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Whither UAP Data?[1]

GUEST EDITORIAL

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[NB: this editorial uses the term UFO/UAP instead of either UFO or UAP, except when referring to early works where the original term UFO is referenced or in modern works where UAP is explicitly noted.]

Recently, an intense public interest in unidentified anomalous phenomena (UAP) has prompted a number of scientists to get involved in the topic. However, they have found that concrete scientific data on the nature of UFO/UAP is lacking.

> Although many UAP reports remain unsolved or unidentified, AARO assesses that if more and better quality data were available, most of these cases also could be identified and resolved as ordinary objects or phenomena. Sensors and visual observations are imperfect; the vast majority of cases lack actionable data, or the data available is limited or of poor quality (United States Department of Defense, 2024b, p. 7).

How can this be? Several databases of unidentified flying object (UFO) and/or UAP cases are known to exist and have been used in analyses to interpret and understand the nature of the phenomena. Despite this, there seems to be reluctance among scientists to embrace the hundreds of thousands of reported UFO/UAP observations as evidence of non-human intelligence on Earth. Why? Indicative of the view of such databases is the mandate of the Galileo Project, which states:

> The goal of the Galileo Project is to bring the search for extraterrestrial technological signatures of Extraterrestrial Technological Civilizations (ETCs) from accidental or anecdotal observations and legends to the mainstream of transparent, validated, and systematic scientific research (Harvard University, n.d.-b, para. 1).

However, regarding UFO/UAP report databases:

> Moreover, the Galileo Project will not engage in retroactive attempts to analyze existing images or radar data, or speculate on prior UAP, observations or anecdotal reports, as these are not conducive to cross-validated, evidence-based scientific explanations (Harvard University, n.d.-a, para. 1).

In order to understand any kind of phenomenon, it is necessary to gather data so that analyses can be done. This holds true whether the subject is climate change, political preference, traffic congestion, or UFO/UAP. Preferably, the data in question would be

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acquired through dedicated instruments, sensors, random sampling, polls, or repeatable observations. However, this is not always the case.

Areas of study such as birdwatching, human relationships, and plane- or trainspotting all contribute to knowledge through gathering and reporting of subjective data, much of which may not be repeatable or recordable. When it comes to UFO/UAP, belief about the nature of such phenomena is often based on the many reports of anomalous objects over the past several decades. The amount of UFO/UAP data varies greatly depending on the source, but it is generally agreed that there are tens of thousands, if not hundreds of thousands, of UFO/UAP sightings on record. The National UFO Reporting Center, based in Washington State, has over 170,000 international UFO/UAP reports on file, the Canadian UFO Survey has about 24,000 Canadian UFO/UAP reports, and the United States Air Force's infamous Project Blue Book investigated and recorded 12,618 UFO reports from around the world between 1952 and 1969 (see: https://nuforc.org/about-us/ and https://www.canadianuforeport.com/survey/essay/2011survey.html).

Many believers argue that this large body of cases must be enough to prove there is a real phenomenon, if not proof of actual alien visitation. Could so many UFO witnesses be right? (ABC News, 2008). Scott Waring, editor ufosightingsdaily.com, states: "Something big is going on for so many UFO sightings world wide to be occurring" (Martin, 2020, para. 12).

Alas, UFO/UAP data is more problematic than most UFO zealots appreciate. Many studies have shown that eyewitness testimony is often flawed, incorrect, and inaccurate. A recent book that is essentially a meta-analysis examining the reliability of UFO/UAP witnesses addressed this in great detail:

> The acceptance of a true anomaly behind UFO sightings lies in the dogma that the testimony of witnesses is absolutely reliable, even if the stories told are abnormal by mainstream science standards. But this is far from certain; it is merely a presumption that matches the fantasies of the proponents. Single witnesses and shortage of material verification lie in the antipodes of how real-life works. Not only are there no error-free witnesses, but people's imagination and prejudices can play unforgettable games on them (Olmos & Heiden, 2023, p. 10).

