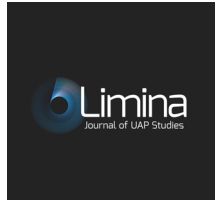




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The Demarcation Problem of UAP Studies

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“...all concepts in which an entire process is semiotically concentrated elude definition; only that which has no history is definable.”¹

ABSTRACT

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In this article, I discuss constitutive tasks in the development of UAP studies as a new academic discipline. Tracing the historical evolution of terminology from “Flying Saucers” to “UFOs” and finally “UAP,” my text highlights how shifts in nomenclature reflect deeper issues of conceptual clarity. I argue that grounding the discipline in a variety of unknown phenomena—ranging from aerial phenomena to reports involving encounters and abductions—under the presumption of a common, extraterrestrial cause, would ground it in a “modern myth” (C.G. Jung). This creates a demarcation problem which prevents the clear definition of basic terms and the development of valid hypotheses and scientific methodologies in favor of a predetermined correlation. There is a necessity for “boundary-work”—the careful delineation of independent subdisciplines with distinct hypotheses and methodologies. As new subdisciplines, I suggest object research, observation research, and encounter research, with the novel distinction that the research subject of all subdisciplines is not assumed to be uniform. At this stage, other relevant fields such as from the humanities and social sciences, which do not directly address the phenomena themselves, are excluded. Further structuring will not only sharpen methodological rigor but also integrate UAP studies more firmly into adjacent scientific domains. Some new subdisciplines, particularly encounter research, would require active collaboration with neighboring fields such as parapsychology, acknowledging the phenomenological richness that demands interdisciplinary approaches. Concurrently, UAP studies must maintain resilience: methodological designs should anticipate false positives and false negatives, that presumed anomalous phenomena are nonexistent or are incorrectly ignored. By addressing these foundational issues, I aim to contribute to the establishment of UAP studies as a credible, meticulously defined academic discipline with the aim of rendering concepts like “UAP” obsolete in the long term.

1 Nietzsche, trans. 2013, 57. „[...] alle Begriffe, in denen sich ein ganzer Prozess semiotisch zusammenfasst, entziehen sich der Definition; definierbar ist nur Das, was keine Geschichte hat.“ [sic] Nietzsche, 1887, II 13.

1. Introduction

When Kenneth Arnold reported observing nine peculiar objects in the sky during his flight near Mount Rainier, Washington, in June 1947, this event and the subsequent sighting wave and media coverage² marked both the inception of modern technological-age phenomena and the culmination of humanity's long-term involvement with unusual apparitions in the sky as well as with concepts of non-human intelligence.

Throughout the decades, this focus of studies has undergone a process of nomenclatural change: Coined *Flying Saucers* or *Flying Disks* by the US news media from 1947 on, this appellation has been firmly established in the vernacular for many decades. Following the initiation of military involvement with the topic, the US Air Force sought to define a more neutral term, which was introduced by the head of the Blue Book project, Edward J. Ruppelt, in 1952³: *Unidentified Flying Object—UFO*. And although it had appeared already in a title of proceedings of the “MUFON International Symposium” in 1987 in Washington, DC⁴, it was only recently, with the founding of the “UAP Task Force” by the US Office of Naval Intelligence in 2020⁵, that the term *Unidentified Aerial Phenomena* gained wider usage, later repeatedly redefined as *Unidentified Aerospace Undersea Phenomena* and then as *Unidentified Anomalous Phenomena—UAP*.⁶

Historical analyses in this context revealed that UFOs or UAP are embedded in recurring confrontations of humankind with similar phenomena, but each with different cultural characteristics, “*from Antiquity to Modern Times*”:⁷ “Ghost Fliers”⁸, “Mystery Airships”⁹, “Ghost Rockets”¹⁰, or “Foo Fighters”.¹¹ The existence of an overarching connection is as much a subject of controversy, as is the possible cause(s) of UAP themselves: Have they been “*interpreted [...] in its own terms*” by “*every epoch*” throughout history¹² or have

flying saucers been newly “*born above all as an aeronautical, technical mystery*” when “*the popular culture of the time immediately overlapped with them*” in 1947?¹³

Over the decades, in addition to mere sightings of unknown objects, increasingly exceptional experiences have been reported: alleged crash landings¹⁴, encounters with occupants (“*UFO-nauts*”)¹⁵, abductions by nonhuman beings¹⁶, and paranormal phenomena in the context of UAP¹⁷, each of which required the introduction of new terms and definitions¹⁸ as well as a suitable position within the body of potential explanations for UAP.

The terminological attempts to grasp the topic, as well as the ongoing debate concerning the contemporary nature of unidentified and anomalous aerial phenomena, are indicative of broader issues regarding their use for development of a conceptual framework of UAP studies. Insofar as the objective of these studies is to encompass “*methodologically sound scientific work done on UAP and related phenomena*”¹⁹, the *explanandum*, the knowledge interest and the delineation of the activities that shape such scientific work require precision and clarity.

Therefore, the purpose of this theoretical perspective on UAP studies is to illustrate an imperative for “boundary-work”²⁰ as part of its conceptual (re)structuring, including possible far-reaching consequences for the field. To elaborate on this, I aim to raise and substantiate the following aspects, composed over the different sections of the work:

1. **Background** of prevalent approaches to study UAP, including contemporary methodological varieties and working hypotheses,
2. **Key points of necessary boundary-work**, including terminological differentiation and methodical demarcation through identification of the UAP myth as a unifying context,
3. **Discussion of existing different approaches** to UAP studies and their potential to address the problems previously examined,
4. **Consequences** of the current missing boundaries,

2 for an overview of the media coverage concerning “the birth of the flying saucers” and its social aspects cf. Verga, 2023.

3 Ruppelt, 1956, 1, 8.

4 cf. Andrus and Hall, 1987.

5 US Department of Defense, 2020; it was replaced by the All-domain Anomaly Resolution Office (AARO) in July 2022, whose name evokes even more conceptual uncertainty.

6 cf. Knuth, Ailleris, Agrama et al., 2025, 5.

7 Vallée and Aubeck, 2010; the following are examples only from the 19th and 20th centuries.

8 cf. e.g. Keel, 1970.

9 cf. e.g. Cohen, 1981.

10 cf. e.g. Swords, Powell, Svahn et al., 2012, 12–29.

11 cf. e.g. Rendall, 2021.

12 Vallée and Aubeck, 2010, 12; emphasis by author.

13 Stilo, 2022, 9; emphasis by author.

14 for much more than the all-overshadowing “Roswell incident” cf. Stringfield [1978–1994] 2019.

15 cf. e.g. Bowen, 1974.

16 cf. e.g. Pritchard, Pritchard, Mack et al., 1995.

17 cf. e.g. Rogo, 1977.

18 e.g., what exactly constitutes an “abduction experience”? Cf. Rodeghier, 1995.

19 Cifone, 2024, 7.

20 Gieryn, 1983.

including the obscuring of the target of investigation,

5. **Recommendations** for actions as prerequisites for real knowledge acquisition on the respective research subjects,
6. **Summary** of the arguments given and outlook on their influence on UAP studies.

Each section (except the summary) starts with a short illustrative prelude, citing a practical case relevant to the respective main aspect to be discussed. This allows the theoretical considerations to remain anchored in the extremely diverse practical reality of anomalous phenomena, about which we ultimately strive to learn more.

