

**The Ultraterrestrial Hypothesis: A Case for Scientific Openness to an “Interdimensional”
Explanation for Unidentified Anomalous Phenomena**

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ABSTRACT: Recent years have seen increasing public attention regarding unidentified anomalous phenomena (UAP). Hypotheses for such phenomena tend to fall into two classes: a conventional terrestrial explanation (e.g., human-made drones), or an extraterrestrial explanation (i.e., advanced civilizations from elsewhere in the cosmos). However, there is also a third minority class of hypothesis: an *unconventional* terrestrial explanation, outside the prevailing consensus view of life and the universe. This is the “ultraterrestrial” hypothesis, which includes – but is not limited to – the “interdimensional” hypothesis, namely the highly speculative notion that UAP may reflect activities of beings from other dimensions that coexist alongside our own. Such hypotheses may rightly be regarded with scepticism by most scientists. However, this paper suggests they nevertheless should not be ruled out, and deserve serious consideration in a spirit of epistemic humility and openness.

Key words: philosophy; science; extraterrestrial; ultraterrestrial; non-human intelligence

An Empirical Mystery

This article begins with an empirical mystery. For decades, and indeed centuries, people worldwide have reported seeing phenomena in the sky that appeared “anomalous” in some way. Essentially, these did not seem to conform with the “expected behaviour” of celestial objects or processes people were familiar with, whether naturally occurring (e.g., planets) or human-made (e.g., airplanes), and appeared to defy – to the observer at least – conventional scientific knowledge. These have attracted the label “unidentified flying object” (UFO) and more recently “unidentified aerial phenomena” (UAP), with the latter expanding even further in scope over the past few years to denote unidentified *anomalous* phenomena (reflecting a realization that some UAP appear to have “transmedium” capabilities, including traveling underwater, and are not only aerial). However, just what constitutes “conventional” scientific opinion begs the questions central to this paper: what makes knowledge conventional, how accurate is it, and what kinds of findings might encourage its revision. These questions shall be explored below, but for now, let us grant that – at least until recently – the conventional scientific consensus held that humans are alone in the universe, the Earth a solitary

outpost of sentience, indeed of life in general. With this view, there are only two recognized classes of celestial phenomena: naturally occurring material bodies (e.g., planets) or processes (e.g., atmospheric occasions); or human inventions (e.g., airplanes) and productions (e.g., gas emissions). In that context, “unidentified” indicates a phenomenon cannot be conclusively situated within either category. A key consideration in that respect is the implicit question, “by whom?” The article delves into this issue below, but for now let us differentiate “authorities” (including scientific, military, and political personnel) and the “public” (i.e., everyone else). The former are usually granted more credibility, not least since their bar for ascertaining phenomena as unidentified is far higher (given their privileged access to relevant information, technology, and learning) than the public.

Until recently, most UAP reports hailed from the public. Indeed, there are vast quantities, with the Mutual UFO Network reportedly receiving over 200,000 since its founding in 1969 (Mellon, 2022). However, on the whole, these have not been taken seriously by the academic community, with some exceptions (Anton, 2020). The question of whether *other* authorities have taken them seriously is a matter of dispute, with allegations of secretive government and military programs investigating the phenomenon (discussed further below). At the very least, authorities have generally maintained a lack of interest *publicly*. In that respect, reports of UAPs by the public have tended to be dismissed, usually attributed to perceptual or cognitive error. In some cases, this means doubting the phenomenon a person ostensibly witnessed occurred at all, with explanations including hallucination, delusion, and fraud (Mohr & Pfeifer, 2009). In other cases, the visual experience per se may be granted, but the interpretation is chalked up as errant, a misperception or misunderstanding; the phenomenon may be unidentified for that *observer*, but would not be for others with the requisite technology or knowledge, who could “debunk” their assessment as merely a prosaic airborne event, like a weather balloon (Jacobs, 1998). However, more recently – over the past two decades especially – reports have begun accumulating that resist such debunking. Crucially, many are not from the public but the authorities themselves, which makes the reports more credible for many reasons. For a start, they involve observers who have excelled in occupations that require the highest skill and training in visual perception and processing – such as fighter pilots – meaning they are regarded as higher quality witnesses than the average observer. Moreover, their testimony is often triangulated with other evidence, including relatively high quality photographs or video, and other information sources (e.g., radar).

As a result of these accumulating observations, in 2020 the US military established a UAP Task Force, charged with investigating these occurrences, which has subsequently produced various reports and analyses¹. However, I should emphasise that the news around this topic is developing fast, and this article – which went to press in early August 2023 – is likely to be swiftly overtaken by forthcoming events and assessments. For example, in June 2023, public whistleblowing allegations were made by David Grusch, a veteran of the intelligence community, that the US actually has non-human UAP craft and entities in its possession². While the veracity of these claims is not publicly

known at present, they seem to have at least been received as credible, and moreover have apparently been corroborated by others³. Additionally, they have apparently prompted various significant developments, including new legislation, most strikingly bipartisan proposals in July from Chuck Schumer, Majority Leader of the United States Senate, for an “Unidentified Anomalous Phenomena Disclosure Act” (U.S.C., S. 2226, 2023)⁴. As reported in the *New York Times*, this is intended to create “a commission with broad authority to declassify government documents about U.F.O.s and extraterrestrial matters, in an attempt to force the government to share all that it knows about unidentified phenomena” (Barnes, 2023, paragraph 1). As Schumer wrote, “The American public has a right to learn about technologies of unknown origins, non-human intelligence, and unexplainable phenomena” (Bolton, 2023, paragraph 3). Moreover, the act gives authorities a 300 day deadline to “organize their records... and provide them to the review board.” Other consequential developments include Congressional hearings, including one by the House Oversight Committee on July 26 – which committee member Rep. Tim Burchett announced on Twitter accompanied by the statement “We're done with the cover-ups” (<https://twitter.com/RepTimBurchett/status/1680992520895905792>) – at which Grusch and two Navy pilots testified under oath, making numerous extraordinary allegations that the committee members seem determined to investigate and act upon⁵. As such, there are likely to be significant new developments on this topic going forward, and readers are encouraged to follow the latest updates from key figures⁶.

In terms of current information though, the most recent data release (at the time of writing) from the UAP Task Force came in May 2023, when NASA convened a televised panel to discuss the efforts of their own UAP task force, formed in October 2022. Presenting at the event was Dr Sean Kirkpatrick – see <https://science.nasa.gov/uap>: Sean Kirkpatrick May 31 Presentation – director of the All-domain Anomaly Resolution Office (AARO). Launched in November 2021 by the Defense Department as successor to the original military Task Force – initially as the Airborne Object Identification and Management Group, and renamed in July 2022 – AARO has a remit “to, among other things, identify unidentified anomalous phenomena that might pose a threat to national security and the operations of the military and federal agencies” (Vergun, 2023, paragraph 1). Answering questions, he revealed the current number of anomalous sightings of which AARO was aware was around 800, though he speculated the majority most likely *did* have conventional explanations, and currently remained unidentified only through lack of good data that would allow conclusive identification. However, around two to five percent of the 800 – perhaps between 15 and 40 occurrences – were genuinely “possibly really anomalous” (cited in von Rennenkampff, 2023b, online article, paragraphs 6–8). Intriguingly, most involved small spherical “orbs” – often between three and thirteen feet – usually described as either, white, silver, metallic, or “translucent” (Kirkpatrick presentation, slides 2-3: <https://science.nasa.gov/uap> link), with the latter frequently featuring a dark “cube” inside (cited in von Rennenkampff, 2023b, online article, paragraphs 6–8)⁷. Despite lacking wings, apparent forms of propulsion, or any “thermal exhaust,” these strange orbs are seemingly

capable of unusual manoeuvres and flying at velocities up to twice the speed of sound. Moreover, investigative journalist Ross Coulthart (2023) – who is intimately connected to the UAP topic, and has conducted numerous interviews with key players, as cited below – suggested these are frequently reported as being apparently under “intelligent control,” including “intelligently moving around aircraft.”

Essentially, for the authorities – with all their knowledge, data, and technology – such phenomena are not only currently unidentified, but also seem genuinely anomalous (as opposed to simply lacking the data to permit conclusive identification as conventional). These phenomena therefore constitute a real empirical mystery, one which science is surely obligated to investigate, as indeed is already happening. In that regard, scholars are also beginning to formulate hypotheses about what UAP may represent. There are two main classes of explanation: a conventional terrestrial origin (e.g., human-made drones), and more radically, an unconventional extraterrestrial origin (i.e., advanced civilizations from elsewhere in the cosmos). Indeed, the latter interpretation was discussed in two recently published papers by the author (Lomas, 2022; Lomas & Case, 2023), which provided the genesis for the present article⁸. However, I had become increasingly aware that many scientists closest to the topic – including people on the UAP Task Force⁹ – were not *only* considering an extra-terrestrial explanation, but had become compelled to contemplate an even more radical third class of explanation: an *unconventional terrestrial* origin, one outside the prevailing consensus view of the universe.

This is the “ultraterrestrial” hypothesis, a broad category of conjecture that includes the “interdimensional” hypothesis (Imbrogno, 2013), namely the highly speculative notion that UAP may involve activities of beings from other dimensions that coexist alongside our own. Hence *ultra*-terrestrial: such beings may already be present in the Earth’s environment in some sense, just not in ways we can conventionally understand. One should note that these two hypotheses are not identical, but rather constitute an overlapping Venn diagram. On one hand, an entity could be interdimensional without being ultraterrestrial, instead perhaps “materialising” from this other dimension somewhere in the universe other than Earth. Conversely, an entity could be ultraterrestrial without being interdimensional. To that point, other ultraterrestrial hypotheses have been proposed, as per a recent taxonomy proffered by Puthoff (2022), including “extradimensional [i.e., interdimensional], crypto-terrestrial, demonic/djinn, proto/ancient human, [and] time-travelers” (p. 20001). He defines these broadly as “sequestered terrestrial cultures... existing alongside us in distinct stealth.” For instance, “crypto-terrestrials” implies that, rather than hailing from other “dimensions,” the entities responsible for UAP activity instead reside on Earth in a relatively more conventional sense (i.e., within standard spacetime dimensions) but are nevertheless “hidden” in some way (e.g., living underground).

I recognize of course that many scientists would simply dismiss the notion of an interdimensional hypothesis – and likewise ultraterrestrial hypotheses more broadly – out of hand. Indeed, many of the UAP experts who began broaching these possibilities *themselves* seemed highly

sceptical and wary of even considering these, being aware how far outside the boundaries of conventional scientific understanding and discourse such ideas are. However, they have become compelled by the sheer peculiarities of the empirical data – by what has been called the “high strangeness” of many UAP occurrences – to put these kinds of hypotheses on the table (Vallée & Davis, 2004). Consider Garry Nolan, an immunologist with an endowed chair at Stanford, who has for the past decade been involved in UAP research, including analysing anomalous materials potentially linked to recovered UAP (Nolan et al., 2022). In a recent interview (7Spotlight, 2022) with Nolan, Ross Coulthart asked, “You believe, on the evidence, that there is a non-human intelligence, of advanced technology, on this planet?” Nolan replied:

Advanced capabilities. No, I don’t know whether it’s a technology per se, because I’m leaving open the idea that it’s some form of consciousness that is non-material. And I know, say to my colleagues out there, this sounds absolutely crazy. But if you’ve seen the things that I’ve seen, you would only be able to come to a similar conclusion.

In this same spirit, this article argues for tentatively keeping at least an open mind to possibilities that may be “interdimensional,” no matter how unlikely they may appear. There was no way of seriously entertaining this hypothesis in the aforementioned published papers, other than briefly introducing it. Such is its nature, an entire paper is needed to even consider it, and even then it is impossible to do justice to the relevant perspectives and issues within standard word limits (despite being generously allowed to exceed these). Nevertheless, it is important to make the attempt. As such, this article makes the case for scientific openness to this hypothesis over seven sections. Following the present introductory ground-setting, it proceeds by considering the current state of publicly available UAP assessment, knowledge, and hypothesising. From there I turn to the ultraterrestrial hypothesis, and suggest openness to this is warranted based on the sheer strangeness of (a) UAP activity, (b) the universe, and (c) consciousness. The article concludes with a general plea for epistemic humility and openness.

UAP Assessment

Over recent decades, numerous UAP events have received intense scrutiny¹⁰. Arguably the most intriguing and well-studied recent occurrence is a series of encounters in November 2004 involving the US Navy’s Carrier Strike Group Eleven, particularly the USS Nimitz nuclear aircraft carrier, which have been subjected to detailed analysis (see Powell et al., 2019, and Knuth et al., 2019).¹¹ Essentially, situated off the Californian Coast, over a two-week period the group encountered as many as 100 UAPs. This culminated in a dramatic sequence of interactions on November 14th 2004, which began when two F/A-18F Super Hornets on a training exercise engaged at close quarters a white airborne UAP, shaped like a cylindrical butane tank – or a “Tic-Tac” – moving erratically back and forth, involving instantaneous changes in direction without changing speed, despite lacking apparent flight surfaces or means of propulsion, which eventually suddenly accelerated as if “shot out of a rifle” and was out of sight in a split second. Subsequently, F/A-18Fs with infrared recording

technologies went to investigate, and managed to film a UAP (albeit from a considerable distance), a segment of which was released to the public in 2017. Analysing the available data, Knuth et al. suggest “the extreme estimated flight characteristics” of the objects mean there are two main explanations: either the observations are “fabricated or seriously in error,” or alternatively, “these craft exhibit technology far more advanced than any known craft on Earth” (p.1). Some committed sceptics – convinced *a priori* there must be conventional explanations – have been determined to prove the first option. However, such explanations require one to entirely discount the eye-witness testimony of the experienced aviators, all of whom report observing something highly anomalous. As pilot Chad Underwood, who took the infrared video, said, “It was just behaving in ways that aren’t physically normal. That’s what caught my eye. Because, aircraft, whether they’re manned or unmanned, still have to obey the laws of physics. They have to have some source of lift, some source of propulsion. The Tic Tac was not doing that. It was going from like 50,000 feet to, you know, a hundred feet in like seconds, which is not possible” (cited in Mellon, 2022, online article, paragraph 21). In part due to such testimony, Knuth et al. concluded “the number and quality of witnesses, the variety of roles they played in the encounters, and the equipment used to track and record the craft favor the latter hypothesis that these are technologically advanced craft.”

Due to such incidents, the UAP question has commanded increasing attention from authorities in the past few years, certainly publicly at least. Private interest may be another matter: over the past 75 years have been reports of various secretive programs run by the US government (among others) to investigate UAP (Dolan, 2002)¹². However, still very little has been publicly released or known about them, and the official government position was generally one of denial. This situation began to change, though, in December 2017 when the Nimitz video was obtained and published online, along with US military footage of two similar incidents, which began to bring the topic to wider attention, especially following an article in the *New York Times* entitled, “Glowing Auras and ‘Black Money’: The Pentagon’s Mysterious U.F.O. Program” (Cooper et al., 2017). At that point, the government was still not commenting publicly on the issue, but in April 2020 the Department of Defense confirmed the footage was genuine, prompting a *New York Times* article in July 2020: “No Longer in Shadows, Pentagon’s U.F.O. Unit Will Make Some Findings Public” (Blumenthal & Kean, 2020). The next month the US announced it was establishing its UAP Task Force, charged with investigating these incidents. As noted above, at its most recent public update in May 2023, Dr Kirkpatrick stated the number of sightings was now around 800, and while most probably did have conventional explanations, around two to five percent were genuinely “possibly really anomalous.”

Indeed, while much of the work of the Task Force and now AARO is still classified, comments from key figures indicate the possibility of some UAP being truly extraordinary (e.g., extraterrestrial) is being taken seriously. Barack Obama, for example, said, “There’s footage and records of objects in the skies that we don’t know exactly what they are. We can’t explain how they moved, their trajectory. They did not have an easily explainable pattern” (cited in von Rennenkampff,

2021a, online article, paragraph 7)¹³. Indeed, despite the efforts over the past few years to investigate such phenomena – such as through the UAP Task Force – some are still perplexing authorities. Speaking about the issue in early August 2023, for instance, General Mark Milley, Chairman of the Joint Chiefs of Staff – the US’s highest-ranking military officer, and the principal military advisor to the President – said that the military “can explain a lot of it [i.e., UAP], but there is some that’s really kind of weird and unexplainable” (Wolfgang, 2023, paragraph 9). Moreover, the authorities clearly regard such phenomena as a potential source of concern and even threat. John Ratcliffe, former Director of National Intelligence, said “we are talking about objects that have been seen by Navy or Air Force pilots, or have been picked up by satellite imagery, that frankly engage in actions that are difficult to explain, movements that are hard to replicate, that we don’t have the technology for” (cited in Lewis-Kraus, 2021, online article, paragraph 11). He also warned “frankly... we are not capable of defending against” these technologies. Regarding the latter point, it is worth emphasizing the intention behind the creation of AARO in November 2021 – within the new National Defense Authorization Act as successor to the original Task Force – namely to “synchronize efforts across the Department and the broader U.S. government to detect, identify and attribute objects of interests in Special Use Airspace (SUA), and to assess and mitigate any associated threats to safety of flight and national security” (Department of Defense, 2021, paragraph 1). The importance of this task was illustrated in a hearing in Congress on May 17th 2022, which Representative André Carson opened and contextualized by stating (cited in McMillan, 2022, online article, paragraph 7):

This hearing and oversight work has a simple idea at its core. Unidentified aerial phenomena are a potential national security threat, and they need to be treated that way. For too long the stigma associated with UAPs has gotten in the way of good intelligence analysis. Pilots avoided reporting or laughed at when they did. DOD officials relegated the issue to the back room or swept it under the rug entirely fearful of a skeptical national security community. Today, we know better UAPs are unexplained. It’s true, but they are real. They need to be investigated and many threats they pose need to be mitigated.

Later fielding questions, Scott W Bray (Deputy Director of US Naval Intelligence) added, “I would simply say that there are a number of other events in which we do not have an explanation in which there are a small handful in which there are flight characteristics or signature management that we can’t explain with the data that we have.” So, the vital question then is, what *are* these UAP? In the senate hearing, Bray would not speculate, but noted they are “open to all hypotheses” and that “we’ll go wherever the data takes us.” This is the spirit of scientific enquiry. As discussed below, the history of science is characterized by discoveries of phenomena that cannot be accommodated within the conventional scientific paradigm. At that point, there are two main options: to dismiss the data (e.g., as errant), or to consider explanations outside this paradigm (and hence to update or even overturn it).

With UAP, the general paradigmatic assumption until recently has been that humans are alone in the cosmos; or, at least, even if extraterrestrial life per se is granted as a statistical probability, the chance of such entities actually reaching Earth is considered exceedingly unlikely. From that perspective, the baseline presumption would be that UAP involve either natural phenomena or human-made inventions. However, such are the data that authorities are essentially being compelled to consider other possibilities, namely that some UAP may represent the activity of intelligent life besides humans. Former CIA director John Brennan, for example, called it “presumptuous and arrogant for us to believe that there’s no other form of life anywhere in the entire universe,” adding cryptically, “I think some of the phenomena we’re going to be seeing continues to be unexplained and might, in fact, be some type of phenomenon that is the result of something that we don’t yet understand and that could involve some type of activity that some might say constitutes a different form of life” (cited in von Rennenkampff, 2021b, online article, paragraph 5).

