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2023-06-07 something up there - nasa and uaps

A brief note on Grusch

First, a disclaimer of sorts: I am posting another article on UAPs, yet I am not addressing the recent claims by David Grusch. This is for a couple of reasons. First, I am skeptical of Grusch. He is not the first seemingly well-positioned former intelligence official to make such claims, and I think there's a real possibility that we are looking at the next Bob Lazar. Even without impugning his character by comparison to Lazar, Grusch claims only secondhand knowledge and some details make me think that there is a real possibility that he is mistaken or excessively extrapolating. As we have seen previously with the case of Luis Elizondo, job titles and responsibilities in the intelligence community are often both secretive and bureaucratically complex. It is very difficult to evaluate how credible a former member of the IC is, and the media complicates this by overemphasizing weak signals.

Second, I am hesitant to state even my skepticism as Grusch's claims are very much breaking news. It will take at least a month or two, I think, for there to be enough information to really evaluate them. The state of media reporting on UAP is extremely poor, and I already see Grusch's story "growing legs" and getting more extreme in the retelling. The state of internet discourse on UAP is also extremely poor, the conversation almost always being dominated by the most extreme of both positions. It will be difficult to really form an opinion on Grusch until I have been able to do a lot more reading and, more importantly, an opportunity has been given for both the media and the government to present additional information.

It is frustrating to say that we need to be patient, but our first impressions of individuals like Grusch are often dominated by our biases. The history of UFOlogy provides many cautionary tales: argumentation based on first impressions has both lead to clear hoaxes gaining enormous hold in the UFO community (profoundly injuring the credibility of UFO research) and to UAP encounters being ridiculed, creating the stigma that we are now struggling to reverse. In politics, as in science, as in life, it takes time to understand a situation. We have to keep an open mind as we work through that process.

Previously on Something Up There

I have previously written two parts in which I present an opinionated history of our current era of UAP research. To present it in tight summary form: a confluence of factors around the legacy of WWII, the end of the Cold War, and American culture created

a situation in which UFOs were ridiculed. Neither the civilian government nor the military performed any meaningful research on the topic, and throughout the military especially a culture of suppression dominated. Sightings of apparent UAPs were almost universally unreported, and those reports that existed were ignored.

This situation became untenable in the changing military context of the 21st century. A resurgence of military R&D in Russia and the increasing capabilities of the Chinese defense establishment have made it increasingly likely that rival nations secretly possess advanced technology, much like the US fielded several advanced military technologies, in secret, during the mid-20th century. At the same time, the lack of any serious consideration of unusual aerial phenomena meant that the US had near zero capability to detect these systems, outside of traditional espionage methods which must be assumed to be limited (remember that the despite the Soviet Union's considerable intelligence apparatus, the US managed to field significant advancements without their knowledge).

As a result of this alarming situation, the DoD began to rethink its traditional view of UFOs. Unfortunately, early DoD funding for UAP research was essentially hijacked by Robert Bigelow, an eccentric millionaire and friend of the powerful Senator Reid with a hobby interest in the paranormal (not just UFOs but ghosts, etc). Bigelow has a history of similar larks, and his UAP research program (called AATIP) ended the same way his previous paranormal ventures have: with a lot of press coverage but no actual results. A combination of typical DoD secrecy and, I suspect, embarrassment over the misspent funds resulted in very little information on this program reaching the public until Bigelow and surprise partner Tom DeLonge launched a publicity campaign in an effort to raise money.

AATIP was replaced by the All-Domain Anomaly Resolution Office (AARO), a more standard military intelligence program, which has only seriously started their work in the last two years. The AARO has collected and analyzed over 800 reports of UAPs, unsurprisingly finding that the majority are uninteresting (i.e. most likely a result of some well-known phenomenon), but finding that a few have properties which cannot be explained by known aviation technology.

The NASA UAP advisory committee

The activities of the AARO have not been sufficient to satisfy political pressure for the government to Do Something about UAPs. This was already true after the wave of press generated by DeLonge's bizarre media ventures, but became even more as the Chinese spy balloon made the limitations of US airspace sovereignty extremely apparent.

Moreover, many government personnel studying the UAP question agree that one of the biggest problems facing UAP research right now is stigma. The military has a decades-old tradition of suppressing any reports that might be classified as "kookie," and the scientific community has not always been much more open-minded. This is especially true in the defense industry, where Bigelow's lark did a great deal of reputational damage to DoD UAP efforts. In short, despite AAROs efforts, many were not taking AARO seriously.

