

ADDRESSING THE US DOMAIN AWARENESS GAP POSED BY UNIDENTIFIED ANOMALOUS PHENOMENA

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ABSTRACT

This article analyzes how unidentified anomalous phenomena (UAP) expose a significant domain awareness gap for the United States (US) concerning national defense, aviation safety and scientific understanding. Bolstered by reports from elite military aviators and underscored by the incursion of unidentified objects (including one alleged Chinese surveillance balloon) over US airspace in February 2023,¹ UAPs have garnered widespread concern and interest from the public and Congressional members without any formalized regimen for data sharing and analysis. Nearly half of 2022's 366 cases received by the Pentagon's All-Domain Anomaly

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¹ David Vergun, *General Says Chinese Surveillance Balloon Now Over Center of US*, DOD NEWS (Feb. 3, 2023), <https://www.defense.gov/News/News-Stories/Article/Article/3288103/general-says-chinese-surveillance-balloon-now-over-center-of-us/#:~:text=As%20of%20noon%20to-day%2C%20the,on%20the%20ground%2C%20said%20the>.

Resolution Office (AARO) remain unidentified.² Addressing public concerns regarding transparency warrants cooperative research between the US government and academia to serve as a central source for gathering and disseminating reliable data, reports, and research. The focus of this article is not on UAP that have prosaic explanations, but rather on reports made by military observers and systems that continue to resist description in conventional terms after repeated attempts to identify them. These reports are often imperfectly studied or otherwise ignored by science and academia due to a lack of sufficient data and enduring taboos. While there are likely multiple explanations for remaining unidentified cases, the number of reports indicating incursions in restricted airspace and highly sensitive defense installations justifies a conduit to research the issue and keep the public appropriately informed of how taxpayer dollars are allocated to investigate.

I. INTRODUCTION

The goal of this article is to separate the noise of the Unidentified Flying Object (UFO) (and associated visitors from outer space) as a cultural sensation from genuine, and ongoing unidentified anomalous phenomena (UAP) reports that continue to pose a challenge to national defense, aviation safety and scientific understanding. The author recommends that these deficiencies be met with data sharing among stakeholders in the defense, civil government and scientific communities to balance regard for sensitive defense information with public safety and curiosity. At a minimum, the author offers the present work to contribute positively to the serious academic study of UAP without speculating on the causes of the phenomena. As entertaining as the topic may be, it must be stressed that this matter continues to stump the military and intelligence communities we depend on for national security.

The author will use the remainder of this article to elaborate on the following four assertions regarding UAP:

² See U.S. OFFICE OF THE DIR. OF NAT'L INTEL., 2022 ANNUAL REPORT ON UNIDENTIFIED AERIAL PHENOMENA 5 (2022), available at: <https://www.dni.gov/files/ODNI/documents/assessments/Unclassified-2022-Annual-Report-UAP.pdf> [hereinafter DNI 2022 UAP Ann. Rep.].

(1) Truly *unidentified* reports of objects in United States (US) airspace and protected waters do exist and continue to be made by credible—and often technically trained—persons whose testimony would be accepted in a hearing or court of law in any other context. Of the 366 new reports collected by the All-Domain Anomaly Resolution Office (AARO) between January 2021 and August 2022, 46.7% remain unidentified after scrutiny by persons capable of making a commonsense identification.³

(2) These genuine unknowns have been imperfectly studied, or otherwise ignored, by broader science and academia due to the lack of data available to the public and enduring stigmas.⁴ The challenges should not outweigh the need for academic cooperation and public understanding to inform appropriate policies, especially given recent incursions over US airspace, subsequent engagement from the National Aeronautics and Space Administration (NASA) and the Department of Defense (DoD), and growing public concern.

(3) The significant number of unexplained reports, combined with the absence of robust reporting mechanisms and public access to data, highlights a critical domain awareness gap regarding national defense, aviation safety, and scientific understanding.

(4) An essential step in closing this three-pronged gap would be a collaborative, open-source data repository between federal agencies, local municipalities and civilian scientists that serves as the central authority for gathering and disseminating reliable information, reports and research. Such activity would decrease ambiguity over federal agency jurisdictions, increase transparent data sharing, and accelerate identification of unknown objects in US airspace.

II. RATIONALE FOR THIS ARTICLE

There needs to be more consensus among scientists, academics, government officials and the public on what UAPs represent. Many describe reports as hoaxes or nonsense, while others are

³ *Id.*

⁴ See JOSEPH ALLEN HYNEK & JACQUES VALLEE, THE EDGE OF REALITY: A PROGRESS REPORT ON UNIDENTIFIED FLYING OBJECTS 8-9 (1975).

convinced they represent visitors from outer space or interdimensional travelers.⁵ By definition, unidentified means *we do not know*, but variability in the reports suggests more than a singular explanation.⁶

Fortunately, the logical and methodological structure of the scientific method has proven effective in allowing us to understand a variety of previously unknown phenomena in nature. These advances have come about from new empirical observations and novel explanation schemes, such as concepts or laws, to encompass them into our understanding.⁷ This is how reluctance to accept the findings of Copernicus, Newton, and Darwin as tenets of our worldview were replaced by new frameworks that included them.⁸ Assuming we do not know all there is to know about our world and the universe, perhaps the closure of the UAP domain awareness gap requires new understanding and explanation schemes.⁹ As the UAP Preliminary Assessment states, “we may require additional scientific knowledge to successfully collect on, analyze and characterize some [UAP].”¹⁰

The facts of many reports are often circumstantial and anecdotal, though not unlike data in the fields of anthropology, psychology and meteorology.¹¹ The observations outlined in reports are certainly interesting; many give the reader the impression that the observer indeed witnessed the events as described, made a severe error in identification, or was bereft of their senses and reason. Could this indicate a psychological phenomenon that results in these reports, warranting further engagement from the field of psychology?¹² Perhaps the number of strange objects reported by service members, pilots and radar operators necessitates a sociologists’

⁵ JOSEPH ALLEN HYNEK, *THE UFO EXPERIENCE: A SCIENTIFIC INQUIRY* 13-14 (1972).

⁶ See U.S. OFFICE OF THE DIR. OF NAT’L INTEL., *PRELIMINARY ASSESSMENT: UNIDENTIFIED AERIAL PHENOMENA* 3 (2021), available at: <https://www.dni.gov/files/ODNI/documents/assessments/Preliminary-Assessment-UAP-20210625.pdf> [hereinafter UAP Preliminary Assessment].

⁷ See HYNEK, *supra* note 5, at 260.

⁸ Hanne Andersen & Brian Hepburn, *Scientific Change*, INTERNET ENCYCLOPEDIA OF PHILOSOPHY, <https://iep.utm.edu/scientific-change/> (last visited July 4, 2023).

⁹ See HYNEK, *supra* note 5, at 9.

¹⁰ UAP Preliminary Assessment, *supra* note 6, at 6.

¹¹ HYNEK, *supra* note 5, at 38.

¹² See *id.* at 16-17.

review of the screening process for critical defense personnel? While given fair consideration as possibilities, the occupations, training and experience of the various observers and systems in the UAP Preliminary Assessment study do not support these notions. Despite how strange the reports highlighted in this article and the research are, the pattern spread is somewhat small, whereas hallucinations can vary considerably and cannot be captured on advanced sensor systems.¹³

We must note that ambiguity in the details of a given report does not necessarily indicate a misperception of a known object or attempts at deception. Interviews with witnesses in the 2004 *Nimitz* case and audio from the “Gimbal” and “Go Fast” clips, show that a lack of expression can plague these individuals who are otherwise technically trained in recanting specific minutiae.¹⁴ Especially in cases where there is a high degree of reliability from multiple observers, supported by instruments of equal or greater reliability, we have no reason to dismiss these reports out of hand.¹⁵ The criteria for “believing” or “disbelieving” these types of qualified reports are suddenly on par—“why should we believe them?” is just as valid a question as “why shouldn’t we?”¹⁶ With the level of responsibility entrusted to these various observers, particularly as it relates to national defense, the author tends to trust their accounts as reported, especially when backed up by reliable data collection systems.