These remarks are profound, and indicate at least an openness to two striking possibilities. The first is that UAP represent activities of extraterrestrial beings (i.e., lifeforms from elsewhere in the universe). The second is the even more radical notion that they may represent *ultraterrestrial* beings (i.e., lifeforms already present in our Earth environment in some form). Before focusing on the latter, we should acknowledge that an extraterrestrial hypothesis is certainly plausible¹⁴. However, intriguingly, authorities also appear open – perhaps even increasingly so – to an ultraterrestrial hypothesis. It is notable, for example, that the new UAP Disclosure Act (U.S.C., S. 2226, 2023) does not include “extraterrestrial,” but rather repeatedly (22 times) refers ambiguously to “non-human intelligence” which it defines as “any sentient intelligent non-human lifeform regardless of nature or ultimate origin that may be presumed responsible for unidentified anomalous phenomena or of which the Federal Government has become aware” (p.6). Indeed, multiple hypotheses could be correct: the phenomenon may be multifaceted, involving numerous extraterrestrial and/or ultraterrestrial entities¹⁵. Thus, establishing the ultraterrestrial hypothesis as valid would not necessarily negate an extraterrestrial explanation, and vice versa. With that in mind, I turn to the hypothesis at the heart of this article.

Ultraterrestrial Hypotheses

To repeat, in the theorizing surrounding UAP, while most thinking involves two main classes of explanation – a conventional terrestrial origin, or an unconventional extraterrestrial one – there is also a third class: an *unconventional terrestrial* origin. This is sometimes called the ultraterrestrial hypothesis, an overarching category which includes the interdimensional hypothesis (Imbrogno, 2013), our focus here. This hypothesis is the highly speculative notion that UAP may reflect activities of beings from dimensions that coexist alongside the four dimensions of spacetime we humans usually perceive (i.e., three physical dimensions plus time). Hence *ultra*-terrestrial: such beings are already present in Earth’s environment in some sense, just not in ways we can conventionally understand. Before looking into the interdimensional hypothesis, I should reiterate that this is not the

only ultraterrestrial hypothesis, with Puthoff (2022) elucidating other possibilities, including “extradimensional [i.e., interdimensional], crypto-terrestrial, demonic/djinn, proto/ancient human, [and] time-travelers” (p. 20001). While such hypotheses may sound very far-fetched, in the spirit of this article I would concur with Puthoff that they should not be *a priori* dismissed as impossible; indeed, some observers closely connected to the UAP topic are also beginning to genuinely entertain these¹⁶.

In terms of the interdimensional hypothesis specifically, among its earliest modern proponents was ufologist Meade Layne (1950), who argued that UAPs were piloted by beings from a parallel dimension he called Etheria, whose “ether ships” were usually invisible but could be seen when their atomic motion became slow enough (Reece, 2007). The notion was then developed by Jacque Vallée and John Keel, the latter coining “ultraterrestrials” in 1970 to denote such beings, describing them as entities who are potentially “composed of energy, inhabiting a spectrum (wavelength) of energy which we can neither observe or even presently detect” (1976, p.6). Or, as Vallée (2008) put it, “I believe the UFO phenomenon *represents evidence for other dimensions beyond spacetime*; the UFOs may not come from ordinary space, but from a multiverse which is all around us, and of which we have stubbornly refused to consider the disturbing reality in spite of the evidence available to us for centuries” (p. 325, italics in original). Vallée also saw this notion as being a conceptual continuum between modern UAP sightings and experiences in past generations interpreted as spiritual beings (e.g., angels) (Lomas & Case, 2022). For instance, he discusses the famous sightings in Fatima, Portugal in 1917, the final one of which was witnessed by up to 70,000 people. While interpreted by many as a religious vocation, it was described in terms that recall modern UAP accounts (e.g., reports of a “weird disk that turns rapidly on its own axis and casts of beams of colored lights in all directions”) (Vallée, 2008, p. 252).

I acknowledge that the notion of ultraterrestrial/interdimensional beings is very far-fetched to modern science. However, I would nevertheless argue that this hypothesis should not yet be definitively ruled out. Indeed, many UAP analysts allude to such possibilities, even if they do not use “ultraterrestrial” per se, as reflected in Garry Nolan’s quote above. This openness was articulated by Senator Harry Reid – a driving force behind efforts towards greater attention and openness to UAP among US authorities – in a foreword to a book by Lacatski et al. (2021) recounting a recent program to investigate UAP funded by the Defense Intelligence Agency (discussed below):

The UAP taskforce report proves what I have been saying all along: this is a matter of science, national security, and technological advancement. From whatever hypothesis you begin with – UAPs being technological leaps from foreign adversaries, natural occurrences distorting visual perception, *visitations from other dimensions*, or technology from otherworldly sources – the key point is we need to engage the best minds in science to explore the data we know exists. (p. 184, italics mine)

As the portion in italics shows, the idea of interdimensional ultraterrestrials is a genuine hypothesis that deserves – indeed *is* receiving, at least in some quarters – real consideration. Take for example reactions to whistleblower David Grusch’s explosive allegations – introduced above – that US authorities actually have some UAP craft and non-human entities in their possession as part of a “crash retrieval” program (Kean & Blumenthal, 2023). As noted above, although there is no way of knowing the validity of these allegations at the time of writing, they seemed to have spurred various consequential developments, including legislative proposals seemingly designed to address Grusch’s concerns. Of particular interest here are speculations regarding the possible nature of any such craft, with Grusch claiming these are “of exotic origin (non-human intelligence, whether extraterrestrial *or* unknown origin)” (Kean & Blumenthal, 2023, paragraph 6, my italics). Elaborating on this point, interviewed by Ross Coulthart (aired on News Nation on June 11), when asked if the US government had been “concealing the existence on this planet of alien life,” Grusch pointedly clarified (in a way reminiscent of Garry Nolan’s response to a similar question from Coulthart above):

I would couch it as “non-human intelligence”... [because] I don’t necessarily want to denote origin. I don’t think we have all the data to say, “Oh, they’re coming from a certain location,” and I couch it as someone who’s studied physics, that maybe they’re coming from another *physical* dimension, as described in quantum mechanics ... There is a possibility that... this is not necessarily extraterrestrial, and it's coming from a higher dimensional physical space, that might be co-located right here. We know there’s extra dimensions due to high energy particle collisions etcetera, and there’s a theoretical framework to explain that.

Indeed, one of the legislative endeavours alluded to above are amendments to the forthcoming Intelligence Authorization Act (U.S.C., S.2103, 2023), which requires anyone with knowledge of crash retrieval programs to make available to AARO for “assessment, analysis, and inspection,” within 180 days, “a comprehensive list of all non-earth origin *or* exotic unidentified anomalous phenomena material” (p.216, my italics). So, even if Grusch’s allegations ultimately prove unfounded, nevertheless it is notable that extraterrestrial (“non-earth origin”) explanations are not the only hypotheses being touted within the intelligence community for potentially “exotic” crafts (hence the “or”), and that another possibility is an interdimensional explanation. Openness among authorities to this seems related to one of four main interlinked reasons. The first three concern the sheer strangeness of the (a) phenomena observed, (b) universe, and (c) consciousness. The final one involves a more general awareness – unconnected to UAP per se – about the limits of human perception and the need for epistemic humility in science. The remainder of the article addresses these in turn.

The Strangeness of the Phenomena

Consideration of the ultraterrestrial/interdimensional hypothesis begins with the sheer “high strangeness” of UAP activity itself (Vallée & Davis, 2004), which can be so anomalous that it sometimes attracts the label “paranormal” (i.e., outside or beyond what is usually considered normal).

The starting point for turning to labels like “high strangeness” and “paranormal” is people essentially struggling to make sense of the phenomenon within conventional frames of reference¹⁷. Recall the quote above from pilot Underwood, who said of the Tic-Tac: “It was just behaving in ways that aren’t physically normal. That’s what caught my eye. Because, aircraft, whether they’re manned or unmanned, still have to obey the laws of physics” (cited in Mellon, 2022, paragraph 21). In that respect, people are beginning to question whether UAP are *physical* craft at all, as we would understand these terms. With the extraterrestrial hypothesis, people’s thinking often remains tethered to conventional understanding of physics and technology (i.e., physical objects moving through spacetime), except one imagines these civilizations as exponentially farther advanced. So, a person might picture our most cutting-edge propulsion technology, and conceive of it just going far quicker. However, one finds scientists wondering whether that frame is adequate, even if they recognize that abandoning it might sound outlandish. This speculation is reflected in the quote above from Garry Nolan, who said he was “leaving open the idea that it’s some form of consciousness that is non-material” even though he knows it “sounds absolutely crazy.”

This kind of suggestion – invoking ideas like non-material forms of consciousness – is not uncommon among UAP researchers. At this point, discussions of UAP intersect with considerations of other phenomena that might broadly be classified as paranormal. That is, one encounters a blurry line between “classical” UAP reports (e.g., objects in the sky) and other anomalous phenomena that are less easily categorized. Indeed, this consideration was cited by Keel (1970) as the reason he “abandoned the extraterrestrial hypothesis in 1967 when my own field investigations disclosed an astonishing overlap between psychic phenomena and UFOs ... The objects and apparitions do not necessarily originate on another planet and may not even exist as permanent constructions of matter” (p.272). The question of paranormal phenomena is a vast and complex topic in its own right. As such, this article limits its discussion of such phenomena in relation to UAP specifically. In that respect, though, there has been considerable attention paid to this intersection dating back to at least the 1980s, some even involving government funded projects, where research on paranormal activities overlaps with that focusing more narrowly on flight behaviours of UAP. A pioneer in exploring this intersection is John B. Alexander, Ph.D., a (now retired) Colonel in the US military with “above top secret” clearance – i.e., Sensitive Compartmented Information (SCI) access – who since the 1980s has investigated UAP in a defense context. Across decades of research, although he did not find any traces of secretive government “black programs” or coverups on this topic – which contradicts Grusch’s allegations – he did accumulate voluminous evidence attesting to the reality of such phenomena, as summarized in his 2012 book *UFOs: Myths, Conspiracies and Realities*. Even more relevantly, he resisted the notion these were necessarily, or only, extraterrestrial in nature, and instead engaged in ideas that align with the interdimensional hypothesis. As his book concludes, “In the end it is clear the universe is far more complex than we ever imagined. We are not close to solving the

enigmas posed by UFOs, rather we are still on the front end of defining the fundamental issues and boundaries” (p.273).

A more recent example of openness to the intersection of UAP and paranormal phenomena – from both a scientific and military perspective – is the Advanced Aerospace Weapons System Applications Program (AAWSAP). Funded with \$22 million from the Defense Intelligence Agency (DIA), this ran from 2008-2010 and involved a company formed by businessman Robert Bigelow (Bigelow Advanced Aerospace Space Studies), run by James Lacatski (a DIA intelligence officer). The program was based at a 500-acre property in Utah owned at that point by Bigelow called “Skinwalker Ranch” – a name derived from a Navajo legend concerning vengeful shamans – with a long history of apparent paranormal activity. Hence, the title of the aforementioned book by Lacatski et al. (2021) detailing the program, entitled “Skinwalkers at the Pentagon.” While the UAP Task Force, and now AARO, have focused more narrowly on UAP flight behaviour, AAWSAP was intended to have “as broad a scope as possible” (Lacatski et al., ebook location 239). In addition to “scrutinizing the core UAP technology itself” (e.g., apparent crafts and their activity), equal weight was placed on researching “paranormal phenomena that co-locate with UAPs and to examine psychic effects in UAP witnesses.” Hence the significance of Skinwalker Ranch, upon which various “extraordinary phenomena have been witnessed by scores of independent visitors to the ranch almost continuously between 1994 and 2021,” including “flying orbs of varying colours, otherworldly creatures, discarnate voices, poltergeist, electromagnetic anomalies, and orange “portals”” (ebook location 298). For instance, Lacatski himself experienced an unusual phenomenon there: “Abruptly, Lacatski was transfixed by something... an unearthly technological device had suddenly and silently appeared out of nowhere in the adjacent kitchen. It looked to be a complex semi-opaque, yellowish, tubular structure. Lacatski said nothing, but stared at the object. He looked away, looked back, and there it still was. It remained visible to Lacatski for no more than 30 seconds before vanishing on the spot” (ebook location 828). The book contains many such examples that might be called paranormal. The essential point here though is not the paranormal activity per se, but that this is intertwined with phenomena classed as UAPs. There are numerous accounts of orbs¹⁸ for example, which is especially significant given the statement by Dr Kirkpatrick that the majority of “possibly really anomalous” reports studied by AARO involve such phenomena.

Essentially, AAWSAP identified an intimate connection between UAP and so-called paranormal activity. As Lacatski puts it, “People say, ‘Well, we’re only going to look at the nuts-and-bolts machines.’ Well, you better come up with a lot of physics. It’s far more advanced than we’re capable of now. And then there’s others who say, ‘Well, they’re nothing more than ghosts. Part of the paranormal world.’ No, they’re a hybrid of both” (cited in Tritten, 2022, online article, paragraph 6). Similarly, UAP scholar Jeffrey Kripal said,

The difficult truth is that the UFO phenomenon has both an objective ‘hard’ aspect (think fighter jet videos, photographs, alleged metamaterials, apparent advanced propulsion

methods, and landing marks) and a subjective ‘human’ aspect (think close encounters, multiple and coordinated visual sightings, altered states of consciousness, visionary displays, often of a most baroque or sci-fi sort, and experienced traumatic or transcendent abductions). And both sides – both the material and the mental dimensions – are incredibly important to get a sense of the full picture,” cited in Lacatski et al., who further note that “AAWSAP was determined to capture both” (ebook location 2442).

In that respect, AAWSAP followed a “six layer model” developed by Vallée and Davis (2004) that “encapsulates all of the potential characteristics of UAP events that can be studied”: (a) The Physical Layer: those physical characteristics associated with a UAP event; (b) The Anti-Physical Layer: the patterns that conflict with those predicted in modern physics; (c) The Psychological Layer: the psychological impacts to the witness(es) and the social conditions that surround them; (d) The Physiological Layer: the effects perceived by humans; (e) The Psychic Layer: the effects commonly found in the parapsychology literature; and (f) The Cultural Layer: the primary and secondary effects upon society. The more conventional scientific approach to UAP – as seen with the UAP Task Force and associated analyses – is to focus on “a” above, and sometimes also “b.” However, the key message from endeavours like AAWSAP is that the other four layers are also integral to the phenomenon, and that ignoring/downplaying these would hinder our understanding of it. These layers are part of the case for openness to the ultraterrestrial hypothesis. Significantly though, so is layer (b), the “anti-physical layer.” That is, the strangeness of the phenomena leads some observers to conclude the behaviour of UAP somehow contravenes the “laws of nature,” as per the quote above by pilot Underwood. That, however, of course begs the questions of what these laws actually are, and how complete our knowledge is of them. In that regard, it is possible that an ultraterrestrial/interdimensional hypothesis may not in fact run counter to these laws.

A good example of such complexities again comes from Skinwalker Ranch, which since AAWSAP has continued to be studied, most recently by a team featuring astrophysicist Travis Taylor – for many years involved with governmental initiatives relating to UAP, including the Task Force (as mentioned in endnote 9) – as documented on the TV program “The Secret of Skinwalker Ranch.” Among the anomalies investigated is a strange area of space/air above the ranch, situated roughly between 31 and 5000 feet. The team’s attention was first drawn to this due to UAP (generally orbs) frequently appearing and disappearing suddenly in this area. Probing further, technological malfunctions often occurred there; for instance, rockets would explode or veer wildly off course, frequently at exactly 31 feet. Various scanning techniques have thus been harnessed to investigate it, including – on Season 4 Episode 9 – a low frequency radio wave radar scanner carried by meteorological balloon (Lessard et al., 2023). Strikingly, this identified “huge increases in the magnetic field and [simultaneous] decreases in the electric field.” The team were stunned, given “typically we would see both fields rise and lower together.” As described by Taylor, as the balloon ascended it encountered “an extreme level of magnetic energy that we have no conventional

explanation [for],” and indeed “truly defies physics.” Moreover, there was a “clock anomaly” in the data involving a “time shift of a quarter of a second,” as if “there’s wrinkles in space and time.” Attempting to explain such strangeness, Taylor said, “some scientists have suggested that these types of anomalies could be telltale signs of a traversable wormhole” (i.e., a structure in spacetime theorised as making it possible to take a “short-cut” through space¹⁹). Could that explain, he wondered, why the team have apparently seen UAPs ascend and “simply vanish into thin air”? Indeed, legends of the area feature this very same notion: as Taylor put it, “could we have just discovered evidence of what the indigenous people of the area have claimed for centuries, namely that interdimensional portals exist.”

As with other claims featured here, such as Grusch’s allegations, there is no way at present of confirming the veracity of such reports, let alone the validity of interpretations like “interdimensional portals.” Nevertheless, Taylor’s remarks are germane to our discussion: on one hand, their data seemingly “defy physics,” at least in terms of a relatively conventional understanding of the field (e.g., standard ideas of spacetime); yet on the other hand, the data *can* potentially be accommodated by certain boundary-pushing ideas, such as wormholes. Indeed, notions like “wormholes” could be placed at the intersection of the extraterrestrial and ultraterrestrial hypotheses, in that entities involved in UAP could be situated elsewhere in space (hence extraterrestrial), yet materialize on earth as if from another dimension (hence ultraterrestrial). To that point, work at the frontiers of physics suggests that not only is UAP behaviour exceedingly strange, so is the universe itself, including in ways that might even allow an interdimensional hypothesis.

The Strangeness of the Universe

The section above suggested that UAP have aspects that appear paranormal, and possibly involve beings from other dimensions. While many people may be resistant to such extraordinary “paranormal” explanations, this begs the question of what *is* paranormal, which in turn depends on what one considers “normal,” and relatedly what “reality” is. In that respect, it is vital one be aware of the limits of one’s knowledge, and not *a priori* dismiss possibilities based on what may be a relatively impoverished understanding of the relevant terrain. After all, the frontiers of fields like physics are *exceedingly* strange. Indeed, various scientific luminaries have been credited with remarks on this theme (see <https://quoteinvestigator.com/2018/12/25/universe/>), including J. B. S. Haldane (1927), who wrote “the universe is not only queerer than we suppose, but queerer than we can suppose” (p.298). To that point, while an interdimensional explanation may sound far-fetched, it ought to give people pause that the idea of other dimensions beyond the four of spacetime we normally perceive is given serious consideration in contemporary physics. String theory for example – one of the leading unifying field accounts of the universe, merging quantum mechanics with the general theory of relativity – posits our cosmos may have *ten* dimensions (Horowitz, 2005). Relatedly, some accounts of string theory argue for “parallel universes,” with new “bubble” universes constantly forming and expanding indefinitely (Vilenkin, 2007). It is beyond our scope to delve into such theories, not least because I am not a physicist, and we non-physicists must be wary of trespassing into this most

rarefied of fields and using its esoteric theories as a basis for one's own arguments. Thus, that some theories in physics posit multiple dimensions by no means provides evidence *for* an interdimensional hypothesis. Crucially though, I suggest it also means that physics cannot simply be used as an argument *against* this possibility.