2. Prevalent Approaches to UAP

2.1 Illustrative Prelude

Roger Clifton Jennison, a radio astronomer, observed a glowing sphere about 20 cm in diameter emerge from the pilots' cabin and move down the aisle during an electrical storm on a late-night flight in 1963.²¹ In his correspondence to *Nature* about his experience, he described this "Ball Lightning" as symmetrical and without heat.²² Such observations have been part of UAP cases many times, from visible small "Balls of Light"²³ to photographs of "Orbs" and have been related to extraterrestrial intelligence as well as to paranormal phenomena and to spirits of the dead.²⁴ Cases of "Balls of Light" are part of many UAP databases.

2.2 UAP Single Case Studies

As soon as the concept of UAP (in the form of "flying saucers") was introduced to Western society, the investigation of sightings and the questioning of witnesses who had reported them began. Since Kenneth Arnold's experience²⁵, many civilian organizations (and individual researchers) have emerged, some of which still exist today and receive and investigate UAP sighting reports from the general population.²⁶ Government organizations have also collected and investigated UAP reports, sometimes for decades, and

their files are often freely accessible today.²⁷ Furthermore, the case studies of civilian organizations are now often available for further research via online databases created by these organizations.

This main area of "classical ufology," the "forensic investigation and case compilation,"²⁸ is categorized methodologically as a collection of **single case studies**. These are part of many academic disciplines and are connected to the investigation of spontaneous phenomena prevalent in many sub-areas of anomalistics, including UAP, Recurrent Spontaneous Psychokinesis (RSPK), cryptozoology, and more.²⁹ The procedures and findings from single case studies on UAP have been published repeatedly.³⁰

Single case studies are responsible for most of the current knowledge concerning UAP³¹:

1. The vast majority (more than 95%) of people with UAP experiences have been shown to misinterpret a conventional stimulus—the reported objects could be identified.
2. UAP cases which remain unexplained are exceptional and rare events.³²
3. The category of UAP cases that remain unexplained has not yet been traced back to a single cause and there may not be one single cause.³³
4. The methodological separation of the potential physical properties of an observed UAP from the effects of human perception, interpretation, communication, and investigation is an extremely difficult process.³⁴

There are additional findings, e.g. the wave-like occurrence of UAP sightings, but it is unclear whether external stimuli cause them or whether a kind of media-fostered contagionism is the cause, which should be

21 Jennison, 1969.

22 cf. Ibid.

23 cf. e.g. Hopkins, 1987, 30 f.

24 cf. Schwartz and Creath, 2005; Pasulka, 2016; Santos, Arsenio and Koren, 2024.

25 cf. section "Introduction".

26 for an international historical overview cf. Eghigian, 2024.

27 cf. Koi, 2023.

28 Cifone, 2025, 6.

29 cf. Mayer and Schetsche, 2019, 13 f.

30 cf. most notably Hendry, 1979, and Randles, 1981.

31 for a more in-depth overview cf. Anton, 2019.

32 Different classification systems have been developed to categorize UAP phenomenologically as well as the investigation results, for an overview cf. Watson, 2013, 65–71.

33 "There are probably multiple types of UAP requiring different explanations based on the range of appearances and behaviors described in the available reporting." DNI, 2021, 3.

34 cf. the impressive collection of current work in Ballester Olmos and Heiden, 2023, and the comprehensive bibliography in Ickinger, Ballester Olmos, and Magin, 2024.

investigated further.³⁵

Presently, sighting databases comprising collections of reports and investigations represent the most comprehensive available collection of data on UAP, a fact that is unlikely to change in the coming years. These databases can serve as a valuable resource for the analysis of specific research questions related to UAP.³⁶ However, they are also subject to significant variations and problems regarding the quality of data they contain.³⁷ The main challenges are difficult access, varying source material, unclear investigation status, lack of structuring, and lack of standardization.³⁸ These issues must be considered in any data analysis.

For the conceptualization of UAP studies, questions arise if this type of methodology will become part of the new discipline and what it can contribute to the acquisition of knowledge about (which part of) UAP.

2.3 Physical UAP Data Capture

Confronted by the challenges inherent in the collection, documentation, and handling of data in single case studies, where the UAP of interest is invariably a thing of the past (the potential object as well as the experience connected to it), methods are being devised to measure UAP, thereby yielding “hard data.” With potentially significant new scientific discoveries, reliable, objective, scientifically assessable data are required, preferably from suitably calibrated sensors of various types.

It is surprising that, given today’s ubiquitous availability, there is still no conclusive visual evidence of UAP.³⁹ However, the characteristics of UAP complicate the process of “collect[ing] scientifically usable data about them”.⁴⁰ And although sensory calibration is problematic for objects of unknown origin, potentially measurable “observables” have been defined and promising approaches formulated⁴¹: from different types of cameras to (active as well as passive)

RADAR or MADAR, to remote sensing satellites, combined with AI-based approaches to evaluate the resulting extensive amounts of data in a useful manner⁴². To date, however, I am not aware of any accessible data sets from this type of research.

There are also arguments against attempting to capture physical UAP data only, as a substitute for reliance on UAP experiencers. Unlike instruments designed to obtain specific, predefined types of data, humans are able to perceive seemingly unrelated, unexpected, or new phenomena in context. Some properties of UAP do not even seem to have a “degree of physicality” (changing shape, becoming transparent, splitting up or merging, disappearing and reappearing elsewhere, moving in curves or turns at high speeds)⁴³. Furthermore, components of UAP that are closely intertwined with human experiences (e.g., the Oz factor⁴⁴) may never be physically measurable. Thus, “*relying only on instruments, hardware and software, diminishes centuries of useful and trusted emanations from the human condition.*”⁴⁵ In the worst case, the “*move away from the forensic cold case chase such as typifies classical ufology*”⁴⁶ might lead research groups studying UAP to act like ghost hunting groups.⁴⁷

For the conceptualization of UAP studies, the questions arise if this type of methodology directly is “*the new science of UAP*”⁴⁸ and how do we deal with experiences previously classified as UAP which will never be physically measurable?

These issues will become even more acute in the following subsection.

2.4 Encounter Research and Fringe Subjects

In some reported experiences categorized as UAP, the personal, psychological component so clearly outweighs any presumed physical event that different methods than those described above are used when working with the reporters and, if necessary, gathering data about their experience. These include, in particular, transformative UAP sightings⁴⁹, parapsychological effects in conjunction with UAP, as well as

35 There is some indication that the media exerts a considerable influence on the factors contributing to the proliferation of sighting reports. For instance, the marketing campaign “Humans Only” for the movie *District 9* in 2009 resulted in approximately 33,000 calls and 2,500 voice messages reporting alien sightings in the USA (as requested on the campaign posters), cf. Lee, 2009.

36 For examples of current work based on UAP report databases cf. Antonio, Itami, Dalmedico et al., 2022; Medina, Brewer, and Kirkpatrick, 2023; Powell, Little, Hancock et al., 2023.

37 For illustrative examples of this, cf. Rutkowski, 2024, and Powell, 2024, 23–25, 28–29. That anecdotal data contained in these databases “*can be improved using NLP*” as stated on Powell, 2024, p. 44, however, I am not convinced of.

38 cf. Ammon, Günter, Kramer et al., 2023, 310–312.

39 for interesting initial statistical considerations cf. Szydagis, 2025.

40 Kayal, 2022, 95.

41 for an overview cf. Knuth, Ailleris, Agrama et al., 2025, 40–43.

42 Even long-lasting field observations and measurements are part of the work, cf. Tedesco and Tedesco, 2024.

43 Thompson, 2024, 167 f. In this contemporary book, the author refutes the hypothesis that UAP can be explained as physical, material objects.