Part of the problem with AARO is its slow start and minimal public work product to date. Admittedly, most of this is a result of some funding issues and then the secretive nature of work carried out within military intelligence organizations. But that underscores the point: AARO is an intelligence organization that works primarily with classified sources and thus produces classified products. UAPs, though, have become a quite public issue.

Over the last two years it has become increasingly important to not only study UAPs but to do so in a way that provides a higher degree of public assurance and public information. That requires an investigation carried out by a non-intelligence organization. The stigmatized nature of UAP research also demands that any serious civilian investigation be carried by an organization with credibility in aerospace science.

The aerospace industry has faced a somewhat similar problem before: pilots not reporting safety incidents for fear of negative impacts on their careers. It's thought that a culture of suppressing safety incidents in aviation lead to delayed discovery of several aircraft design and manufacturing faults. The best solution that was found to this problem of under-reporting was the introduction of a neutral third-party. The third-party would need to have the credibility to be considered a subject-matter expert in aerospace, but also needed to be removed from the regulatory and certification process to reduce reporters fears of adverse action being taken in response to their reports. The best fit was NASA: a federal agency with an aerospace science mission and without direct authority over civil aviation.

The result is the Aviation Safety Reporting System, which accepts reports of aviation safety incidents while providing confidentiality and even a degree of immunity to reporters. Beyond the policy protections around ASRS, it is widely believed that NASA's brand reputation has been a key ingredient in its success. NASA is fairly well regarded in both scientific and industry circles as a research agency, and besides, NASA is cool. NASA operates ASRS to this day.

I explain this little bit of history because I suspect it factored into the decision to place a civilian, public UAP investigation in NASA. With funding from a recent NDAA, NASA announced around this time last year that it would commission a federal advisory committee to make recommendations on UAP research. As a committee formed under the Federal Advisory Committee Act, the "UAP Study Team" would work in public, with unclassified information, and produce a public report as its final product.

It is important to understand that the scope of the UAP study team is limited. Rather than addressing the entire UAP question, the study team was tasked with a first step: examining the data sources and analytical processes available to investigate UAPs, and making recommendations on how to advance UAP research. Yes, an advisory committee to make recommendations on future research is an intensely bureaucratic approach to such a large question, but this is NASA we're talking about. This is how they work.

In October of last year, NASA announced the composition of the panel. Its sixteen members consist of aerospace experts drawn primarily from universities, although there are some members from think tanks and contractors. Most members of the committee have a history of either work with NASA or work in aerospace and astrophysical research. The members are drawn from fairly diverse fields, ranging from astronaut Scott Kelly to oceanographer Paula Bontempi. Some members of the committee are drawn from other federal agencies, for example Karlin Toner, an FAA executive.

On May 31st, the UAP Study Team held its first public meeting. Prior to this point the members of the committee had an opportunity to gather and study information about data sources, government programs, and UAP reports. This meeting, although it is the first public event, is actually relatively close to the end of the committee's work: they are expecting to produce their final report, which will be public, in July. This has the advantage that the meeting is far enough along that the members have had the opportunity to collect a lot of information and form initial positions, so there was plenty to discuss.

The meeting was four hours long if you include the lunch break (the NASA livestream did!), so you might not want to watch all of it. Fear not, for I did. And here are my thoughts.

The Public Meeting on Unidentified Anomalous Phenomena

The meeting began on an unfortunate note. First one NASA administrator, and then another, gave a solemn speech: NASA stands by the members of the panel despite the harassment and threats they have received.

UAPs have become sort of a cultural third rail. You can find almost any online discussion related to UAPs and observe extreme opinions held by extreme people, stated so loudly and frequently that they drown out anything else. If I could make one strong statement to the collective world of people interested in UAP, it would be this:

Calm the fuck down.

It is completely unacceptable the extent to which any UAP discourse inevitably devolves into allegations of treachery. Whether you believe that the government is in long-term contact with aliens that it is covering up, or you believe that the entire UAP phenomenon of the 21st century is fabrication for political reasons, accusing anyone who dares speak aloud of UAPs of being a CIA plant or an FSB plant or just a stooge of the New World Order is perpetuating the situation that you fear.

The reason that so much of UAP research seems suspect, seems odd, is because political and cultural forces have suppressed any meaningful UAP research since approximately 1970. The reason for that is the tendency of people with an opinion, one way or the other, to doubt not only the integrity or loyalty but even the identity of anyone who ventures onto the topic. UFOlogy is a deeply troubled field, and many of those troubles have emerged from within, but just as many have been imposed by the outrageously over-the-top reactions that UFO topics produce. This kind of thing is corrosive to any discourse whatsoever, including the opinions you agree with.