Irrespective of any explanation, there are far too many reports from credible observers of various socioeconomic backgrounds worldwide, often supported by reliable systems, to dismiss them entirely. Based on the Air Force’s Project Blue Book files, a possible 5-25% of cases remain unidentifiable or unexplainable.¹⁷ These remaining cases—considered anomalous detections¹⁸—do not include

¹³ See Flavie Waters et al., *Visual Hallucinations in the Psychosis Spectrum and Comparative Information from Neurodegenerative Disorders and Eye Disease*, 40 SCHIZOPHRENIA BULL. S233, S234 (2014).

¹⁴ 60 Minutes, *Navy Pilots Describe Encounters with UFOs*, YOUTUBE (May 16, 2021), <https://www.youtube.com/watch?v=ZBtMbBPzqHY> (last visited June 15, 2023). Full descriptions of these events can be found *infra* at part VI.

¹⁵ See HYNEK, *supra* note 5, at 22.

¹⁶ *Id.* at 21.

¹⁷ See HYNEK & VALLEE, *supra* note 4, at 21.

¹⁸ See ALL-DOMAIN ANOMALY RESOLUTION OFFICE, <https://www.aaro.mil/> (last visited Sept. 15, 2023).

misperceptions of conventional objects, psychological effects, or hoaxes and will be further defined in the methodology.

III. CASE METHODOLOGY

The following definitions will serve as a guide for the remainder of the article:

Account - the content of a report.

Report - a written statement submitted through government channels and made by observers judged psychologically coherent and responsible, describing an event, object, or natural process that cannot be immediately identified.

Observer - Individual(s) who make a report and are generally acknowledged to be a reputable person who is reliable, honest in their dealings with others, and accustomed to responsibility; *whose testimony would be accepted in a hearing or court of law in any other context.*

Unidentified Anomalous Phenomena (UAP) - reported perception of a light or object whose trajectory, appearance, or luminescence is perplexing to the observer and remains unidentified after scrutiny by persons deemed technically capable of making a commonsense identification.¹⁹

When discussing UAP for this article, it encompasses only those reports that remain unexplained to trained individuals capable of identifying them—not the vast majority of misperceptions of conventional objects or natural phenomena. For example, the alleged Chinese surveillance balloon that crossed into US airspace in early 2023 would not be considered a UAP given its characteristics and origin are well-defined. However, the failure to detect the balloon and other slow-moving objects lingering near sensitive defense installations underscores the need for increased engagement from multiple disciplines.²⁰ While many of these reports remain unidentified after serious attempts to solve them, the Pentagon's All-

¹⁹ See UAP Preliminary Assessment, *supra* note 6, at 3, 5.

²⁰ See Sascha Brodsky, *The Pentagon is Investigating UFOs That Possibly Turned off Warheads*, POPULAR MECH. (Feb. 23, 2023), <https://www.popularmechanics.com/military/research/a43033115/pentagon-investigating-ufos-nuclear-warheads/>.

Domain Anomaly Resolution Office (AARO) states these “unknowns,” once identified, can be classified into the following five categories:

- (1) **Airborne Clutter:** balloons, birds, civilian drones, or debris.
- (2) **Natural Atmospheric Phenomena:** ice crystals, thermal fluctuations, and weather patterns that sometimes register on radar.
- (3) **US Government or Industry Developmental Programs:** advanced or otherwise classified developmental programs by US entities.
- (4) **Foreign Adversary Systems:** technologies deployed by Russia, China, or other foreign government and non-governmental entities.
- (5) **Other:** genuinely new empirical observations involving unusual flight characteristics or signature management, requiring additional scientific knowledge or advancements to collect on, analyze, or characterize them successfully.²¹

To emphasize credibility in the included reports, single-observer accounts, regardless of the reliability of the witness, were excluded. This practice prevents the possibility of a meritorious observer who made an honest mistake in identifying a known object. The highlighted cases in this article were selected because they meet two essential criteria: 1) the reports describe events that defy prosaic explanations and perhaps warrant further academic and scientific study to understand them regardless of their origin; and 2) due to the credibility of the observers and the reliability of systems that corroborated their accounts, the probability that these events occurred as described is high. While the probability of evidence is high, we cannot establish *certainty* by academic standards. However, a national scientific working group managing a repository of reports and research could establish if a sample size of similar high-probability cases might render compound probability tantamount to certainty.²²

²¹ UAP Preliminary Assessment, *supra* note 6, at 5-6.

²² *See, e.g.*, HYNEK, *supra* note 5, at 65-66.

IV. CHALLENGES

Even considering some of the most perplexing cases, such as those highlighted in this article, there are still significant challenges associated with adequately assessing UAP: digital evidence, enduring stigmas, North American Aerospace Defense (NORAD) tracking practices, and most notably, the paucity of publicly available data, which is exacerbated by poor reporting and the transience of UAPs themselves.

Many critics suggest that photos and videos are required evidence for the existence of UAP, especially in modern times where mobile phones are ubiquitous and have advanced tremendously in photographic capability.²³ Where are the photos and videos? In an age of advanced deep fake technology and computer-generated trickery, these publicly sourced photos and videos are often no more reliable than the individual observer and contribute to ongoing taboos with their unreliability.²⁴ An abundance of hoaxes and misperceptions requires that we refine our standard of evidence to encompass observations only captured by reliable military or civil aviation systems until other viable methods become commercially vetted and available for use.²⁵ Some high-quality evidence has been released to the public and authenticated by the DoD.²⁶ However, many critical data points, specifically size, shape, velocity, propulsion, trajectory, and detection method, remain classified.²⁷ Indeed, some cell phone photographs taken from the cockpits of military aircraft have been made public and remain unidentified, such as those in Exhibit 1 below.

Developing methods to disseminate that data to an open-source repository without compromising sensitive defense

²³ See Samson Amore, *Neil Degrasse Tyson Thinks We Should Have Better Pictures of Aliens by Now*, THE WRAP (June 28, 2021), <https://www.thewrap.com/neil-degrasse-tyson-ufos-aliens-tweets-us-pentagon-report/>.

²⁴ See HYNEK, *supra* note 5, at 65.

²⁵ For example, a quick internet search will reveal strings of Starlink satellites or the planet Venus are commonly confused for UAP.

²⁶ Natasha Turak, *Pentagon Declassifies Three UFO Videos Taken by Navy Pilots*, CNBC (Apr. 28, 2020), <https://www.cnbc.com/2020/04/28/pentagon-declassifies-ufo-vid-eos-taken-by-navy-pilots.html>.

²⁷ See John Greenewald, *Range Fouler Debrief Forms and Reports*, THE BLACK VAULT (Jan. 16, 2023), <https://www.theblackvault.com/documentarchive/range-fouler-debrief-forms-and-reports/>.

information would provide invaluable knowledge for civilian scientists attempting to aid in the classification of unknown objects.



Exhibit 1²⁸

Stigma and taboos involving UAP continue to be an impediment to acceptance of the subject for broader study. Decades of portrayals of UAP studies as pseudo-science and media sensationalism of the subject have contributed to disinformation and resulted in a reluctance from science and academia to engage.²⁹ On one hand, this has led to conspiracy theories of a “cover-up” from camps of true believers and the assertion that UAPs are undoubtedly

²⁸ <https://thedebrief.org/pentagon-confirms-leaked-ufo-images-are-authentic/>

²⁹ See Alexander Wendt & Raymond Duvall, *Sovereignty and the UFO*, 36 POL. THEORY 607, 626 (2008).

extraterrestrial.³⁰ On the other, a mindset of “debunking” UAPs professes to be rational and scientific but at the same time refuses to accept any evidence that would suggest otherwise.³¹ As far back as the 1950s, Dr. J. Allen Hynek would lament the “*it can’t be, therefore it isn’t*” mentality of Air Force brass during his two decades as an astronomical consultant for Project Blue Book.³² This attitude continues to be pervasive amongst the public, media, science, academia and various sectors of government as evidenced by the Federal Aviation Administration’s (FAA) response to the 2006 Chicago O’Hare International Airport incident, among other cases.³³

Another ill-conceived notion about UAP is the widespread assumption that such objects do not show up on radar and therefore cannot be codified.³⁴ In fact, there are countless reports corroborated by radar returns made by civilian and military operators.³⁵ NORAD is responsible for aerospace control over the US and Canada, possessing the capability to track such objects.³⁶ Officially, NORAD does not have data related to UAP in North American airspace; however, the system only monitors for, *inter alia*, trajectories of air traffic, ballistic missiles, satellites, and space debris.³⁷ Since most UAP trajectories do not satisfy these conditions, they are automatically rejected from the data as Uncorrelated Targets (UCTs) without further examination.³⁸ While these UCTs are not officially

³⁰ See Karlyn Bowman, *UFOs and Government Cover-Ups*, AM. ENTER. INST. (Feb. 14, 2023), <https://www.aei.org/politics-and-public-opinion/ufo-and-government-cover-ups/>.