44 “*This sensation of being isolated, or transposed from the real world into a different environmental framework, is one of great importance to our understanding of UFOs. [...] I call it ‘the Oz Factor’, after the fairytale land of Oz.*” Randles, 1983, 100.

45 Bohlander, 2024, 460.

46 Knuth, Ailleris, Agrama et al., 2025, 43.

47 cf. e.g. Mayer, 2013.

48 Knuth, Ailleris, Agrama et al., 2025.

49 on the psychological impact on UAP experiencers cf. de la Torre, 2024.

bedroom visitors and abductions.

For distressing exceptional experiences, counseling work is indicated in order to alleviate anxieties and to facilitate the integration of the experience and subsequent changes into the individual's worldview and their everyday experience, regardless of their ontological status.⁵⁰

The findings from this working methodology prompt further inquiry into the factors that lead to certain individuals having such life-changing experiences (and placing them in the context of UAP) and others do not. The concept of an “encounter-prone personality” arose, without this trait having any psychopathological character.⁵¹ This concept aims to explain effects such as the Oz factor⁵², but also why some people experience UAP and other parapsychological phenomena throughout their entire lives.

Some researchers have gone so far as to classify the topic of UAP generally as a part of parapsychology (“paraufology”) and interpret UAP as subjective, symbolic manifestations in the sky whose physical properties, if any, are generated psychokinetically.⁵³ It is noteworthy that here, the *explanandum* “UAP” is substituted by another *explanandum* (“psi”), for which an *explanans* remains equally absent. The assertion that UAP are part of a category of phenomena which can only be understood by establishing a new worldview, deviating from the prevailing materialistic trends, has also been suggested.⁵⁴

Sometimes, results presented by researchers on these types of encounters are not shared by the experiencers. They understand their experiences in a broader, not only extraterrestrial context which often extends beyond the specific UAP-related theses pursued by the researcher (see also the following subsection).⁵⁵

Beyond the realm of personal experience and extending into the physical realm, there may be fringe phenomena that some researchers include in the complex of UAP, depending on their hypothesis: “UAP deposits and damage”⁵⁶, but also crop circles, animal (and sometimes human) mutilations, encounters with “Men In Black”, or with cryptids: For all of these exist reports with connection to UAP. Likewise, different

investigative methods are required to explore these subjects.⁵⁷

For the conceptualization of UAP studies, the questions arise if these methodologies (which ones?) will become part of the new discipline and on what conceptual basis a demarcation will be established for accepted vs. non-accepted methods pertaining to UAP.

The fact that the absence of precisely this conceptual basis is currently the most significant impediment to the development of UAP studies will be the subject of the following section on *boundary-work*.

2.5 Formulation of Hypotheses

In scientific research, (working) hypotheses are used as guiding principles for the definition of research questions, for the design of experiments and collection of data for confirmation or disproof of them, and for the interpretation of work results. Regrettably, research on UAP is marked by a paucity of clearly defined and rigorously pursued hypotheses.

Beliefs on the cause for UAP developed early on with their (modern) emergence and over the decades underwent a type of escalation⁵⁸, together with reports of UAP and related experiences⁵⁹:

- *anthropogenic cause*: UAP are human-made, secret new weapons from the US government, or, more shockingly, from the cold war enemy: the Soviet Union⁶⁰
- *extraterrestrial cause*: UAP are intelligent space aliens, visiting earth in their vehicles
- *interdimensional cause*: UAP are entities which are not part of our space-time continuum
- *time traveler cause*: UAP are (humans) from the future

But also causes originating from earth and from experiencers were proposed, some explicitly as reaction to problems with the application of an extraterrestrial cause:

- *zoological cause*: UAP are unknown organisms
- *geophysical cause*: UAP are unknown natural phenomena

50 for a description of this methodology cf. e.g. Rabeyron, 2022.

51 cf. Ring, 1992.

52 cf. previous subsection.

53 cf. e.g. Clark and Coleman, 1975.

54 for arguments in favor of an idealistic worldview, cf. Thompson, 2024; for an overview of animistic beliefs, cf. Dumsday, 2025.

55 Examples from the topic of abduction experiences are Jordan-Kauble, 2021 (referring to the researcher Budd Hopkins, 1987) and Pasulka, 2016, 379–384 (referring to the researcher John E. Mack, 1994); cf. also Thompson, 2024, 124 f., 225 for further examples, even including Kenneth Arnold.

56 Knuth, Ailleris, Agrama et al., 2025, 23–25 list burnt plants and burnt or drilled-into soil, dropped metallic fragments, and “angel hair”.

57 There are of course several other ways to approach the topic of UAP, including the humanities and social sciences, as well as political (especially demands for “disclosure”), explicitly religious, or personal perspectives; I will not consider these further here, as I argue that they do not fall under the category of direct scientific knowledge acquisition on UAP.

58 aptly described also as individual consideration by Jeffrey Kripal in Thompson, 2024, 3 f.

59 lists based on Ammon, 2020.

60 cf. e.g. Eghigian, 2024, 84.

- *parapsychological hypotheses*: UAP are created by unknown parapsychological abilities of the experiencers
- *psychosocial cause*: UAP are unknown, culturally influenced psychological phenomena
- *known cause*: UAP can generally be explained by known causes

It is not possible here to explain these assumptions in detail, some of which have been expressed many times before, but they are of course contradictory, and most are too vague to serve as scientific hypotheses because of their lack of specific and verifiable predictions. One of the reasons for this is the aspiration to provide a cohesive explanation for a wide variety of phenomena classified as UAP (from unexplained nocturnal lights all the way to abduction experiences). I consider this criticism particularly appropriate in the context of presumed extraterrestrial causes, which have been pursued for nearly eight decades.

The supposition that UAP could be extraterrestrial visitors⁶¹ which can be physically confirmed one day (often mockingly called the “nuts and bolts” approach to UAP⁶²) faces the following problems in particular⁶³:

- undetermined provenance of the objects / beings
- ambiguous motivation of the visitors
- changes in the form, appearance, and behavior of the objects / beings, adapted to respective cultural ideas (over the centuries, if you will)
- implausible, contradictory, or absurd elements in UAP experiences

In my estimation, the “Extraterrestrial Hypothesis (ETH)” cannot be considered as hypothesis without more specific information about exactly who is visiting us how, from where, and why. “It’s space aliens” is neither adequate nor does it explain the variety of phenomena.⁶⁴ The current successor term of “Non-Human Intelligence (NHI)”⁶⁵ is of course (deliberately) even more vague.

The absence of well-formed hypotheses concerning UAP is a major obstacle to the professional development of a new discipline of UAP studies: How should we proceed with Prof. Jennison’s report⁶⁶ and similar events? On what basis could further investigations be conducted? How can UAP studies develop well-founded hypotheses? Below, I will contend that preparatory work, in the sense of *boundary-work*, is a prerequisite for this purpose.

3. Boundary-work for UAP Studies

3.1 Illustrative Prelude

Ms. Betty Lambert, a classical dancer, actress, and pianist, went to sleep in her bedroom in Westcliff-on-Sea, Essex, on a warm September night. She had been lying in bed for about ten minutes when she heard a loud buzzing sound and saw a “lovely pair of wings” with a wingspan of fourteen to sixteen inches belonging to a “a little being like a gnome” about nine inches long, which flew across the room to the bay window and then into a niche next to the mantelpiece.⁶⁷ She reported the experience to the Fairy Investigation Society in the UK.