The key point is the need for epistemic humility given the strangeness of the universe, and the imperative to keep an open mind, especially in areas where one is non-expert. Unfortunately, there is a widespread tendency for academics to confidently step outside their domain of expertise and make assumptions about reality – about what is normal or paranormal – based on their non-expert understanding of the relevant science. Relatedly, humans are liable to an epistemological stance of naïve realism: the tendency to believe our perception of the world reflects it faithfully just as it is, unbiased and unfiltered; significantly, this tendency also applies to scientists themselves (Michell, 2003). This is especially so with the positivist approaches that dominate much of science, which limit scientific enquiry – and at an extreme, reality itself – to what can be observed and measured. From a naïve realist perspective, for example, we assume the universe is composed of solid objects. Delving into subatomic realms, however, has shown matter to be elusive and ephemeral, involving mostly “empty” space, together with subatomic particles that exist as a superimposition or cloud of statistical probabilities. That is, while the universe may be exceedingly strange, for most people it is *not* perceived in that way. It is instead likely to be appraised in an unreflecting way as conventional and commonplace, using assumptions based on the prosaic behaviour of everyday objects and processes (e.g., where matter really does seem solid). Such dynamics mean scholars and practitioners are often closed to possibilities that contravene their “common sense” view of the universe²⁰. However, it is striking that, of all scientific fields, physics seems particularly associated with views that might be deemed paranormal, as seen in the philosopher Ken Wilber's (2001) compilation, *Quantum Questions: Mystical Writings of the World's Great Physicists*. Consider the view expressed by Sir James Jeans (1937), who wrote in *The Mysterious Universe* that “The universe begins to look more like a great thought than a great machine” (p.137). That said, I acknowledge not all physicists would share such views, and some might outright dismiss the possibilities in this article. If so, though, one might ask, can they *really* be sure that current knowledge in the field is final and total? Or, more likely, might there yet be much outside our current understanding, including not only “known unknowns” (phenomena scholars believe exist, but do not understand, such as dark matter), but also “unknown unknowns” (of which people are not even aware at all). After all, the history of science means *some* epistemic humility is required, as considered below.

Indeed, scientists have suggested that groundbreaking work at the frontiers of physics has direct relevance to the question of UAP. For instance, there has been considerable interest and speculation around the viabilities of potential breakthrough technologies that would make interstellar travel feasible, such as an “Alcubierre warp drive” that could allow faster-than-light travel by effectively “stretching the fabric of spacetime” (Williams, 2017, paragraph 5). As Lue Elizondo

explains, “a significant amount of mass or energy warps space-time... It’s a scientific fact, not fiction. The question now is how we can manipulate this physics for technological advancement. Potentially, we could warp space-time in a way that allows us to travel from point A to point B more quickly” (cited in Verma, 2023d, paragraph 12). One purported example of research into these very possibilities is the work of Salvatore Pais, an aerospace engineer at the Naval Air Warfare Center Aircraft Division. Leaked documents disclosed by The War Zone (Tingley, 2020) suggested that over recent years Pais had not only obtained numerous patents for highly advanced and esoteric forms of technology – including a “Spacetime Modification Weapon” and a “hybrid aerospace-underwater craft” that would apparently be capable of “altering the fabric of time and space” – but that the US Navy had actually conducted experiments on some of these. Needless to say, this work remains highly secretive, though what little is publicly available is very intriguing and germane to this paper; indeed, in Coulthart’s (2021) book, *In Plain Sight: An Investigation into UFOs and Impossible Science*, he devotes an entire chapter to “Dr. Salvator Pais’s Puzzling Patents”²¹. Thus, even with the secrecy surrounding it, such work suggests that research is occurring at the cutting edge of physics and other scientific fields that is not only demonstrating the “strangeness” of the universe, but may even be harnessing its unusual qualities in the forms of new technologies that have relevance to the question of UAP²². Finally, besides the strangeness of UAP and the universe, openness to an interdimensional hypothesis also turns on the mysteries of consciousness.

The Strangeness of Consciousness

A third pillar in the argument for openness to the interdimensional hypothesis concerns the mystery of consciousness. Recall again Nolan’s response about “leaving open the idea that [UAPs involve] some form of consciousness that is non-material,” even though it “sounds absolutely crazy.” It would seem that Nolan’s concern was not misplaced, with the potential relevance of consciousness to the UAP topic often not taken seriously by authorities. As noted above, NASA (2022) for example recently convened a 16-person team to study UAP, featuring “some of the world’s leading scientists, data and artificial intelligence practitioners, aerospace safety experts” (paragraph 7). Despite this breadth of expertise, they evidently did not deem it necessary to widen the scope to include scholars of consciousness. However, such experts may well have much to contribute to the discussion. Indeed, many have wrestled with the kinds of ideas raised by Nolan. Moreover, contrary to his concern, such views may well *not* be considered “crazy” by them. I noted above how non-physicists often have a relatively limited view of the field’s cutting edge, leading them to dismiss possibilities that may not actually be ruled out by physicists themselves. Similar dynamics apply to consciousness studies. From an unreflective, naïve realist perspective, consciousness may seem unremarkable, with subjective experience taken for granted as an unexceptional aspect of life. However, for consciousness scholars themselves, one often finds that the deeper one considers the topic, the stranger it becomes. Here we can briefly consider this strangeness with respect to issues such as (a) how consciousness is thought to emerge in humans, (b) whether beings other than humans can be conscious, and (c) whether even

matter itself can be conscious. If one keeps in mind Nolan's speculation, one can appreciate the relevance of these issues to the interdimensional hypothesis.

The first issue is the least contentious, at least insofar as just about all scholars would concur that consciousness does indeed "emerge" in humans²³. The second issue is also now becoming less contested, with consciousness increasingly recognized as prevalent throughout the animal kingdom. This does not mean in a human sense (e.g., *self*-conscious or aware), rather, just that some form of subjective experience is there. As Nagel (1974) put it, there is *something* "it is like to be" a creature such as a bat (i.e., qualia of some sort, and a locus of sentience for whom these are happening). However, the central debate is how far "down" to push its emergence in terms of evolutionary and neurophysiological complexity (Demertzi et al., 2019). Mammals are perhaps readily seen as conscious, but the issue is more contentious with organisms like insects (Klein & Barron, 2016). Moreover, there are disagreements about what emergence itself entails. Some argue for a distinct and discrete *point* in complexity at which consciousness appears, before which it is not present, such as neural activity in the thalamocortical system (Seth et al., 2005). However, others question whether we can indeed "draw a line" separating conscious from non-conscious organisms, suggesting consciousness may emerge by degrees from the very simplest forms of life, even unicellular entities (Mashour & Alkire, 2013).

In itself, the question of consciousness in organic life forms is not directly relevant to the interdimensional hypothesis. However, this line of speculation *does* become particularly germane when one finds theorists wondering whether we can even locate the boundary of consciousness at life itself, and asking instead whether *matter* could be conscious in some way, a view broadly known as panpsychism. Indeed, the dividing line between living and non-living is itself surprisingly "fuzzy" and contested²⁴. In any case, even if one could clearly differentiate living and non-living entities, some theorists nevertheless argue the latter can also be conscious. While this may sound radical, consider the view above that consciousness may not suddenly appear at a given point on the evolutionary tree, but emerges by degrees; so, as one proceeds down the tree, it "fades away" into increasingly rudimentary proto forms. But then, if we lack a clear dividing line between living and nonliving phenomena, on what basis must we restrict it to the former; might it not continue, in some way, even into matter itself? Indeed, the possibility of such panpsychism is taken seriously by some of the most influential philosophers of mind²⁵.

Related to panpsychism, some theorists have proposed that consciousness may be a physical field extending beyond the brain, as I have recently reviewed and argued for myself (Lomas, 2023). There are two subtly different variants of this idea. The first is that consciousness originates in the brain, but may radiate out in some way; some theories for example suggest electrical brain activity generates an electromagnetic field that is the basis for consciousness, and moreover which – as with other such fields – can extend outwards, thus interacting with matter outside the brain (McFadden, 2007). The second is the even more far-reaching notion that consciousness does *not* originate in the

brain, but exists in some other fashion, with the brain “receiving” it in some manner (like an antenna picking up radio waves). On this view, consciousness is suffused throughout the universe as an emergent force or property, akin to other forces of nature; Mocombe (2021) for instance describes the “consciousness field” as “an interconnected, endless, and nonlocal fifth force of nature” that is “received by the brain and integrated by its electromagnetic field” to generate its local consciousness (p.11). Relatedly, Meijer and Geesink (2017) propose the brain is “embedded in a holographic structured field that interacts with resonant sensitive structures in the various cell types in our body” (p.41). It is beyond the scope here to dwell on the intricacies of such theories. The point is they are being given consideration by consciousness scholars, and clearly have relevance to the UAP issue, being pertinent for example to the kind of views aired by Nolan above²⁶. Moreover, at this point, one starts to see mysteries intertwining, with speculations by scholars of physics, consciousness, and UAP converging on fascinating common territory with direct relevance to the interdimensional hypothesis.

Perhaps the key question here, uniting these concerns, is what matter is. A common way to conceptualize matter is through related concepts like “material” and “substance,” in distinction to phenomena that are in some way “immaterial” and ontologically subjective, such as mind and consciousness. Oxford Languages for example – the dictionary used by Google – has, for its first entry on “matter,” the definition “physical substance in general, as distinct from mind and spirit.” But if matter itself could be conscious, then such distinctions begin to break down or make less sense. Indeed, as we saw above, these are the kinds of conundrums with which physicists have been wrestling over the past century, as reflected in Jeans' (1937) remark that “The universe begins to look more like a great thought than a great machine” (p.137). Now, such questions are similarly beginning to perplex UAP scholars, as per Nolan’s speculation about “some form of consciousness that is non-material.” One way to interpret this remark is the possibility of consciousness arising not only in relation to a “conventional” material substance (i.e., a human brain), but in other ways that are not understood but nevertheless involve some form of “physical matter” (even if such terms are now more problematic and mysterious in light of ideas such as panpsychism). Eric Davis for example – a physicist closely connected to the UAP topic, and indeed to possible crash retrieval and reverse engineering programs (Wendorf, 2019) – said in an interview on Open Minds UFO Radio (2018) that many UAP craft “behave like a conscious psychic entity.” Might the strange orbs, which constitute a majority of UAP sightings, for example, be a manifestation of consciousness as a form of matter that appears as a perceptible object in spacetime? Such manifestations could involve anything from the nonlocal consciousness field crystallizing into a temporary “physical” form, to conscious entities who usually exist in other dimensions materializing into the four spacetime dimensions usually perceived by humans.

Clearly, we are far out in speculative territory here. However, it is not out of keeping with ideas found in physics and consciousness studies, as discussed above. Indeed, beyond the issue of UAP per se, some theorists have suggested that *all* matter is a materialization of consciousness.

Rather than matter having ontological primacy, and consciousness emerging from it under special circumstances (e.g., in a human brain), some have reversed this, and view matter instead as an emanation of consciousness. Max Planck, for instance – Nobel Prize winning originator of quantum theory – said, “I regard consciousness as fundamental. I regard matter as derivative from consciousness” (Sullivan, 1931, p.17). From this radical perspective, orbs and other UAP would be just a special subset of a much broader process of “matter” (whatever this now means) arising out of consciousness (whatever this also now means). Whatever the ultimately actuality, such are the kinds of possibilities being wrestled with by UAP scholars, from Vallée and Keel to Lacatski and Nolan. However, as it stands, the significance of consciousness to the topic – and the possibility of an interdimensional hypothesis more generally – does not appear to be a priority for authorities investigating the phenomenon, as noted above with respect to NASA’s task force. Such an omission is problematic, since the contribution of scholars studying subjects like consciousness are needed to fully explore and understand this topic²⁷. To that point, the article concludes with a general plea for epistemic openness and humility.

Epistemic Openness

Above I have argued that three fundamental forms of strangeness – UAP themselves, the universe, and consciousness – mean an interdimensional hypothesis is at least tenable and cannot simply be dismissed. Finally, augmenting these arguments are some more general considerations (i.e., unrelated to UAP per se) around recognizing the limits to our awareness and understanding of the cosmos. In short, humans, like all animals, tend to be aware only of the small aspect of reality that, (a) is pertinent to our existence, and (b) we have the capacity and the technology to perceive. Essentially, our horizons are limited to our “Umwelt,” a term coined by German biologist von Uexküll (1928) to describe the world experienced by a particular organism. This does not merely mean its surrounding environment, for two key reasons. First, only certain aspects of the surroundings are relevant and perceptible to the organism. Second, the organism is not merely passively influenced by its environment, but actively shapes it. Thus, the Umwelt is “all aspects of the world that have an effect on the agent [reason 1] and can be affected by the agent [reason 2]” (Ay & Löhr, 2015, p.105). Although initially used in ethology to describe animal perception and behaviour, more recently the idea has also been extended to humans, such as work on “embodied cognition” (Lindblom, 2015). Crucially, our Umwelt is limited and partial, in three main ways: dimensionally, temporally, and spatially. In each, we only access a narrow portion of the relevant bandwidths, certainly vis-à-vis other animals (Scanes, 2018), and even more so in absolute terms (in the context of all possible perceptual stimuli). Of course, technology – from the telescope to the microscope – has expanded our Umwelt. However, even then, our perceptual horizons are still limited in vital ways, even just compared to other animals²⁸.

Then, more radically, the difference between us and other animals is miniscule compared to the entire scope of Umwelt possibilities. In absolute terms, most animals are very similar in size and

longevity. We cannot imagine, for instance, what it might be like to perceive the universe if we were the size of a photon at one extreme, or a galaxy at the other. This point has been made by numerous UAP experts, who point out that our understanding of UAP – and whatever entities or processes may be responsible for them – is constrained by the limits of our perceptual and cognitive horizons. As former CIA officer Jim Semivan put it, “there’s a whole other reality that surrounds us that we just simply don’t have the ability to see or interact with” (cited in Verma, 2023b, paragraph 11)²⁹. He further suggested that this veil had enabled ultraterrestrial entities of some kind to remain hidden from us, saying, “There’s an entity out there! There’s some kind of non-human intelligence that’s living with us on this F**KING planet” (paragraph 8). Of course, we cannot help being limited in our perceptual range. However, what we can help – but generally do not – is being aware of these limitations. Instead, we often take our Umwelt for granted as just how things are. This does not mean our understanding is necessarily wrong or our truths are relative. Although humans are liable to misapprehensions and errors, we are capable of registering information about our world that seems not only useful but also correct in some objective sense. Crucially though, even such information is highly selective and partial, as if gazing at the night sky through a small window: our view may be faithful as far as our eyes allow, but not only does the vast majority of the sky lie outside the boundary of the frame, even the visible stars do not exhaust the potential contents of that portion of the sky (e.g., with other stars too small and distant, or obscured by light pollution). However, the human tendency is to assume we perceive all there is to perceive. We conflate the Umwelt with the totality of which it is merely a small part.

In one sense, this naïve realism is integral to the efficacy of science. By rigorously attending only to what can be observed and measured, the scientific enterprise has been undeniably successful. However, the history of science also highlights its limitation³⁰, with many advances initially meeting resistance from what Kuhn (1962) called the dominant paradigm, the current scientific Umwelt (reality as understood by most scientists). Whenever findings emerge that challenge this consensus, such work is initially liable to be rejected, ignored, or possibly dismissed as “bad science.” If dissenting evidence keeps accumulating, however, a tipping point might be reached, in which the paradigm is viewed as inaccurate or deficient, and may be supplanted by a new one in a “paradigm shift.” For many scholars, the interdimensional hypothesis will likely be firmly outside their Umwelt, and contrary to their assumptions of the “laws of nature.” However, the UAP data may compel us to reconsider and even overturn our existing paradigms, especially as we develop new technologies that expand our Umwelt and understanding of the cosmos, as noted further in the conclusion.

Conclusion

This article has discussed a hypothesis for a topic that authorities appear increasingly attentive to, and moreover perplexed by, namely Unidentified Anomalous Phenomena (UAP). If these phenomena really cannot be accounted for in terms of human technology or natural conventional phenomena, the first alternative explanation is usually that these constitute extraterrestrial craft. However, many

people closest to the topic – from pilots witnessing UAP to scientists analysing them – are open to even more far-fetched and radical possibilities, ones sometimes interpreted as “paranormal” and that can broadly be assembled under the label of ultraterrestrial hypotheses, which includes the interdimensional hypothesis as a subset. This is the idea that UAP may represent activities of beings or “forms of consciousness” that may already be present in the Earth’s environment in some sense, just not in ways we can conventionally understand. I suggested that people are turning to such notions due to the sheer strangeness of UAP activity, the universe, and consciousness. The paper then concluded with a plea for epistemic humility and openness, given that our perception and understanding of the universe is still very limited. Indeed, every passing year seems to bring new discoveries that challenge or overturn existing assumptions³¹. As we continue to explore the mysteries of the cosmos, we may find that an interdimensional hypothesis is not so unimaginable after all. Indeed, not only that hypothesis, but a host of other phenomena under the broad banner of the “paranormal” that overlap with the UAP topic, from psychokinesis to remote viewing. Although these tend to be dismissed by most scientists, a wealth of data collected over the decades appears to suggest these *may* be genuine phenomena, or at least are not easily dismissed (Radin, 2011)³². While scepticism regarding such phenomena is surely still warranted, such analyses mean we cannot simply dismiss these possibilities out of hand, and must at least investigate further. This article has made the case for epistemic humility and scientific openness towards the interdimensional hypothesis specifically, but this curiosity should be extended to the gamut of potentially extraordinary phenomena. As Einstein said (cited in Zakaria et al., 2017, p.281), “It is entirely possible that behind the perception of our senses, worlds are hidden of which we are unaware.”

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ENDNOTES

¹ The first UAP Task Force report came in response to Congress passing the 2021 Intelligence Authorization Act (U.S.C., H.R. 7856, 2020), which included a stipulation that a preliminary report be released in 2021. As stated in the “Committee Comments” section of the Act, under a section entitled “Advanced Aerial Threats” (paragraph 2): “[T]he Committee directs the DNI [Director of National Intelligence], in consultation with the Secretary of Defense and the heads of such other agencies as the Director and Secretary jointly consider relevant, to submit a report within 180 days of the date of enactment of the Act, to the congressional intelligence and armed services committees on unidentified aerial phenomena (also known as “anomalous aerial vehicles”), including observed airborne objects that have not been identified.” This initial 2021 report focused on 144 incidents deemed most worthy of investigation (Office of the Director of National Intelligence, 2021). Strikingly, in 143 cases, it determined that the authorities “lack sufficient information in our dataset to attribute incidents to specific explanations” (p.5). In 80 cases, UAP were detected by multiple sensors simultaneously (e.g., radar, infrared, etc.); in 18, unusual flight patterns were reported; and in 11, pilots even reported near-collisions. Moreover, such observations continue to accumulate. A subsequent updated 2022 report – released in January 2023 – identified a further 366 events, of which 177 similarly eluded identification, with the publicly available text noting the phenomena “demonstrated unusual

flight characteristics or performance capabilities, and require further analysis” (Office of the Director of National Intelligence, 2023, p.5). The next public data update came in May 2023, when NASA convened a televised panel to discuss the efforts of their own UAP task force, as discussed in the main text.

² Allegations that US authorities – and/or private aerospace companies – have for decades had actual UAP craft, and even non-human “pilots,” in their possession were made by publicly in June 2023 by David Grusch, a veteran of the National Reconnaissance Office and National Geospatial-Intelligence Agency (who served as representative for both offices to the UAP Task Force between 2019 and 2022). Taking advantage of recent legislation protecting “whistleblowers” in the intelligence community, he alleged the US government, together with private aerospace companies, had for decades maintained a “crash retrieval” and “reverse engineering” program (with the latter meaning the attempt to closely study technological products in order to extract design information and even potentially to reproduce them). This program purportedly dated as far back as the “Magenta” UAP craft that was allegedly retrieved in Italy in 1933 and handed to the USA in 1944 (Boswell & Sharp, 2023). Crucially, he alleged this program had been kept secret, not only from the American public, but had even been “illegally withheld from Congress” (Kean & Blumenthal, 2023, paragraph 2).