The problem of reliability in UFO/UAP data was summed up by Hendry (1979), a researcher with the Center for UFO Studies, in his landmark work *The UFO Handbook*, over forty years ago, but largely forgotten. Hendry raised serious concerns about UFO data, "Do UFO statistics represent a valid pursuit for more knowledge about this elusive phenomenon, or do they merely reflect frustration that none of the individual reports are capable of standing on their own two feet?" (Hendry, 1979, p. 269). Hendry challenged UFO researchers who presented UFO case data as proof of an unexplained phenomenon and asked some hard questions:

1) Does the report collection reflect truly random sampling?
2) Have the individual cases been adequately validated?
3) Are apples and oranges being compared? Are NLs (Nocturnal Lights) necessarily the same kind of UFO as DDs (Daylight Discs)?
4) Are differing details among cases obscured through simplification for the purpose of comparisons?
5) Does the study imply the question: "Surely this mass of data proves UFOs exist?"
6) Do the correlations really show causality? (p. 269).

Each of these questions, while proposed decades ago, are still relevant to any examination of UFO/UAP reports today. Let us look at each one with consideration of the current state of UFO/UAP data collection.

Does The Report Collection Reflect Truly Random Sampling?

For the first question, the randomness of a collection of UFO/UAP reports is highly dependent on the agency receiving report data. Is UFO/UAP reporting itself random? Can we be sure that UFO/UAP witnesses represent a true cross-section of the population, or is there some bias in favor of those who 'believe in UFOs' and therefore may report identified flying objects (IFOs) as UFO/UAP? Are there other biases involved? For example, military observations of UFO/UAP are not routinely made available to civilian researchers. Are these cases somehow different from civilian-reported cases?

In fact, in responding to questions from reporters following the release of the recent All-domain Anomaly Resolution Office (AARO) report, acting director Tim Phillips made this comment about UAP data:

> So we've had about 1,200 cases that we've looked at. We approximately receive anywhere between 90 and a 100-110 a month from the operating forces. And you'll see in our reporting, there's a real bias to the Department of Defense because they're out there flying. They tend to have the advanced sensors. And if you're clearing

> a range before you go hot, if you're looking for something, you might find it. We're starting to see an increase in civil aviation sightings, you know, from—through the FAA and through NASA. We're starting to get few or more cases in, and you'll see that reflected in our heat map on our website. You'll see, with the bright red, that tends to reflect where DOD is operating, where they have those detections (United States Department of Defense, 2024a, para. 40).

In other words, AARO UAP reporting is heavily biased towards military reports and military bases geographically. As for other sources of UFO/UAP data, Hendry (1974) stated explicitly that because of "a skewed geographical distribution for report collection ... UFO groups are not getting a portrayal of U.S. "hot areas" and "cold areas" (p. 244), as a function of uniformly distributed, random sampling.

The question of "hot spots" of UAP reports has often been raised by UFO/UAP fans and media, who select specific areas of interest, sometimes based on Zip Codes and other factors such as population density and overall report numbers (CBS News, 2017; James, 2023; University of Utah, 2024). A frequent belief is that UFO/UAP sightings tend to occur over nuclear facilities and military bases (Janos, 2019; Porritt et al., 2023).

One definitive result of statistical studies of UFO/UAP looking at geographical distribution is the fact that UFO/UAP sightings are related to population density. Essentially, the greater the population density, the higher the number of reports. This is logical in that since it is UFO/UAP sightings that are being studied and not UFO/UAP themselves. It makes sense that the more potential witnesses available, the more reports will be generated. Because of this, there is a tendency for more UFO/UAP sightings to be reported from metropolitan centers. However, this was not completely related to the population itself. In self-reported cases, witnesses often note a nearby town or city, which may not be the actual location of where the UFO/UAP was observed. When investigators enter UFO/UAP case data, similar errors might arise.

With so many biases and other factors involved, it is uncomfortable, to say the least, to suggest that UFO/UAP data are rigorous enough to confidently use in statistical studies.

Have The Individual Cases Been Adequately Validated?

