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UAP Research in Germany
Single Case Studies, Data Management, Understanding of "Strangeness"

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Abstract – Unidentified Aerial/Anomalous Phenomena (UAP) have become a serious research topic in the last years. Beyond the current efforts of U. S. government agencies, NASA, and several research institutions, data on UAP have been collected for many decades in private research organizations world-wide. However, the status of the work in Germany in particular is little known internationally. This paper presents the current state of knowledge and lists key issues regarding research on UAP. Using the example of the largest research organization in Germany, the "Gesellschaft zur Erforschung des UFO-Phänomens – GEP e.V." (Society for the Study of the UFO Phenomenon), this paper describes how lay research or citizen science can contribute to addressing these key issues. Conducting individual case studies for data collection, requirements-driven research data management and the theoretical development of basic definitions of "UAP" as well

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as “anomalies” and “strangeness” are identified as core factors for progress in UAP research, for which increased international cooperation between all institutions involved will be required in the future.

Keywords: UAP – UFOs – citizen science – single case studies – research data management – strangeness – anomalies

UAP-Forschung in Deutschland
Einzelfallstudien, Datenmanagement, Verständnis von „Strangeness“

Zusammenfassung[2] – Unidentified Aerial/Anomalous Phenomena (UAP) sind in den letzten Jahren zum seriösen Forschungsgegenstand geworden. Jenseits der aktuellen Bemühungen von Einrichtungen der US-amerikanischen Regierung, der NASA und einigen Forschungsinstitutionen werden Daten über UAP schon seit vielen Jahrzehnten in privaten Forschungsorganisationen weltweit gesammelt. Insbesondere der Stand der Arbeiten in Deutschland ist international jedoch nur wenig bekannt. Der vorliegende Beitrag gibt den aktuellen Erkenntnisstand zu UAP wieder und listet Kernfragestellungen aus der Forschung auf. Am Beispiel der größten Forschungsorganisation in Deutschland, der „Gesellschaft zur Erforschung des UFO-Phänomens – GEP e.V.“, wird beschrieben, wie Laienforschung bzw. Citizen Science zur Bearbeitung dieser Kernfragestellungen beitragen kann. Die Durchführung von Einzelfallstudien zur Datensammlung, ein anforderungsgetriebenes Forschungsdatenmanagement sowie die theoretische Ausarbeitung grundlegender Definitionen zu „UAP“ sowie „Anomalien“ und „Strangeness“ werden dabei als Kernfaktoren für den Fortschritt in der UAP-Forschung identifiziert, für die zukünftig eine verstärkte internationale Zusammenarbeit zwischen allen beteiligten Institutionen erforderlich sein wird.

Schlüsselbegriffe: UAP – UFOs – Citizen Science – Einzelfallstudien – Forschungsdatenmanagement – Strangeness – Anomalien

Introduction

Experiences of unidentified flying objects probably accompany humans since their emergence. With Kenneth Arnold’s sighting in 1947, “flying saucers” became a modern myth (Jung, 1964). Named as UFOs, these experiences and surrounding phenomena have since been investigated by governments, private organizations, and individual researchers. U.S. government investigations ceased in 1969 based on a final scientific assessment (Condon, 1969), although many other countries continued to accumulate files on UFOs, many of which were declassified and made available on the Internet from the early 21st century on (Koi, 2023a).

Engagement with experiences of unidentified objects reached a new threshold in 2017, when it became known that the U.S. Pentagon was again investigating correspondent incidents,

2 Eine erweiterte deutsche Zusammenfassung findet sich am Ende auf den S. 322–323

this time under the more neutral term UAP which stands for "Unidentified Aerial/Anomalous Phenomenon" (e. g., Bender, 2017). In the following years, scientists such as astrophysicist Prof. Avi Loeb from Harvard University in the USA, and space technologist Prof. Hakan Kayal from the University of Würzburg in Germany, attracted attention with research projects on the active search for evidence of extraterrestrial technology (Loeb, 2023; Kayal, 2023). Even NASA performed an "Independent Study on Unidentified Anomalous Phenomena," conducted by 16 interdisciplinary specialists from October 2022 to mid-2023 (NASA, 2023).