³ As noted in the main text, at the time of going to press (in early August 2023), there is no way of knowing the validity of Grusch’s allegations. However, it is notable that, as reported by Kean and Blumenthal (2023), the Intelligence Community Inspector General deemed his complaint “credible and urgent” in July 2022, and moreover that “several current members of the recovery program spoke to the Inspector General’s office and corroborated the information Grusch had provided” (paragraph 27). Furthermore, Senator Marco Rubio, Vice Chairman of the Senate Select Committee on Intelligence, said – in an interview on News Nation on June 26 – that “many” other whistleblowers had subsequently testified to his committee to corroborate Grusch’s claims. Significantly, these include people with “firsthand knowledge” of such programs, some of whom are “public figures”, and most of whom hold (or held) “very high clearances and high positions within our government.” This point about “firsthand knowledge” is worth briefly dwelling upon, as some people who are sceptical about Grusch’s allegations have claimed that neither Grusch nor those corroborating him have personally seen any such potential craft, and are merely passing along unsubstantiated rumours. This critique was raised with Grusch in an interview on BBC Radio 4 on August 3 (available at <https://www.bbc.co.uk/sounds/play/m001p7f5>), in which he was accompanied by his attorney I. Charles McCullough, III, who significantly was the intelligence community’s first Inspector General. In this, he was asked, “But how do you know they [i.e., the government] have these items [i.e., craft], because you’ve not seen them yourself?” to which he replied:

There are certain things I have first-hand access to that I can’t publicly discuss at this time. However, myself and other colleagues interviewed, you know, 40 individuals, both current and former highly distinguished intelligence and military personnel that were specifically *on* these programs, and those that were willing I directed to the Intelligence Community Inspector General, and so the Inspector General was able to interview people that do have direct, first-hand information.

Seeking clarification, the interviewer followed up, “Right, so they have that *information* directly. Have *they* actually seen these vehicles?” To this, Grusch answered, “The individuals that I directed to the Inspector General, yes, they have the first-hand experiences, yes.” Thus, Grusch is strongly implying – perhaps without being able to state outright in public – that he interviewed 40 people who were/are actually directly involved with these programs, at least some of whom (i.e., the subset who were willing to be directed to the Inspector General) had indeed seen such craft. Summarising this situation – in an article entitled, “A monumental UFO scandal is looming” – Von Rennenkampff (2023a) suggests there are two main possibilities, both of which are extraordinary and problematic (hence the title): “Either the U.S. government has mounted an extraordinary, decades-long coverup of UFO retrieval and reverse-engineering activities, or elements of the defense and intelligence establishment are engaging in a staggeringly brazen psychological disinformation campaign” (paragraph 2). He argues that a potential third option raised by the BBC interviewer, namely that “dozens of high-level,

highly-cleared officials have come to believe enduring UFO myths, rumors and speculation as fact” appears “increasingly unlikely.” As he puts it, given the “significant penalties for making false statements to an inspector general, it is extremely unlikely that multiple high-level, highly-cleared officials would falsely claim to have first-hand knowledge of myths and rumors.” Making a similar point, he quotes Marco Rubio, who said, “Most of these people [i.e., whistleblowers/witnesses] have held very high clearances and high positions within our government. So, you ask yourself: ‘What incentive would so many people with that kind of qualification — these are serious people — have to come forward and make something up?’” Hence, the two main options presented by Von Rennenkampff, both of which would be highly consequential.

⁴ The first legislative initiative that emerged subsequent to Grusch’s allegations came on June 14, when the Senate Select Committee on Intelligence unanimously approved new UAP provisions in the latest Intelligence Authorization Act (U.S.C., S.2103, 2023). This includes requirements for anyone with knowledge of any such “crash retrieval” programs to make available to AARO, within 180 days, “a comprehensive list of all non-earth origin or exotic unidentified anomalous phenomena material” for “assessment, analysis, and inspection” (p.216). These amendments were interpreted by observers as having been specifically designed to address Grusch’s concerns (Johnson, 2023). Indeed, Couthart (2023) suggested this legislative language constituted an “explicit admission” by the authorities of the truth of Grusch’s allegations. These new UAP provisions were followed by even more striking proposals announced by Chuck Schumer, Majority Leader of the United States Senate, on July 14 for a new UAP Disclosure Act (U.S.C., S. 2226, 2023), as an amendment to the forthcoming National Defense Authorization Act. Significantly, this amendment was approved by the Senate on July 27 (see <https://twitter.com/ddeanjohnson/status/1684735678200909824>). Furthermore, that same day the White House also signalled it had no resistance to the Act, as the Executive Office of the President published a document – available at <https://www.whitehouse.gov/wp-content/uploads/2023/07/S2226-NDAA-SAP-Followon.pdf> – which outlined its reservations with sections of the proposed National Defense Authorization Act, and which crucially did not include any issues with the Disclosure Act. As such, although it still needs – at the time of writing – to be approved by the House and again by the Senate, and ultimately the President, to become law, this is expected to happen later in 2023. Most relevantly here, it is replete with remarkable language; indeed, even the title seems consequential, given that “disclosure” is the term UAP observers use for the process by which authorities, having long been suspected to have withheld evidence of non-human intelligence and technology, admit and release this information to the public. For example, on July 16, 2023, the Anonymous collective – the decentralized international “hacktivist” group – launched “Project Disclosure,” aimed at “uncovering government secrets about UFOs, UAPs and extraterrestrial intelligences” (<https://twitter.com/YourAnonOne/status/1680627630805078018>). Indeed, the Act itself actually refers to a “Controlled Disclosure Campaign Plan” (p.4).

In terms of content, the Act begins by stating that, (a) “All Federal Government records related to unidentified anomalous phenomena should be preserved and centralized for historical and Federal Government purposes, and (b) that “All Federal Government records concerning unidentified anomalous phenomena should carry a presumption of immediate disclosure and all records should be eventually disclosed to enable the public to become fully informed about the history of the Federal Government’s knowledge and involvement surrounding unidentified anomalous phenomena” (p.2). More specifically, the Act seems to allude to Grusch’s allegation of a crash retrieval and reverse engineering program – including authorities not only possessing and studying UAP craft but actual non-human entities who may have been piloting these – in referring to “legacy programs,” defined as “all Federal, State, and local government, commercial industry, academic, and private sector endeavors to collect, exploit, or reverse engineer technologies of unknown origin or examine biological evidence of living or deceased non-human intelligence” (p.6). As summarized in the *New York Times*, the legislation includes provisions to “force more details of the government’s study of unknown materials to be released... [and give] federal government the power to claim any crashed spaceships in private or corporate hands” (Barnes, 2023, paragraph 18).

Explaining his motivations for creating the Act, on July 14 Schumer wrote that he was “honored to carry on the legacy of my mentor and dear friend Harry Reid [the key political figure behind the creation of the original UAP Task Force]

and fight for the transparency that the public has long demanded surrounding these unexplained phenomena” (<https://twitter.com/SenSchumer/status/1679878630975864832>). However, even more significantly, although being driven forward by Schumer, Sharp (2023b) reports that the proposed Act has involved the coordination of numerous agencies and branches of government, writing that, “Schumer’s staff and others in the Senate have been in coordination with various quarters of the U.S. government, including the White House and its National Security Council to create the language” (paragraph 6). Reflecting on the details of the legislation, journalist and filmmaker Jeremy Corbell stated (paragraph 7):

This language is an ATOMIC BOMB. It was generated to force momentum in the direction of UAP transparency, and to inform future inquiry into the apparent decades-long UFO coverup. ‘I can tell you from an inside perspective, seeing this language crafted so precisely, that there is purpose behind every word in this new proposed legislation. What we should be asking is this - what is known by those who are forcing the issue behind the scenes to expose these illegal UAP programs?

As a final point here, on August 2 the journalist Matt Laslo reported an interesting exchange he had with Mike Rounds – Senator for North Dakota and co-author of the Disclosure Act – about the key phrase “non-human intelligence” (https://twitter.com/ask_a_pol/status/1686933268950556672). Even though Rounds is evidently being cautious in not giving much away, it is clear the authors were very careful in their language, keeping open all possibilities in terms of the nature of UAP and any potential craft and/or occupants:

- Laslo: Who wrote that bill? Because people are curious about the language that was used.
- Rounds: It was a joint effort... There was direct participation between the organizations that currently have to cooperate in this. But we tried to bring a number of different entities in for a discussion so that it wasn’t a surprise to anybody as we wrote it.
- Laslo; I think it might be the term non-human intelligence. I think that might be used, like, 22 times in it.
- Rounds: Well, pretty simple terms, aren’t they (laughs)?
- Laslo: Could that be AI?
- Rounds: Could be.
- Laslo: Non-human?
- Rounds: Could be.
- Laslo: Really?
- Rounds: Yeah.
- Laslo: So it’s that broad?
- Rounds: Well (pause), could be. It was not by accident, let’s put it that way.
- Laslo: Interesting.
- Rounds: Yeah (laughs). I wish I could say more but that’s just... I mean it...we tried keeping it as simple as possible.

⁵ The hearing on July 26 touched upon many of the issues raised in this article. Before noting some key points, it is worth emphasising the significance of the hearing. Many UAP commentators have suggested it represents a conflict between various authorities around access to, and ownership of, information in this area. In the main text I refer generically to “authorities,” but this of course is not a monolithic entity, and there are various competing agendas. As @tinyklaus put it, “This is a bipartisan constitutional struggle that is now spilling out into the public sphere” (<https://twitter.com/tinyklaus/status/1682044572359094272>). Specifically, at a press conference on July 20 (available at <https://www.c-span.org/video/?529468-1/republican-oversight-committee-members-upcoming-unidentified-aerial-phenomena>), Reps. Tim Burchett and Anna Luna suggested the hearing essentially represented a conflict between the military and intelligence community (the majority of whom seemingly want information on this topic kept secret) and politicians (some of whom want access to the information and possibly to make it public). To that point, Burchett said,

“We’ve had a heck of a lot of pushback about this hearing,” and that “There are a lot of people who don’t want this to come to light.” For example, Burchett spoke about travelling to Eglin Air Force base on the promise of receiving a briefing about UAP information, but being denied access:

They basically told us we’re not going to give it [i.e., the information] to you. The arrogance of this general was beyond belief... Ultimately, even before we got down there, the Pentagon actually tried to cancel the field hearing... We went down there; we were stonewalled. They would not give us access to testimony from some of the pilots. They were hiding images and information... So if the Department of the Air Force, if the Pentagon thinks that they’re above Congress, they have something else coming to them, we told them we were going to do this if they continue to hide information. And ultimately, the American people deserve the facts.

The hearing itself – which is available, with a transcript, at <https://www.c-span.org/video/?529499-1/hearing-unidentified-anomalous-phenomena-uap> – was remarkable. There were three main witnesses, who crucially were testifying under oath (i.e., under penalty of prison if giving untruthful accounts). These included Grusch himself, together with two former Navy pilots who have been vocal about UAP encounters: David Fravor (Commander and squadron leader, and one of the pilots involved in the Nimitz encounter, as discussed in the main text and in endnote 11); and Ryan Graves (former F/A-18F pilot, and founder of American for Safe Aerospace, a military pilot-led nonprofit focused on UAP and in particular on helping military personnel to report sightings). Here I shall briefly consider some of the main points pertaining to military UAP encounters in general, before addressing Grusch’s more startling allegations.

In terms of military UAP encounters, (a) These are apparently common. As Graves put it, “These sightings are not rare or isolated. They are routine. Military air crew and commercial pilots, trained observers whose lives depend on accurate identification, are frequently witnessing these phenomena.” Indeed, he said that “when we [he and his colleagues] were first experiencing these objects off the eastern seaboard in the 2014 to 2015 time period, anyone that had upgraded their radar systems were seeing these objects... [and] were further correlating that information with the other onboard sensors and many of them also had their own eye sightings”. (b) The majority of these involve – as noted in the main text – “dark gray or black cubes inside of a clear sphere... where the apex or tips of the cube were touching the inside of that sphere” (Graves). (c) There are other UAP besides these cubes/spheres, and besides the Tic-Tac type craft, which are also relatively common (e.g., as per the Nimitz encounter, described at length in the hearing by Fravor). For example, Graves discussed an event at Van Der Beg Air Force Base in 2003, when “a large group of Boeing contractors... observed a very large 100 yard sided red square [which] approached the base from the ocean and hovered at low altitude over one of the launch facilities. This object remained for about 45 seconds or so before darting off over the mountains.” (d) These UAP seem to demonstrate extraordinary capacities and qualities that are beyond known human technologies; for example, the spheres were reported as travelling up to Mach 2, as well as showing extraordinary properties in terms of maneuverability (Fravor: “we have nothing that can stop in mid air and go in the other direction”). (e) Relatedly, such flight behaviours challenge our understanding of physics, at least in terms of current knowledge: when asked, “Did the Tic Tac defy the laws of physics?”, Fravor replied, “As we understand them, yes.” (f) Despite UAP sightings being both “routine” and yet extraordinary, many sightings are not recorded, with Graves estimating that only around 5% were formally reported by personnel to their superiors. Finally, (g) this non-reporting was described as being partly due to the “stigma” attached to the topic, and relatedly out of “fear” of various kinds, including being perceived as incompetent, or even having mental health issues, and thereby jeopardizing one’s career. As Rep. Luna said, “I’ve had conversations with many pilots where they were in fear of coming forward for retribution and or being taken off flight status.”

This latter point about “retribution” brings us to Grusch’s allegations. Before discussing his claims, one should note he reported being threatened in relation to coming forward, saying “I do have knowledge of active, planned reprisal activity against myself and other colleagues.” Indeed, asked by Rep. Luna whether he had experienced “incidences that have caused you to be in fear for your life for addressing these issues?”, he replied, “Yes, personally.” He even alleged people had actually been hurt in relation to this topic, saying, “I know of multiple colleagues of mine who got physically injured,” and when asked by Rep. Burlison whether this was “By UAPs or by people within the federal government?,” replied “Both.” In

terms of his allegations regarding UAP, he was unable to air any classified details in the hearing, given its public nature. However, he repeatedly emphasized that he had provided specific details to the Intelligence Community Inspector General, as noted above in endnote 3. In terms of his central allegation of a crash retrieval program, for example, when asked “Do you believe our government is in possession of UAP?”, he said, “Absolutely, based on interviewing over 40 witnesses over 40 years. Where? I know the exact locations, and those locations were provided to the Inspector General... [and] I actually had the people with the first-hand knowledge provide a protected disclosure to the Inspector General.” Moreover, he said he would subsequently be able to provide these classified details to committee members in a “SCIF” (Sensitive Compartmented Information Facility): when asked by Rep. Ocasio-Cortez, “If you were me, where would you look [i.e., for information and evidence regarding UAP] – titles, programs, departments, regions...?”, he replied, “I’d be happy to give you that in a closed environment. I could tell you specifically.” Furthermore, despite not being able to share many details in public, Grusch did speak briefly about some of his remarkable whistleblowing claims. In relation to authorities actually possessing non-human intelligent entities, for instance, when asked “do we have the bodies of the pilots who piloted this craft?”, he replied “Biologics came with some of these recoveries.” Questioned whether these were “human or non-human,” he said, “Non-human,” and further said, “that was the assessment of people with direct knowledge on the program I talked to that are currently still on the program.”

As a final note here, the committee members repeatedly emphasized that this session was only the first of many in their efforts to “get down to the bottom of what is actually happening with UAP,” as Rep. Luna put it. To that point, numerous steps forward were proposed for investigating further, including holding closed hearings with Grusch in a SCIF to enable him to share the classified information he was unable to divulge in public. Furthermore, on July 28 four members of the committee (Reps. Burchett, Luna, Gaetz and Moscowitz) wrote to Kevin McCarthy, Speaker of the House of Representatives, to request the establishment of a Select Committee on UAPs, which would include subpoena authority with the power to compel witnesses to testify (see <https://twitter.com/RepTimBurchett/status/1684956861898919936>). One might also note that the hearing received pushback and criticism from the Pentagon, and specifically Dr Kirkpatrick, head of AARO, who disputed Grusch’s claims. In a letter on July 28 – posted somewhat unconventionally to LinkedIn and seemingly written in a personal capacity – he wrote, “I cannot let yesterday’s hearing pass without sharing how insulting it was to the officers of the Department of Defense and Intelligence Community” (cited in Boswell, 2023b, paragraph 6). Moreover, responding to Grusch’s central allegations, he said, “AARO has yet to find any credible evidence to support the allegations of any reverse engineering program for non-human technology.” However, many observers have questioned whether AARO is in a position to know about such evidence. One of Grusch’s claims is that these programs are being withheld from scrutiny by AARO and other oversight bodies (e.g., Congress). Moreover, he also suggested that whistleblowers like himself do not trust AARO to investigate their allegations properly. The latter point was emphasized by Rep. Luna, who reacted to Kirkpatrick’s letter thus: “That’s crazy to me that they would even try to discredit them [i.e., the hearing witnesses] ... [This] is the exact reason why I think people don’t trust AARO” (cited in Boswell, 2023b, paragraphs 10-11). The picture became further complicated when Susan Gough, spokesperson for the Department of Defense, said Kirkpatrick’s letter constituted “personal opinions expressed in his capacity as a private citizen and we won’t comment directly on the contents of the post,” as cited in Sharp (2023c, paragraph 4), with the article which concluding by saying that the author “understand[s] that Kirkpatrick’s position as AARO Director may be untenable.” Furthermore, other people in relevant positions of knowledge and authority have pushed back on scepticism regarding the allegations made in the hearing. For instance, writing in *The Hill* – in an article entitled, “UFOs are the story of the century — wake up, America!,” Rear Admiral Tim Gallaudet (2023), wrote (paragraphs 5-6):

As a retired U.S. Navy flag officer, I can attest to the integrity and authenticity of the two pilots who testified: retired Commander David Fravor and Ryan Graves. I have served on three aircraft carriers and count many Naval aviators as close friends. These two witnesses are the real deal. So is David Grusch. As a Navy information warfare officer, I worked closely with the intelligence community and Grusch’s former command, the National

Geospatial Intelligence Agency. I too have been read into special access programs, and I understand how Department of Defense classification systems and authorities work. His testimony is 100 percent credible.

Suffice to say this is a fast-moving picture. Thus, to reiterate a point made in the main text, as with this topic in general, I encourage readers to look out for future developments in relation to these Congressional activities.

⁶ Many key figures relating to this topic can be followed on Twitter. Intelligence and military professionals include Alex Anne Dietrich (@DietrichVFA41), Lue Elizondo (@LueElizondo), Tim Gallaudet (@GallaudetTim), Ryan Graves (@uncertainvector), Nick Pope (@nickpopemod), Tim McMillan (@LtTimMcMillan), Christopher Mellon (@ChrisKMellon), Matthew Pines (@matthew_pines), Marik von Rennenkampf (@MvonRen), and Robert Salas (@keptycho). Politicians include Tim Burchett (@timburchett), Kirstin Gillibrand (@gillibrandny), Anna Paulina Luna (@RepLuna), Jared Moskowitz (@JaredEMoskowitz), Bill Nelson (@SenBillNelson), Marco Rubio (@marcorubio), and Chuck Schumer (@SenSchumer). Academics include Avi Loeb's Galileo Project (@GalileoProject1), Patrick Jackson (@PatrickQJackson), Peter Levanda (@Peter_Levanda), Michael Masters (@MorphoTime), Garry Nolan (@GarryPNolan), Diane Pasulka (@dwpasulka), Brian Roemmele (@BrianRoemmele), Alejandro Rojas (@alejandrotrojas), Jack Sarfatti (@JackSarfatti), Travis Taylor (@travisstaylor1), Eric Weinstein (@EricRWeinstein), and Jason Wright (@Astro_Wright). Journalists include Dave Beaty (@dave_beaty), Ralph Blumenthal (@ralphblu), Josh Boswell (@JoshTBoswell), Jeremy Corbell (@JeremyCorbell), Ross Coulthart (@rosscoulthart), The Debrief (@Debriefmedia), Baptiste Friscourt (@Baptiste_Fri), George Knapp (@g_knapp), Leslie Kean (@lesliekean), Curt Jaimungal (@TOEwithCurt), Dean Johnson (@ddeanjohnson), Matt Laslo (@MattLaslo), Gadi Schwartz (@GadiNBC), Christopher Sharp (@ChrisUKSharp), Michael Shellenberger (@shellenberger), Vicky Verma (@Unexplained2020), and Dan Zetterström (@TheSignal). Commentators include Ryan Bledsoe (@RyanDBledsoe), Mike Colangelo (@MikeColangelo), Phillip Davis (@Phillip96207244), 'Klaus' (@tinyklaus), 'Jacques Keel' (@Fortean777), Brian Johnson (@BrianJo78940026), Joe Murgia (@TheUfoJoe), 'Spacecowboy' (@Spacecowboy781), 'Think Tank' (@528vibes), and UAP News (@HighPeaks77).