3.2 Scientific Demarcation

Scientific demarcation can be defined as the philosophical and practical endeavor of establishing criteria for distinguishing legitimate science from non-science and other forms of knowledge production. Coined as “Abgrenzungsproblem” by Karl Popper⁶⁸, its challenge lies not only in an academic classification, but in establishing epistemic warrant—the distinct justification that scientific knowledge claims over other forms of knowledge. In light of the contemporary rise of scientific misinformation, challenges to expertise, and post-truth politics, the significance of this issue remains salient.⁶⁹

At its essence, scientific demarcation involves **boundary-work**: social and intellectual processes which involve the creation, maintenance, and challenge of boundaries between scientific and non-scientific domains by scientists and philosophers.⁷⁰ Thomas F. Gieryn’s contributions shifted the focus from purely philosophical demarcation criteria to the practical negotiation and defense of the boundaries of

61 Ironically, the first people to publish about UAP being spaceships, were “parapsychologists” and mediums, cf. Verga, 2022, 143–163.

62 cf. e.g. Eghigian, 2024, 247.

63 These issues have contributed to the development of alternative theses regarding UAP, having a more extensive history particularly in Europe, cf. e.g. Evans, 1986.

64 Cf. also the well-established arguments presented by Vallée, 1990. A notable exception is Daniel M. Gross’s concretization specifically regarding the Hessdalen lights, cf. Gross, 2013. For more recent, different approaches to address the relationship between UAP and extraterrestrial intelligence cf. Watters, Loeb, Laukien et al., 2025, 9 (where the automatic association of UAP and extraterrestrial origin is discussed and dismissed), and Knuth, Powell, and Reali, 2019, 16 (where the estimated accelerations of certain UAP are considered to be a possible indicator of “spacecraft”).

65 cf. e.g. Knuth, Ailleris, Agrama et al., 2025, 39.

66 cf. subsection “Illustrative Prelude” in this section.

67 Johnson, 2014, 171.

68 cf. Popper, 1969, 8–13.

69 cf. e.g. Martini, 2020.

70 cf. Gieryn, 1983 and Gieryn, 1999.

scientific disciplines in response to external challenges or competing forms of knowledge.

I aim to adapt the conceptual framework of demarcation and *boundary-work* to address the definitional challenges in UAP studies as a new scientific discipline.⁷¹ What can and cannot be part of scientific UAP studies? I consider this adaptation to be valid, as the delineation of UAP studies will include the differentiation of concepts and procedures to gain knowledge about UAP as either scientific or non-scientific in nature.

As an initial step, *boundary-work* is therefore begun here on the terms and methods for gaining insights into UAP as they have been discussed in the previous sections.

3.3 Achieving Terminological Clarity

A new scholarly approach to UAP and their rich historical, cultural, political, religious, psychological, and scientific-technological context “*is broader than both classical ufology and the nascent scientific study of UAP; it constitutes a richer conceptual landscape that is critical, empirical, and interpretive, applying the rigor of academic scholarship to UAP as well as the accounts surrounding them (insofar as today we can increasingly distinguish the two).*”⁷² This broadening and re-founding of a subject area necessitates, and encourages, a novel examination of the fundamental concepts, methodologies, and hypotheses. I would like to start this examination with the most fundamental definition, the foundational basis for UAP studies—UAP themselves.

What are UAP? With the different acronyms for the phenomena containing the “U,” an implicit status concept was introduced: UAP are *unidentified*, first by the experiencer and subsequently for the researcher.⁷³ After a thorough investigation, a conventional explanation for a registered UAP can either be found retrospectively—it can be *identified* after all—or it remains unexplained.

The utilization of this term and the delineation of its application present a series of challenges. Firstly, it is important to note that UAP can only be defined in the sense of a negative definition. As previously stated, this signifies that conventional explanations are progressively eliminated, and any phenomenon that cannot be attributed to a known explanation is considered to be part of the residual category

of “UAP.”

The second challenge pertains to the conventional or known explanation, which is part of a corresponding scheme or paradigm but not independent of it. Consequently, the identification, as well as the non-identification, of a UAP is inherently relative to this scheme or paradigm, and the UAP is consequently defined in relation to it. UAP may be unidentified in relation to one scheme or paradigm but identified in relation to others. These first two definitional aspects were addressed in detail by Michael Martin in 1982.⁷⁴

Another characteristic of the UAP definition, namely the subjectivity of the aforementioned elimination process, further complicates matters. When J. Allen Hynek assigned this process to “*persons who are technically capable of making a common sense identification, if one is possible,*”⁷⁵ he thereby invited numerous disputes between such individuals who consider themselves technically skilled but arrive at different conclusions regarding specific case investigations (many publications on UAP consist of exactly these disputes). There is no more direct justification for human involvement in UAP than leaving the question of what constitutes a UAP in specific cases to humans themselves.

One final point to mention here that argues against the use of the term UAP is its inherent complexity. As the term has broadened over time, more diverse phenomena can be considered UAP. The etiology of UAP is likely multifactorial. Concurrently, the uniformity of UAP as a globally consistent class of phenomena remains to be proven. There is a lack of empirical evidence to support this claim, particularly from countries with minimal Western cultural influence.

These considerations complicate the maintenance of the UAP term as such. The impact of eliminating “UAP” on “UAP studies” is evident. However, the phenomenological characteristics delineated have not yielded any viable hypothesis.⁷⁶

The method presented here should be applied to other terms as well, if they are to be integrated into UAP studies, e.g. to “abduction experiences.”⁷⁷ In the following I will focus on another fundamental issue: the anomalous characteristics of UAP, defined by “strangeness.”

What is “strangeness”? UAP evoke anomalous and unexpected characteristics, making it impossible for

71 Greg Eghigian has already published about *boundary-work* in the context of UAP research, but as an external work, for integrating it into mainstream science, cf. Eghigian, 2021.

72 Cifone, 2025.

73 In UAP single case studies, these are different persons, while with physical UAP data capture, these might be roles assumed by the same person in different stages of the data analysis; cf. the preceding sections on methodologies.

74 Martin, 1982; for further references of definitional issues cf. e.g. several contributions from Sagan and Page, 1972, or most recently Watters, Loeb, Laukien et al., 2025, 2 f.

75 Hynek, 1972, 10.

76 cf. subsection “Formulation of Hypotheses”.

77 cf. Rodeghier, 1995.

researchers to provide a prosaic identification. Consequently, they are regarded as potential scientific anomalies that could lead to revolutionary new discoveries.⁷⁸ J. Allen Hynek already suggested that specific numerical values should be assigned to both “strangeness” and “probability” (the probability that a reported UAP observation actually involved a physical object) to categorize and compare UAP cases. Various other scales for determining strangeness were developed later, but mostly without specifying any anomalous characteristics other than the observation of intelligent control or occupants directly.⁷⁹

For reporters of UAP experiences, objects that can later be identified, can exhibit an “apparent strangeness.” For example, the observation of a triangular, floating object—characteristics that appear strange to the observer—might turn out to be an airplane flying toward the observer under unfavorable visibility conditions. Apparent strangeness stems from the limitations of human perception and memory.⁸⁰

Only few fundamentally anomalous properties of UAP are known and these have been only minimally verified. They include light phenomena observed with UAP that contradict the fundamental principles of light wave propagation. Examples are lights that move in and out of an object in an “elevator-like” manner (referred to as “solid lights”), or extremely bright yet non-dazzling lights. However, properties can also be considered anomalous in relation to a specific working hypothesis. For example, a helicopter could be a possible conventional explanation for a given case, but an observed property could contradict the appearance or behavior of a helicopter.