³¹ See HYNEK, *supra* note 5, at 193

³² *Id.* It is worth noting that Dr. Hynek was a professed skeptic who initially sought to debunk the issue. His inability to positively attribute the steady stream of cases for over two decades, while a consultant to Project Blue Book, convinced him of the validity of the phenomenon. Upon his death in 1986, the former skeptic was a leading advocate for serious engagement from science and the public.

³³ See *infra*, part VI.B.

³⁴ *Id.*

³⁵ See *infra*, part VI.A & Section VIII.

³⁶ See generally NORAD AND USNORTHCOM, STRATEGY: EXECUTIVE SUMMARY (March 2021), available at: [https://www.northcom.mil/Portals/28/\(U\)%20NORAD-USNORTHCOM%20Strategy%20EXSUM%20-%20Signed.pdf](https://www.northcom.mil/Portals/28/(U)%20NORAD-USNORTHCOM%20Strategy%20EXSUM%20-%20Signed.pdf).

³⁷ *Id.*

³⁸ See Phoebe A. Jackson, *Small Satellite Debris Catalog Maintenance Issues*, PROC. OF NASA’S 4TH ANN. WORKSHOP ON SPACE OPERATIONS APPLICATIONS & RSCH., 696, 699 (1991), <https://ntrs.nasa.gov/api/citations/19910011389/downloads/19910011389.pdf> (defining UCTs and citing NORAD’s data for explanation of USSPACECOM’s catalog).

reported, the research suggests such targets are not rare.³⁹ Even a slight change in approach to cataloging UCTs with trajectories that match those given in reports could go a long way in providing additional data to a very complex problem. This proved to be the case in the hours after the alleged Chinese surveillance balloon was identified over US airspace.⁴⁰ NORAD began tracking smaller objects with slower trajectories which resulted in the shutdown of three other objects in the subsequent weeks.⁴¹

When it comes to reports themselves, the amount of useable data is deplorable. The data from reports are typically anecdotal and difficult to verify, which does not stand up to scientific scrutiny. In declassified releases, many important details with diminutive relation to overall national security are frustratingly redacted, such as size, shape, color, altitude, velocity and apparent means of propulsion.⁴² Hindering complete research is the inability to access information about reports that are still classified.⁴³ In more recent cases, such as the *Nimitz* and Gimbal reports,⁴⁴ first-hand accounts corroborated through a multitude of mediums and reputable sources were able to fill in gaps on cases that were included, but not detailed, in the AAROs 2022 dataset.⁴⁵

More empirical data—in the form of radar data and other advanced sensors—is sorely needed to accurately assess the *nature* of certain UAP cases. This data is currently used to publicly and accurately gauge the position, speed and flight path of civil aircraft, making possible the thousands of flights that occur every day.⁴⁶ As expressed in many reports,⁴⁷ UAPs have unquestionably been

³⁹ HYNEK, *supra* note 5, at 81.

⁴⁰ See, e.g., Sanya Mansoor, *Why America's Air Defense Network Failed to Detect the Chinese Spy Balloons*, TIME, (Feb. 10, 2023) <https://time.com/6254681/chinese-balloons-us-air-defense-network-failure/>.

⁴¹ *Id.*

⁴² See Greenewald, *supra* note 27.

⁴³ ROBERT HASTINGS, *UFOS & NUKES: EXTRAORDINARY ENCOUNTERS AT NUCLEAR WEAPONS SITES 15* (2d ed. 2017).

⁴⁴ See generally, Kevin H. Huth, et al., *Estimating Flight Characteristics of Anomalous Unidentified Aerial Vehicles*, 21 Entropy 939 (2019). See also Jan Tegler & Cat Hofacker, *Mystery of the "Damn Things"* AEROSPACE AMERICA (Oct. 31, 2019), <https://aerospaceamerica.aiaa.org/features/mystery-of-the-damn-things/>. For details on the events, see *infra* part VI.

⁴⁵ See DNI 2022 UAP Ann. Rep, *supra* note 2, at 5.

⁴⁶ HASTINGS, *supra* note 43, at 20.

⁴⁷ See UAP Preliminary Assessment, *supra* note 6, at 2.

captured on radar by the FAA and branches of the military over the decades but much of the data, even qualitative aspects such as size, shape, trajectory, altitude and velocity, remains unavailable for public scientific scrutiny.⁴⁸

The lack of a formalized reporting structure beyond local municipalities for civilian observations contributes to the unsatisfactory state of the data. Some of the best reports come from scientifically or technically trained people who can rule out several conventional explanations at the gate and provide serious credibility to the events. These individuals are often reluctant to come forward to avoid publicity and maintain their anonymity in the face of inevitable scrutiny and official apathy.⁴⁹ Further, even the accounts of the most technically trained individuals are complicated by their inability to explain reported objects in common sense terms.⁵⁰ These reports often describe events that are so spontaneous and unusual that it is likely difficult to observe and report at the same time.⁵¹

Beyond that, UAPs collectively appear to be beyond control in an experimental sense. Reports indicate they are transient, highly localized, and unscheduled—not unlike meteorites.⁵² The observer is then only able to collect data circumstantially. In most cases, these observers are unprepared and unable to make a dispassionate analysis. This heavily restricts any attempt to test and replicate results. The author invites discussion over what constitutes quality data in this particular field but analyzing remaining unidentified reports for clustering around size, shape, color, velocity, altitude, and apparent means of propulsion is a sensible place to start.

V. VAGUE PATTERNS CAN BE DERIVED FROM PUBLICLY AVAILABLE REPORTS

A. *Patterns Among Observers*

Observers come from various walks of life and seem to describe genuine events, representing a fantastic experience that they

⁴⁸ See Greenewald, *supra* note 27.

⁴⁹ See UAP Preliminary Assessment, *supra* note 6, at 4.

⁵⁰ See HYNEK, *supra* note 5, at 28.

⁵¹ *Id.* at 28-29.

⁵² *Id.* at 261.

struggle to comprehend and explain.⁵³ Typically, the most articulate and coherent reports come from people who appear to be genuinely surprised by their experience after serious attempts at applying a logical explanation have been made.⁵⁴ The incident has the “reality” of an actual event (like a crime scene, car crash or combat scenario) but the observer is unable to provide a rational explanation or description.⁵⁵ Often, this is after the observer has exhibited the step-by-step application of an explanation only to realize each conventional description is inadequate.⁵⁶ While most people in these positions of responsibility have the competent vocabulary to describe tangible events relevant to their roles, observers like those highlighted in this article have a sense of bewilderment and are at a loss for descriptive terms.⁵⁷

B. Patterns Among Reports

If UAPs are imagined or hallucinated, it is noteworthy that these misperceptions are restricted to a series of relative patterns.⁵⁸ The narrow spectrum of quality UAP reports is precisely why they can and should be studied. If reports varied wildly, then it would only further complicate the study of UAP.

The stark lack of resemblance in the reports to any depictions of spacecraft in science fiction and pop-culture suggests that genuine UAP cases do not represent some manifestation of media intake.⁵⁹ Household favorites, such as *Star Wars*, *Star Trek*, and even fringe sci-fi material, depict craft with discernible flight features and means of propulsion.⁶⁰ Despite their fictional advancements beyond our technology, they still tend to obey the laws of physics as we understand them. All things considered, these depictions often resemble the technology of the present imposed on the future but still conform to our current explanation schemes.