In a perfect world, each UFO/UAP case would be fully documented and thoroughly investigated by trained researchers with unlimited time and expenses, as well as through perfect cooperation with civilian and military authorities. In reality, though, this hardly is the situation. UFO/UAP investigations are often conducted by relatively untrained enthusiasts with little free time, sometimes working in isolation from official sources of useful information. Many UFO/UAP investigators do not have formal backgrounds in astronomy, meteorology, or aviation—fields that are useful in evaluating reports of unidentified flying objects. Thus, there is no way to ensure that all cases contributed are adequately validated.

The good news is that a small percentage of UFO/UAP enthusiasts do go on to receive additional instruction and guidance and become field investigators. Training for UFO/UAP investigation is offered for field investigators in MUFON, including interview techniques and the use of Geiger counters. However, varying biases among UFO/UAP investigators can reduce objectivity and skew results. Furthermore, the number of investigators varies by region, making onsite investigations impractical in some areas of North America.

Are Apples and Oranges Being Compared? Are NLs (Nocturnal Lights) Necessarily the Same Kind of UFO as DDs (Daylight Discs)?

We do not know the answer to this question with certainty. However, since nocturnal objects constitute the vast majority of UFO/UAP cases, this may not be a serious problem. We can also ask if all nocturnal objects are themselves homogeneous. Is UFO/UAP data concurrently valid with itself? Hendry (1979) noted:

> ... A thin veil can often separate an identifiable object from a truly 'worthy' UFO. Beware of statistical exercises that boast of thousands of reports in the data; there aren't thousands of well-investigated reports. Also, beware of attempts to catalog every known UFO in a certain category (e.g., the Center for UFO Studies' Physical Trace [CE II] Catalogue) when cases are plugged into the statistics, whether they are anecdotal or well studied. Efforts to weight the probability of cases or even to divide them into certain or non-certain groups virtually never appear in these compilations (p. 268).

Hendry (1979) suggested caution in this regard: "The huge variety of UFO shapes and behaviors works against any casual grouping of UFOs. Collections of IFOs are a mixture of many unrelated sources with unrelated characteristics—is this also true for the UFOs?" (p. 268).

Even the All-domain Anomaly Resolution Office (2023) may have fallen victim to this issue when it released a cumulative set of "Typically-Reported UAP Characteristics" reported by military witnesses.

Are Differing Details Among Cases Obscured Through Simplification For The Purpose of Comparisons?

This is true to a certain extent. A witness who chooses red as the primary color of a UFO/UAP with red and white lights may have made an error of judgment. Similarly, when the data is encoded, 'red and white' could be entered differently from 'white and red.' In some categories, this is a valid concern. In others, such as date and location, this is not a problem. However, when evaluations of cases are made, subjective interpretations will certainly cause some difficulties.

Does the Study Imply the Question: "Surely This Mass of Data Proves UFOs Exist?"

As noted earlier, the answer is clearly "No." All that can be said is that people are reporting sightings of unusual objects, some of which have no simple explanation. Hendry (1979) warned:

> Beware of attempts to collect as many reports as possible of, say, EM [electromagnetic] interference cases or abductions accompanied by the question: "can all of these people be wrong [or liars or crazy]?" Remember, for every valid UFO judgment there were nine UFO impostors—IFOs—where the sincere witnesses were most certainly wrong. You seldom get reminded of this truism, however (p. 268).

Do the Correlations Really Show Causality?

While it is tempting to use UFO/UAP case data to prove correlations and gain insight into the nature of alien spacecraft, the data are simply not homogenous enough for such conclusions. It is known that almost all UFO/UAP reports are either explainable or have insufficient information for meaningful analysis. Therefore, using data from a collection of UFO/UAP case reports means that what is being correlated are not characteristics of UFO/UAP but only witnesses' observations of objects.