The most recent endeavor to define anomalous characteristics of UAP are Luis Elizondo’s “Five Observables”⁸¹:

1. positive lift without flight surfaces
2. sudden/instantaneous acceleration
3. hypersonic velocity without signatures
4. trans-medium travel
5. low observability or cloaking

Several issues are associated with these observables:

Firstly, they appear to imply intelligently controlled objects with a physical propulsion, which precludes their application to arbitrary hypotheses regarding UAP. Furthermore,

the five observables are not an exhaustive list: UAP cases may not manifest any of these observables and yet remain fundamentally unexplained; a future exclusion of such cases from the category of UAP would require objective justification. Furthermore, some of these observables have only been measurable in very few cases to date. Observations by humans are often misinterpretations; for example, bursting weather balloons are often reported as “it instantaneously accelerated and was gone.” Finally, at least some observables are time-bound by humanity’s own technological progress; trans-medium travel is already being implemented today by Chinese drones launched from submarines.⁸²

Another subcategory or part of the scale, “high strangeness,” is typically associated with close encounters and abduction experiences. However, these are almost exclusively subjective experiences. With high strangeness in specific cases, the distinction between UAP and other exceptional human experiences⁸³ becomes increasingly blurred, a point that researchers have previously noted⁸⁴. Consequently, it is plausible that UAP-associated experiences characterized by high strangeness and other exceptional experiences share the same underlying causes, whether external or internal. This suggests that a focused investigation of exclusively UAP-related experiences may hinder the acquisition of new knowledge.⁸⁵ Regardless, if high-strangeness experiences are included in the concept of UAP, then UAP contain a human element that cannot be measured physically. The relationship between external and internal is fundamentally unclear here.⁸⁶ There have already been several attempts in the past to distinguish UAP research from experiences that are characterized by high strangeness.⁸⁷ Attempting this again would be tantamount to repeating history. A more effective approach could be to compartmentalize the concept of UAP.

The most problematic aspect of UAP with high strangeness is the presence of absurd elements within these experiences. These defy credulity without them being attributable to an unreliable reporter or other easily explainable circumstances, from unusual behavior observed in objects to contradictory and nonsensical statements made

⁷⁸ cf. Chen, 2025.

⁷⁹ Exceptional human experiences include, for example, near-death experiences, out-of-body experiences, or telepathy, all of which have been documented in abduction cases.

⁸⁰ cf. e.g. Ring, 1992.

⁸¹ cf. Thompson, 124 f.

⁸² “...there might be ‘something’ to this weird phenomenon [UFO abduction reports]. Just what this ‘something’ is, however, I am unable to say with any assurance, since the phenomenon itself seems to defy most attempts to categorize it in terms either as a subjective event of ‘inner space’ or as an objective event of ‘outer space’.” Zimmerman, 1997, 235.

⁸³ cf. Hynek, 1972, 138 f., and Denzler, 2003, 140 f.

⁷⁸ on the role of anomalies in scientific progress cf. Humphreys, 1968, Kuhn, 1970, Cleland, 2019, pp. 176–184.

⁷⁹ for an overview cf. Ammon, 2016.

⁸⁰ cf. subsection “UAP Single Case Studies”.

⁸¹ cf. Knuth, Ailleris, Agrama et al., 2025, 5.

by alleged occupants, to overlaps with seemingly unbelievable parapsychological events: “[*Near-death experiences*] can occur in conjunction with *UFO experiences*; *Bigfoot has been sighted during UFO flaps*; there are accounts of *Bigfoot making bedroom visitations*. *Fairies and uniformed military personnel have been encountered in ET abduction experiences*. *Poltergeist phenomena are found in the lives of crop circle investigators and UFO witnesses*.”⁸⁸

This led J. Allen Hynek and Jacques Vallée to the conclusion that these experiences are “*not consistent either with what you would expect from space visitors, or with what we know about physics*.”⁸⁹ Despite their vagueness, the category of strangeness too suggests that classifying all different forms of experiences as UAP has problematic effects on the demarcation of UAP studies. In the following subsection, I aim to explain the rationale behind this classification and its implications.

4. Dissecting the UAP Myth and Separating Scientific Disciplines

The core of *boundary-work* lies in the identification of scientific methods and their demarcation from other modes of knowledge acquisition. According to Brenda Denzler, who has conducted extensive research through the administration of surveys to numerous participants at UAP-related conferences in the United States, there are four ways to approach the topic⁹⁰:

- government-/political approach
- religious approach
- scientific-critical approach
- personal-experience-based approach

The absence of a concrete, clearly defined subject of investigation, termed “UAP”⁹¹, gives rise to the question of what exactly unites these approaches in the background. The answer can be found in the realm of popular culture, specifically in the modern myth of extraterrestrial (non-human, intelligent) visitors.

The concept of intelligent extraterrestrial life has its origins in ancient thought and was later adopted by Christian philosophers.⁹² With the advent of industrialization based on scientific and technological advancements in the 19th century,

a plethora of new tropes emerged from speculative scientific essays, novels, newspaper hoaxes, or religious revelations⁹³, which from 1947 became integral components of “the spectrum of UFO research”⁹⁴: Object sightings, physical and biological interactions, contacts with occupants, “psychic connections,” and abductions.

Years before the first modern report by Kenneth Arnold, similar reports of disc-shaped spacecraft, stories of alien abduction, and conspiracy claims were a regular part of the pulp science fiction magazine *Amazing Stories*.⁹⁵ Along with the media coverage of the reports and recordings of unknown objects, popular culture addressed the topic, which has since become the subject of numerous products, including movies, television or streaming series, books, comics, and everyday items. The term “UFO” is widely associated with images of spaceships and aliens, which are deeply entrenched in the collective memory of at least Western civilization. This close relationship between UAP experiences / research ideas and popular culture has been most thoroughly investigated by Martin Kottmeyer.⁹⁶

Carl Gustav Jung coined the term “modern myth” for UFOs, when he distinguished between traditional historical myths and contemporary narratives which serve the same psychological functions.⁹⁷ He noted that individuals from diverse cultural backgrounds exhibited a propensity to ascribe reality to UFOs, irrespective of their personal experiences—a phenomenon which to him suggested an emergence from the collective unconscious rather than from individual psychological factors.

In the last years, religious scholar Diana Walsh Pasulka pointed out that the “modern myth” functions as a framework for the interpretation of extraordinary experiences, a function previously performed by traditional religions: “*anomalous experiences become connected to a cultural narrative*”⁹⁸, they are “*remembered with and through the vast corpus of media products about abductions and UFOs*.”⁹⁹

If the concept of extraterrestrial intelligence is, above all, a belief system which links observed balls of light with object recordings, physical and biological effects, close encounters, and abductions¹⁰⁰, then it is important

88 Hansen, 2001, 469.

89 Hynek and Vallée 1975, 25.

90 cf. Denzler, 2001, 32 f.

91 because of its negative definition, cf. previous subsection.

92 For the history on the debate about the origins of human concepts of extraterrestrial life cf. Guthke, trans. 1990 (from Guthke, 1983), Crowe, 1986, Dick, 1982, and Dick, 1996.

93 for a detailed review of these historical “artifacts” on extraterrestrials cf. Aubeck, 2022.

94 cf. Hynek, 1988.

95 cf. Peebles, 1994, 3–7.

96 cf. Kottmeyer 1990, and Kottmeyer, 1989.

97 cf. Jung, 1958.

98 Pasulka, 2019, 101.

99 Pasulka, 2019, 148.

100 cf. also Scribner and Wheeler, 2025; Zeller, 2021, 3–6.

to consider the implications of this on the design of UAP studies: From a phenomenological perspective, there are no established correlations between all the disparate experiences, measurements, and other data labeled as UFO or UAP¹⁰¹!