I will now step down from my soapbox and return to my writing couch.

NASA administrator Daniel Evans, the assistant deputy associate administrator (what a title!) responsible for the committee, provides a strong pull quote: "NASA believes that the study of unidentified anomalous phenomena represents an exciting step forwards in our quest to uncover the mysteries of the world around us." While emphasizing the panel's purpose of "creating a roadmap" for future research as well as NASA's intent to operate its research in the most public and transparent way possible, he also explains an oddity of the meeting's title.

UAP, as we have understood it, meant Unidentified Aerial Phenomena. The recent NDAA changed the meaning of UAP, within numerous federal programs, to Unidentified Anomalous Phenomena. The intent of this change seems to have been to encompass phenomena observed on land or at (and even under) the sea, but in the eyes of NASA, one member points out, it also becomes more inclusive of the solar system and beyond. That said, the panel was formed before that change and consists mostly (but not entirely) of aerospace experts, and so understandably the panel's work focuses on aerial observations. Later in the meeting one panel member points out that there are no known reports of undersea UAPs by federal channels, although it is clear that some panel members are aware of the traditional association between UFOs and water.

Our first featured speaker is David Spergel, chair of the committee. Spergel is a highly respected researcher in astrophysics, and also, we learn, a strong personality. He presents a series of points which will be echoed throughout the meetings.

First, federal efforts to collect information on UAPs are scattered, uncoordinated, and until recently often nonexistent. It is believed that many UAP events are unreported. For example, there are indications that a strong stigma remains which prevents commercial pilots reporting UAP incidents through formal channels. This results in an overall dearth of data.

Second, of the UAP data that does exist, the majority takes the form of eyewitness reports. While eyewitness reports do have some value as broad trends can be gleaned from them, they lack enough data (especially quantitative data) to be useful for deeper analysis. Some reports do come with more solid data such as photos and videos, but these are almost always collected with consumer or military equipment that has not been well-studied for scientific use. As a result, the data is uncalibrated---that is, the impacts of the sensor system on the data are unknown. This makes it difficult to use these photos and videos for any type of scientific analysis. This point is particularly important since it is well known that many photos and videos of UAP are the result of defects or edge-case behaviors of cameras. Without good information on the design and performance of the sensor, it's hard to know if a photo reflects a UAP at all.

Finally, Spergel emphasizes the value of the topic. "Anomalies are so often the engine of discovery," one of the other panel members says, to which Spergel adds that "if it's something that's anomalous, that makes it interesting and worthy of study." This might be somewhat familiar to you, if you have read my oldest UFO writings, as it echos a fundamental part of the "psychosocial theory" of UFOs: whether UFOs are "real" or not, the fact that they are a widely reported phenomena makes them interesting. Even if nothing unusual has ever graced the skies of this earth, the fact that people keep saying they saw UFOs makes them real, in a way. That's what it means to be a phenomenon, and much of science has involved studying phenomena in this sense.

Besides: while there's not a lot of evidence, there is an increasing portion of modern evidence suggesting that there is *something* to *some* UAP sightings, even if it's most likely to be of terrestrial origin. This is still interesting! Even if you find the theory that UAPs represent extraterrestrial presence to be utterly beyond reason (a feeling that I largely share), there is good reason to believe that *some* people have seen *something*. One ought to be reminded of sprites, an atmospheric phenomenon so rarely observed that their existence was subject to a great deal of doubt until the first example was photographed in 1989. What other rare atmospheric phenomena remain to be characterized?

The next speaker is Sean Kirkpatrick, director of the AARO. He presents to the committee the same slides that he recently presented to a congressional panel, so while they are not new, the way he addresses them to this committee is interesting. He explains that a current focus of the AARO is the use of physical testing and modeling to determine what types of objects or phenomena could produce the types of sightings AARO has received.

The AARO has received some reports that it struggles to explain, and has summed up these reports to provide a very broad profile of a "typical" UAP: 1-4 meters in size, moving between Mach 0 and 2, emitting short and medium-wave infrared, intermittent X-band radar returns, and emitting RF radiation in the 1-3GHz and 8-12GHz ranges (the upper one is the X-band, very typical of compact radar systems). He emphasizes that this data is based on a very limited set of reports and is vague and preliminary. Of reported UAPs, the largest portion (nearly half) are spherical. Reports come primarily from altitudes of

15-25k feet and the coasts of the US, Europe, and East Asia, although he emphasizes that these location patterns are almost certainly a result of observation bias. They correlate with common altitudes for military aircraft and regions with significant US military operations.