In fact, Hendry (1979) advised that UFO/UAP report data that is missing some parameters should be suspect:

> In my own reports, I would never have dreamed of making an IFO/UFO judgment without important parameters like shape and duration. Instead of dumping these reports into the "insufficient information" pile where they belong (or better yet, seeking out the additional data), they saw fit to make commitments to them. To judge reports like these as "UFOs" and "IFOs" and to include them in the chi-square tests is sloppy investigative and statistical process. Nor should they have included "not stated" figures in the chi-square tests at all, since "not stated" is not a characteristic of the "knowns" and "unknowns," just of poor investigation (p. 267).

Some UFO/UAP organizations seem to focus on their record of unexplained and unsolved cases and classify them as "unknowns," but in many instances, these might be better classified as "insufficient information."

A good example illustrative of problems in interpreting UFO/UAP data is the series of statistical studies of UFOs by neuroscientist Michael Persinger, often cited for his scientific approach to ufology. Persinger published more than one hundred papers on the subject, many in peer-reviewed journals, to support his view that electromagnetic fields are correlated with UFO/UAP sightings. One of Persinger's papers purported to show a correlation between the variance of UFO report numbers and seismic events in southern Manitoba, in accordance with what was posited as the tectonic strain hypothesis (Persinger & Derr, 1985). This suggests relationships between small, undetectable seismic events deep underground and observations of luminous phenomena.

Persinger and Derr (1985) had shown "large correlations" in other areas that experienced seismic events within about 150 km of reports of UFOs, and had been challenged to test the hypothesis in a seismically-inactive area, specifically southern Manitoba, Canada. From 1974 to 1977, a significant number of UFO reports were recorded for a region centered on Carman, Manitoba (Persinger & Derr, 1985). But, Persinger found that through expanding the radius of influence to more than 1000 km and counting seismic events three years before and three years after the Carman UFO flap suggested a correlation. During that period, there were exactly two seismic events of significant magnitude, and those were nearly 500 km away and 870 km away from Carman, Manitoba, and were not even sensed by any Manitoba residents. Despite this, Persinger and Derr (1985) stated, "We concluded that the temporal distribution of seismic events with 1250 km of Winnipeg and the occurrence of UFORs [UFO reports] during the 34 mo. that constituted the Carman episode indicate the two phenomena are related" (p. 811). It was further pointed out by Persinger and Derr (1985) that the

data used to show a relationship between UFO reports and seismic events were almost all not UFOs at all.

In a report on Manitoba UFO sightings, data from a bar graph were used to compare the number of UFO reports in Manitoba with earthquake occurrences in nearby Northern U.S. states, supporting the hypothesis. However, the same report emphasizes the fact that most UFO sightings are easily explained as astronomical or aeronautical objects. Knowing this, we can then wonder what the statistical correlations might mean. It is suspected that inaccurate and/or inadequate data are being used to verify an unfounded physical mechanism. Indeed, if as some researchers believe, all UFOs are explainable without invoking this hypothesis, then the hypothesis is possibly an artefact of the statistical analyses (Rutkowski, 1986). It is absurd to think that proof of a geophysical phenomenon could be based on misidentifications of stars, planets, aircraft, and satellites, yet that was what was proposed. The statistics were sound, but the data were inappropriate.

Similarly, an organization that advertises on behalf of casinos and online gambling sites for several years has been sending news releases to media on topics that show the odds or likelihood of various events, including the sighting of UFO/UAP. A recent release titled "Here's How Likely You Are to Get Abducted by Aliens in Provinces Across Canada" stated,

> In a new report published by Casino.ca, the provinces in Canada where you're most likely to get abducted by aliens were revealed, and the results may surprise you. Using data provided by the National UFO Reporting Centre, the gambling site was able to rank and rate sighting hotspots across the country.
>
> "Each data point was categorized into its corresponding province/territory," Curiocity was told in an email. To make an accurate assessment, the sightings were divided by the province/territories population, to allow us to understand the sightings per capita.
>
> So, who came out on top? Who else but the Yukon! According to the company, the Northern destination ranked #1 overall, followed by the Northwest Territories, New Brunswick, and Nova Scotia (Stefanic, 2024, para. 1–6).