⁵³ *See id.* at 14-18.

⁵⁴ *Id.*

⁵⁵ *Id.*

⁵⁶ HYNEK, *supra* note 5, at 14-18.

⁵⁷ *Id.*

⁵⁸ *Id.*

⁵⁹ HASTINGS, *supra* note 43, at 38.

⁶⁰ Elizabeth Howell & Callum McKelvie, *The Greatest Spaceships of Science Fiction*, SPACE.COM. (Jan. 31, 2022), <https://www.space.com/42312-greatest-spaceships-of-science-fiction/2.html>.

Bona fide UAP reports, on the other hand, tend to cluster around size, shape, color, velocity and means of propulsion, depicting objects that can rapidly accelerate and make right-angle turns without slowing down or producing sound. They are often reported as having few or no discernable flight features or means of propulsion and in some cases do not appear to be affected by laws of gravity or inertia as we understand them.⁶¹ These unusual flight characteristics are observed repeatedly in civilian cases as well. The most striking aspect to observers, as noted in their reports, is often the color or speed of the object. When appearing as a light, the source is often extremely intense and of very vivid color but can range across the color spectrum.⁶² Reports made by observers and corroborated by radar describe flight trajectories that are usually controlled, with many describing vertical flight paths or exhibiting a wobbling or tumbling motion when moving horizontally.⁶³ Vertical trajectories are commonly reported at the conclusion of an encounter.⁶⁴ In rare instances such as the *Nimitz* case (discussed *infra* at part. VI.A) and others tracked on radar, the motion of an object is reported to be coincidental with maneuvers of nearby aircraft. Clustering in government cases can be more accurately determined if such reports were stripped of sensitive defense information and made available for scientific analysis. At a minimum, this could allow investigators to rule out several prosaic explanations at the gate.

As indicated in historical reports and the Office of the Director of National Intelligence's (ODNI) Preliminary Assessment, some UAPs are reported to display a degree of signature management.⁶⁵ In military reports, this is evidenced by jamming aircraft radar or "breaking" its lock on the target.⁶⁶ In civilian cases, interference with electric circuits within close proximity is sometimes reported.⁶⁷ In the 1957 Levelland, Texas sightings, this physical effect

⁶¹ UAP Preliminary Assessment, *supra* note 6, at 5; HYNEK, *supra* note 5, at 13.

⁶² HYNEK, *supra* note 5, at 56.

⁶³ *Id.* at 63.

⁶⁴ *See, e.g., id.* at 69, 82, 120.

⁶⁵ UAP Preliminary Assessment, *supra* note 6, at 5, 6.

⁶⁶ Weaponized, *Episode #27 – Lt. Cmdr. Chad Underwood / The Man Who Filmed the Tic Tac UFO*, at 53:41, JEREMY KENYON LOCKYER CORBELL (Aug. 17, 2020), <https://www.weaponizedpodcast.com/episodes-1/episode-number-27>.

⁶⁷ *See* HYNEK & VALLEE, *supra* note 4, at 19.

was reported by ten separate observers who were geographically and occupationally independent of each other, including truck drivers, police officers, a fire marshal, and a college student.⁶⁸ Similar effects have been documented in countless other reports, with recent legislation requiring AARO to study these aspects and provide briefings to Congress.⁶⁹

Despite decades of Hollywood films featuring UFOs as the public generally perceives them, the most puzzling and compelling cases bear almost no resemblance to what we see in pop-culture,⁷⁰ and have instead formed a separate but relatively consistent pattern for more than 75 years. It stands to reason that if reports resulted from the depictions of visitors from outer space in the media, these tropes would eventually surface among the reports or in discernible trends. Perhaps they do in cases of hoaxes or hallucinations, but the level of credibility is incomparable to the cases that ultimately remain unidentified to the AARO and broader public. Instead, the most compelling cases are well-evidenced and detail events that repeatedly resist attempts to explain them. In these quality reports, you do not find the observer stating, “[i]t was just like you see in the movies.” The more standard description is some variation of “I have never seen anything like it before or since.”⁷¹

VI. HIGHLIGHTED CASES

The observers submitting reports to the AARO represent a cross-reference of reliable and technically trained individuals who are critical to national defense,⁷² including military aviators, radar

⁶⁸ See HYNEK, *supra* note 5, at 140-147.

⁶⁹ H.R. 4350, 117th Cong. § 1652 (2022).

⁷⁰ The one apparent exception would be Stephen Spielberg’s film, *Close Encounters of the Third Kind* (Columbia Pictures 1977). However, Jacques Vallee and J. Allen Hynek both were heavily consulted for the film after their participation for over two decades in government UAP research. The film is unique in that the appearance and behavior of UAP differ significantly from other depictions in science fiction and wider pop-culture. See Meet J. Allen Hynek, the Astronomer Who First Classified UFO “Close Encounters,” HISTORY, <https://www.history.com/news/j-allen-hynek-ufos-project-blue-book> (last visited Nov. 18, 2023), Chantel Tattoli, *Jacques Vallee Still Doesn’t Know What UFOs Are*, WIRED.COM (Feb. 10, 2022) <https://www.wired.com/story/jacques-vallee-still-doesnt-know-what-ufos-are/>.

⁷¹ See, e.g., HYNEK, *supra* note 5, at 15.

⁷² See ALL-DOMAIN ANOMALY RESOLUTION OFFICE, <https://www.aaro.mil/> (last visited September 15, 2023).

operators and commanding officers.⁷³ Data sharing within government has expanded AARO reporting to include information from other agencies, such as the Federal Aviation Administration (FAA). While these reports will be the focus of this article, there are countless public reports made by civilian pilots, police officers, farmers, intelligence officers, and civil scientists.⁷⁴ Reports are by no means limited to any subset of occupations. However, the observers in the highlighted cases were often considered the most credible in the absence of any formal reporting infrastructure. In terms of the observers themselves, the occupations and corroboration of their reports speak to their credibility; however, given the lack of publicly available documentation about these incidents, some aspects of are unverifiable and serve as a historical account of events. Considering most professional historians employ similar approximations, these reports should be viewed in the same manner and considered to be reliable but incomplete.⁷⁵

A. USS *Nimitz* (2004)

The 2004 *Nimitz* Carrier Group encounter is arguably the most well-known report in the AARO's collection data—and perhaps the most compelling in terms of unusual flight characteristics displayed and the number of credible witnesses and systems used to capture the event.⁷⁶ In November 2004, the USS *Nimitz* and USS *Princeton* tracked as many as 100 UAPs in restricted military airspace over two weeks.⁷⁷ Senior Chief Operations Specialist Kevin Day managed radar operations, detecting groups of UAPs in low Earth orbit before dropping from 80,000 feet to 28,000 feet with variation in altitude among objects.⁷⁸ Several targets were tracked on

⁷³ See DNI 2022 UAP Ann. Rep., *supra* note 2, at 5-6.

⁷⁴ HYNEK, *supra* note 5, at 97 n.2.

⁷⁵ HASTINGS, *supra* note 43, at 21.

⁷⁶ See Kevin H. Knuth, et al., *Estimating Flight Characteristics of Anomalous Unidentified Aerial Vehicles in the 2004 Nimitz Encounter*, 33 PROCEEDINGS 26, 26 (2019).

⁷⁷ *Id.* at 27.