To make a point about the limitations of the available data, he shows a video. There's a decent chance you've seen it, it's the recently released video of an orb, taken by the weapons targeting infrared camera on a military aircraft. It remains unexplained by the AARO and is considered one of the more anomalous cases, he says, but the video---just a few seconds long---is all there is. We can squint at the video, we can play it on repeat at 1/4 speed, but it is the sum total of the evidence. To Determine whether the object is a visitor from the planet Mars or a stray balloon that has caught the sunlight just right will require more data from better sensors.

The AARO has so far had a heavy emphasis on understanding the types of sensor systems that collected the best-known UAP sightings. Military sensor systems, Kirkpatrick explains, are very distinct from intelligence or scientific sensor systems. They are designed exclusively for acquiring and tracking targets for weapons, and so the data they produce is of poor resolution and limited precision compared to the sensors used in the scientific and intelligence communities. Moreover, they are wholly uncalibrated: for the most part, their actual sensitivity, actual resolution, actual precision remains unstudied. Even the target-tracking and stabilization behavior of gimbal-mounted cameras is not always well understood by military intelligence. The AARO is in the process of characterizing some of these sensor systems so that more quantitative analysis can be performed of any future UAP recordings.

Kirkpatrick says, as will many members of the committee later, that it is unlikely that anyone will produce conclusive answers about UAP without data collected by scientific instruments. The rarity of UAPs and limited emissions mean that this will likely require "large scale, ground-based scientific instruments" that collect over extended periods of time. Speaking directly to the committee, he hopes that NASA will serve a role. The intelligence community is limited, by law, in what data they can collect over US soil. They cannot use intelligence remote sensing assets to perform long-term, wide-area observations of the California coast. For IC sensors to produce any data on UAP, they will probably need real-time tipping and cueing[1] from civilian systems.

Additionally, it is important to collect baseline data. Many UAP incidents involve radar or optical observation of something that seems unusual, but there isn't really long-term baseline data to say how unusual it actually is. Some UAPs may actually be very routine events that are just rarely noticed, as has happened historically with atmospheric phenomena. He suggests, for example, that a ground-based sensor system observing the sky might operate 24x7 for three months at a time in order to establish which events are normal, and which are anomalous.

There is movement in the intelligence community: they receive 50 to 100 new reports a month, he says, and have begun collaboration with the FVEYES community. The stigma in the military seems reduced, he says, but notes that unfortunately AARO staff have also been subject to harassment and threats online.

By way of closing remarks, he says that "NASA should lead the scientific discourse." The intelligence community is not scientific in its goal, and cannot fill a scientific function well because of the requirements of operational secrecy. While AARO intends to collaborate with scientific investigation, for there to be any truly scientific investigation at all it must occur in a civilian organization.

The next speaker, Mike Freie, comes from the FAA to tell us a bit about what is normal in the skies: aircraft. There are about 45,000 flights each day around the world, he says, and at peak hours there are 5,400 aircraft in the sky at the same time. He shows a map of the coverage of the FAAs radar network: for primary (he uses the term non-cooperative) radar systems, coverage of the United States at 10,000 feet AGL is nearly complete. At 1,000 feet AGL, the map resembles T-Mobile coverage before they were popular. While ADSB coverage of the country is almost complete as low as 1,500 AGL, there are substantial areas in which an object without a transponder can fly undetected as high as 5,000 AGL. These coverage maps are based on a 1-meter spherical target [2], he notes, and while most aircraft are bigger than this most sUAS are far smaller.

Answering questions from the committee, he explains that the FAA does have a standard mechanism to collect UAP reports from air traffic controllers and receives 4-5 each month. While the FAA does operate a large radar network, he explains that only data displayed to controllers is archived, and that controllers have typically configured their radar displays to hide small objects and objects moving at low speeds. In short, the radar network is built and operated for tracking aircraft, not for detecting UAPs. If it is to be used for UAP detection it will need modifications, and the FAA doesn't have the money to pay for them.

Rounding out these meeting, we begin to hear from some of the panel members who want to address specific topics. Nadia Drake, a journalist, offers a line that is eminently quotable: "It is not our job to define nature, but to study it in ways that lets nature reveal itself to us." She is explaining that "UAP" has not been precisely defined, and probably can't be. Still, many members clearly bristle at the change from "Aerial" to "Anomalous." The new meaning of UAP is broad that it is difficult to define the scope of UAP research, and that was already a difficult problem when it was only concerned with aerial effects.