The events and media coverage of them over the last six years mark a "180-degree turnaround in reporting on the UFO phenomenon [which] finally arrived, with some delay, in Germany in 2021" (Anton & Vugrin, 2022, p. 28). Although once again unknown phenomena continue to be associated with the subject of extraterrestrial intelligence, without a reliable basis of knowledge, the more serious examination of the topic, including an open scientific debate, is an opportunity for research, including by private organizations, in the spirit of citizen science.

This article focuses on the current activities of UAP research in Germany, especially those of the "Gesellschaft zur Erforschung des UFO-Phänomens—GEP e. V." (Society for the Study of the UFO Phenomenon) as the largest and most active German organization (GEP, 2023a). First, the current state of knowledge and challenges related to the study of UAP is reviewed. Building on this, three core research questions on UAP are defined and their addressing in Germany is described. The article concludes with the current interim results of the German activities and offers perspectives for increased international cooperation.

The content of the paper refers to presentations given at conferences on UAP in Germany in 2022, namely at the conference of the Society for Anomalistics on June 18 in Marburg with the title "Da draußen – Neue Entwicklungen in der SETI-, SETA- und UFO-Forschung" (Out there –New Developments in SETI, SETA and UFO Research) as well as the jubilee conference on the occasion of the 50th anniversary of the GEP on November 5, 2022 (GEP, 2022).

UAP: Present Knowledge and Challenges

76 years after their first modern appearance, a part of UFOs or UAP remain unexplained phenomena. Due to the premature but long-lasting equation of unidentified objects with intelligent extraterrestrial visitors or other fantastic interpretations, the topic was for many years considered nonscientific, irrational, or even ridiculous.

The basic problem, however, is the lack of a theoretical basis for the research activities themselves. In UAP research, we are dealing with unexplained experiences or measurements. These are categorized as "UFOs," or now "UAP," based on cultural interpretation. On the close rela-

tionship between UAP experiences and popular culture, see in particular the work of Martin Kottmeyer (e. g. Kottmeyer, 1989, 1990). Without this culturally shaped context, we only know (a) what these phenomena are *not* and (b) we know this only "relative to one body of evidence and not relative to another" (Martin, 1982).

Even after over 75 years, there are still no seriously defined and pursuable hypotheses for unexplained UAP.[3] Moreover, UAP still only "exist, for most of us, as reports" (Hynek, 1976, p. 39). "We only get to study reports of UFOs not the UFOs themselves" agrees Allan Hendry (1979, p. 6) due to these being spontaneous phenomena (Anton, 2019, p. 133). The authors of the 2021 Pentagon report also note that in all likelihood a single explanation for all UAP cannot be found: "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, p. 3). However, if there are different explanations, experts from a variety of disciplines may be called upon to find them – from various natural sciences to the human and social sciences.

Due to the spontaneity of the appearance and the unpredictability of the phenomena, researchers often deal with statements from eyewitnesses. In single case studies (Anton, 2019), the information obtained from these eyewitnesses is supplemented with further external data (e. g. weather data, astronomical constellations) and then examined.

In most of these cases, an identification of the object observed can be made if sufficient information is available ("identified flying object," IFO). UFO or UAP which remain unexplained typically account for up to 5% of eyewitness cases which have been investigated by UFO groups or experts. Currently published examples:

Organization	Country	Time Period	Unidentified Cases	Source
GEP	Germany	1977– July 2021	5%	GEP e.V., 2021
AARO	USA	2023	2–4%	Liebermann, 2023
UFO-Sverige	Sweden	2022	0,75%	Riksorganisationen UFO-Sverige, 2023
Belgisch UFO-meldpunt	Belgium	2022	0%	Belgisch UFO-meldpunt, 2023

Table 1. Currently published examples of reports with percentages of unexplained cases.

3 In Germany, this has been criticized by Pröschold (2013, pp. 46–49) who argues that hypotheses are largely avoided and thus UAP research would be a discipline without an objective. He proposes testable hypotheses without which UAP cannot be of interest to mainstream science.

