

Attachment #2

Microsoft Word - Extraterrestrial or Terrestrial origin.docx.pdf

Original view

3 pages (displayed on pages 9 to 11)

This document is made available through the declassification efforts
and research of John Greenewald, Jr., creator of:

The Black Vault



The Black Vault is the largest online Freedom of Information Act (FOIA) document clearinghouse in the world. The research efforts here are responsible for the declassification of hundreds of thousands of pages released by the U.S. Government & Military.

Discover the Truth at: <http://www.theblackvault.com>

Thoughts on UFOs

David Spergel

The recent publication of observations of unidentified flying objects (UFOs) has stimulated a revived interest in the possibility of extraterrestrial visitors. This note describes possible hypotheses about the nature of UFOs, outlines key observables, and then suggests possible observing programs with an emphasis on approaches that will lead to interesting science even if UFOs have terrestrial origin.

What are they?

The most conservative hypothesis is that these UFOs are built by humans: experimental vehicles under development by the US military or by foreign militaries. In the past, famous UFO sites (e.g., Area 51) have turned out to be test sites for advanced technologies. Some of the “triangular shaped” objects that are capable of rapid accelerations and high speeds do seem remarkably similar to descriptions of hypersonic vehicles that are currently under development by the Army, [Navy](#), [Air Force](#), [DARPA](#) and the [NSA](#). The [Indian](#), [Chinese](#) and [Russian](#) military are all developing their own hypersonic vehicles. DARPA’s HTV-2 had test flights over a decade ago so that the recent appearance of flying triangular shaped objects that can reach high speeds seems consistent with this hypothesis. There is also extensive work on developing [drone swarms](#) by many nations (including even Armenia) whose properties match some UFO reports.



Image of the Indian HGV-2, one of many hypersonic vehicles that are being tested and deployed.

Another possible explanation for some of the events are natural phenomena such as [Ball lightning](#) or St. Elmo Fire. Plasma physicists and atmospheric physicists are still struggling to fully understand these phenomena. Recent work associates these events with lightning induced quasi-stable plasma effects (see e.g., [Skyrmion origin of ball lightning](#)). Some of the events could be optical illusions due to multiple reflections in airplane windows or atmospheric effects.

The most exciting hypothesis is that some of the UFOs are extraterrestrials visiting the Earth and studying the planet and its life forms. Aliens capable of interstellar space travel are not likely to be using technologies that are familiar to us (e.g., solar sails or hypersonic airbreathing vehicles). They would only be detectable if they wished to be seen. For example, they would likely want to miniaturize their probes and not likely to have familiar-looking vehicles. Given astronomical timescales, alien life is likely either a billion years less advanced than human life or a billion years more advanced technologically. As [Clarke's third law](#) states, "any sufficiently advanced technology is indistinguishable from magic".

Observables

What are the observables that can distinguish between these hypotheses? We would like to characterize the UFO events: What is their duration? What is the amplitude of the observed accelerations and velocities? How frequent are these events? Are they associated with weather phenomena? Where do the events occur? What are the properties of the objects? Do they have a surface or are they a plasma? Observations that can answer these questions can help identify the UFOs.

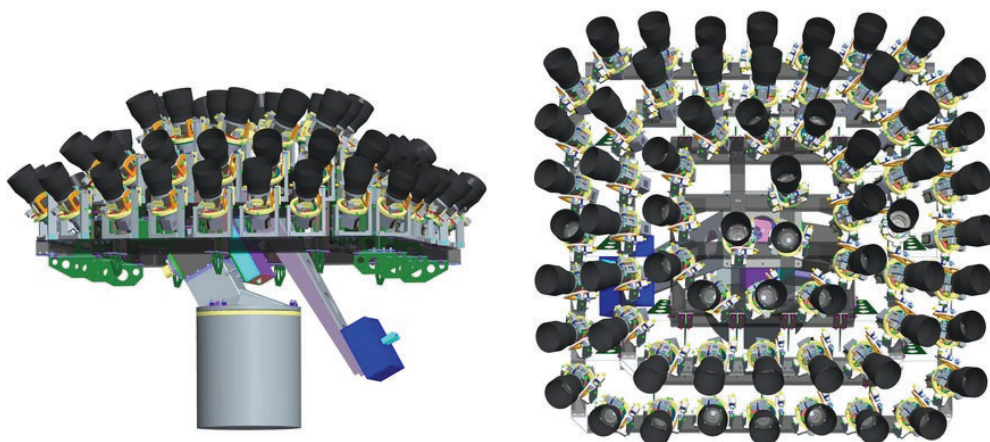
Potential observational program

An observational program that monitors the sky for rapidly moving objects and for time-variability would likely be able to help address the origin of these UFOs. Ideally, these telescopes would be monitoring much of the sky continuously so that they could simultaneously observe the events reported by pilots.

There are several existing observing programs that could be used to extrapolate to an all-sky monitoring program. In the optical, the [ASAS](#) telescope and the [HATPI](#) project monitor a significant fraction of the sky. ASAS operates a network of telescopes in South Africa, Texas, Hawaii, and Chile. HATPI uses a series of small cameras to monitor most of the sky visible from Chile. Currently, HATPI cover $\frac{3}{4}$ of the visible sky and detects 1% variations in 13th magnitude stars within 30 seconds. The approximate cost of HATPI was ~\$5 million, so that a program of making multiple copies of HATPI would not be overwhelmingly costly. This network would complement the Vera Rubin Observatory by enabling constant monitoring of transients, would detect transiting planets, and would be able to observe UFOs in clear weather. The telescopes are currently designed to operate at night and there would need to be significant modifications in the software for day-time operations. The biggest cost for these telescopes would be developing the software optimized for detecting fast moving objects and the ability to sort

through enormous databases and not be dominated by planes, birds, and human-made satellites.

Model of HATPI telescope



Microwave observations would be able to detect the thermal emission from objects in orbit or in the upper atmosphere. For example, consider a 0.5m telescope operating at 2mm with modern detectors. A one-meter diameter object at 20 km moving at 10 km/s subtends 10" and moves 2' in a millisecond. With a temperature of 300K, the UFO would appear as a 0.1K source. [Modern detectors](#) have noise variances of $\sim 1 \text{ (mK)}^2 \text{ s}$, so sources are > 10 sigma in a single detector in 1 millisecond. It would potentially be possible to build a set of small microwave telescopes that could monitor the sky and detect any moving satellite or plane. If these were also equipped with polarizers, they could be used for CMB polarization measurements. In the past year, CMB experiments have been repurposed to look for [astrophysical transients](#) and [planet IX](#). They have not been used to look for rapidly moving objects.

Another possibility would be to monitor the sky at radio wavelengths using observatories based on the design of [CHIME](#) or [HIRAX](#). These radio telescopes are already monitoring much of the sky (from Canada and eventually from South Africa) searching for [fast radio bursts](#).

Downward-looking satellites could also monitor the earth's atmosphere for fast moving events. One potential approach would be to design "hitchhiker" instruments for satellites that could be downward looking. There are likely national reconnaissance organization capabilities that can already monitor the Earth for fast moving planes and rockets and existing earth science observations likely contain data that could be used to look for anomalous fast-moving objects.

For all these observational approaches, one of the challenges would be to balance the desire to protect national security with the desire to reassure the public that all the relevant information on UFOs was being revealed. Any observing program that could detect UFO would also detect other flying objects including many classified satellites.