As there are currently a total of 24 UFO/UAP reports from Yukon in the NUFORC database, this works out to a per-capita rate of UFO/UAP observation of 0.06%. In comparison, NUFORC lists 2,539 UFO/UAP reports for Ontario, with only a 0.02% per-capita rate of UFO/UAP observation. Hence, the statistics bear out that Canada's least-populous territory has a higher rate of UFO/UAP observation than the largest province by population. Of course, this is a preposterous result. In 2023, there were only two UFO/UAP reports from Yukon filed with NUFORC, only one in 2022, and none at all in 2021. Yet, Ontario had 133 UFO/UAP reports in 2023, 216 in 2022, and 215 in 2021. Apart from the fact that "ordinary" UFO/UAP sightings by themselves have not been shown to be directly related to the abduction phenomenon (if it exists at all), claiming a trend based on only one or two data points per year is not supported by reality.

Unfortunately, even when good data are used, interpretations can be misleading. In 2022, a Canadian politician made public his inquiry into UFO/UAP observed "in or near Canadian nuclear facilities." He noted several "open-sourced incidents," such as:

> May 24, 2021, 9:34 pm
> Pickering, ON
> Over Pickering Nuclear Plant, 4 to 5 orange lights, very slow moving, one at a time came from the water/behind nuke plant. They would get to a certain point in the sky and then vanish and then another one would come from behind the other lights like they were trading places … (Maguire, 2022, p. 18).

There are several issues with this kind of UFO/UAP report. First, assuming the person reporting was legitimate, were the UFO/UAP seen actually over the nuclear facility, or were they simply in the line-of-sight direction? How was this determined? Was an onsite investigation made? Pickering is a city directly under a flight path from Toronto to Ottawa and within a heavily populated region of Ontario, Canada. It would be expected that many aircraft could have been in the skies that night. Also, May 24, 2021, was a national holiday, and there would have been some fireworks and paper lanterns sent aloft to celebrate that night, so the UFO/UAP might have had mundane explanations.

This means that using this particular report as a data point in a study of UFO/UAP correlated with nuclear facilities could skew any results or interpretations that UFO/UAP show an interest in nuclear facilities. With this in mind, it is prudent to be cautious about larger and more robust studies that are said to show correlations between UFO/UAP and military and/or nuclear facilities, such as those published by the Scientific Coalition for UAP Studies (e.g., Porritt et al., 2023).

Hendry (1979) noted that,

> Military bases have sentinels and twenty-four-

> hour logged records of daily events, unlike most of the rest of the world. Consequently, it can seem that they have more UFOs 'hovering nearby.' Similarly, police are out patrolling while the rest of us are asleep (p. 262).

In a paper about the misuse of statistical correlations, Vogelstein (2020) advised:

> Be modest about the role of statistical inference in scientific inference ... "Scientific inference is a far broader concept than statistical inference"... Because of the strong desire to inform and be informed, there is a relentless demand to state results with certainty ... Resist the urge to overreach in the generalizability of claims ... Accept that both scientific inference and statistical inference are hard, and understand that no knowledge will be efficiently advanced using simplistic, mechanical rules and procedures (p. 6).

Then, there is the issue of the quality of UFO/UAP reports themselves. In its Historical Record Report published in March 2024, the US government All-domain Anomaly Resolution Office (AARO) noted its concerns regarding the nature of UAP data:

> Previous and current investigations have been challenged by insufficient data and information for intelligence and scientific analysis to resolve anomalous incidents. Insufficient data and information [n.b.] was compounded by inconsistent reporting and lack of continuity among investigations and investigative practices. Capt Ruppelt, the first director of Project BLUE BOOK, noted that the inability to collect the UFO's altitude, size, and speed was a recurring and significant obstacle to resolving cases... Most UAP sightings have no data associated with them beyond an often vague narrative account, and when there is hard data, it is often incomplete or of poor quality. In terms of military reporting, the sensors on which UAP most frequently are captured are calibrated and optimized for combat (United States Department of Defense, 2024b, p. 38).