⁷ Intriguingly, there is suggestive evidence of sightings of such "cubes" dating back centuries. For example, three airborne cubes are prominent in Michael Maier's *Atalanta Fugiens*, painted in 1617. The artwork is usually interpreted as representing alchemical themes, in which the cubes are explained as signifying "prima materia" – a concept, often associated with Aristotle, representing the primitive formless base of all matter (Hasler & Johann, 2011). However, in light of contemporary accounts of UAP cubes, commentators such as Patrick Jackson (<https://twitter.com/PatrickQJackson/status/1678344832173916160>) have suggested that these images may actually – or indeed perhaps *also*, alongside existing interpretations, such as prima materia – reflect historic UAP encounters.

⁸ The first paper (Lomas, 2022) explored the possibility of various non-human forms of consciousness, including extraterrestrial beings (with an updated summary of this discussion included below in endnote 14). The second paper (Lomas & Case, 2023) then considered the continuities and discontinuities between historical accounts of angels and modern UAP reports.

⁹ Openness to an interdimensional hypothesis among the UAP Task Force is shown in remarks by one of its members, Dr Travis Taylor. At a recent conference (transcribed by Murgia, 2023), he spoke about how they were collectively unsure how to describe the genuinely anomalous phenomena, with an interdimensional explanation among the possibilities considered:

We were writing down a list of what could it be? We started with near peers, and then we said, "If it wasn't near peers, then it's some oligarch, or group of oligarchs that pooled their money together and done something." Then we said, "Okay, mother nature's invented something that we haven't seen before," right? And then we said, "Other than that, the only other bucket we could find is if it was extra-something: terrestrial, temporal, dimensional,

whatever.” That’s because it’s just the only other bucket we can think of...an unknown bucket. And we even were nervous about putting that list on the official document, and so we didn’t. We left it as, just unknown. We never put the word alien or extraterrestrial on any memo, document, or anything that went forward, other than a draft between us and the few other members of the team that were reading the draft.

¹⁰ The past century has seen numerous UAP-related events that have been subject to considerable scrutiny and analysis. Moreover, as with some current encounters, many have similarly been appraised by authorities as potentially genuinely anomalous and possibly involving non-human forms of intelligence. Consider for example remarks attributed to Rear Admiral Hillenkoetter, first Director of the CIA (from 1947 to 1950), in a newspaper article by Griffen (1960) which the CIA has made available online (<https://www.cia.gov/readingroom/docs/CIA-RDP68-00046R000200090025-2.pdf>). Griffen reports that Hillenkoetter had “recently declared... about the flying saucers” – though at what date and in what context is not specified – that (quote), “The unknown objects are under intelligent control. It is imperative that we learn where the UFO’s (Unidentified Flying Objects) come from and what their purpose is” (paragraph 1). Griffen further notes that, speaking specifically about “the years of World War II and the years immediately following,” Hillenkoetter said, “I know that neither Russia nor this country had anything even approaching such high speeds and maneuvers” (paragraph 2). Indeed, in relation to Grusch’s allegations of a crash retrieval program, it has even been suggested that some of the US’s foremost scientists were involved with analysing such craft. For example, in 1983 the UFO researcher William Steinman received a letter from Robert Sarbacher, a former student of Albert Einstein, regarding Steinman’s request for information regarding possible retrievals in the late 1940s and early 1950s (as reported by, and available in, Verma, 2023a). Sarbacher reported that numerous retrievals had occurred, and that various eminent scientists had been involved with their analysis, including “definitely” John von Neumann and Vannevar Bush, and probably also Robert Oppenheimer. The letter also contains other fascinating details, such as that the “materials reported to have come from flying saucer crashes were extremely light and very tough,” and that the entities who were “operating these machines were also of very light weight, sufficient to withstand the tremendous deceleration and acceleration associated with their machinery,” with Sarbacher having “the impression these “aliens” were constructed like certain insects we have observed on earth.” However, Sarbacher also stressed that this crash retrieval program was highly secretive. Indeed, according to a memo written by Canadian engineer Wilbert Smith in 1950 – but which only surfaced in the early 1980s – that recorded a conversation he had with Sarbacher (see <https://twitter.com/MvonRen/status/1685674848373366785>), Sarbacher is reported as saying that the program was “the most highly classified subject in the U.S. government,” classified two points higher than even the Manhattan Project to develop the atomic bomb.

Thus, UAP activities in the modern era date back decades, even before Roswell in 1947 (the most famous modern case). For instance, the 2022 US National Defense Authorization Act requires the department to review historical documents related to UAPs starting from 1945 (Tumin, 2023). This requirement may be because, several weeks after the US detonated the world’s first atomic bomb in July 1945 at the Trinity Site in the New Mexico desert, an “avocado” shaped craft reportedly crashed into a communication tower at this very location (Vallée & Harris, 2021). Indeed, there have since been many documented connections between UAP and nuclear activity and installations, as detailed by Hastings (2015). Arguably the most well-known is an incident in 1967 at Malmstrom Air Force Base, Montana, in which ten nuclear Intercontinental Ballistic Missiles (ICBMs) were seemingly deactivated by a UAP. The event was recalled by Robert Salas, a missile launch officer at the base, as follows (cited in Mounce, 2023):

Sometime in the evening, I got the first phone call from my security guard, and he said they’d seen some strange lights in the sky. Making no noise, flying very fast, stopping on a dime, reversing course, making 90-degree turns. Noiseless. He said, “They are not aircraft, sir.” We had reports in the city of Great Falls in the newspaper at the time of people seeing these strange lights and reporting them as UFOs. He calls back, and this time, he’s screaming into the phone. He’s frightened. You could tell by his voice that he’s very frightened. He said he had all

the guards out with their weapons drawn. They were looking at a glowing red-orange object hovering above the front gate. It was a pulsating red-orange light. I told him, “Well, make sure you secure the facility.” He was injured, and he had to hang up, so he hung up the phone. All our missiles started going no-go or shutdown. We also had two sites, the launch facilities where the missiles were actually located, about a mile or so away. We had incursion lights at two of the facilities. So, they got close to the sites and saw UFOs hovering over those two sites. We had control of 10 nuclear missiles. They were probably down for about 24 hours, I estimate.

Moreover, similar events have been reported in other countries with nuclear capabilities. For example, as part of the Congressional hearing on July 26, investigative journalist George Knapp submitted sworn testimony in which he discussed UAP investigations undertaken by the USSR during the cold war (cited in, and available at, Eberhart, 2023). Indeed, he said many such investigations had taken place: during a 10-year period, “thousands” of case files were accumulated, including 45 incidents in which “Russian warplanes engaged with UFOs, chased them, even shot at them.” Of particular relevance here are details of “an alarming incident at a Russian ICBM base in Ukraine” which had been shared with Knapp by the director of the USSR’s investigation program, Colonel Boris Sokolov, who said (paragraph 10),

UFOs appeared over the base, performed astonishing maneuvers in front of stunned eyewitnesses and then somehow took control of the launch system. The missiles aimed at the US were suddenly fired up. Launch control codes were somehow entered, and the base was unable to stop what could have initiated World War 3. Then, just as suddenly, the UFOs disappeared, and the launch-control system shut down.

More broadly, even aside from the nuclear connection, there has long been a close association between UAP encounters and military sites. In the UK, for example, the most famous such event occurred in December 1980 in England’s Rendlesham Forest (situated between two US air force bases), dubbed the “best documented and most compelling UFO incident ever to have taken place” (Pope et al., 2014, p. xvi). Over three nights dozens of military personnel saw various UAP activity, and two men actually apparently encountered a “small, metallic craft” in a clearing – described as “roughly triangular,” approximately three meters high and across the base, adorned with symbols akin to “Egyptian hieroglyphics” (p. 6) – with Sergeant Jim Penniston claiming to have even touched it. Such examples could be multiplied at length. Thus, it seems significant that although there have been UAP sightings throughout history (as noted further in the next paragraph), there has been a particular surge following the development of atomic weapons in the mid-1940s, which may be causally related to these very developments (as discussed in endnote 16 in relation to the ultraterrestrial hypothesis involving time-travelling humans from the future).

However, to reiterate, UAP are not only a modern phenomenon that has coincided with human beings developing advanced military technology and aviation capabilities. Indeed, accounts of UAP go back centuries. Crucially, as addressed in my previous article (Lomas & Case, 2023), such events are recorded as extraordinary and anomalous, and are clearly distinct from more conventional celestial phenomena that, even if novel and unexpected, such as comets, still behave in conventional ways (i.e., regular speed and trajectory). For instance, Vallée (2008) quotes from a 1594 edition of a book by Pierre Boaistuau, which cites the following as occurring near Tübingen, Germany, on December 5th, 1577 (pp. 24-25):

About the sun many dark clouds appeared, such as we are wont to see during great storms: and soon afterward have come from the sun other clouds, all fiery and bloody, and others, yellow as saffron. Out of these clouds have come forth reverberations resembling large, tall and wide hats, and the earth showed itself yellow and bloody, and seemed to be covered with hats, tall and wide, which appeared in various colors such as red, blue, green, and most of them black.

Moreover, as we enter the modern age, we find more recent UAP reports which crucially still pre-date the 20th century, which rules out the possibility of mistaking human aviation technology for UAP. For instance, in 1865 the *Brooklyn Daily Eagle* reported an encounter in Missouri, in which a fur trapper witnessed “a bright luminous body... moving with great rapidity... [which] suddenly separated into particles, resembling... the bursting of a sky rocket in the air... [followed by] a heavy explosion, which jarred the earth very perceptibly” (paragraph 2). Later that day, he came across a scene of “great and widespread devastation” involving a “track of desolation” cutting through the forest, with “giant trees uprooted,”

which he ascertained was caused by “an immense stone that had been driven into the side of a mountain.” Most strikingly, when examining this “stone,” he reported it was “divided into various compartments,” and “in various places it was carved with the curious hieroglyphics.” The latter remark of course has parallels with the Rendlesham Forest UAP, and indeed is a common feature of UAP encounters, including events that occurred well before the development of the internet or mass media (which would argue against mere “copycat” descriptions), such as the famous US airship sightings of 1896-1897 (see endnote 17).

As a final point, it should be emphasized that UAP are not merely a North American phenomenon, as illustrated by the examples in the USSR above. This point bears repeating, since following the Congressional hearing on July 26, numerous sceptics appeared to disparage the subject by mockingly wondering why UAP observations seem heavily concentrated in the USA. For example, Congressman Ted Lieu tweeted to his 1.6 million followers (<https://twitter.com/tedlieu/status/1685189657309663232>): “NSA can’t even keep basic secrets when employees go rogue that I highly doubt the government could keep spaceships and alien bodies a secret. Still waiting for any whistleblower to disclose the address of where the aliens are. Also, why are aliens always showing up in America?” However, as commentators like Daniel Miller have sought to clarify (e.g., <https://twitter.com/SicCoP1/status/1684795545544806402>), this is a misreading of the data, perhaps due to the fact that many of the maps circulating online that purport to show global UAP sightings in fact only draw on American and/or English sources, such as the US-based National UFO Reporting Center (<https://nuforc.org/>). When one takes a global perspective, one realizes this is indeed a worldwide phenomenon. Consider Brazil, for example: Rony Vernet, a Brazilian UAP researcher, shared a map featuring UAP cases documented by the Brazilian Air Force between just between 1954 and 2005 (i.e., omitting more recent cases), and noted no fewer than 674 in that country alone (<https://twitter.com/RonyVernet/status/1685696828392579074>).

¹¹ The “Nimitz encounter” refers to a series of episodes in November 2004 involving the US Navy’s Carrier Strike Group Eleven, which includes the USS Nimitz nuclear aircraft carrier, and the guided missile cruiser USS Princeton. As noted in the main text, over a two-week period the group encountered as many as 100 UAPs. This sequence began when radar operators on the Princeton – equipped with the SPY-1 radar system to act as air defense protection for the group – began detecting numerous UAPs. These were initially in low Earth orbit, before descending to around 80,000 feet (15.15 miles). These would arrive in groups of 10 to 20, before dropping further to around 28,000 feet (5.3 miles), then – suddenly and periodically – to around sea level, or even under the water, sometimes in as little as 0.78 seconds. Subsequent analyses by Knuth et al. (2019) indicate this rate of descent would have involved a maximum speed of an astonishing 46,000 mph (60 times the speed of sound). Knuth et al. moreover estimated the power required for this kind of acceleration. They conjectured – based on available data, including eye-witness reports – that each UAP was roughly the size of an F/A-18 Super Hornet (approximately 14,550 kg). As a result, they calculated the power required would peak at an incredible 1100 gigawatt (a unit of 1 billion watts), which exceeds the total nuclear power production of the USA by more than a factor of ten. Such calculations were not available at the time to personnel present, but the behaviour of these objects was evidently extraordinary and causing great perplexity and concern.

Such concerns came to a head on November 14th 2004, as two F/A-18F Super Hornets launched from the Nimitz on a training exercise. Each had a pilot – one of which was David Fravor, who testified in detail about the following encounter during the UAP Congressional hearing on July 26 – and a weapons system operator. Shortly after take-off, the radar operator on the Princeton detected a UAP entering the training area, and diverted the planes to intercept. As they approached its location, the aviators observed a disturbed patch of water below, as if a large object was submerged 10-15 feet below the surface. Observing this from 20,000 ft, all four aviators also noticed a white airborne UAP, shaped like a cylindrical butane tank – or a “Tic-Tac” – approximately 40-50 feet long and 10-15 feet wide, that was moving erratically back and forth like a “bouncing ping-pong ball,” involving instantaneous changes in direction without changing speed, despite having no apparent flight surfaces or means of propulsion. Fravor descended to investigate, at which point the UAP appeared to notice him and ascended to meet him, whereupon they began circling each other. However, when Fravor moved

to close the distance, it suddenly accelerated as if “shot out of a rifle” and was out of sight in a split second. (By comparison, a jet at Mach 3 takes 10-15 seconds to be out of sight.) Moreover, the Princeton radar operators observed that, in just a couple of seconds, the UAP then appeared at the “Combat Air Patrol” region – the planes’ original training rendezvous point – about 60 nautical miles away. Even more significant, this was a secret location with precise latitude, longitude, and altitude, at which the UAP arrived exactly. Meanwhile, the planes returned to the Nimitz, whereupon Fravor requested that F/A-18Fs equipped with infrared recording technologies be sent out to attempt to obtain footage. One did locate a UAP, albeit from a greater distance, and filmed it. A segment of this video was released to the public in 2017 (see e.g., <https://www.youtube.com/watch?v=IWLZgmnRDs4>), though it is very low resolution and relatively short (1.15 minutes); the unreleased version – classified “secret,” accompanied by briefing slides classified “top secret” – is reportedly much higher resolution and longer (e.g., 7-8 minutes) (Banias, 2020).

Such is the publicly available information about the incident. The key question is, what to make of it? As noted in the main text, Knuth et al. suggest “the extreme estimated flight characteristics” of the objects mean there are two main explanations: either the observations are “fabricated or seriously in error,” or alternatively, “these craft exhibit technology far more advanced than any known craft on Earth” (p.1). Some committed sceptics – people convinced *a priori* there must be conventional explanations – have been determined to prove the first option. One prominent debunker for instance speculated the apparent UAP on the infra-red video is “essentially just the glare of a hot object,” most likely a fighter jet (cited in Dyer, 2021, online article, paragraph 17). However, such explanations require one to discount the eye-witness testimony of the aviators, all of whom report observing something highly anomalous, as detailed in the main text. In part due to such testimony, Knuth et al. concluded “the number and quality of witnesses, the variety of roles they played in the encounters, and the equipment used to track and record the craft favor the latter hypothesis that these are technologically advanced craft.” Crucially, the US government has since acknowledged it was not an experimental US craft, nor do they believe it belonged to another nation. In this context, scientists have now sought to explore exactly what kind of technological advancements could explain their apparent behaviour. For example, physicist Jack Sarfatti suggested on the Hidden Truth podcast (2020) that the Nimitz Tic-Tac was able to attain its incredible speed and maneuverability by using a “metamaterial” that essentially allowed it to time travel by “alter[ing] the speed of light dramatically.” On a somewhat similar theme, Condorman (2023) explored how orb-type UAPs might be able to fly and manoeuvre (given how *non*-aerodynamic such shapes are), hypothesising that these could be built with “exotic superconducting materials” that could enable the orb to fly “using quantum magnetic levitation,” also known as the “Meissner effect” (paragraph 3). When such materials “are cooled to or below their critical temperature, they expel magnetic fields”; since this effect would apply to the Earth’s magnetic field too, by “switching sections of the sphere surface ‘on’ to expel the magnetic field and ‘off’ to stop the effect, one could make a sphere levitate and even move in any direction.”

¹² In terms of UAP-related projects associated with the US government, first was Project Sign (1948-1949), which evolved into Project Grudge (1949-1952) and then Project Blue Book (1952-1969). More recently there has been the Advanced Aerospace Weapons System Applications Program (AAWSAP) (2008-2010), sometimes also/alternatively known as the Advanced Aerospace Threat Identification Program (AATIP). The relationship between AAWSAP and AATIP is somewhat murky and often misunderstood. According to Lacatski et al. (2021), AATIP was initially an “unclassified nickname” used by Senator Harry Reid in his letter to the Deputy Secretary of Defense seeking funding for AAWSAP, whose real name Lacatski sought to keep secret for security reasons. Complicating the picture further, after AAWSAP closed in 2010, the AATIP designation was used for a separate smaller initiative at the Pentagon to study UAPs encountered by military personnel, from which the UAP Task Force emerged. Finally, one should note that this list only includes endeavours about which some confirmed information has entered the public domain; this still leaves the possibility of yet other completely secret “black” programs, which some informed observers speculate do indeed exist (e.g., as per Grusch’s allegations).

¹³ Numerous well-placed figures within the US government and military have recently made intriguing remarks in relation to some UAP potentially being genuinely anomalous, and have even alluded to the veracity of Grusch's allegations around a crash retrieval program. Of course, here we run into the interrelated questions of, (a) what kind of classified information such figures are granted access to, and (b) what they are able to share with the public. To the first point, interviewed on 7News Australia (2023) following the Congressional UAP hearing on July 26 (available at https://www.youtube.com/watch?v=x_9gTDXF9Vc&t=1403s), Ross Coulthart suggested that even US presidents have sometimes not been granted access to all relevant information, saying, "I know for a fact that, historically, presidents have been kept out of the loop. There were decisions made by gatekeepers in the national security and intelligence establishment not to brief presidents about the existence of this crash retrieval program." However, Coulthart said he also knows "for a fact" that Presidents Obama and Trump have been briefed not only in relation to UAP, but even the alleged crash retrieval program. Then, to the second point, even though figures like Obama and Trump are under obligations to not reveal details, Coulthart suggested that some of their public utterances do allude to their knowledge in this area, with several pertinent clips included within his 7News interview. For example, with Obama, besides the quote featured in the main text – where, interviewed by James Corden on 21 May 2021, he said, "There's footage and records of objects in the skies that we don't know exactly what they are" – he had an intriguing interview with Stephen Colbert on Dec 2, 2020. In this, Colbert asked, "Did you ever ask for information and they said, 'We can't tell you?'" to which Obama said, "No, but I will tell you there were times when I asked for information and it came slower than I wanted... Prying information out of the bowels of an agency can be challenging." Colbert then asked, "Any UFOs, did you ask about that?" to which Obama replied, "Certainly asked about that," then when prompted "And," said, with visible seriousness, "Can't tell you, sorry." Intriguingly, Obama further alluded to crash retrievals, saying, "Can I just say that it used to be that... Roswell was the biggest conspiracy, and now that seems so tame, right, the idea that the government might have an alien spaceship." Trump too spoke about Roswell in an interview conducted by his son Donald Trump Jr. on 20 June, 2020, that also featured in the compilation aired by 7News. Asked if he would declassify information about it, he said, "I won't talk to you about what I know about it, but it's very interesting." Commenting on this exchange, Coulthart said, "He's been briefed into Roswell, I know Trump's been briefed."