⁷⁸ *Id.*

radar subsequently dropping from 28,000 feet to sea level in 0.78 seconds⁷⁹ without producing a sonic boom.⁸⁰

On November 14, CDR Dave Fravor of the elite Naval flight squadron, the Black Aces, took off with another F/A-18F Super Hornet for a training exercise in the area.⁸¹ After the *USS Princeton* picked up a UAP on radar, the two aircraft were vectored to the location to investigate.⁸²

All four pilots spotted a white, unmanned aerial vehicle (UAV), shaped like a large cylindrical butane tank, or a tic-tac candy, moving erratically back and forth, almost like a bouncing ping-pong ball making instantaneous changes in direction without changing speed. The tic-tac UAV was estimated to be about the size of an F-18, about 40–50 feet in length and 10–15 feet wide but had no apparent flight surfaces or means of propulsion, and its movement had no apparent effect on the ocean surface as one would expect from something like rotor wash from a helicopter.⁸³

As Fravor flew down to get a closer look, the object appeared to show awareness of his presence by flying up to mirror the pilot's movements before instantly accelerating as if it was "shot out of a rifle."⁸⁴ The seasoned aviator pointed out that a jet flying at three times the speed of sound will still take 10 to 15 seconds to be out of sight, yet this object seemed to disappear instantaneously.⁸⁵ Moments later, Fravor received a transmission from the *Princeton* that they had picked up the same tic-tac on radar at an encrypted, pre-determined rendezvous point for the pilots some sixty miles away.⁸⁶

Upon Fravor's return to the *Nimitz*, pilot Chad Underwood was sent to capture video of the object using the F/A-18's forward-

⁷⁹ *Id.*

⁸⁰ Matthew Phelan, *Navy Pilot Who Filmed a UFO Speaks: 'It Wasn't Behaving by the Laws of Physics'*, INTELLIGENCER (Dec. 19, 2019), <https://nymag.com/intelligencer/2019/12/tic-tac-ufo-video-q-and-a-with-navy-pilot-chad-underwood.html>.

⁸¹ Knuth et al., *supra* note 76, at 29.

⁸² *Id.*

⁸³ *Id.*

⁸⁴ 60 Minutes, *supra* note 14.

⁸⁵ Knuth et al., *supra* note 76, at 29.

⁸⁶ See Knuth et al., *supra* note 76, at 30 (Calculating the probability of selecting this particular point out of all locations in a 60-mile radius, to within one mile, is 00.0088%).

looking infrared (FLIR) camera.⁸⁷ FLIR cameras are highly adept at identifying aircraft, yet Underwood was unable to discern any tail, wings, or exhaust plume within close range of the tic-tac object.⁸⁸ An experienced FLIR operator, Underwood cited the lack of propulsion as an immediate indicator that this was not a conventional aircraft.⁸⁹ Moreover, airspeed, altitude, and heading measurements on the FLIR began to behave erratically once he was able to lock on the moving object, which jammed his radar and broke the FLIR lock before rapidly accelerating out of the frame.⁹⁰ The US considers jamming of military radar during peacetime as an act of war.⁹¹

The UAP encounters with the *Nimitz* Carrier Group in 2004 are among the most well-documented reports in the AARO case files. Two weeks were spent tracking and documenting the objects, a process that included the shutdown and recalibration of both ships' radar systems to ensure these tracks were not errors.⁹² Four elite aviators were able to observe the object at close range while others corroborated the unique flight characteristics with sensor data and FLIR footage.⁹³ Using the publicly available sensor information and size estimates from eyewitness accounts, a research group at the University at Albany's (SUNY) Department of Physics determined that the tic-tac object accelerated out of the FLIR frame at a range from 75g to 5000g without giving off any heat, sonic boom or air disturbance.⁹⁴ For comparison, the human body cannot endure more than 25g for a single second, and some of the most advanced aircraft maintain structural integrity only up to 13g.⁹⁵ Energy estimates to accomplish such a feat exceed the nuclear energy

⁸⁷ See Phelan, *supra* note 80.

⁸⁸ Weaponized, *supra* note 66, at 16:40.

⁸⁹ *Id.*

⁹⁰ Underwood further explained that FLIR weapon systems are designed for maintaining a lock on targets performing aggressive maneuvers by saying, "If it were to just veer off to the left, the FLIR would've been able to track that with no problem. But it shot off at an instant acceleration that the FLIR just is not [Underwood laughs] not engineered to track." *Id.* at 12:30. The pilot stated that it usually takes at least 3-5g of acceleration to break a FLIR lock. *Id.* at 13:00.

⁹¹ *Id.* at 53:41.

⁹² Phelan, *supra* note 80.

⁹³ *Id.*

⁹⁴ Knuth et al., *supra* note 76, at 26.

⁹⁵ *Id.* at 39.

production of the US by a factor of ten.⁹⁶ The extreme data collected from this incident suggests the information is either erroneous, fabricated, or a genuine depiction of advanced flight capability.⁹⁷ The USS *Nimitz* incident is just one of the 171 remaining unexplained reports made by military aviators in recent years.⁹⁸ The possibility of misperception of conventional objects has been thoroughly investigated, yet the case remains unexplained.⁹⁹

B. Chicago O'Hare International Airport (2006)

During the afternoon hours of November 7, 2006, a “saucer-like” object was visually observed hovering above one of the busiest airports in the world¹⁰⁰ by over fifteen airline pilots, mechanics, and management personnel.¹⁰¹ The event was estimated to last about eighteen minutes, concluding with the object departing rapidly in a vertical trajectory through the clouds, leaving behind a perfect circle of similar size that persisted for another fourteen minutes.¹⁰² When the story broke in *The Chicago Tribune*, the FAA and United Airlines stated they had no knowledge or records of the reported occurrence.¹⁰³ Only after Freedom of Information Act (FOIA) requests revealed three separate telephone inquiries, a written notation in the FAA tower’s “Daily Record of Facility Operation,” and significant radio chatter discussing the object, did the agency and

⁹⁶ See *id.* at 33. Even accounting for a large margin for error suggests the energy requirements for the described maneuver are far beyond known current capacity.

⁹⁷ *Id.* at 26.

⁹⁸ DNI 2022 UAP Ann. Rep., *supra* note 2, at 5.

⁹⁹ *Id.*

¹⁰⁰ Michelle Baran, *These Are the World's Busiest Airports—A List That Marks a Comeback for Several Major International Hubs*, AFAR (Apr. 6, 2023), [https://www.afar.com/magazine/the-busiest-airports-in-the-world#:~:text=Chicago's%20O'Hare%20International%20Airport,Pudong%20International%20Airport%20\(74%20million\)](https://www.afar.com/magazine/the-busiest-airports-in-the-world#:~:text=Chicago's%20O'Hare%20International%20Airport,Pudong%20International%20Airport%20(74%20million).).

¹⁰¹ Ryan Smith, *O'Hare UFO Sighting in 2006 One of the Most Famous Reported*, CHI. TRIB. (Mar. 20, 2013), <https://www.chicagotribune.com/redeye/ct-redeye-xpm-2013-03-20-37880251-story.html>.

¹⁰² RICHARD F. HAINES ET AL., NAT'L AVIATION REPORTING CTR. ON ANOMALOUS PHENOMENA, REPORT OF AN UNIDENTIFIED AERIAL PHENOMENON AND ITS SAFETY IMPLICATIONS AT O'HARE INTERNATIONAL AIRPORT ON NOVEMBER 7, 2006 38 (May 14, 2007), https://static1.squarespace.com/static/5cf80ff422b5a90001351e31/t/5d02ec731230e20001528e2c/1560472703346/NARCAP_TR-10.pdf.

¹⁰³ Leslie Kean, *UFOs: Investigating the Unknown*, NAT'L GEOGRAPHIC (Feb. 24, 2023), Season 1, Ep. 4, at 26:20-27:41, <https://www.nationalgeographic.com/tv/shows/ufo-investigating-the-unknown>.

United Airlines concede that they did receive reports about the event.¹⁰⁴

According to the FAA, nothing appeared on the radar during this time and location, nor was it seen by air traffic controllers.¹⁰⁵ The head spokesperson for the FAA attributed it to the reflection of airport lights on the cloud deck, despite confirmation that all exterior lights were inactive between 4-4:30 PM when the observations occurred.¹⁰⁶ A subsequent statement pointed to an obscure weather anomaly known as a hole-punch cloud. This explanation was deemed inadequate considering the event requires conditions below freezing and the weather was approximately 50 degrees Fahrenheit during the time of observation.¹⁰⁷

This case was explicitly selected because the identity of the object in question *does not matter* regarding aviation safety. The fact that a perceived object can be visually observed over one of the world's busiest airports for an extended duration while not registering on radar constitutes a significant potential flight safety risk. As one of the witnesses later remarked, "I knew no one would make a false call like that. But if somebody was bouncing a weather balloon or something else over O'Hare, we had to stop it because it was in very close proximity to our flight operations."¹⁰⁸ This is poignant considering what we have learned from the 9/11 attacks and recently disclosed incursions of foreign balloons.¹⁰⁹ From the pilot's perspective, any uncertainty in an operating space, particularly during a takeoff or landing scenario, could range from distracting to dangerous. Yet the FAA—charged with the responsibility of public aviation safety—offered grossly oversimplified explanations that were not based on the facts of the event.¹¹⁰ From another observer disgruntled by the lack of action: "If we see a funny-looking bag all damn hell breaks loose, but park a funny silver thing a few hundred

¹⁰⁴ HAINES ET AL., *supra* note 102, at 17.