However, which criteria should be utilized to select certain aspects of a conceptually unclear term and disregard the rest? As previously mentioned,¹⁰² the act of renaming the research subject to “UAP” and excluding the “incredulous experiences” does not contribute to a solution, especially not if the phenomena are inextricably linked to humanity. I regard this **“the demarcation problem of UAP studies.”**

The issue of the myth’s influence on scientific-critical work is evident even in contemporary publications, where UAP as a topic of “*local SETI*”¹⁰³ appear in volumes named “*Extraterrestrial Intelligence*”¹⁰⁴, while the relationship between UAP and extraterrestrial life remains an area of speculation.¹⁰⁵ Here, extraterrestrial visitors can act as “invisible intentional agents”¹⁰⁶, carrying the risk of a wide range of *ad hoc* justifications.

My position on this matter is that *boundary-work* for UAP studies should involve the separation of mythical elements of space aliens and spacecrafts from the rigorous scientific methods to be employed. This approach might even facilitate for a certain subdiscipline to someday substantiate a concrete, actionable “extraterrestrial hypothesis”, beyond the confines of popular imagination.

If a modern myth serves as the backdrop for previous activities related to UAP, then I conclude that the various methods¹⁰⁷ are *incommensurable*: they may not target the same research subject, so, a comparison of their contents is impossible. The terminological ambiguity regarding UAP serves to obscure this fact.

I see no alternative to consciously addressing these facts by defining and delineating independent subdisciplines for UAP studies, addressing specific subtopics of the UAP complex, without presuming that these subdisciplines share a uniform research agenda or the same research subject. The subdisciplines would have the potential to formulate hypotheses without necessitating the comprehensive

integration of the entire complex of phenomena. The physical data capture of UAP, as currently favored¹⁰⁸, can be considered one of these subdisciplines, but it cannot be exhaustive for the field. The physical capture of UAP data will be unsuccessful in replicating certain anomalous effects derived from UAP experiences and obtaining “hard data” about them. A fundamental objective in the development of UAP studies as a new discipline is therefore to distinguish between anomalous objects and exceptional experiences.

Observing or registration with technical sensors of unexplained phenomena mostly in the sky can be a unique event with no possibility of repetition for those involved. A substantial corpus of documentation and data exists on this part of UAP. However, UAP also encompass lifelong, life-altering exceptional experiences in the context of unexplained objects and beings. These topics elucidate the most fundamental phenomenological discrepancies. And yet, people register objects in the sky, or they establish connections between disparate unusual experiences in their lives and categorize both “UFOs” or “UAP”. From a phenomenological perspective, it would be advisable to establish distinct terms for these phenomena, perhaps in conjunction with adequate subdisciplines.

These considerations result in a proposal for an initial subdivision:

UAP-related object research could address the physical and technical detection of anomalous objects, with a particular emphasis on acquiring hard data.¹⁰⁹ This subdiscipline encompasses a range of specialties, including but not limited to physics, space technology, and sensor technology. The research subject of this subdiscipline would be anomalous sky-related objects.

UAP-related observation research could involve the investigation of reports concerning the perception of unusual sky-related phenomena as reported by members of the general public or by pilots, for instance.¹¹⁰ One potential objective could be to assess their impact on flight safety. Necessary here would be competencies in interviewing techniques, data collection on aerial conditions, and so on. The research subject would be individual, seemingly anomalous experiences.

UAP-related encounter research would concentrate on individuals with (repeated) experiences with “high

101 for a discussion on how different researchers describe different things and label them as UFOs / UAP cf. Thompson, 2024, 18.

102 cf. previous section.

103 cf. Ailleris, 2011.

104 cf. Kayal, 2022.

105 Cf. also Peters, 2025. These speculations also exert an influence on SETI initiatives, cf. Traphagan, 2014.

106 Boudry, 2022, 91.

107 cf. section “Background”.

108 cf. Knuth, Ailleris, Agrama et al., 2025.

109 Current initiatives in this subdiscipline which also already aim at boundary-work include Watters, Loeb, Laukien et al., 2025.

110 for foundational work on this topic cf. Hendry, 1979, Haines, 1980, Randles, 1981.

strangeness,” who designate these encounters as UAP-related. However, this subdiscipline would engage in collaborative work with other research groups investigating different exceptional experiences, as their research domains are interconnected, potentially leading to the identification of related causative factors.¹¹¹ Psychological and parapsychological knowledge is important for a comprehensive understanding of the subject matter. The subject of research would be exceptional human experiences.

My demarcation proposal appears to reiterate existing conditions; however, a novel distinction is the recognition that the research subject of all subdisciplines is not assumed to be uniform. This approach enables the formulation of hypotheses and the application of scientific methods that are specific to the subdiscipline in question. For instance, in the context of *encounter research*, studies may be designed with control groups, such as individuals whose life-altering experiences do not appear to be rooted in actual events¹¹², without affecting or questioning the work of *object research*. Nevertheless, since all subdivisions remain parts of UAP studies, exchange on procedures for study as well as on parallels and discrepancies in their findings would be beneficial.

Ideally, this work would soon lead to basic textbooks for these fields, which are sorely lacking in research on UAP to date. And additional subdisciplines may be established upon the scientific community’s consensus that these should (also) be incorporated into UAP studies.

I would like to recognize that, following a transition period, this distinction of *research programs* has the potential to ultimately eliminate the need for unjustifiably unifying terms such as “UFO” or “UAP” in the field of anomalistics altogether. Moreover, the approach would prevent the entire topic of UAP from being classified as a sub-issue of the mind-body problem, due to its subject-object involvement, which would clearly complicate any further, specific research.¹¹³

The winged gnome that Ms. Lambert saw in the bedroom in Essex¹¹⁴, would become a subject of the necessary collaboration in *encounter research*, since she classified her experience as a *fairy sighting* based on her cultural background: Apart from the appearance of the being, the parallels to experiences of others who interpret them as (*alien*) *bedroom*

visitors are striking.

5. Discussion

5.1 Illustrative Prelude

In 2018, 81-year-old Laurie Beatty of New Brunswick, Canada, developed memory loss, communication issues, and seizures, passing away the following year.¹¹⁵ Dozens of patients, mostly younger, showed similar unexplained neurological symptoms, but no definitive diagnosis or suspected common environmental cause was found. Eight deceased patients were later found to have different, known diseases. The discourse surrounding the potential identification of a shared etiology for the observed illnesses, as opposed to the notion of diverse, unrelated factors, persists.

5.2 Phenomenological Approach

In this section, different approaches for addressing the challenges associated with the topic of UAP are discussed, with increasing levels of peculiarity, as they can be regarded as alternative viewpoints or hypotheses compared to my proposal.

The first approach involves a strengthened phenomenological approach to understanding what UAP are. Here, the acquisition of knowledge is to be derived from immediate appearances and actual phenomena. This facilitates the identification and significant mitigation of the influence of the modern myth of extraterrestrial visitors. Furthermore, considerations are raised regarding the overlap of UAP with other phenomena, such as parapsychological phenomena. A renowned proponent of this approach is Bertrand Méheust¹¹⁶, but also philosopher Kimberley Engels¹¹⁷, and others. The challenge inherent in a purely phenomenological approach stems from the broad spectrum of phenomena falling under the umbrella of “UAP.” The objective would remain to provide a comprehensive description of balls of light, as well as object recordings, physical and biological effects, close encounters, and abductions, etc., employing a phenomenological approach, and then to derive a hypothesis, a potential agent, a common cause. In particular, since the concept of “strangeness” has not (yet) been plausibly objectified and we cannot identify

¹¹¹ A notable illustration for this is the research conducted by Kenneth Ring, 1992, who methodically examined the characteristics of alien abduction experiences, comparing them to those of near-death experiences.