One can find numerous examples of authorities implying knowledge of potential UAP activity, but also evidently being constrained in what they can say publicly. For example, February 2023 saw a strange series of events, in which the US government not only publicly admitted tracking three UAP over its airspace, but actually attempted to shoot these down. Asked whether these were potentially extraterrestrial, General Glen VanHerck – Commander of the North American Aerospace Defense Command (NORAD) – said "I haven't ruled anything out" (cited in Stewart & Ali, 2023, paragraph 2). Strangely, it apparently is still unclear what these were, at least to some authorities; Lisa Murkowski, Senator for Alaska – the state over which one was reportedly shot down – said in July, "We haven't been able to retrieve it, so we haven't been able to confirm, you know: 'what was it?'" (see <https://www.askapol.com/p/sen-murkowski-on-uap-shot-down-over?>). That said, in the Congressional hearing on July 26, Grusch suggested the military *does* have more information about these shoot-downs (such as video recordings), but that these were being withheld from the public and possibly even from Congress, saying, "I've seen some of the videos of the recent shoot-down, and I saw no reason that couldn't have been released as long as they mask some data. The American people deserve to see that imagery in full motion video." On that latter point, speaking at the time about these events, Senator Richard Blumenthal made some cryptic remarks that sounded rather portentous, especially in light of Grusch's comments: "The American people should be given more information. They're ready for it. They can handle it. And they need and deserve to know it" (The Hill TV, 2023; available at <https://twitter.com/thehill/status/1626235199779667968>).

Indeed, some of the Congressional representatives involved in the UAP hearing on July 26 have been even more explicit. For example, in an interview on Event Horizon (2023), Rep. Burchett was asked, "have you seen compelling evidence that we're actually seeing something really weird in the skies that might affect national security or global security for that matter, that ... might be not of this Earth?" He replied, "Oh, one hundred percent, one hundred percent, no question."

In fact, discussing the hearing beforehand, he bluntly stated, “That’s what it is about: aliens. ... I think people deserve to know” (Carney, 2023, paragraph 4). Similarly, a commentator on Twitter suggested on July 1 that Burchett and fellow Congressman Matt Gaetz had recently been “shown something at a Florida Airbase that rocked their world view,” to which Burchett himself replied, “We don’t have crafts like this” (<https://twitter.com/timburchett/status/1675314791781392384>). He was subsequently asked about this Florida visit by Jeremy Corbell on July 4 on the Weaponised podcast (see <https://www.youtube.com/watch?v=hR1qPjKQao&feature=youtu.be>), who said, “Have you seen credible information, video footage ... that indicates to you there is a technology that’s more advanced than what the United States has?,” to which Burchett replied, “Matt Gaetz said it best, that he has ‘seen evidence of craft that do not exist on this planet, basically,’ so yes, absolutely, 100%.” Gaetz then elaborated on this point in the July 26 hearing, in which he spoke about seeing photographic evidence of “a sequence of four craft in a diamond formation, for which there is a radar sequence that I, and I alone, have observed in the United States Congress,” which was also accompanied by “a large, floating, what I can only describe as an ‘orb.’” Commenting on these photos, he said, “The image was of something that I am not able to attach to any human capability, either from the United States or from any of our adversaries.”

¹⁴ Recent research and analysis have suggested an extraterrestrial explanation for UAP is certainly plausible. Before considering whether extraterrestrial life could have actually visited earth, it is worth first noting the likelihood of extraterrestrial life existing *per se* elsewhere. In that respect, the scientific consensus is now that, statistically, this is almost certain, given the unfathomable scale of the universe. Although estimates vary, NASA calculates that our Milky Way contains at least 100 billion stars (NASA, 2023), and the observable universe contains at least 2 trillion galaxies (NASA, 2016). This means – if galaxies were all a similar size – there may be 200 sextillion (200 billion trillion, i.e., 2 followed by 23 zeros) stars in the observable universe. Of course, not all may host habitable planets (e.g., rocky planets capable of supporting liquid water on their surface), requiring a carefully calibrated “Goldilocks’ zone,” where conditions are “just right” (e.g., neither too hot nor cold). Even accounting for these parameters though, such planets may be relatively common, with estimates just for our galaxy ranging from 300 million (Bryson et al., 2020) to 6 billion (Westby & Conselice, 2020) up to possible even *every* star, which could mean up to 100 billion (Ojha et al., 2022). Fundamentally, whichever calculation one adopts, if the universe contains at least 2 trillion galaxies, the number of potentially habitable planets becomes incalculably large. However, even if habitable, this does not mean a planet actually *has* life. In recent years though, evidence has emerged suggesting life is capable of emerging under very diverse environmental conditions, and may well be relatively widespread throughout the cosmos. Indeed, tantalisingly, researchers have found potential signatures of organic life within our own solar system, including on Venus (Lea, 2023), Mars (Sharma et al., 2023), and Enceladus (one of Saturn’s 146 moons) (Postberg et al., 2023).

Even if life may be widespread through the cosmos though, the question of intelligent or civilized forms is another matter entirely. Calculating the likelihood of this is very difficult, as attested to by years of debates around the Drake Equation – regarding the number of detectable/contactable civilizations in the Milky Way (Drake et al., 2015) – and estimates vary wildly, depending on assumptions (Sandberg et al., 2018). Nevertheless, even if one stipulates, for instance, that the series of evolutionary leaps required for intelligent life to emerge on a habitable planet has odds of a trillion to one – so vanishingly small as to be essentially non-existent – we could still have, per Ojha’s et al.’s suggestion that every star possibly hosts a habitable planet, up to 200 billion potential instances across the cosmos. Indeed, even if only one star in every *billion* had a habitable planet, this would still mean, based on the assumptions above, around 200 cases of intelligent life. As such, the scientific consensus now acknowledges intelligent life elsewhere *does* exist. Consider for example remarks by Bill Nelson, head of NASA – who among all people is especially well placed to comment on this topic – during an interview at the University of Virginia (UVA) with Larry Sabato, Director of the UVA Center for Politics: “My personal opinion is that the universe is so big, and now, there are even theories that there might be other universes. If that’s the case, who am I to say that planet Earth is the only location of a life form that is civilized and organized like ours?” (cited in Todd, 2021, online article, paragraph 3; interview available at <https://www.youtube.com/watch?v=9hH1XEqKlTs>). Indeed, Westby

and Conselice (2020) estimated the number of “Communicating Extra-Terrestrial Intelligent” civilizations just within our own galaxy, and even under the strictest criteria suggest there may be dozens.

However, the possibility of such life actually engaging with Earth is considered far less likely, mainly due to the perceived difficulty of interstellar travel, given the vastness of space. Consider that our nearest stars, Alpha Centauri A and B, are 4.35 light years away. Using our current fastest existing means of travel – namely Gravity Assist, which harnesses the relative movement and gravity of planets to accelerate a craft, this being the method the Voyager 1 probe used to attain its current velocity of 60,000 km/hr – it would take 76,000 years to reach these stars (Williams, 2016). Crucially though, these calculations are only based on human beings’ current technological capacities, which are likely limited and liable to be radically revised in future. Indeed, even now, proposals for exponentially faster methods have begun to receive experimental testing (Williams, 2016). For example, an aerospace company (Pulsar Fusion) has begun construction of a nuclear fusion rocket engine – due for completion in 2027 – that is predicted to create exhaust speeds of over 500,000 MPH; if then the technology is developed further to allow this engine to be contained and harnessed within a space vehicle itself, this would greatly reduce travel times (e.g., enabling Mars to be reached within 30 days) (Sampson, 2023). Moreover, even faster methods are being developed. For example, NASA suggests a “laser sail” – ultrathin mirrors driven by focused energy beams – measuring about 965 km in diameter could accelerate to half the speed of light in less than a decade, thus arriving at Alpha Centauri in under nine years. Work on such ideas is already underway, including “Project Starshot,” which plans to send a small sensory package to Alpha Centauri at 1/5 the speed of light, meaning it may arrive within 30 years (Parkin, 2018).

Furthermore, even if such technologies are currently beyond our capacity, they may not be beyond that of *other* intelligent beings. Humankind has reached such possibilities being in its grasp after mere centuries of scientific development. Imagine what a civilization could be capable of after several thousand years of scientific progress, let alone longer time spans. People have wondered, for example, whether it may be theoretically possible to exploit “wormholes” to take a “short cut” through space (see endnote 20). Moreover, even if an interstellar voyage *did* take thousands of years, while obviously impossible for biological organisms as we understand them, it would be doable if hibernation or procreation could be maintained aboard the vessel. Indeed, it would most certainly be feasible if craft were piloted instead by AI systems or robots. To that point, Harvard’s Avi Loeb – director of the Galileo Project, which is systematically searching for “extraterrestrial technological artifacts” – suggests that craft being piloted by AI is indeed the most likely scenario if some UAPs really were extraterrestrial in origin (Loeb & Kirkpatrick, 2023). In fact, Loeb is of the position that two such artifacts may have already actually engaged with Earth. One is an object dubbed “Oumuamua” – a Hawaiian term roughly meaning “scout” – that passed through our galaxy in 2017 (Bialy & Loeb, 2018). This seemingly had numerous properties that “defied easy natural explanation” (Billings, 2021, paragraph 3), including being shaped like a 100-meter-long cigar, being at least 10 times more reflective than typical space rocks (suggesting “the gleam of burnished metal”), and, after passing by the sun, accelerating faster than could be explained by the star’s waning gravitational grip alone, and without emitting evaporating gases as comets do. To Loeb, the most likely hypothesis that fits all these data is that the object is a laser sail, perhaps “a derelict from some long-expired galactic culture” – though one should note that other scientists have disputed this conclusion (Wright et al., 2023).

Moreover, Loeb made further headlines in June 2023 with respect to a second potential interstellar artifact, when his Galileo Project embarked on an expedition to recover the remains of an unusual meteor, which fell into the Pacific Ocean in 2014. Based on its speed and other apparent properties (e.g., toughness), it was formally recognized as having an interstellar origin – i.e., from outside the solar system – at “the 99.999% confidence [level] in an official letter from the US Space Command under DoD to NASA on March 1, 2022” (cited in Loeb, 2023b, paragraph 8). Their search was seemingly successful, retrieving more than 140 sub-millimetre “metallic spheres” from the object’s projected landing path that seemed highly unusual, being mostly around 84% iron, 8% silicon, 4% magnesium and 2% titanium, a composition that Loeb (2023a, paragraph 2) suggested is “anomalous compared to human-made alloys, known asteroids and familiar astrophysical sources.” The absence of nickel is especially striking: iron and nickel are produced together in supernovae, and do not

usually become separated in natural astrophysical environments because of their similar atomic weights; however, humans remove nickel from iron alloys to make them stronger. As such, Loeb speculated these spheres could be “technological” rather than natural.

As to the potential nature and origin of any such technological artefacts, Loeb has offered various ideas, ranging from probes being deliberately sent to Earth (e.g., piloted by AI), to discarded “space trash” from other civilizations. Regarding the first theory, Loeb recently wrote a paper – intriguingly co-authored with Dr Kirkpatrick, director of AARO – that aimed to articulate a set of “physical constraints” based on “standard physics and known forms of matter and radiation” that would help in identifying “highly maneuverable” UAP that may genuinely be anomalous (Loeb & Kirkpatrick, 2023, p.1). They suggested that Oumuamua – or comparable large artificial interstellar objects – might function as a “parent craft that releases many small probes during its close passage to Earth,” akin to “dandelion seeds.” Although the entity recovered by Loeb’s team in 2023 preceded the appearance of Oumuamua, six months prior to the latter’s closest approach to Earth, a meter-sized object also recognized as interstellar collided with Earth, which Loeb and Kirkpatrick suggested could be one such “seed.” Another idea proposed by Loeb (2023c) is that such artefacts may constitute “space trash”: “Over the past ten billion years, other technological civilizations could have littered the volume of the Milky Way disk with numerous dysfunctional devices. This trash may have accumulated in interstellar space like plastics in the ocean” (paragraph 6). On that note, returning to questions of the statistical likelihood of there being intelligent extraterrestrial civilizations elsewhere, Loeb suggested that while “many scientists regard an encounter with a relic from another technological civilization as extraordinarily unlikely,” he regards it as “common sense to search for space trash of the type that we produce since there are *billions of Earth-like planets in the Milky-Way*” (paragraph 5, my italics).

Finally here, a related idea to extraterrestrial craft being piloted by AI is the possibility of “biological robots,” created by a non-human civilization, that are wholly or partially synthetic. This notion has been raised by Garry Nolan, who has suggested such entities might be designed to act as an “intermediary” between their creators and human beings (cited in Verma, 2023d, paragraph 12). This is why, he speculated, that reports of alien encounters usually involve entities with surprisingly similar physiognomy to humans, which one might not necessarily expect given the myriad of evolutionary pathways that intelligent life might take in the cosmos. That is, such entities may be deliberately fashioned to be not too dissimilar to us, thus not being too challenging to engage with, thereby allowing them to fulfil this intermediary role. Somewhat similarly, philosopher Bernard Kastrup (2023) suggested it was “plausible that a more technologically advanced alien civilisation would have vast control of their own genotypes and phenotypes, thereby designing themselves” for their various purposes, including space travel, “which could benefit greatly from DNA manipulation” (paragraph 7). Intriguingly, allegations along the lines of Nolan’s and Kastrup’s ideas surfaced recently on social media, causing a stir among UAP commentators. On July 5, 2023, an anonymous Reddit user (EBOscientistA) filed an incredibly detailed post, claiming that from the late 2000s to the mid-2010s he/she “worked as a molecular biologist for a national security contractor in a program to study Exo-Biospheric-Organisms (EBO)” at the Battelle National Biodefense Institute (https://www.reddit.com/r/aliens/comments/14rp7w9/from_the_late_2000s_to_the_mid2010s_i_worked_as_a/). The poster claimed the institute actually possessed four EBO bodies (and that other EBO entities were held elsewhere), and that the program aimed to “elucidate the genome and proteome basis of these organisms.” Most relevantly here, the explanation aligned with Nolan’s suppositions, reporting that “we’ve discovered that the EBO genome is a chimera of genomes from our biosphere and from an unknown one. They are artificial, ephemeral and disposable organisms created for a purpose that still partially eludes us.” As with other allegations reported in this paper, there is no way to know the validity of these claims at present. However, it is intriguing that most commentators leaned towards the account being at least plausible, and worth investigating further, including Nolan himself, who wrote, “This is a challenge to the [UAP] community to determine if they can come together and analyze this logically” (https://www.reddit.com/r/aliens/comments/14sni0y/garry_nolans_comment_reply_to_the_microbiologist/).

Moreover, the plausibility of such claims was subsequently lent further credibility by the proposed new UAP Disclosure Act, which specifically refers to the possibility – alleged by Grusch – that authorities actually have such EBOs in

their possession, referring to “biological evidence of living or deceased non-human intelligence” (p.6). Furthermore, in terms of Nolan’s suggestion of synthetic biological entities, it may be significant that in Grusch’s testimony to the Congressional UAP hearing on July 26, he used the specific and unusual term “biologics” to refer to EBOs in the government’s possession. In subsequent speculation online as to the precise meaning of this term, some commentators pointed to Pasulka’s (2018) chapter on “The spectrum of human techno-hybridity,” in which she writes that “Biologics is a category of bioengineered living tissue” (p.182). On a more general point about the possibility of authorities possessing EBOs (whatever their actual nature), for decades videos have circulated online purporting to show authorities interacting with EBOs. One of the most well-known is reportedly an interrogation of an EBO in 1997 by members of the US military at the underground S2 Alpha facility in Area 51, of which a video copy was apparently smuggled out by a disgruntled employee known as “Victor.” Another is a series of clips, known as the “Skinny Bob” tapes, which were uploaded to a YouTube channel named ivan0135 in 2011, which feature a classic “grey” EBO, and which were purportedly recorded by the KGB after a craft from the Zeta Reticuli star system landed in Russia. As with the Reddit post, there is of course no way to know the validity of such videos at present. However, some have been appraised as at least being plausible by observers who have studied them closely. For instance, Jon Stewart, the former candidate for Illinois governor, was interviewed on Redacted on July 23 about the “Victor” video (<https://www.youtube.com/watch?v=tIHgFr6DTvs>), where he said that, having spent more than five years investigating its providence and veracity, had concluded that it was likely genuine. Similarly, the Skinny Bob tapes have also been subject to considerable scrutiny (such as a forensic analysis at <https://skinnybob.info/>), and seem to have likewise so far resisted debunking. While many commentators are – perhaps rightly – sceptical of such footage and related accounts, in light of developments such as the new UAP Disclosure Act, once again it is perhaps worth keeping an open mind here as well.

¹⁵ In term of the phenomena potentially involving *numerous* extraterrestrial and/or ultraterrestrial entities, this is considered not only possible but likely by numerous people close to the topic. An eloquent elucidation of these possibilities is provided by Sharp (2023a) in an article on the upcoming – at the time his article was published – Congressional UAP hearing on July 26, of which he says, “key representatives in the U.S. Congress are aware of smoking gun evidence, which has compelled them to act. The momentum is now almost unstoppable” (paragraph 8). He finishes the piece by speculating on the “nature of potential non-human intelligences,” asking, “what if the picture is far more intricate” than many people suspect.

Let’s say there exist various factions representing conflicting agendas of multiple intelligences. Yes, some assert the presence of one or multiple intelligences, all benevolent and eager to aid humanity. That may be true and cannot be ruled out. And yes, on the other hand, there are those who paint a darker picture, warning of non-human intelligences that could bring doom to Earth. Again, that may be true and cannot be ruled out. Or perhaps the reality is far more complex. Consider our humble, small planet, with hundreds of nations, each competing with one another - all have differing and complex agendas... Now, try to fathom the complexity when we view this on a cosmic level. Humanity may find itself entangled in a broader situation. It’s possible that some of the inexplicable craft seen in the sky are in conflict with one another, which could be a cause of certain crashes. Another potential is that they’re indifferent towards us - or even that humanity fits within a wider agenda. Perhaps we cannot even anthropomorphize some of these multiple intelligences, indicating numerous layers of added complexity when compared to our small planet.