Federica Bianco, of the University of Delaware among other institutions, speaks briefly on the role of data science in UAP research. The problem, she repeats, is the lack of data and the lack of structure in the data that is available. Understanding UAPs will require data collected by well-understood sensors under documented conditions, and lots of it. That data needs to be well-organized and easily retrievable. Eyewitness reports, she notes, are useful but cannot provide the kind of numerical observations required for large-scale analysis. What UAP research needs is persistent, multi-sensor systems.

She does have good news: some newer astronomical observatories, designed for researching near-earth objects, are capable of detecting and observing moving targets. There is also some potential in crowdsourcing, if technology can be used to enable people to take observations with consistent collection of metadata. I imagine a sort of TikTok for UFOs, that captures not only a short video but characteristics of the phone camera and device sensor data.

Later speakers take more of a whirlwind pace as the meeting starts to fall behind schedule. David Grinspoon of the Planetary Institute speaks briefly of exobiology, biosignatures, and technosignatures. Exobiology has suggested various observables to indicate the presence of life, he explains. Likely of more interest to UAP research, though, is the field of technosignatures: remotely observable signatures that suggest the presence of technology. The solar system has never really been searched for technosignatures, he explains, and largely because technosignatures have been marginalized with the rest of UAP research. If researchers can develop possible technosignatures, it may be possible to equip future NASA missions to detect them as a secondary function. While unlikely to conclusively rule extraterrestrial origin of UAPs out, there is a chance it might rule them in, and that seems worth pursuing.

Drawing an analogy to the FAA's primary and secondary radar systems, he explains that "traditional SETI" research has focused only on finding extraterrestrial intelligence that is trying to be found. They have been listening for radio transmissions, but no meaningful SETI program has ever observed for the mere presence of technology.

Karlin Toner of the FAA talks about reporting. Relatively few reports come in, likely due to stigma, but there is also an issue of reporting paths not being well-defined. She suggests that NASA study cultural and social barriers to UAP reporting and develop ways to reduce them.

Joshua Semeter of Boston University talks a bit about photo and video evidence. It comes almost exclusively from Navy aviators, he says, and specifically from radar and infrared targeting sensors. He uses the "gofast" video as an example to explain the strengths and limitations of this data. The "gofast" video, a well known example of a UAP caught on video, looks like a very rapidly moving object. By using the numerical data superimposed on the image, though, it is possible to calculate the approximate position of the object relative to the aircraft and the ground. Doing so reveals that the object in the "gofast" video is only moving about 40mph---typical of the wind at altitude over the ocean. It is most likely just something blowing in the wind, even though the parallax motion against the ocean far below makes it appear to move with extreme speed. The AARO's work to characterize these types of sensors should provide a much better ability to perform this kind of analysis in the future.

There's still a good hour to the meeting, with summarization of plans for the final report and public questions, but all of the new material has now been said. During questions, panel members once again emphasize NASA's intent to be open and transparent in its work, the lack of data to analyze, and the need for standardized, consistent, calibrated data collection.

There you have it: the current state of United States UAP research in a four hour formal public meeting, the kind of thing that only NASA can bring us. The meeting today might be a small step, but it really is a step towards a new era of UAP research. NASA has made no commitments, and can't without congressional authorization, but multiple panel members called for a permanent program of UAP research within NASA and for the funding of sensor systems tailor-made to detect and characterize UAPs.

We will have to wait for the committee's final report to know their exact recommendations, and then there is (as ever) the question of funding. Still, it's clear that congress has taken an interest, and we can make a strong guess from this meeting that the recommendations will include long-term observing infrastructure. I think it's quite possible that within the next few years we will see the beginning of a "UAP observatory." How do you think I get a job there? Please refer to the entire months of undergraduate research work in astronomical instrumentation which you will find on my resume, and yes I retain a surprising amount of knowledge of reading and writing both FITS and HDF5. No, I will not work in the "lightweight Java scripting" environment Beanshell, ever again. This is on the advice of my therapist.

[1] Tip and cue is a common term of art in intelligence remote sensing. It refers to the use of real-time communications to coordinate multiple sensor systems. For example, if a ground-based radar system detects a possible missile launch, it can generate a "tip" that will "cue" a satellite-based optical sensor to observe the launch area. This is a very powerful idea that allows multiple remote sensing systems to far exceed the sum of their abilities.

[2] This approximation of a sphere of given diameter is a common way to discuss radar

cross section. While fighter jets are all a lot bigger than one meter, many are, for radar purposes, about equal to quite a bit smaller than a 1-meter sphere due to the use of "stealth" or low-radar-profile techniques. The latest F-22 variants have a radar cross section as small as 1cm^2, highlighting what is possible when an aircraft is designed to be difficult to detect. Such an aircraft may not be detected at all by the FAA's radar network, even at high altitudes and speeds.