¹¹² for explicit dreams about UFOs / UAP cf. e.g. Jung, 1958, 29–88, and Méheust, 2025, 32.

¹¹³ cf. Thompson, 2024.

¹¹⁴ cf. subsection “Illustrative Prelude” in this section.

¹¹⁵ cf. Donahue, 2024.

¹¹⁶ cf. Méheust, 2025.

¹¹⁷ cf. Engels, 2025.

any anomalous characteristics that unite the complex of topics related to UAP¹¹⁸, I argue that it is difficult to find and describe “genuine phenomena.”

However, phenomenological approaches are compatible with the proposed specific subdisciplines of UAP studies. They can help to redefine a research topic for these subdisciplines and to formulate hypotheses.

5.3 Elusiveness Thesis

A second approach to comprehending UAP involves acknowledging their primary characteristic of “elusiveness”, which prevents them “*from exceeding a certain threshold*”¹¹⁹ and “*seems to limit or render impossible any more precise knowledge of their manifestations.*”¹²⁰ Consequently, obtaining indisputable proof remains unattainable.

Bertrand Méheust identifies the correlation between elusiveness and intentionality, suggesting that such behavior indicates a deliberate intention.¹²¹ Additionally, he is accurate in referring to intentionality in poltergeist phenomena¹²², where (contrary to the name) research does not implicate a supernatural entity, but rather attributes them to the unconscious and impulsive energies of individuals, often adolescents – Recurrent Spontaneous Psychokinesis (RSPK) as a more specific, scientific term.

Ultimately, the discussed elusiveness, intentionality, and “theatricality”¹²³ are human attributes. If these are constitutive of UAP, then UAP are clearly and exclusively (para-)psychological phenomena. Given this premise, I propose that rather than newly creating UAP studies, the observed phenomena should become part of parapsychology. The explanation of the elusiveness of such phenomena is already part of parapsychological models such as the Model of Pragmatic Information (MPI).¹²⁴

Furthermore, the question arises as to what extent elusive phenomena, whether external or internal, would be falsifiable in Popper’s sense. This problem becomes even more acute in the following subsection.

5.4 Control System Thesis

I will conclude by discussing approaches in which the complex

topic of UAP is considered to be subject to an even stronger degree of unknown, intelligent control, using the example of Jacques Vallée’s “spiritual control system”. He articulates his thought process: “*To put it bluntly, the UFO phenomenon does not give evidence of being extraterrestrial at all. Instead it appears to be inter-dimensional and to manipulate physical realities outside of our own space-time continuum.*”¹²⁵ He proposes a spiritual control system, influencing human consciousness with paranormal and UFO phenomena. There are no statements on the nature of this control, other than that its development was a reaction to the absurd elements in the cases he investigated. In this respect, the approach is the sole one under discussion that explicitly targets these characteristics of “high-strangeness” UAP.

The control system and comparable theses have been characterized as scientifically problematic in various sources¹²⁶, as they do not meet criteria of falsifiability¹²⁷ for a rigid hypothesis: It is nearly impossible to define events or results that would prove the thesis to be false. The control system could always be responsible for them. With these considerations, one is thus (consciously) departing from the scientific framework.

I consider this to be a significant boundary condition for hypotheses that are newly developed in a nascent field of UAP studies: their falsifiability should be considered from the outset, and appropriate criteria should be incorporated when formulating them. If the control system thesis, for example, would specifically be defined as psychical abilities of humanity (perhaps inspired by the concept of the collective unconscious¹²⁸), then if it cannot be proven that humans possess these abilities, or they possess other, conflicting abilities instead, this thesis would be refuted.¹²⁹

The various approaches discussed here involve the retention of UAP as a coherent concept. The illness cases in New Brunswick¹³⁰ serve to illustrate the complexity of distinguishing between a shared cause and distinct individual causes for multifaceted phenomena. Once perceived as interconnected, pursuing opposing approaches appears very difficult. For this reason, too, I have proposed dividing the field of UAP studies into subdisciplines, each covering part of the UAP complex.

118 cf. section “Achieving Terminological Clarity”.

119 cf. Méheust, 2025, 28.

120 cf. Méheust, 2025, 29.

121 cf. Méheust, 2025, 34 f.

122 cf. Méheust, 2025, 37–39.

123 cf. Méheust, 2025, 30.

124 cf. e.g. von Lucadou, 1995.

125 Vallée, 1988, 209.

126 cf. e.g. Peters, 2024.

127 for the development of this concept („Falsifizierbarkeit”), cf. Popper, 1969, 14–17.

128 cf. Jung, 1958, 116–122.

129 for a more refined model for dealing with UAP, retaining the critique on the extraterrestrial theses, but also not deconstructing the UAP concept, cf. Vallée and Davis, 2003.

130 cf. subsection “Illustrative Prelude” in this section.

It is important to reiterate that my perspective currently eschews other relevant areas of UAP studies¹³¹, such as those in the humanities, social sciences, or religious studies¹³², whose research focus is not directly on the phenomena themselves, but on relevant aspects of their broader context, such as interpretations, perspectives, and effects of UAP on humans and society. The integration of these important research domains is reserved for subsequent work. Finally, part of the discussion of my approach must also include the consequences of not following my proposals outlined (and whether this would contain counterarguments), which will be part of the next section.

6. Implications and Significance

6.1 Illustrative Prelude

In the 1970s, Japanese essayist and mountaineer Shinya Nishimaru undertook an expedition to Mount Ontake, a sacred volcano located on the border of Nagano and Gifu prefectures.¹³³ He left his tent at night to conduct observations of *Hitodama*, which are believed to be human souls, in the vicinity of the stone piles of *Sai no Kawara* (children's limbo) at night. His depictions of numerous fist-sized, spherical entities with a faint luminescence are among the most detailed portrayals of location-bound balls of light, which are considered *Hitodama* according to Japanese folklore.

6.2 Consequences of Missing Boundaries

The study of UAP is of interest to many, yet the nature of these phenomena remains undetermined. Therefore, it is essential to ascertain effective methods for assessing progress. But is our research aligned with the appropriate objectives? Especially: How do we prevent engineers from succumbing to the influence of psychological phenomena regarding UAP; how do we ensure that human scientists do not ignore their technological dimension? Endeavoring to study UAP as an aggregate phenomenon, the UAP scholar would have to become a “*Renaissance man*,” as described by Allan Hendry in

1979, “*fully acquainted with all relevant fields*.”¹³⁴

The notion that UAP are homogeneous phenomena is not supported by the extant research. Especially the absence of any evidence to substantiate claims of non-human intelligence (NHI), or the possibility that aspects of human intelligence are involved, underscores the need for further investigation.¹³⁵ However, it is not possible to ascertain whether the scientific methods employed are appropriate for UAP as a whole since they do not cover the entire spectrum of the phenomena. In scientific research, the discovery of anomalies that defy prevailing theoretical frameworks often happened by chance, which necessitates new approaches.¹³⁶

Another problematic implication is that the unclear demarcation of UAP research prevents analyses based on case studies from including a comprehensive representation of the phenomenon, since our case data only contains experiences interpreted as possible (space-)craft, excluding experiences with other interpretations. Since popular cultural preconceptions and interpretations (the “modern myth”) serve as the foundational premise¹³⁷, sightings interpreted as djinns, fairies, shadow people, or spirits like *Hitodama*¹³⁸ are overlooked, despite their identified parallels to UAP.¹³⁹ Regrettably, UAP researchers, parapsychologists, and cryptozoologists share the concern of being associated with other fringe sciences.¹⁴⁰ Consequently, when analyzing UAP, it is not possible to satisfactorily answer the question of the total population of UAP occurrences, nor how many potential occurrences are missing from current datasets.