The possibility of numerous classes of extraterrestrial and/or ultraterrestrial beings stems partly from a rich tradition of encounter narratives that have emerged over the decades, in which people report having actually seen or met such entities (Kelley-Romano, 2006). The most common encounters involve the archetypal “Grey” alien which dominates portrayals of extraterrestrials in films (e.g., small grey bodies, large heads tapering to a narrow chin, and large black eyes), but others include “Nordics” (i.e., with a purported resemblance to Scandinavians, being tall, and with long blond hair, blue eyes, and fair skin), and “Mantis” types (an insect-like appearance). Furthermore, in addition to these kinds of humanoid entities – i.e., that are relatively close in size and physiognomy to humans – people have speculated there may be other life forms that are even stranger and harder to comprehend. For example, the musician Tom Delonge has been closely connected

to the UAP topic over recent years, having seemingly been selected by figures within the intelligence community that are pushing for disclosure to help advance their agenda and bring awareness of the phenomenon to the wider public (see e.g., Taylor, 2019, in the *New York Times*). In various interviews he has discussed what he has been told by his sources in this community, most of whom have not been publicly revealed (although it has been reported (e.g., by Aniftos, 2020) that emails leaked by WikiLeaks suggest Delonge had been working with Major General William N. McCasland – currently Commander of the Air Force Research Laboratory at Wright-Patterson Air Force Base – to assemble a UAP “advisory team”). Among the topics covered in these interviews are different potential life forms (as for instance discussed on Jimmy Church’s radio show “Fade to Black” on August 30, 2016 – available at <https://www.youtube.com/watch?v=nDIZ4iK0NSo>). In this, he said, “How it was told to me, the universe is teeming with life ... You have intelligences at all different levels on different planets.” This includes not only the humanoid entities noted above, but also “inorganic beings ... on rock planets or gas planets” and even “weird bands of light that are alive, that swim like worms in the vacuum of space” and “amoebas that are floating around sucking up energy [that] could be the size of Jupiter”. Clearly, we are far out in speculative territory here; however, the key point is that given how diverse life forms are even just on this planet, one would logically expect that, if life did exist elsewhere in the cosmos, it would similarly take on myriad forms, many of which we may not even be able to perceive or understand.

Moreover, the notion of there being numerous non-human intelligent entities has also gathered steam due to rumours that authorities have actually even interacted with some of these species. Perhaps the most persistent such story is that, in 1954, President Dwight Eisenhower held three meetings at the Holloman Air Force base with representatives of the Nordics to explore the possibility of signing a “treaty” in relation to us ceasing the development of nuclear weapons (which Eisenhower apparently did not agree to, wanting to keep exploring such technology), and instead later reached a “deal” with the Greys that would allow them to capture “cattle and humans for medical experiments” (Carlson, 2004, paragraph 15). Indeed, it has even been alleged that the US and other governments have entered into treaties with a “galactic federation” involving numerous non-human entities and civilizations. Although this notion might sound outlandish (even by the radically open-minded stance of this article), it has been explicitly suggested by people whose background and authority would apparently give their views at least some weight. These include Haim Eshed, former head of the Israeli Defense Ministry’s space directorate, who made the claims in a 2020 book whose title in English means “The Universe Beyond the Horizon. Although the book has not been translated into English, his comments on the book and the idea of a “galactic federation” have been reported in the US media, including by Suliman and Goldman (2020) for NBC News, who quote him as saying “There is an agreement between the U.S. government and the aliens” (paragraph 5).

To that point, some people close to the UAP topic – including those in the military and intelligence communities, with examples included below – believe that the process of governmental disclosure, as reflected in the new UAP Disclosure Act, is being accelerated due to some impending moment of contact, possibly with non-human civilizations with which some kind of agreement has been made. In contrast to any previous forms of encounter that may have been kept secret or only experienced by select people, it is thought this impending contact might potentially be a highly visible and public event of which all people would become aware. The need therefore is to acclimatize and inform the world regarding the existence and nature of whichever non-human beings or processes might be involved in the UAP phenomenon before this contact occurs. This point is made in a series of interview clips compiled and posted on Twitter by @redacted_media on July 23 (https://twitter.com/redacted_media/status/1683323812245553152). Speaking to the question of the disclosure process being accelerated, Lue Elizondo – former Director of the Pentagon’s Advanced Aerospace Threat Identification Program, who is currently still closely involved with the UAP topic – said, “There is a sense of urgency. People have said, ‘why now?’ Well, it’s because it’s not on our timescale, not on our schedule.” As to what this timescale may be, former CIA officer John Ramirez gave a possible date of 2027: “The word got out within the government that they’re showing up in 2027, and we better be prepared, and if not there’s going to be a lot of explaining to do.”

Finally, as to why this impending contact might be happening, the video compilation includes an undated clip from Paul Hellyer, former National Minister for Defense for Canada, apparently speaking in a public setting. In this video he

appears to be quoting a segment of text from Jim Sparks' (2006) book *The Keepers: An Alien Message for the Human Race*. Sparks was a well-known UAP "abductee" (i.e., someone who had reportedly had personal encounters with a non-human intelligence), who Hellyer himself had interviewed at length, as reported in his own 2014 book *The Money Mafia*. Sparks said that over numerous meetings with what he called "The Visitors" he had received various messages, which he was to relay to the human race. The segment quoted by Hellyer essentially indicated that contact will occur because the authorities on Earth had broken agreements that had been made with non-human intelligences around safeguarding the environmental conditions on this planet. The segment focuses on one particular meeting, in which Sparks recalls The Visitors saying:

There are some things you need to understand. Yes, it's true that we have been in contact with your government and heads of power. It is also true that agreements have been made and kept secret from your people ... We contacted your leaders because your planet is in grave trouble. Your leaders said that the vast majority of your population wasn't ready for anything like us yet. So we made time agreements with your leaders as to when your people would be made aware of our presence. This part of the agreement has not at all been kept. It was also agreed that in the meantime steps would be taken to correct the environmental condition of your planet with our advice and technology. We say 'advice' because we respect the fact that this is your planet, not ours. They also broke this agreement. Your air, your water, are contaminated. Your forests, jungles, trees and plant life are dying. There are several breaks in your food chain. You have an overwhelming amount of nuclear and biological weapons, which include nuclear and biological contamination. Your planet is overpopulated. Warning: It is almost the point of being too late, unless your people act.

¹⁶ In terms of the plausibility of other ultraterrestrial hypotheses, consider for example the categories of crypto-terrestrials and proto/ancient humans. Their existence would of course challenge the scientific consensus on the emergence of advanced civilization on this planet, which broadly holds that this was not attained until *Homo Sapiens* – who emerged around 2–300,000 years ago – began to develop complex societies around 5,500 BCE. However, some scholars have speculated that Earth could have witnessed other civilizations dating much farther back in time – whether early/proto humans, other hominid species, or even extraterrestrial visitors that long ago "settled" here – of which the evidence has since been eradicated. One line of thought, for instance, is that these may have been wiped out by the sudden and catastrophic rise in sea levels that occurred at the end of the last ice age, around 10,000 years ago. Tantalisingly, though, it is possible that traces of these early societies *do* remain – such as in cultural memories and religious narratives of a great "flood," which are found nearly universally (Nunn & Cook, 2022), and in submerged ancient architecture (Bell et al., 2008) – but that these have been generally overlooked or misunderstood (e.g., dismissed as "myth"). Of even greater intrigue and relevance here are conjectures that some such prehistoric civilizations managed to *continue* to exist, somehow surviving deep underground or under the sea, and moreover have been able to maintain and even develop their technological capacities (Tonnie, 2011). If so, one ultraterrestrial possibility for UAP would be technologies from these societies appearing above ground.

Indeed, notably, some UAP sightings report crafts entering/exiting potential underground entry points – from volcanoes to oceans – hence the reconfiguring of the UAP acronym to denote unidentified *anomalous* (rather than simply aerial) phenomena, reflecting these "transmedium" capabilities. To that point, the new UAP Disclosure Act (U.S.C., S. 2226, 2023), besides referring to "intact aerospace vehicles," requires authorities to release information regarding "damaged or intact ocean-surface and undersea craft associated with unidentified anomalous phenomena" (p.8). Thus, there seems to be increasing recognition of the importance of taking into account an underwater or underground dimension to the phenomenon. For example, in an article that reports on interviews with several Navy Submarine officers who have had "direct or indirect encounters with underwater UAPs," McGregor (2023) summarises the situation by saying, "These objects have been observed to behave in ways that defy our current understanding of physics, much like their aerial counterparts. They are said to move at incredible speeds, and are capable of sudden and rapid acceleration, deceleration, and direction changes, all without any visible means of propulsion or control" (paragraph 2). Thus, although this article focuses on the interdimensional hypothesis, in terms of the general epistemic openness and humility advocated here, the other

ultraterrestrial possibilities suggested by Puthoff (2022) are equally worthy of consideration and investigation. Indeed, there already seems an openness to such conjectures among authorities. Discussing the Grusch allegations, Rep. Mike Gallagher alluded to the crypto-terrestrial hypothesis, noting that another potential explanation for UAP is “an ancient civilization that’s just been hiding here, for all this time, and is suddenly showing itself right now” (The Pat McAfee Show, 2023). Making a similar point, Coulthart (2023) said that “there are NHIs, non-human intelligences, that have been engaging with this planet for ... more than tens of thousands of years. They’ve been with us from time immemorial, I’ve been told.”

Even Puthoff’s category of time-travellers – which on first glance may sound like the most improbable explanation – is being given serious consideration in the discourse on this topic (e.g., Masters, 2019). Indeed, Coulthart (2021b) – the investigative journalist who helped break Grusch’s allegations – said his sources in the intelligence community were specifically worrying about this explanation, and linked it to concerns future humans may have around our development of nuclear weapons:

I wish it was as simple as extraterrestrials ... that’s the easy explanation. The explanation that I’ve been exploring... involves the notion of future human time travel. Look, it’s only hypothetical... [but] if what I’m being told about that is true, then I would be ‘sombre’... If you think about it, why since 1947 has there been a phenomenon taking interest in the human race, particularly in nuclear weapons? Why is someone or something trying to send us a message about nuclear weapons? Why are nuclear weapons being shut down by ... ‘remote sensor disassembly’? What’s it trying to say? What’s coming? ... Imagine if future humans knew that, if we continue on the path we’re going, there’s going to be a nuclear war ... Wouldn’t you want to head that off? Wouldn’t you want to protect your kin?”

Intriguingly, serious physicists have weighed in to say that such scenarios are not *a priori* impossible. For example, in June Michio Kaku was interviewed on NBC (2023) on the UAP topic (available at <https://youtu.be/EZKQGzIddM4>). He began by saying that UAP data were receiving detailed scrutiny from scientists like himself, and that they really seemed genuinely anomalous: “We have videotapes of these things, and we physicists are now taking them apart frame by frame to analyse what is the state of their technology, and so far it seems to be beyond anything we can field with our arsenal.” Fascinatingly, he was then specifically asked about the possibility of time travel from future humans as an explanation, and said “I wouldn’t bet on it, but I wouldn’t rule it out either.” The discussion was nuanced enough to include his rejection of cosmologist Stephen Hawking’s objection to time travel (namely that it could create an infinite “loop” that could “blow the universe apart”). Kaku suggested that going back time would mean “the river of time would fork into two rivers,” so one would “split the universe” at that juncture into two different realities (i.e., one universe in which an agent did travel back in time, and changed the course of history from what it would otherwise have been, and one where no such intervention happened, and history proceeds as “normal”). In this context, scientists have begun to speculate on how it might actually be possible for vehicles or entities to time travel. For example, as noted above in relation to the Nimitz UAP, Sarfatti speculated that it was able to attain its incredible speed and maneuverability by using a “metamaterial” that allowed it to time travel by “alter[ing] the speed of light dramatically.” In a different conceptual space, new work on “traversable wormholes” suggests these may be able to function as a “time machine” (Frolov et al., 2023; see endnote 20).

¹⁷ It is curious though that as human “frames of reference” change over time through scientific and technological development, it appears that so do some UAP phenomena, strangely often doing so in ways that only slightly elude comprehension at the time. For example, in 1896-1897, the US saw a spate of UAP sightings that seemed to resemble “airships,” involving apparent technology that, as DeLonge and Levanda (2017) put it, was merely “twenty or thirty years (at most) beyond the capability” of humans at that time (p.89). That said, some sceptics have suggested such technology *could* have been within human reach at that point, perhaps being tested in secret by inventors and investors (Danalek, 2010). However, newspaper reports of the events are replete with unusual details that resist such explanations (see Busby, 1994), not least sightings of unusual beings. For example, writing in *The Dallas Morning News*, Haydon (1897) reported:

Early risers of Aurora were astonished at the sudden appearance of the airship, which has been sailing through the country... Evidently some of the machinery was out of order, for it was making a speed of only ten or twelve miles an hour and... [eventually] collided with the tower of Judge Proctor's windmill and went to pieces with a terrific explosion.

Significantly, the report notes that "The pilot of this ship is supposed to have been the only one on board, and while his remains are badly disfigured, enough of the original has been picked up to show he was not an inhabitant of this world" (paragraph 1-4). Moreover, echoing descriptions of other UAP cases – such as the 1865 Missouri and 1980 Rendlesham events discussed above – the report states that "Papers found on his person – evidently the record of his travels – are written in some unknown hieroglyphics." Of particular relevance here though is the relative crudeness of the phenomenon, at least relative to more modern UAP accounts (such as the Nimitz encounter). As such, some observers have suggested that the "Phenomenon" – capitalized to encompass and give a name to all UAP-related phenomena without presuming or foreclosing exactly what such phenomena are – is somehow being carefully orchestrated by some power or entity, doing so relative to human knowledge and expectation at a given time, and moreover doing so to achieve certain objectives vis-à-vis human beings. As DeLonge and Levanda (2017) write in relation to the airship encounters (pp.89-90):

Whatever is causing the Phenomenon to exhibit these characteristics has "stepped down" its visual impact so that it teases at the edge of our imagination... making an appearance that was almost credible to the level of technology of the general population of the time. They looked like flying boats... [and] were often silent but could change direction suddenly without any obvious propulsion system. ... They were just advanced enough to cause wonder and astonishment (if they were gas-filled balloons no one would have noticed, and it seems important that they be noticed), but not too much so that they would be invisible or beyond description. In other words, the Phenomenon is not looking to be ineffable, just wonderful. Fantastic, as in a manifestation of fantasy. It is as if we are being urged to dream a little more daringly, to imagine the possibilities of which we are capable. They have baited a hook, which we imagine to be a worm, and we take the bait."

¹⁸ In terms of orb-related phenomena studied by AAWSAP, there are a variety of observations. At times these come into close contact with individuals, so might not ordinarily fall into the class of observations labelled as UAPs. A previous owner of Skinwalker Ranch, for instance, had an experience reported by Lacatski et al. (2021) as follows:

Suddenly the orb flew directly towards the rancher and his wife, then halted about 10 feet above and in front of them. As the blue orb hovered above them, they got a very clear view of it. In interviews, both remembered that the orb was a glass-like object, about the size of a baseball, with two different bubbling blue liquids mixing and rotating inside. The object appeared to emit a sound like the faint crackling of static electricity. (ebook location 1329)

In other observations though, the orbs are closer to classical depictions of UAPs (i.e., distant objects in the sky). One case discussed by Lacatski et al. involved the owner of a different ranch, who reported witnessing a UAP that appeared to disappear in an unexplainable way: "As they were looking around, Roger saw a silver, grey, and blue flash disappear into an opening in the sky... Roger later told investigators that the sky "literally opened and a blue flash occurred as an oblong object appeared to enter the opening which then swiftly closed"" (ebook location 1117). Three AASWAP investigators subsequently visited to investigate, during which they

saw lights to the west as all three trained their night vision goggles (NVGs) in that direction. All separately verified seeing a series of six to eight brightly lit circular orbs that were estimated to be about two miles away. All the objects were moving and formed different transient patterns in the sky, ranging from a straight line with all eight objects parallel to the ground to a tightly clustered formation. (ebook location 1174).

Moreover, outside of the specific context of AAWSAP are other accounts of orbs in military and intelligence circles that could similarly be interpreted as "paranormal." Consider for example an experience

recounted in 2022 (available at <https://www.youtube.com/watch?v=2nkDQ21UInA>) by William McRaven, retired United States Navy four-star (the highest rank) Admiral who served as the ninth Commander of the United States Special Operations Command from 2011 to 2014. His account centres on attempts he was part of to recover the remains of nine US aviators who died in a plane crash in a remote part of Canada in 1948. As he retells it, the group did discover the plane, and held a ceremony for the victims. Strikingly during this, nine orbs appeared. Given these types of accounts, some UAP scholars and commentators have suggested there could be a spiritual dimension to this phenomenon, with some orbs interpreted as potentially being “souls” or “spirits” (see e.g., Steenhuisen-Siemonsma, 2022). Here is how McRaven himself describes the encounter:

We have found the remains of the plane and ... some bone fragments and we buried those at the site... You can believe it or not, but it is true, and I'm not the only one to have seen it. As we are kind of burying the remains of this thing and I said a little prayer over this cross we put up there, and then as I get through saying it one of the guys turns me goes, “Hey Sir, take a look up there.” And again, if you can imagine we're in this bowl and I think it goes up to about 8,000 feet or something like that and right above the ridge line I see what looks like a parachute flare. I'm thinking, “Is somebody shooting parachute flares?”. I'm looking around ... [but] nobody's shooting ... and there's two, three, four, five, six, seven, eight, nine, and they're kind of hovering up there, and [I'm] looking around thinking, “What in the world,” and the guy says, “Uh hey, Sir, how many of those do you see?”, and again it's this kind of glowing orb, and it's just kind of floating up there, and there were nine of them and there were nine victims on the plane, and it was up there for 10 or 15 minutes, [then] they all kind of hovered up and one by one they just kind of went up.”

¹⁹ A wormhole is a speculative structure, predicted by the theory of general relativity, that links disparate points in spacetime, potentially making it possible to take a “short-cut” through space. Most relevantly here, a special class of wormholes are theorised as being “traversable.” As Frolov et al. (2023) explain, their “characteristic property is that a region with nontrivial topology is located inside a compact spatial domain and the particles and light can penetrate through a topological handle and return to the exterior region without meeting a singularity.” Moreover, as noted above, they suggest a traversable “ring wormhole” could essentially function as a “time machine,” allowing entry to different points not only in space but in time.

²⁰ An illustrative case of psychologists being dismissive and closed off to findings that challenge a “common sense” view of the universe was reactions to research by Bem (2011), in a prominent journal, which appeared to show evidence of “precognition” (i.e., awareness of the future). Generally unable to fault the methodology per se, most psychologists just refused to accept the results, deciding *a priori* that such phenomena are impossible. For instance, Rabeyron (2020) states that “precognition *cannot* exist for a lot of psychologists” [my italics], so the only explanation for the results must be that “something [is] profoundly wrong in the way experiments are conducted in the field of psychology.” The attitude in those quotes is striking. On what basis are such psychologists so certain? Presumably, based on their understanding of the “laws of nature.” One wonders, however, about the state of understanding of physics among psychologists. One might guess that, for many (myself included, I should add), formal education in physics lasted possibly only as far as high school, and is unlikely to have covered cutting edge developments at a graduate level and beyond. This is of course not to disparage high school education nor us psychologists. However, it does mean we non-physicists should have humility regarding our relative ignorance, and not hubristically reject ideas based on a non-expert understanding of this and other fields. Indeed, regarding pre-cognition, there are serious discussions in physics about the “arrow” of time possibly being reversible (Donoghue & Menezes, 2020). Relatedly, the theory of a “block universe” can imply the future is already not only determined but actually

somehow present (Petkov, 2006). Indeed, Einstein wrote, “People like us who believe in physics know that the distinction between past, present and future is only a stubbornly persistent illusion” (cited in Block & Gruber, 2014, p.129). To be clear, as with the interdimensional hypothesis, such theories provide no evidence *for* precognition, but likewise physics also cannot necessarily be used as an argument *against* this possibility.