A variety of research questions can be addressed to the data collected in single case studies, aiming at gaining knowledge about the observed objects and their characteristics, about the observers themselves and their behavior, or about the connections between UAP observations and aspects of modern society and pop culture. However, existing data material is not available in a combined form. It is distributed among (sometimes inaccessible) governmental data or private research groups as well as individuals who will publish the results of their work in various forms. Data quality is hardly assessable or comparable.

While no clear, consistent hypothesis has ever been formulated for the causes behind the unexplained cases, speculations revolve around extraterrestrial intelligence as possible explanations but there are no verifiable statements (Impey, 2022, p. 29). In fact, arguments against extraterrestrial origins have been brought forward which also led to deviating theses about unexplained cases already during the 1970s (cf., e. g., Hourcade, 2018; Vallée, 1990).

The current situation, after more than 75 years of trying to solve the UFO enigma, ironically led to a series of rather critical publications concerning the work of UFO research from longtime active researchers (Ballester Olmos, 2023; Ballester Olmos & Bullard, 2017; Bullard, 2014, 2017), while the topic returned in the form of UAP with the political activities in the USA.

In summary, the challenges in UAP research can be described as follows:

- lack of clear definition and hypotheses for UAP which cannot be identified by experts,
- lack of access to the alleged objects due to their status as spontaneous phenomena,
- lack of knowledge about the effects of cultural and personal influences on experiences and interpretations of UAP,
- uncertainty about which disciplines are able to clarify which parts of the phenomena.

Key Issues of UAP Research and Their Approach in Germany

Methods and Activities

UAP belong to the field of anomalistics, an umbrella term, which can be defined as the investigation of anomalies or phenomena that fall outside current understanding – e. g., parapsychological or cryptozoological topics – and their evaluation by the general application of scientific methods (Anton & Ammon, 2015; Truzzi, 2000). This has implications for phenomenology and possible research methods applied to the subject.

A general classification developed in Germany discerns *object-oriented research* which focuses on the perceived or measured objects themselves from *subject-oriented research* where people with UAP experiences would be the core of the knowledge interest, and from *communication-oriented research*, which deals with how the topic of UAP is treated in societies and cultures (Anton, 2019; Wunder, 2006).

Object-oriented methods are often used in a targeted attempt to identify the causes of unexplained UAP cases, i. e. reports, photos, videos, or measurements. With the rise of the UAP term, attempts to bypass the testimony of personal experiences and rely on measurements of anomalous phenomena in the sky (e. g., through automatic recordings of special camera setups directed at sky segments) seem to dominate. Examples are the already-mentioned projects from Loeb (2023) in the USA and Kayal (2023) in Germany, respectively.

While this kind of search for previously unknown objects in the sky has illustrious predecessors (e. g., the German *Himmelspolizey* in the 1800s, cf. Wikipedia, 2023), private research groups in modern times have been collecting data for much longer by interviewing UFO witnesses or people with UFO experiences.

The most typical form of active research on UAP in Germany is still the cooperation of interested laypeople in registered associations or interest groups. While a history of the formation of such groups in Germany, starting from 1956, is described elsewhere (Ammon & Cincinnati, 2013), the current situation leaves only two research groups with a relatively high number of members – the "Gesellschaft zur Erforschung des UFO-Phänomens (GEP e.V.)" with around 200 members and the "Mutual UFO Network – Central European Section (MUFON-CES e.V.)" with around 70 members.

While there are also individually active persons and other organizations which at least in part deal with UAP,[4] the main occurrence of UAP as a topic in Germany is found on information platforms on the internet, especially on social media channels.[5] In the following, we will focus on the work in active UAP research in Germany and address the most important current issues and how they are addressed.

Issue 1: How to Obtain Data About UAP? Single Case Studies

One of the key issues, even after more than 75 years, is still a comprehensive collection of data on UAP. As these are spontaneous phenomena, witness reports are still the most important

4 These include Hansjürgen Köhler (CENAP), IGAAP e.V. (Interdisciplinary Society for the Analysis of Anomalous Phenomena), and the Society for Anomalistics itself.