¹⁰⁵ *Id.*

¹⁰⁶ Kean, *supra* note 103, at 29:35.

¹⁰⁷ *Id.*

¹⁰⁸ Smith, *supra* note 101.

¹⁰⁹ David Vergun, *Chinese Surveillance Balloons Global in Scope, Says Official*, DOD NEWS (Feb. 13, 2023), <https://www.defense.gov/News/News-Stories/Article/Article/3297104/chinese-surveillance-balloons-global-in-scope-says-official/>.

¹¹⁰ *Id.*

feet above a busy airport and everyone tries to hush it up.”¹¹¹ Reporting unusual activity in areas of dense air traffic is encouraged in any other context. At the time of writing however, the FAA still has no internal procedure for reporting UAPs. According to their website, official protocol requires pilots and employees to submit reports to civilian research organizations or local law enforcement.¹¹²

C. “Gimbal” & “Go Fast” (2014-2015)

Over six months in 2014 and 2015, Navy pilots conducting exercises in restricted airspace off the coast of Virginia Beach were picking up dozens of unidentified targets on their newly upgraded Raytheon APG-79 radar systems.¹¹³ According to one of the pilots, Lt. Ryan Graves, these tracks would appear almost daily and poke along at about 100mph.¹¹⁴ What struck him as unusual was that they could seemingly do this all day, every day with no apparent need to refuel.¹¹⁵ Initially, the pilots believed the targets were the result of a malfunction with the new radar systems, considering some of the targets would change altitude or direction with impressive agility.¹¹⁶ This theory was discredited when the pilots began corroborating the radar tracks by picking them up on electro-optical and infrared sensors on the F-18/F’s FLIR system.¹¹⁷

FLIR sensors are so precise that “you can almost see the rivets” of a conventional aircraft.¹¹⁸ Observers from the *Roosevelt* Carrier Strike Group have publicly stated that what they observed through the sensors did not have any distinct outlines or apparent means of propulsion that are characteristic of known aircraft.¹¹⁹ Moreover, no exhaust plumes, wings, or tail were discernible and

¹¹¹ David Bates, *The O’Hare Field UFO Remains a Great Case*, MEDIUM (Sept. 17, 2021) <https://medium.com/on-the-trail-of-the-saucers/why-skeptical-inquirers-debunking-of-the-o-hare-field-ufo-is-ridiculous-428d4ee077ad>.

¹¹² FAA Order JO 7110.65, ch. 9, § 8.

¹¹³ Tegler & Hofacker, *supra* note 44.

¹¹⁴ The Kevin Rose Show, *UFOs - Advanced Navy Fighter Pilot, Ryan Graves* (Dec. 3, 2019) <https://podcast.kevinrose.com/ufos-advanced-navy-fighter-pilot-ryan-graves/> (last visited Aug. 20, 2023).

¹¹⁵ *Id.*

¹¹⁶ Tegler & Hofacker, *supra* note 44.

¹¹⁷ *Id.*

¹¹⁸ *Id.*

¹¹⁹ 60 Minutes, *supra* note 14.

instead gave off an aura, suggesting a bright infrared emission from the source.¹²⁰

One pilot informed Graves that he had a near miss with one of the objects. He described how the object did not appear on radar but only noticed it as it passed within 400 feet of him and another F/18 and nearly caused a collision.¹²¹ It was described as a “partially transparent cube with a sphere inside.”¹²² This “near miss” was one of the 11 included in the UAP Task Force’s (UAPTF) 2019 Preliminary Assessment,¹²³ and later highlighted during hearings held by the US House Intelligence Subcommittee on Counterterrorism, Counterintelligence, and Counterproliferation in 2022.¹²⁴

AT-FLIR footage of the objects leaked in 2017 and were later authenticated by the Pentagon as genuine unknowns.¹²⁵ Titled “Gimbal” and “Go Fast”, the former features a top-shaped object moving at high speed against the wind and turning 90 degrees on its axis.¹²⁶ “Go Fast” captures an unknown object moving at high speed.¹²⁷ Both videos were captured on the same day and are incomplete without their priceless audio, which features the same baffled responses typical among UAP observers. It is almost easy to forget that these are highly-trained, technical professionals who are not easily excited or fooled.

The tracks were so common and of such high concern that a Notice to Airmen (NOTAM) was given to pilots to make them aware of the hazard.¹²⁸ Once again, here is a case in which multiple observers and systems of high credibility captured unidentified objects that continuously resisted explanation over an extended timeframe. The observations occurred over a large radius of

¹²⁰ Tegler & Hofacker, *supra* note 44.

¹²¹ *Id.*

¹²² *Id.*

¹²³ UAP Preliminary Assessment, *supra* note 6, at 6.

¹²⁴ *Hearing on Government Investigation of UFOs Before the H. Intel. Subcomm. on Counterterrorism, Counterintelligence and Counterproliferation* (statements of Scott Bray, Deputy Director, Off. of Naval Intel., at 59:33) (May 17, 2022) <https://www.c-span.org/video/?520133-1%2Fhearing-government-investigation-ufos>.

¹²⁵ Turak, *supra* note 26.

¹²⁶ Helene Cooper, et al., *Glowing Auras and ‘Black Money’: The Pentagon’s Mysterious U.F.O. Program*. N.Y. TIMES (Dec. 16, 2017) <https://www.nytimes.com/2017/12/16/us/politics/pentagon-program-ufo-harry-reid.html>.

¹²⁷ *Id.*

¹²⁸ Kevin Rose Show, *supra* note 114.

airspace and were too removed from the mainland to be civilian or commercial drones.¹²⁹ Weather patterns could not be responsible for observations over the six-month duration and all sensor systems were investigated for possible malfunction.¹³⁰ In subsequent interviews, Graves stated similar sightings by his colleagues became a daily occurrence “for at least a couple years.”¹³¹ The author cannot attempt to apply a common sense explanation to these events if the pilots and intelligence officials, capable of making a determination, are at an equal loss.

VII. IMPLICATIONS

A. *Misperceptions of Known Objects (Airborne Clutter or Natural Atmospheric Phenomena)*

It is possible that the average remaining “unknowns” in the AARO dataset could be identified as airborne clutter or natural atmospheric phenomena with additional investigation and data. However, only one of the 144 unknowns in the UAPTF’s Preliminary Assessment from 2021 was able to be positively identified: it was a balloon.¹³² Out of the 366 newly-identified reports included in the follow-up assessment, 163 are balloons or balloon-like entities, 26 are characterized as Unmanned Aircraft Systems (UAS), and six others are attributed to clutter.¹³³ The other 46.7% of cases remain unidentified after numerous attempts to apply an explanation, which suggests a severe shortcoming in either US sensor capability to detect known objects or US ability to collect sufficient data to characterize reports.¹³⁴ In the event some UAPs turn out to be naturally occurring, perhaps their apparent flight characteristics should be studied for potential technological advances in the same sense that other observations in nature (such as birds and

¹²⁹ *Id.*

¹³⁰ *Id.*

¹³¹ Reis Thebault, *For Some Navy Pilots, UFO Sightings were an Ordinary Event*, WASH. POST (May 17, 2021) <https://www.washingtonpost.com/nation/2021/05/17/ufo-sightings-navy-ryan-graves/>.

¹³² Kevin Rose Show, *supra* note 114.

¹³³ DNI 2022 UAP Ann. Rep, *supra* note 2, at 5.