²¹ Coulthart’s (2021a) chapter on Pais’s work begins by noting the momentous detection of gravitational waves in 2015 (i.e., “ripples” in spacetime caused by objects with mass, such as black holes, moving through space and colliding/interacting). This discovery – almost one century after these had been predicted by Einstein as part of his theory of relativity in 1916 – earned the scientists involved a Nobel Prize in 2017. Coulthart then writes:

Yet, within just eight weeks of the announcement of this momentous breakthrough, in April 2016, an unknown US Navy aerospace engineer named Dr Salvatore Pais filed a patent for a revolutionary spacecraft driven by gravity waves that was straight out of *Star Trek*. As far as we know, nothing that Dr Pais said in his patent application had any basis in known and proven scientific technological breakthroughs and neither had it been subject to independent peer review and scrutiny. Oddly, he still got his patent, largely because the Navy vouched for his discovery. Intriguingly, the plans for his proposed craft resemble a triangular-shaped UAP. Dr Pais claimed to have discovered what he called an ‘inertial mass reduction device’, capable of generating the same kinds of gravitational waves whose existence had just been confirmed weeks earlier. He asserted his incredible new propulsion system would allow his craft to move at extremely high speeds in either water, air or outer space and, most incredibly of all, his navy boss alleged that the gravity wave propulsion system in Pais’s invention would soon become a *reality*” (italics in original).

Subsequently, although most details of Pais’s work remain hidden, he did speak about his ideas in a 2022 interview with Curt Jaimungal (available at <https://www.youtube.com/watch?v=5E6QyAhTB3o>). In this he discusses various aspects of his research, including the rigorous process he went through to be granted his patents, as well as specific patents and projects. Intriguingly, just before this paper went to press, one such patent was connected to an unfolding story that was captivating the scientific community. One area of Pais’s research focuses on room-temperature superconductors (i.e., material that perfectly conducts electricity at room temperature), long regarded as the “holy grail” of material science (Orf, 2023). Pais has seemingly created designs for advanced vehicles that could deploy such materials, as elucidated in a 2019 paper titled “Room Temperature Superconducting System for use on a Hybrid Aerospace-Undersea Craft.” Of particular note here, in late July, a team of researchers in South Korea claimed they had managed to create such a superconductor (see <https://twitter.com/Docneuroeo/status/1687502164833558528>), making headlines (Chang, 2023). At the time of writing, their achievement had not been confirmed, although several other teams had possibly replicated their findings (e.g., <https://www.tomshardware.com/news/superconductor-breakthrough-replicated-twice>). Most relevantly, a patent application by the Korean team (<https://patents.google.com/patent/WO2023027537A1/en>) included a citation for a patent for a “Piezoelectricity-induced Room Temperature Superconductor” Pais had submitted in 2017 (<https://patents.google.com/patent/US20190058105A1/en>). Indeed, these researchers are evidently not the only ones to have drawn on Pais’s patent; for example, in 2019, the engineer/scientist Brian Roemmele tweeted (<https://twitter.com/BrianRoemmele/status/1155535463962120192>) that he was “already working with an EIR at a Sand Hill Road VC to utilize the artifacts of the “Piezoelectricity-induced Room Temperature Superconductor” patent by Salvatore Cezar Pais.”

Moreover, some observers have suggested it may be more than a co-incidence that these scientific breakthroughs in material sciences have occurred around the same time as allegations of “reverse engineering” have surfaced publicly, and especially with the Disclosure Act on the horizon. In addition to superconductors, such developments include a team at the University of Connecticut creating a material five times lighter and four times stronger than steel (<https://scitechdaily.com/scientists-create-new-material-five-times-lighter-and-four-times-stronger-than-steel/>), and Sandia National Laboratories and Texas A&M University discovering metals with unprecedented apparent “self-healing” properties

(<https://www.timesnownews.com/technology-science/engineering-breakthrough-metals-now-capable-of-self-healing-scientists-article-102010743>). Of course, these remarkable breakthroughs may well be unconnected to the UAP topic, and the timing is genuinely coincidental and possibly connected to other recent advances, such as Chat-GPT. Nevertheless, observers have still speculated these discoveries might be linked to the programs alleged by Grusch. For example, some have pointed to claims made by Boyd Bushman, an engineer/scientist at Lockheed Martin, that he himself worked on a reverse engineering program (see https://www.youtube.com/watch?v=nd_ZXgObNNg). Most relevantly here, he alleged the program had led to technological breakthroughs in relation to “anti-gravity,” including creating materials that are able to “levitate.” Strikingly, the materials in the superconductor apparently have this same property (e.g., <https://twitter.com/instsondaw/status/1687458668814479360>). As such, observers like Roemmele (e.g., <https://twitter.com/BrianRoemmele/status/1687469968458444800>) have pointed to the role Bushman may have played in these developments.

Indeed, some observers have speculatively linked the timing of these breakthroughs to the Disclosure Act, which would compel the government and aerospace companies to reveal information or technologies they may have acquired in relation to attempts to “reverse engineer technologies of unknown origin” (p.6). One theory is that the government itself may be co-ordinating these developments as a form of “pre-emptive disclosure” (e.g., <https://twitter.com/Docneuroeo/status/1687497301781336064>: “If room-temperature superconductors are expected to lead to a rapid increase in technological development and potentially reveal the existence of UAPs independently, governments may choose to disclose their knowledge proactively to manage the narrative, rather than having it emerge chaotically”). Another possibility is private companies releasing the information before being compelled (e.g., <https://twitter.com/HappyAtomsBob/status/1687036395829784576>: “all these announcements may not be purely due to scientific progress, but possibly part of an intentional campaign to “leak” defense contractor R&D before Congress comes knocking”). Of course, as with other allegations featured in this paper, there is no way at present to know the validity of these speculations. However, also as with those allegations, it is worth also keeping an open mind regarding this topic and following people close to the topic (e.g., @BrianRoemmele) for updates regarding these potential breakthrough technologies.

²² The possibility that some UAP may be able to warp spacetime has even been raised in relation to Grusch’s claims of a crash retrieval program. Daniel Sheehan, an attorney involved in bringing whistleblowers to Congress, said that one alleged recovery involved a craft partially embedded in the earth that involved “all kinds of time distortion and space distortion” (cited in Boswell, 2023a, paragraphs 10-12). One person is reported as going inside, whereupon he experienced it as being “the size of a football stadium,” even though the outside was “only about 30 feet in diameter,” while in terms of time, he reportedly “staggered back out after being in there a couple of minutes, and outside it was four hours later.”

²³ Most experts regard consciousness as requiring – or at least involving – a substrate in the form of a biological nervous system. In that respect, the dominant scientific approach is the “neural correlates of consciousness” paradigm (Fell, 2004), which examines associations between subjectivity (mind states) and objectivity (brain states). However, the research is in its infancy, and this link remains poorly understood. As such, beyond these simple conjectures, the picture already becomes mysterious rather swiftly. This is particularly so with what Chalmers (1996) influentially called the “hard problem” of consciousness, namely *how* it apparently arises out of brain matter (in comparison to the relatively easy task of just tracing patterns of association). This lack of understanding means we currently have little knowledge around key questions, such as what architecture is necessary for consciousness, and relatedly, what types of beings and forms of material can experience it.

²⁴ There are certainly characteristics that most living organisms are thought to possess. NASA’s working definition of life, for instance, is a “self-sustaining chemical system capable of Darwinian evolution.” However, the borders of what constitutes life are rendered opaque by various phenomena that are not easily categorised, such as viruses (Forterre, 2016).

²⁵ Nagel (1979) for instance argues that although it may be inconceivable to imagine consciousness as a property of matter, it is no *less* strange than it somehow emerging from the interaction of complex forms of that very same matter (and indeed may be *more* unlikely). Somewhat similarly, Chalmers (2015) has developed a “monist” theory of consciousness in which the apparent dualist distinction between subjective mind and objective brain actually arises from a single substance (monism), which is neither mind nor matter (hence neutral), but rather is *information*. He suggests the dynamic flow and interaction of such information essentially requires a mentality of sorts. If two atoms interact, say, this involves a process in which they register and “understand” each other’s information. In that case, these information exchanges may have “protophenomenal” qualities, even if these “intrinsic properties are quite foreign to our conception” (p.154) of consciousness in humans. He admits this presents “the threat of panpsychism,” but suggests this may not be “such a bad prospect.” Evidently, even scholars open to panpsychism seem wary of it, as if too strange or radical. Likewise, Nagel felt the notion had “the faintly sickening odor of something put together in the metaphysical laboratory” (p.49). Yet they remain open to it, not least because consciousness *itself* is so fundamentally mysterious, with solutions to its “hard problem” as elusive as ever.

²⁶ Numerous observers have alluded to the potential relevance of field theories of consciousness to UAP topic. Sean Cahill for example – retired US Navy Chief Master-at-Arms who was one of the witnesses of the Nimitz UAP – was interviewed by Matt Ford (2023) in relation to the proposed UAP Disclosure Act. Discussing the Phenomenon, he first alluded to an interdimensional hypothesis, and went on to discuss possible implications for consciousness and our very existence as human beings (my italics):

What we're dealing with is something that can change the entire world... If these non-human intelligences are not coming from a planet like our own within the physical universe that we inhabit, because those distances are quite vast, then it speaks to a universe that we have nearly no understanding of other than at a mathematical level... So we're looking at aspects of our of ourself, we're looking at aspects of our reality, we're tiptoeing up to the idea that *we may be more than just this body, and that there are things involved with this technology that have to do with whatever we are when we are not this body*. Those are heavy, heavy concepts, and we seem a very young and confused species.

On a similar theme, it was intriguing that the Reddit user/poster/scientist who professed to be engaged in the analysis of Exo-Biospheric-Organisms (EBOs) – as detailed in endnote 14 – also dwelt upon such ideas, and in fact went into quite some detail. While much of their post focused on the biology of EBOs, it also touched upon what had apparently been learned from the EBOs about their “religion.” The poster wrote (paragraph 41):

They believe that the soul is not an extension of the individual, but rather a fundamental characteristic of nature that expresses itself as a field, not unlike gravity. In the presence of life, this field acquires complexity, resulting in negative entropy if that makes sense. This gain in complexity is directly correlated with the concentration of living organisms in a given location. With time, and with the right conditions, life in turn becomes more complex until the appearance of sentient life. After reaching this threshold, the field begins to express itself through these sentient beings, forming what we call the soul. Through their life experiences, sentient beings will in turn influence the field in a sort of positive feedback loop. This in turn further accelerates the complexity of the field. Eventually, when the field reaches a "critical mass", there will be a sort of apotheosis. It's not clear what this means in practical terms, but this quest for apotheosis seems to be the EBOs main motivation.

²⁷ A good illustration of the potential contribution of consciousness scholars to the UAP topic is offered by Curt Jaimungal’s “Theories of Everything” podcast, which provides a forum in which leading theorists of consciousness have elucidated their ideas at length, including Joscha Bach (2020), Carl Friston (2021), Stuart Hameroff (2021), Donald Hoffman (2020), Bernardo Kastrup (2021), Iain McGilchrist (2021), Chris Langan (2021), Anil Seth (2020), and Rupert Sheldrake (2020). Although not all would endorse perspectives one might describe as transpersonal or even paranormal, many explore some of

the more unconventional ideas around consciousness raised in this paper, such as going beyond the more conventional dualistic notion of it being localized within individual brains and instead possibly being ubiquitous throughout the cosmos (i.e., variants of idealism or panpsychism). Moreover, many of these interviews also directly touch on the UAP topic in that regard, with this a regular theme of the podcast. These are the kinds of conversations we shall need going forward to properly investigate and understand the phenomenon at hand.

²⁸ In terms of human perceptual limitations, first, we are constrained in the dimensions we can perceive. The clearest example is the electromagnetic spectrum, with waves involving frequencies ranging from one hertz (Hz, i.e., one cycle per second, with a wavelength of nearly 300,000 km), or even less, to above 10^{25} Hz (many trillion cycles per second, with wavelengths of less than a trillionth of a meter). This spectrum is divided into overlapping bands – from slowest/longest to fastest/shortest – consisting of: (a) radio waves (speeds of 3,000 Hz to 300 GHz [gigahertz, 1 billion Hz], and wavelengths from 100 km to 1mm); (b) infrared radiation (300 GHz to 400 THz [terahertz, 1 trillion Hz], and 1mm to 780 nm [nanometre, a billionth of a meter]); (c) visible light (4×10^{14} to 8×10^{14} Hz, and 740 to 380 nm); (d) ultraviolet radiation (7.5×10^{14} to 3×10^{16} Hz, and 400 to 10 nm); (e) X-rays (10^{16} to 10^{20} hertz, and 10 nm to 10 pm [picometer, a trillionth of a meter]); and (f) gamma rays (greater than 10^{19} Hz, and less than 100 pm). Of this vast array of signals, only visible light is perceptible to the human eye. By contrast, many animals have access to other regions of the bandwidth, especially longer/slower infrared radiation and shorter/quicker ultraviolet light (Cronin & Bok, 2016). Moreover, electromagnetism is not the only such spectrum of activity and information in the cosmos. Consider gravitational waves (as discussed in endnote 21); having been directly observed in 2015, in June 2023 the North American Nanohertz Observatory for Gravitational Waves (NANOGrav) made the first official detection of the gravitational wave “background” of the universe (Eureka Alert, 2023). These are so massive and slow that the distance between two crests is 2-10 light-years (9-90 trillion kilometers), and the corresponding time period can be as long as several decades!

In one sense, humans have gained access to these forms of “invisible” spectral data through theoretical and technological advances. For example, with the electromagnetic spectrum emerging in the work of Michael Faraday in the 1840s and James Clerk Maxwell in the 1860s, by 1886 Heinrich Hertz had invented apparatus to generate and detect radio waves. In such ways, our Umwelt expanded. However, it only did so selectively (i.e., only available to certain people), and in ways that rely on complicated processes of “translating” these hidden signals into ones humans can perceive themselves. Moreover, our Umwelt is constrained in further ways that relate to the above limitations. Staying with vision for the moment, organisms perceive events relevant to their size and existence. This means, to begin with, there are temporal limitations to our Umwelt. Thus, animals who exist on smaller and briefer scales can detect fast events to which the human eye would be oblivious. Flies for example can perceive flashes of a flickering light up to four times the speed of humans (who just see a constant light), meaning that subjectively, relative to humans, they perceive events in slow motion (Healy et al., 2013). Visually humans are also constrained in terms of factors like colour and sharpness. With colour, compared to our trichromatic retinas (blue, green and red cones; plus rods), butterflies have six or more photoreceptor classes with distinct spectral sensitivities (Arikawa, 2017). Moreover, our Umwelt boundaries are not only visual. With sound, for instance, while we only generally detect sounds from 20 Hz to 20 kHz, some bats have a range of 20 to 200 kHz (Heffner & Heffner, 2007). Beyond sound, animals can access other information sources that humans are not generally attuned to, like magnetoreception (Wiltschko & Wiltschko, 2019). Such examples could be multiplied at length, but the point is clear: our Umwelt is very different from other animals, even if we have extended its reach through technological innovation.

²⁹ Numerous UAP experts have argued that our perceptual and cognitive limitations hinder us from fully apprehending and understanding the phenomenon. As Semivan put it (cited in Verma, 2023b, paragraph 10-11):

The phenomenon is a natural part of our universe, and we’re living in it but we don’t recognize it. The same way that insects and animals don’t recognize the human universe. A cat and a dog could be running through a library, but they don’t have the faintest idea what the books are all about and what libraries are all about. We might be

walking through our existence and there's a whole other reality that surrounds us that we just simply don't have the ability to see or interact with."

Or consider a paper co-authored by two figures cited heavily above, Jacques Vallée and Garry Nolan (Vallée et al., 2018, p.2). In this, together with Federico Faggin, they suggest that perceptions and experiences regarded as "paranormal" may represent our brains actually accessing forms of information that usually lie outside the boundaries of conscious awareness:

[N]ew models for the evolution of consciousness and matter are under study... that suggest novel possibilities to interpret the nature of reality and which are at odds with a materialistic worldview. This includes the possibility of other forms of communication or contact with alien intelligences that are considered "science fiction" by mainstream science, yet have an extraordinary history of anecdotal evidence. We are speaking of everything from telepathy, empathy, remote viewing, and out of body experiences that may be pointing towards channels of communications beyond what electromagnetic waves can reveal. Before dismissing such ideas, we need keep in mind that all sensory apparatus our consciousness employs to interpret our immediate universe relies upon electromagnetic waves, which propagate as quantum fields. Our sensory apparatus operates in that quantum reality. We perceive quantum information and construct our internal "animal" view of reality—but are we perceiving all information fields enfolding us? Are we consciously aware of everything we are perceiving? Animals, and now humans, are recently understood to perceive magnetic fields. The proteins in our brain that form our neurons sit in a quantum mix where information is transferred in still unfathomable manners. Are those proteins and biologicals completely blind to all forms of information passing through them?

Making a somewhat similar point, Alain Juillet – former director of the French Republic's foreign intelligence service – suggested that although UAP may be usually outside the boundaries of our perception and cognition, they may sometimes become perceptible for some reason (Verma, 2022, paragraph 5):

For comparison, a fly with its faceted eyes can see dimensions other than ours even though it lives in our world. Perhaps, therefore, there are things that are in our universe that we cannot see in normal times because they are not in our field of vision. But perhaps, from time to time, something happens, that a phenomenon passes through our field of perception before disappearing.

³⁰ In terms of resistance to new ideas within science, consider for instance that the notion of diseases being spread by "micro-organisms" (germs and viruses) only gained acceptance in the late 19th Century (MacDonald, 2004). In part, this resistance stemmed from an inability to accurately observe and analyse such phenomena. After all, without adequate microscopes, pathogens are literally invisible. Therefore, from a naïve realist perspective, they do not exist: they are outside the Umwelt. No doubt, the idea of such invisible creatures may have seemed "paranormal" to some. However, development of technologies expands the Umwelt, bringing new dimensions and forms of existence into view, and in turn new theories and ideas, and indeed an expansion of reality, of what is "normal." The history of science is replete with such dynamics. Indeed, there seems to be a general tendency for people to hubristically assume their particular era has reached the pinnacle of knowledge and technology, and that further advancements are unlikely. However, such pronouncements are then often soon overtaken by work at the frontiers of science and technology. Take for example the question of aviation, which is of course pertinent to this article. Right up until the Wright Brothers made their first successful flight of a motor-powered heavier-than-air plane on December 17th, 1903, many scientists were confidently asserting such a feat was against the "laws of physics." Most famous perhaps was Lord Kelvin, eminent mathematical physicist, engineer, and President of the prestigious Royal Society of England, who in 1895 declared, "I can state flatly that heavier-than-air flying machines are impossible" (cited in Winston, 2002, p.292). As such, we should be not only be wary of assuming that the current state of scientific knowledge is relatively complete, but rather should expect that it is *not*, and so with humility and curiosity keep an open mind to possibilities, even if they seem highly unlikely from our current position, including the kinds of ultraterrestrial hypotheses discussed in this article.

³¹ In terms of new scientific/technological developments, consider for example the James Webb telescope, launched in late 2021, which can look an astonishing 13.6 billion light years into the distance, right back in time to the formation of the universe itself. Early findings from this are so surprising they are described as having the potential to “break cosmology,” suggesting “the universe is more strange and complex than even our boldest theories had supposed” (O’Callaghan, 2022). To that point, among these results are data suggesting the universe may be twice as old as suspected, potentially being 26.7 billion years old rather than 13.7 (Gupta, 2023).

³² In relation to remote viewing, for example, a CIA-funded program at the Stanford Research Institute, directed by Hal Puthoff from 1972-1985, generated some impressive and intriguing results (Targ, 2019). According to CIA documents declassified in 2002 (The American Institutes for Research, 1995), a review of the program concluded that although it did not provide an “unequivocal demonstration” of the phenomenon, nevertheless a “statistically significant effect has been observed in the recent laboratory experiments” (chapter 5, page 2).

NOTE: British spelling and punctuation have been retained throughout the article, per customary expression of the author.

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