5 Examples: http://www.ufo-information.de, https://www.grenzwissenschaft-aktuell.de, http://www.alarmstufo.space, https://www.youtube.com/@Hangar18b

source. Consequently, for more than 50 years, the German GEP has been carrying out single case studies with investigations on reported UAP sightings. Persons from the population who have observed or photographed objects in the sky that are unknown to them can contact the GEP with a request for investigation. Currently, the GEP can be reached via their website www.ufo-forschung.de, their UFO database www.ufo-db.com, their Facebook group https://www.facebook.com/groups/362533025597937, or per phone or e-mail. In 2023, approximately one report was sent to the GEP per day. After receiving a report, one of the GEP case investigators is collecting necessary data and building a working hypothesis for a possible explanation of the case. In order to achieve a uniform collection of the fundamentally necessary data, these are collected from the reporters in the form of a standardized structure. The best tool for this is a structured questionnaire, which has been developed since 2011[6] and is used, for example, at the website and as a basis for the data model of the UFO database.

In addition to the UAP reporter's statements and materials, secondary data is often collected or retrieved, e. g., geographical data, weather conditions, astronomical constellations, which help to form hypotheses for the reported UAP. If such a hypothesis is not very clear (which often depends on the experience of the particular case investigator), the status of work on the case is discussed among colleagues. In the GEP, mailing lists and video conferences are used for this kind of discussion. Ideally, at the end of the case investigation there is an explanatory hypothesis with a fairly high probability of being correct. Around 5% of reported cases remain unexplained (see above).

For structured documentation and publication of a single case, its core data and additional free text components (original quotes from the reporter, arguments for the explanation, lists of anomalies in the case, etc.) are used. In addition, several common classifications help to compare the case with others, but also determine, for example, the degree of probability for the explanatory hypothesis.[7]

The *Journal für UFO-Forschung* (JUFOF, Journal for UFO Research) has been published since 1980 to document the GEP's single case studies.[8] A typical, short case documentation as published there can be found in Figure 1. Furthermore, the single case receives an entry in the publicly accessible UFO database. The case documented in Figure 1 can be found at http://www.ufo-db.com/WfrmSetupSichtung.aspx?uid_Sichtung=a527d3d6-5b15-46b0-9b6f-21bdcf2e9fc9

6 The structured questionnaire (German language) used by the GEP can be downloaded in PDF format here: https://www.ufo-forschung.de/download/5539/?tmstv=1698515848

7 see https://www.ufo-forschung.de/forschung-standpunkte/ufo-klassifikationen (in German)

8 see https://www.jufof.de (in German); the majority of past issues is now available in PDF format at the Swedish "Archives for the Unexplained" online: https://files.afu.se/Downloads/?dir=Magazines%2FGermany%2FJUFOF%20%28GEP%29

The procedures of data collection and individual case investigation have been carried out in a similar way for many decades in numerous research groups around the world (cf. Anton, 2019; Hendry, 1979). The refinement of these methods to be achieved in the GEP aims to improve the standardization of data collection, data modeling (cf. next subsection), and case documentation. While this can improve comparability between single case studies, there are still issues that affect what insights can be gained from the data collected.

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Objekt auf Urlaubsfotos der Schweizer Alpen entdeckt

FALLNUMMER: 20171007 A
DATUM: 7.10.2017
UHRZEIT: 14.59 Uhr Mesz (12.59 Uhr UTC)
PLZ, ORT: 9107 Schwägalp
LAND: Schweiz
ZEUGE: Stefan S.
KLASSIFIKATION: DD
BEURTEILUNG: IFO / V1
IDENTIFIKATION: Flugzeug
ERMITTLUNGEN: sind abgeschlossen
ERSTKONTAKT: 8.10.2017 / em / em
UNTERSUCHER: Hans-Werner Peiniger

Sachverhalt

Der Melder entdeckte beim späteren Betrachten seiner Urlaubfotos auf einer Aufnahme ein Objekt am Himmel. Obwohl es einem Flugzeug ähnlich ist, schien es ihm so ungewöhnlich zu sein, dass er sich an eine UFO-Forschungsorganisation wandte.