What kinds of UFO/UAP data then are useful in helping to better understand the phenomena? These vary depending on the institution, agency, or investigator and can change with time. CUFOS, for example, in its large UFOCAT database of cases, included the categories of the source of the report, date, time, location, state and county (or country), the numbers, ages, sexes, and names of the witnesses, the type and special features of the report, the number of objects seen, duration, size (estimated or angular), and latitude/longitude. Some UFO/UAP organizations, such as MUFON and NUFORC, have lengthy reporting forms asking for details such as date, time, location, shape of object seen, color, estimated size, estimated distance, and the number of witnesses. Other organizations have short forms and rely more on a textual description of what was experienced in witnesses' own words.

As mentioned earlier, eyewitness testimony is not always as good as most people believe. AARO recognized this and noted:

> Some literature suggests individual accounts can be unreliable as they are subject to a person's interpretation of sensory data through the filter of their experiences, beliefs, or state of mind during the event. A person who reports a case might be credible, in that they believe the elements of their account to be accurate. However, their reliability, which is their ability to accurately interpret events—as well as to recall and convey those events due to a range of factors—is altogether different from their inherent sincerity (United States Department of Defense, 2024b, p. 12).

Each detail of a particular report, however, has its own set of limitations and interpretations. The category of duration is interesting in that it represents the subjective length of time a witness believes a UFO/UAP experience lasted. Naturally, these times are greatly suspect because it is known that people tend to misjudge the flow of time. Yet some individuals appear to be good at estimating time, so this value does have some meaning. Although an estimate of "one hour" in a particular case may be in error by several minutes, it is unlikely that the correct value would be only one minute. Furthermore, there have been cases when a UFO/UAP was observed and clocked accurately so that we can be reasonably certain that UFO/UAP events can last considerable periods of time. A case of extremely short duration might not have enough content to be considered truly unexplained, but a long-duration case would likely be explainable as a star or planet.

Previous analyses have shown that long-duration sightings tend to occur in the early morning hours, from about midnight until 6:00 a.m. It is probable that the majority of observations at this time are those of astronomical objects moving slowly with the rotation of the Earth. Duration data by itself is not wholly useful

in analyzing UFO/UAP behavior. Duration events of a few seconds to about ten seconds are usually fireballs or bolides, while very long duration events of an hour or more are very probably astronomical objects. In between, there can be no way to distinguish conventional objects from UFO/UAP solely with duration data. Hendry (1979) cited a Canadian study by an Ontario UFO group which timed aircraft observations and found that the duration of such sightings varied between 15 seconds to more than eight minutes.

Even a witness' estimate of the duration of his or her UFO/UAP sighting, which can give insight into the nature of the object being observed, can be problematic. Hendry (1979) advised, "Duration is a powerful feature of identity when it refers to extremely short and long events, but is otherwise mostly a reflection of the witness's behavior during the event, coupled with the fluctuating behavior of the objects watched" (p. 249).

Hendry further expanded on this:

> I regard it as a mistake to expect "duration" to stand on its own feet. Consider all the conditions that affect duration that have to be checked out on a case-by-case basis:
>
> —Did the witness start watching the object from the "start?"
>
> —Did the witness leave the event without watching it to its completion? (This is disappointingly common.)
>
> —Did the witness have a wide-open view of the sky (horizon to horizon)? Was it partially restricted by trees, buildings, or clouds? Was his view severely restricted by, say, looking out a window?
>
> —Was the witness stationary, or did he try chasing the object in a car? (Not uncommon.) (p. 249).

And that is just one of the characteristics of a typical UFO/UAP report that can be entered as data into a database for analysis.

Another set of data usually collected for a UFO/UAP case is the shape of the object observed. The shape of a perceived object depends on many factors, such as the witness' own visual acuity, the angle of viewing, the distance of viewing, and the witness's own biases and descriptive abilities. Nevertheless, in combination with other case data such as duration, shape can be a good clue towards a UFO/UAP's possible explanation. However, witnesses' descriptions of the shapes of UFO/UAP vary greatly. A large percentage of reported shapes are simply "point sources"—that is, "starlike" objects or distant lights. In recent years, it has become common for a witness who has seen simply a light in the sky to label it an "orb."

