserving the scientific credibility it has earned for itself over the past half-century. It is only because the claimant alleged electromagnetic radiation, an easily measured phenomenon with which two of the investigators possess expertise, that we decided to test the claim. Given the time, effort, and expense involved in achieving this null result, we are unlikely to explore any further unconventional claims in the future.

The danger is that in so restricting ourselves, we risk closing our minds to contact. Like all SETI projects, we must create a scientific methodology that avoids being too open-minded—too friendly to unsubstantiated claims. But if we go too far in the direction of rigor and respectability, we could be closing our eyes and our doors to a genuine manifestation of extraterrestrial intelligence. Given the likelihood that ETI will turn out to be quite different from our preconceptions, it would be foolish to dismiss the possibility that ETI could someday be discovered by a scientist carefully checking out some anomalous phenomenon.