If these issues remain unaddressed, they could cause dire implications for UAP studies in their entirety: Without a clear foundational context, the perception that “UAP are now a seriously researchable phenomenon, with a new name” could be interpreted negatively by critics who recognize this in the context of the contemporary rise of scientific misinformation¹⁴¹ as “alternative facts are becoming valid subjects of research.”

131 cf. section “Background”, especially footnote 55.

132 The aspect of extraterrestrials as a belief system, however, is relevant as an argument in this article, cf. subsection “Dissecting the UAP Myth and Separating Scientific Disciplines”. For a current overview of UFOs/UAP and beliefs, cf. Zeller, 2022.

133 Cf. Nishimaru, 1990, and Hayashi, 1973. Given his numerous reports of other exceptional experiences (mostly regarded as spirits), Nishimaru could be considered an *encounter-prone personality*.

134 Hendry, 1979, 271 [emphasis in original].

135 cf. “*whatever is controlling the UAP*”, Knuth, Ailleris, Agrama et al., 2025, 39.

136 Cf. Watters, Loeb, Laukien et al., 2025, 9–13 for an approach to actively search for anomalies in object research.

137 cf. subsection “Dissecting the UAP Myth and Separating Scientific Disciplines”.

138 cf. subsection “Illustrative Prelude” in this section.

139 Diana Pasulka offers an additional illustrative example when, during her research on descriptions of purgatory, she encountered experiences that were perfectly consistent with UAP yet had not been classified as such by individuals with a Catholic background, cf. Pasulka, 2016.

140 cf. e.g. Denzler, 2003, 98 f.

141 cf. subsection “Scientific Demarcation”.

6.3 Prerequisites for Knowledge Acquisition and Error Analysis

As outlined in the section on *boundary-work*, I believe it is essential that UAP studies be classified into different subdisciplines based on well-established hypotheses specific to distinct subparts of UAP, rather than according to phenomenology or elements of the “modern myth.” In addition to dispelling the myth, a demarcation must also be established between scientific activities and political or intelligence operations, as these have different objectives.

In light of the inherently social character of *boundary-work*, its perpetuation depends on the (emerging) community addressing UAP. The field of UAP studies will then consist of specialized subdisciplines, each of which may evolve to become part of other subfields of established science. This, however, is a favorable development.

Moreover, it is essential to consider the ramifications of null hypotheses. If UAP studies would be designed with the sole objective of physical (data) capture of these phenomena, what would be the implications of failing to measure any significant data? Subsequently dissolving the field?

A contrary issue arises when UAP studies are invariably regarded as “pushing the boundaries of science”, which systematically disadvantages potential answers that can be found within current science. The definition of subdisciplines could help mitigate this risk.

Further considered from the perspective of statistical hypothesis testing, a null hypothesis (H_0) would hold that UAP can be fully explained by conventional causes, while an alternative hypothesis (H_1) would assume that UAP present a genuinely novel phenomenon. What potential errors might be made in UAP studies?

A Type I error occurs when H_0 is rejected despite its truth. This would entail the treatment of UAP evidence as something fundamentally new when they are the cumulative effect of ordinary phenomena. Such an error has the potential to misdirect resources, foster unwarranted speculation, and compromise the credibility of the scientific enterprise.¹⁴²

A Type II error occurs when H_0 is retained despite its falsity. This would entail the misguided integration of UAP into extant, heterogeneous explanatory frameworks, disregarding the potential for them to represent a unified, coherent, and unknown underlying cause. The repercussions

of this error would be the potential loss of a genuine scientific discovery and the delay of theoretical progress.

Balancing these risks requires careful methodological design. Lowering the threshold for rejecting H_0 increases sensitivity to new phenomena but heightens the risk of Type I errors. The elevation of the threshold safeguards against the occurrence of false positives but increases the likelihood of Type II errors. I propose that for all possible subdisciplines of UAP studies, this balance should be deliberately negotiated, for example, with targeted error analyses as mandatory part of specific analyses and studies, but also with clear hypotheses, rigorous data validation, and a willingness to revise judgments as evidence accumulates.

Conclusion

In this article, I aim to demonstrate the foundational challenges UAP studies are facing, particularly those relating to definition, demarcation, and methodological rigor. The analysis underscores that without clear boundaries and a robust theoretical framework, UAP studies risk conflating scientific inquiry with modern myth, speculation, and non-scientific agendas. The methods and terms currently employed¹⁴³ are incommensurable as they are likely to address disparate research topics. This leads to misunderstandings and disputes based on categorical errors.

To mitigate these challenges, I propose engaging in *boundary-work* that explicitly addresses issues of demarcation.¹⁴⁴ A potential outcome of this process would be the division of the field into specialized subdisciplines, each anchored by established scientific hypotheses and distinct terms replacing the only negatively defined “UAP”. I suggest *object research*, *observation research*, and *encounter research* as first possible new subdisciplines. This not only clarifies the objects of investigation but also facilitates methodological integrity and the future inclusion of UAP studies into broader scientific domains, a feat that other approaches and theories cannot achieve in this way.¹⁴⁵

Moreover, due to terminological ambiguity, cooperation with other specialist areas must play a pivotal role in some cases. The work in *encounter research* would be carried out in close collaboration with related domains, such as parapsychology.

Furthermore, UAP studies should remain adaptable, with

143 cf. section “Background”.

144 cf. section “Boundary-work for UAP Studies”.

145 cf. section “Discussion”.

142 cf. previous subsection and for further considerations Milligan, 2024.

meticulously designed methodologies to ensure resilience in the face of null hypotheses and various forms of error, for instance, if measurement-based research ultimately fails to yield significant findings, or if a truly anomalous phenomenon has been disregarded.

The suggestions I present are merely a preliminary step. The evolution of UAP studies demands ongoing *boundary-work*—a social and scientific endeavor—to disentangle legitimate scientific inquiry from modern myth. Only through deliberate demarcation and the pursuit of commensurate, evidence-based subfields can UAP research achieve its potential as a credible scientific discipline.

The subject of UAP has undergone a gradual evolution, seemingly transforming from perceived airships to rockets and eventually to flying disks and various forms of potential spacecraft.¹⁴⁶ Even specific subtopics, such as abduction experiences, possess a distinct historical trajectory. According to Nietzsche, it is this intricate historical progression which renders new definitional work particularly challenging.¹⁴⁷

Pending further work in the direction described here, a helpful approach might be to comprehend UAP not as physical objects or (para-)psychological experiences (and assuredly not as a means of resolving this incongruity), but rather (in the sense of Heidegger) as “symptoms” [“Anzeichen”], “*which show themselves and which, in showing themselves as thus showing themselves, ‘indicate’ something which does not show itself*”¹⁴⁸, implying underlying causes. In UAP studies, as a nascent field of anomalistics research, we aim to investigate these underlying causes with the objective of one day rendering the UAP term obsolete.

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¹⁴⁶ cf. section “Introduction”.

¹⁴⁷ cf. epigraph.

¹⁴⁸ Heidegger, trans. 1962, 52. Heidegger originally referred to bodily symptoms of underlying illnesses: „[Vorkommnisse am Leib,] die sich zeigen und im Sichzeigen als diese Sichzeigenden etwas ‘indizieren’, was sich selbst nicht zeigt“, Heidegger, 1927, 29.

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