It is important to determine if this was just a judgment on the part of the witness. "Orb" is commonly used by UFO/UAP fans to describe a simple light observed in the night sky, even at a great distance, believing the light to be a much larger object, or something that is spherical in nature, despite the human visual limitation and inability to determine an actual shape of a distant light. Therefore, "orb" should not automatically imply a spherical object.

The classic "flying saucer" or disc-shaped object is quite rare in UFO/UAP reports today, comprising only about five percent or less of all reported shapes. It is worthwhile noting that a disc-shaped object viewed on the edge will appear to be a cylinder or a cigar-shaped object, and when viewed from above or below, would appear as a circle or sphere. Waxing or waning shapes such as a football or egg—or indeed, a "tic tac"—could be simply discs viewed from other angles. Therefore, a witness's opinion on the shape of an observed UFO/UAP, unless observed at close range, should be suspect.

What about color? Does a witness' description of the color of a UFO/UAP constitute good data? Again, no. Apart from the obvious problem of some people being color blind, even those unaffected by that condition can misjudge the colors of the lights in the sky. A distant white light can appear to be yellow, orange, or reddish if seen through a dusty atmosphere, and if a light is sufficiently dazzling, determining a color might not be possible at all.

If so many recorded characteristics of UFO/UAP can be in doubt, is there value in databases of report data at all? Hendry (1979) was highly critical of any statistical studies of UFO data:

> There is hardly a statistical effort that has ever been applied to the UFO phenomenon that is not problematic in its construction or interpretation. Short of some seemingly impossible changes in the collection mechanisms that feed these efforts, it hardly seems likely that such efforts in the future will fare any better. That doesn't mean that they won't be undertaken, as the temptation to reduce large bodies of UFO data to statistical conclusions is very strong; "overinterpretation" is always the real menace (p. 268).

Given the often incomplete nature of UFO/UAP data, is there any way that databases of report data can be useful? First, it should be noted that simply having statistics on dates and times of UFO/UAP sightings is useful in determining reporting and temporal trends. Having exact dates and times can be used to compare with known

satellite passes, aircraft flights, astronomical phenomena and events, and occurrences of balloon launches, fireworks festivals, and celebratory paper lantern releases. These alone could lead to explanations for many UFO/UAP sightings. If there are multiple reports from a small geographical area on a certain date, known as flaps, the likelihood of a mundane explanation is increased.

Over time, the variance of the number of UFO/UAP reports, spanning decades, can show trends known as "waves," which may be noticeable over large regions of the world. For instance, the increase in UFO/UAP reports at the beginning of the COVID-19 pandemic might have been at least partially due to more people in isolation spending time looking into the night sky.

Despite the noted limitations of other variables, as long as statistical studies do not purport to support definitive explanations for UFO/UAP, they can show trends in how witnesses themselves are reporting UFO/UAP. As the term "flying saucer" fell out of use over time, reported shapes such as triangles become more common, probably due to the popularization of these alternative shapes in media.

Recently, following the "leaked" US Navy video of a UAP shaped like a "tic tac," this shape began being reported by other witnesses. In the 1800s, witnesses described unidentified aerial objects as "airships," as there were no other kinds of objects that flew in the sky. Later, unidentified objects were thought to be unusual "aeroplanes." Mysterious objects tend to be described in terms of objects popular during a given era. The biggest problem with UFO/UAP data, however, is the lack of consistency or standardization of the data itself. Almost every UFO/UAP organization created its own method for recording witnesses' observations in reporting forms. This was true both for government and civilian agencies. While paper reporting forms have only relatively recently transitioned to digital files, the majority of UFO/UAP reports are now self-reported on online websites.