¹³⁴ *Id.*

insects) are used to inform biomimicry principles in aircraft design.¹³⁵

B. Proprietary Advanced Technology (US Developmental Programs or Foreign Adversary Systems)

Proprietary advanced technology remains a possibility in many of the reports, however, AARO is authorized to compare state-of-the-art developments to reports without revealing the nature of the undisclosed programs to the public.¹³⁶ In more recent cases such as the *Nimitz*, the sightings occurred during the middle of military exercises, and the UAPTF assessment indicates these reports continue to occur regularly during planned operations.¹³⁷ While it could be argued that this possibly suggests a classified project's way of testing the responses of pilots in real-time, CDR Fravor ruled out this possibility as it would likely be a breach of government methodologies.¹³⁸ Numerous experienced pilots have echoed this assertion.¹³⁹ Moreover, the multitude of reports in the UAPTF's assessment indicates this is not a unique occurrence. While this does nothing to explain the civilian sightings, why would an undisclosed government program display this technology in seemingly obvious public domains? More specifically, why would a foreign entity do this over American soil and risk the project's secrecy?

In terms of foreign adversary systems, the Soviet Union was arguably the only other power during the post-World War era capable of developing technology with advanced flight capability. The brazen incursions on US defense installations of vital security interest over the same period would be commensurate to a secret developmental program, foreign or domestic, flaunting their

¹³⁵ ADSactly. *Is it a Bird? Is it a Plane? Biomimicry in Airplanes*. MEDIUM (Jan. 28, 2018), <https://medium.com/@adsactly/is-it-a-bird-is-it-a-plane-biomimicry-in-airplanes-9862d331df2e#:~:text=Birds%20have%20stream-lined%20shapes%20so,when%20they%20are%20in%20motion>.

¹³⁶ Testimony on Mission, Activities, Oversight, and Budget of the All-Domain Anomaly Resolution Office: Hearing Before the Subcomm. on Emerging Threats and Capabilities of the S. Comm. On Armed Serv. 118th Cong. 26-27 (2023) (statement of Dr. Sean Kirkpatrick, Dir. of AARO).

¹³⁷ UAP Preliminary Assessment, *supra* note 6, at 4.

¹³⁸ Lex Fridman Podcast, *David Fravor: UFOs, Aliens, Fighter Jets, and Aerospace Engineering*, at 2:48:24 (Sept. 8, 2020), https://www.youtube.com/watch?v=aB8zcAttP1E&ab_channel=LexFridman.

¹³⁹ 60 Minutes, *supra* note 14.

technology in front of multiple trained observers. Assessments during that time indicate there was no evidence the Soviets had developed any aircraft that could match the reported maneuvers of UAP sightings.¹⁴⁰ Scientists in the 1950s were well aware that the US was spending billions of dollars on projects attempting to break the speed of sound.¹⁴¹ It was assessed as highly unlikely that this money was spent while the capabilities described in reports were concealed, or that the US had been surpassed technologically by the Russians, British, or others.¹⁴² Further, assessments as early as 1947 concluded that the human body was unable to withstand the violent maneuvers associated with some UAP reports.¹⁴³ Considering UAVs were not deployed en masse until the Vietnam War,¹⁴⁴ this indicates nearly two decades where foreign adversary systems and drones as explanations for UAP are all but ruled out. Considering that numerous reports indicate the US government historically found no evidence of UAP being foreign adversary systems, any revelation to the contrary would suggest an embarrassing lapse in national security and intelligence. Such an instance would undoubtedly require an overhaul in enhanced efforts to collect more robust data. This is perhaps best highlighted by the public revelation of the extent of the Chinese balloon program that had previously gone undetected, resulting in the shootdown of four objects over North American airspace in two weeks, a move many consider to be an overcorrection.¹⁴⁵

C. Other

In the event some UAP represent genuinely new empirical observations, the most baseline implication would be that we may require additional scientific knowledge or advancements to understand them.¹⁴⁶ This could be as small as encompassing new

¹⁴⁰ *Id.*

¹⁴¹ *Id.*

¹⁴² *Id.*

¹⁴³ *Id.*

¹⁴⁴ *A Brief History of Drones*, IMPERIAL WAR MUSEUMS, <https://www.iwm.org.uk/history/a-brief-history-of-drones> (last visited July 31, 2023).

¹⁴⁵ Brad Dress, *How China's Spy Balloon Spurred a Rapid Shift in US Sky Patrol*, THE HILL (Feb. 16, 2023), <https://thehill.com/policy/defense/3859855-how-chinas-spy-balloon-spurred-a-rapid-shift-in-us-sky-patrol/>.

¹⁴⁶ UAP Preliminary Assessment, *supra* note 6, at 6.

concepts in our explanation schemes or, at the extreme, result in us reworking our explanation schemes altogether. For example, Newton's 2nd Law rules out very rapid acceleration for bodies of appreciable mass.¹⁴⁷ Moreover, the AARO tracks for transmedium observations, or reported instances of bodies of mass transitioning between mediums (such as air & sea) with apparent no changes in velocity.¹⁴⁸ Considering the nature of some reports, such as the *Nimitz* case, it may be as difficult to conceive an appropriate explanation scheme for their events as it would have been for Newton to accept quantum mechanics in his time.¹⁴⁹ Since most UAP captured on multiple sensors represent physical objects, we need more data to determine *how* they accomplish remarkable feats such as those described in the highlighted cases.

Irrespective of origin, should some UAPs be determined to be physical craft, that would suggest they are probably very well-resourced with advanced energy technologies to accomplish their in-flight capabilities. The ramifications are astounding in terms of the possibility of sustained energy far beyond our current capability.¹⁵⁰ This understanding would have a far-reaching impact on our current economic and geopolitical structure.¹⁵¹ Determining the origin of UAP is a separate question entirely, but even if one case is determined to be non-human, it would undoubtedly be one of the most significant discoveries in recorded history, shaking the foundation of our current belief systems.¹⁵² These possibilities must be met with a high bar of evidence. The author does not wish to speculate further, other than that if this is even a remote possibility, it is worth serious scientific and academic inquiry considering millions of dollars are spent blasting radio waves into remote areas of space, which has produced no empirical evidence of intelligent life to date.¹⁵³

¹⁴⁷ HYNEK, *supra* note 5, at 38.

¹⁴⁸ DNI 2022 UAP Ann. Rep, *supra* note 2, at 3, 11.

¹⁴⁹ HYNEK, *supra* note 5, at 28-29.

¹⁵⁰ See Alexander Wendt & Raymond Duvall, *Sovereignty and the UFO*, 36 POL. THEORY 607, 616 (2008).

¹⁵¹ See *id.* at 619.

¹⁵² See *id.* at 626-29.

¹⁵³ Paul Sutter, *Why Are We Still Searching for Intelligent Alien Life?* SPACE.COM (Nov. 9, 2021) <https://www.space.com/why-humans-search-intelligent-alien-life-SETI>.

VIII. RECOMMENDATIONS: CLOSING THE DOMAIN AWARENESS GAP

Characterizing UAP requires a multidisciplinary approach, necessitating a national scientific working group to serve as a central source for gathering and disseminating reliable information, reports, and research in coordination with federal agencies. The purpose of this group would be to serve the following functions:

Streamline and consolidate data collection and processing by establishing an open-source data repository among several states or entities to collaborate on a major statistical study to search for clustering or trends. It may be necessary to use the United Nations in efforts to uniformly codify data for a broader international study.¹⁵⁴ Regardless, this will involve the development of consistent terminology and the systemization and organization of data. Determinations for UAP must be rigorously defined and stripped of unrelated aspects, and defense information should be redacted for any sensitive material without compromising the integrity of data points that are critical for characterization.¹⁵⁵

This hypothetical organization would include a research team with the capability to react quickly to new and significant reports.¹⁵⁶ To improve reports in newer cases, color wheels can be used to reference colors, or brightness can be translated to lumens by approximation to known sources.¹⁵⁷ Modernized artificial intelligence and machine learning algorithms can be used to sift through data and rule out conventional explanations with more efficiency as the pool of data increases. A massive statistical study could then use this data to determine any evidence of a new empirical observation by analyzing various sample sizes. On a smaller scale, this commission could provide a detailed analysis of roughly two to three quality cases per month and keep the public informed, through non-sensational channels, of what is known and what is not regarding high-profile reports.¹⁵⁸

Analogs for this type of activity do exist outside of the US. The French space agency Centre National d'Études Spatiales (CNES)

¹⁵⁴ See HYNEK, *supra* note 5, at 214.