Diskussion und Beurteilung

Eine Rekonstruktion der Fluglage zum betreffenden Zeitpunkt hat ergeben, dass es sich bei dem fotografierten Objekt zweifelsfrei um ein kleines Privatflugzeug vom Typ »Jodel DR 100« gehandelt hat.

Hans-Werner Peiniger

Originalfoto mit Insertausschnittvergrößerung

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Figure 1. Example of UAP single case study documentation in the GEP's *Journal für UFO-Forschung* (Peiniger, 2017).

First and foremost, the reliability of visual perception, memory, and given statements of human reporters of anomalous phenomena is significantly limited (Ballester-Olmos & Heiden, 2023; Condon, 1968). Moreover, despite the efforts at standardization, the results of single case studies on UAP are not necessarily comparable and always require further discussion and assessment. This is easy to see when comparing different positions on "famous," frequently published UFO cases. Moreover, the problems of reliability and comparability seem to increase with the degree of "strangeness" of a single case. While strangeness itself will be the third key issue reflected on in a later subsection, the more anomalies arise in a UFO experience, the less reliable and the less comparable the characteristics of this experience become. This is most relevant in so-called

close encounter cases, where experiencers seemingly come into close contact with anomalous objects or even unknown beings (Evans, 1984), most prominent in the cases of so-called alien abduction experiences (Perrotta, 2020). These types of experiences are very closely linked to the individuals who have them, and are the furthest thing from modern measurement approaches that focus on distant UAP in the sky. Since UFO research is thus located in the area of tension between measurement-based object investigation and the exploration of exceptional human experiences shaped by culture, the question arises as to whether one can speak of a coherent field of research at all or whether certain parts will disintegrate into separate research branches in the future.

On a purely statistical basis, after more than 75 years of data collection, the question also arises as to whether the aforementioned limitations in the usability of the data material alone are causal for the up to 5% of unexplained cases.

In order to better understand the interrelationships and differences in the respective approaches and outcome data, some working groups in the GEP are dedicated to the purely video-based recording of UAP and to the application of AI methods to assumed UAP images as well, while in specific projects also more subject- or communication-oriented research is carried out.

Issue 2: How to Analyze UAP? Data Management

Modern research data management is described by the FAIR principles: In general, data to be usable for scientific discovery must be **f**indable, **a**ccessible, **i**nteroperable, and **r**eusable (Wilkinson et al., 2016). Unfortunately, data currently collected on UAP to be used to answer research questions do not share some of these characteristics. For a better understanding, Table 2 offers possible examples of research questions to be addressed in a data-driven manner.

First of all, the data on UAP is distributed across the work outputs from governments, research groups, and individuals, all of whom choose to publish (or not to publish) their work in different forms. There is no common set of metadata to universally describe case studies. Finding all the necessary data to answer a research question even today, with the modern means of the Internet, can be extremely hard.

The accessibility of data is subject to the same problems: It is up to the respective institution or person whether the data is made accessible and thus usable for others. Without a common data model or shared interface description, the data on UAP is not interoperable. The lack of standardization, especially at international level, as well as the lack of provenance and domain-specific data (How was the case investigated? What are the anomalous characteristics? Etc.) also make reusability difficult.

Type	Research Question
object-centered	How many UAP cases with an “Oz Factor” have happened in Germany?
	Were there also sightings of black, triangular shaped objects in the 2000s?
subject-centered	Who reports sightings to the GEP in terms of gender, occupation, level of education?
	Are there correlations between UAP and other exceptional human experiences?
communication-centered	Are more people reporting UAP to the GEP via Facebook or by e-mail?
	Are there correspondences between characteristics of UAP messages and current aspects from pop culture?