The key attributes of observed UFO/UAP, therefore, vary greatly depending on the investigating agency or person, and this can cause problems when entering data into a spreadsheet for analysis. Indeed, the person entering the data may need to interpret the UFO/UAP characteristics, even when a coding key is employed. There is no "central repository" or collecting agency for UFO/UAP, with sightings reported to a variety of organizations, both civilian, and governmental. Many individuals, associations, clubs, and groups claim to investigate UFO/UAP reports and otherwise solicit reports from the general public. However, very few of them actually participate in any kind of information sharing or data gathering for scientific programs. Many are only interest groups, perhaps based in museums, planetariums, church basements, or members' homes, and do virtually nothing with the case reports they receive. Indeed, because there is no way to enforce standards in UFO/UAP report investigations, the quality of case investigations varies considerably. Some researchers do not maintain useable case files and do not retain quantitative criteria in their investigations (e.g., alien abduction or contactee groups).

The Canadian UFO Survey attempted to circumvent some of the concerns with UFO/UAP data files with two adjustments. The first was to accept report data from UFO groups, but only the lowest common denominators. Only basic UFO/UAP report data, such as report date, time of day, and witness location, were initially collected. If other specifics such as color, shape, and duration of the sighting were available, these would be included, but with an understanding of the limitations involved. The second adjustment was that in addition to entering the available data, the researcher entering the data would make an evaluation of the quality of the report based on the Hynek Scale of Strangeness and Reliability.

Hynek (1972), an astronomer, was a scientist who took the subject of UFOs very seriously and believed that reports could be analyzed for insight into the nature of the phenomenon. In his landmark work, *The UFO Experience: A Scientific Inquiry*, Hynek noted two factors that would be very useful in studying UFO reports:

> The Strangeness Rating is, to express it loosely, a measure of how 'odd-ball' a report is within its particular broad classification. More precisely, it can be taken as a measure of the number of information bits the report contains, each of which is difficult to explain in common-sense terms...
>
> Assessment of the Probability Rating of a report becomes a highly subjective matter. We start with the assessed credibility of the individuals concerned in the report, and we estimate to what degree, given the circumstances at this particular time, the reporters could have erred. Factors that must be considered here are internal consistency of the given report, consistency among several reports of the same incident, the manner in which the report was made, the conviction transmitted by the reporter to the interrogator, and finally, that subtle judgment of how it all 'hangs together' (p. 25).

Through these adjustments, UFO/UAP reports could be triaged so as to refine the data and reflect the

intrinsic quality of the cases in question. Finally, using these additional criteria, it would be possible to make a judgment as to whether a specific UFO/UAP report had a simple explanation (e.g., a Starlink train), a possible explanation, insufficient information for analyses, or no apparent explanation. Such a conclusion would not have any meaning in terms of evidence or alien visitation, of course.

Polls have shown that about 10% of North Americans believe they have seen UFO/UAP. This means that about 40 million Americans have had UFO/UAP experiences. If you have seen a UFO/UAP, you are in good company with many, many others. UFO/UAP witnesses range from farmhands to airline pilots and from teachers to police officers. Witnesses represent all age groups and racial origin. What is being observed? In most cases, only ordinary objects. However, this begs a question. If people are reporting things that can be explained, then the objects they observed were "really" there. Were the objects we cannot identify "really" there as well? If so, what were they? These are questions that only continued and rational research can answer, and only if researchers have the support and encouragement of both scientists and the public. If enough high-quality data on UFO/UAP reports are gathered, analyses of the data may be able to shed light on the true nature of the phenomenon. That does not even include the possibility of non-human involvement in the equation.

ENDNOTES

[1] The title of this editorial is in reference to an excellent paper by ufologist Richard Hall: "Whither Ufology?" (https://www.nicap.org/papers/whither_ufology.pdf), prepared for January 19-21, 2002, at a "Think Tank" sponsored by the Fund for UFO Research. Hall envisioned a "formation of a nonpartisan National Public Fact-Finding Commission" composed of scientists, politicians, astronauts, journalists, and even former Presidents who would, as a body, evaluate UFO evidence from a scientific point of view. Hall may have, in turn, borrowed the title of his presentation from none other than Allan Hendry, whose chapter "Whither UFOCAT?" is in his 1979 book, *The UFO Handbook*.

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