¹⁵⁵ *Id.* at 242-43.

¹⁵⁶ *Id.* at 201-202.

¹⁵⁷ *Id.* at 77-78.

¹⁵⁸ HYNEK, *supra* note 5, at 197.

has operated variations of GEIPAN (translates to unidentified aerospace phenomenon research and information group), which has collected, analyzed, and archived reports from civilians and aviators since 1977.¹⁵⁹ The agency follows a strict methodology of collecting observer testimony, employing multiple disciplines to conduct follow-up investigations, and anonymizing the case file before informing the witness of its classification.¹⁶⁰ Cooperation between GEIPAN, branches of the military, local law enforcement, and the public allows the organization to characterize most of their reports with high confidence. As of February 2023, 32.7% of their 3,012 archived cases remain unidentified due to insufficient data, and another 3.3% (99 reports) remain unexplainable after months or years of detailed investigations.¹⁶¹

During the “wave” of UAPs that occurred in the skies above Belgium from 1989-1991, the Belgian Air Force received over 2,000 reports of similar objects from geographically independent observers near Brussels and the Ardennes forest region.¹⁶² The entire case is outlined by Major General Wilfried De Brouwer, retired Chief of Air Operations for the Belgian Air Force, in a 2010 novel by *New York Times* investigative journalist Leslie Kean.¹⁶³ To enhance transparency, the Belgian Air Force supported SOBEPS, a scientific research group investigating the case, by providing registered air traffic patterns over areas of observation and obliging requests for radar data.¹⁶⁴ Of the total reports, 650 were thoroughly investigated. Some 500 remain unexplainable.¹⁶⁵ While these analogs do not guarantee the characterization of genuine unknowns, the efforts are emblematic of the approach required to increase transparency and data sharing with the public.

NASA and the FAA are two civil government agencies poised to aid in such a proposed effort. NASA’s UAP Independent Study

¹⁵⁹ Centre National d’Etudes Spatiales (CNES), *GEIPAN - Groupe d’Études et d’Informations sur les Phénomènes Aérospatiaux Non Identifiés*, (June 8, 2015), <https://geipan.cnes.fr/en/geipan-0>.

¹⁶⁰ *Id.*

¹⁶¹ *Id.*

¹⁶² See LESLIE KEAN, *UFOs: GENERALS, PILOTS, AND GOVERNMENT OFFICIALS GO ON THE RECORD* 32-34 (2010).

¹⁶³ See *id.* at 17-40.

¹⁶⁴ *Id.* at 37.

¹⁶⁵ *Id.* at 34.

Team's final report found no evidence of extraterrestrial life as the cause of unexplained cases, but found the threat to US airspace safety "self-evident."¹⁶⁶ The agency recommended using earth-imaging assets and commercial remote sensing capabilities to aid in data collection, and promised deeper integration with the Aviation Safety Reporting System (ASRS) administered for the FAA.¹⁶⁷

The FAA is already tasked with regulating all aspects of civil aviation to ensure the safety and efficiency of the system.¹⁶⁸ The Office of Accident Investigation & Prevention is the investigative authority for all aircraft accidents and works to mitigate flight risks through data collection, information sharing, and risk analysis.¹⁶⁹ There is a clear overlap between the Office of Accident Investigation & Prevention's responsibilities and the in-flight safety risks posed by UAP.¹⁷⁰ Perhaps this office, or one similar, could serve as the non-sensational channel by which research, data, and reports regarding UAP in civil aviation can be disseminated to the public. The public already looks to other three letter agencies, such as the CDC and FDA, as trusted, non-partisan entities that inform the populace on known matters.

To facilitate this, minor amendments are required to the 2021 FAA Order JO 7110.65Z on Air Traffic Control. Section 8 on UFO Reports has two provisions that do not provide for any formalized reporting mechanism by requiring any reports to be directed to data collection centers outside of the FAA or with local law enforcement if there is concern over life or property endangerment.¹⁷¹ Any empirical data, such as radar returns, could be more easily shared with the public without fear of revealing classified capabilities (a significant impediment in military cases). New efforts to streamline government reporting of UAP have included encompassing FAA

¹⁶⁶ NASA UNIDENTIFIED ANOMALOUS PHENOMENA INDEPENDENT STUDY TEAM REPORT 4 (2023) [hereinafter UAPIST Report].

¹⁶⁷ *Id.*

¹⁶⁸ *About FAA*, FEDERAL AVIATION ADMINISTRATION (FAA), <https://www.faa.gov/about> (last visited July 31, 2023).

¹⁶⁹ Office of Accident Investigation & Prevention, *Office of Accident Investigation & Prevention*, FAA, [https://www.faa.gov/about/office_org/headquarters_offices/avs/offices/avp#:~:text=The%20Office%20of%20Accident%20Investigation,Transportation%20Safety%20Board%20\(%20NTSB%20\)](https://www.faa.gov/about/office_org/headquarters_offices/avs/offices/avp#:~:text=The%20Office%20of%20Accident%20Investigation,Transportation%20Safety%20Board%20(%20NTSB%20)) (last visited July 31, 2023).

¹⁷⁰ *See* UAP Preliminary Assessment, *supra* note 6, at 3, 6.

¹⁷¹ FAA Order JO 7110.65, ch. 9, § 8, https://www.faa.gov/air_traffic/publications/atpubs/atc_html/chap9_section_8.html (last visited July 31, 2023).

reports, but the existing legislation lacks clarity on how those internal reports are provided if they are already directed to outside entities. Allowing these reports to be collected in-house can ensure proper follow-up is taken by FAA authorities responsible for civilian safety in our skies. As more becomes known about the nature of UAP, investigative responsibility can be delegated as needed to the appropriate federal agency.

IX. CONCLUSION

The cases primarily explored were highlighted because they meet two essential criteria: 1) the reports describe events that defy prosaic explanations and perhaps warrant further academic and scientific study to understand them regardless of their origin. 2) Due to the credibility of the observers and the reliability of systems that corroborated their accounts, the probability that these events occurred as described is high. After a thorough review of the reports and data, the author submits that there are three possible conclusions:

- (1) All UAPs are explainable as known objects or natural phenomena, therefore further study is not warranted.
- (2) UAP reports do not contain enough data upon which to base a final conclusion, therefore further study is warranted in pursuit of obtaining better data to determine if they are undisclosed developmental programs (foreign or domestic) or new observations (in nature or otherwise).
- (3) UAP reports constitute empirically new observations that may require new explanation schemes or scientific knowledge to explain them, therefore further study is warranted.

Despite the small percentage of anomalous cases, the author argues that the patterns of high strangeness frequently reported by credible individuals suggest that all UAP are not explainable as known objects or natural phenomena. It is unlikely that all can be dismissed as foreign adversary systems or USG developmental programs given the repeated patterns for 75 years and a lack of translation of those capabilities into emergent technologies over the given timeframe. Nonetheless, there is no evidence that these UAPs

are extraterrestrial in origin.¹⁷² However, *more data is desperately needed before any final determinations on the cause of unexplained reports can be made.* As explored in this article, numerous studies attempted by various organizations worldwide continue to have sizable portions of cases that are still unidentified. The question remains: if all reported UAPs have conventional explanations, how do they continue to resist characterization after such detailed attempts at investigation? These genuine unknowns continue to challenge the US from national security, aviation safety, and scientific perspectives.

Given that many of these reports occur in areas of security interest to the US, the taxpayer—who funds the nation’s defense—deserves to be adequately informed of the knowns and unknowns. After four objects were shot down over US airspace in quick succession, the public has a right to demand identification and evidence of the origin of each incident. Getting an acceptable answer will require the assembly of a multidisciplinary scientific working group in cooperation with associated government agencies that can centralize reporting and data collection to assess the presence of new empirical observations and transparently inform the public of what those may indicate.

¹⁷² UAPIST Report, *supra* note 166, at 24.