Table 2. Example research questions on UAP which can be dealt with using a data warehouse

Worldwide, there are currently two approaches to combat these challenges, and they both come with advantages and disadvantages due to their influence on UAP data management and the underlying data architecture. The classic approach which is also used in the GEP with the aforementioned UFO database, is the establishment of a *data warehouse* where data on UAP studies is stored and can be queried. This approach starts with the design of a data model and then requires all data to be entered according to the designed data model. Unfortunately, many research groups throughout the decades of UAP research always started to design their own database from scratch and did not include interfaces or links to the work of others. Proposals by long-time researchers such as Jacques Vallée to build a common data warehouse (Vallée, 2014) or efforts to create a common data model for the observation of anomalous phenomena (ADX, 2023) have not yet led to success. Furthermore, structured data entry is time-consuming, which is why not all of the more than 5,000 investigated cases from the GEP are available in the UFO database. However, once data entries are complete and reflect the current status, organization-specific statistics and other data analyses can be carried out.

The second method refers to the massive amount of existing data in unstructured free text publications. Throughout most of the decades of the modern UFO phenomena, research data has been published in books, magazines, written files, etc. To manually read and enter these volumes of data into a prepared data warehouse would probably exceed the total resources available for UAP research worldwide. For this reason, other methods are employed to make this data accessible: Publications are digitized, and the resulting images are processed with optical character recognition (OCR) software, creating large amounts of searchable, indexable PDF documents. The result can be viewed as an unstructured *data lake* (compared to the pre-struc-

tured data warehouse), and currently the largest collection of this type of data is hosted by the Swedish AFU, in which the GEP also participates with PDFs from the *JUFOF* and other publications.[9] As a follow-up, there are initial approaches to train AI tools in the form of large language models (LLM) on this data to enable analysis (Koi, 2023b). While these approaches avoid extensive manual work (especially free text indexing), it is to be expected that digitization and the use of LLM will introduce error rates into data analysis.

In the future, the GEP expects combined approaches for a better data management in UAP research and is therefore involved in both the further development of classical data warehouse methods and the use of digitization and AI methods for processing its own large unstructured quantities of data. In particular, efforts to achieve interoperability and interfaces between data collections should receive support in the future so that working with the data on UAP can be made much easier.

Issue 3: How to Explain UAP? Understanding of "Strangeness"

It is the anomalous features that presumably separate unexplained UAP cases from those with a mundane origin, features like optical appearance, flight behavior, or specific object details: In cases with "high strangeness", these cannot be assigned to conventional causes. Are these "anomalies" the key to the explanation of UAP?

In 2011, one of the authors first outlined the GEP project "GOOD UFO" (Kramer, 2011) and justified this with certain observations: On the one hand, data on UAP were collected and documented in the GEP, but were not further used to draw conclusions about the phenomena themselves. On the other hand, it was apparent that assumptions about the nature of the phenomenon (often theses on extraterrestrial intelligences, see section "UAP: Present Knowledge and Challenges") found in the literature on UAP are essentially the result of deductive reasoning or speculation, without defining the necessary criteria to justify such an assumption.

The GOOD UFO project examined commonalities and differences between 10 studies of single cases where no explanation was found (the name refers to a case classification by Allan Hendry which is given in Table 3). To achieve this, the method of qualitative heuristics according to Kleining was applied (Kleining, 1995). The aim was to test the effectiveness of such a methodological application to a research question on UAP and, of course, to get closer to answering the research question. The question itself could be stated as: Do the cases classified by the GEP as "GOOD UFO" have enough in common to be assumed as a singular phenomenon with a common cause or do the comparisons rather lead to the conclusion that different

9 see https://files.afu.se/

phenomena are subsumed under the one label "GOOD UFO?" In 2013, the results of the project were published, albeit with inconclusive results (Kramer, Felsmann & Cincinnati, 2013).

Level of unexplained UAP quality	Original definition according to Hendry (1979)
Near IFO	*"UFO reports that just miss being ascribable to an IFO cause by virtue of one or two anomalistic features."*
Problematic UFO	*"UFO reports with fundamental difficulties not serious enough to demote them to the exception class, but enough to raise questions about their strength as 'data'."*
Good UFO	*"UFO report is still hampered by the possibility of an IFO explanation."*
Best UFO	*"Strong reports with only a minimal chance of a prosaic explanation."*

Table 3. UAP single case classification after investigation as proposed by Allan Hendry (1979, p. 108).

Due to the limited amount of data that was evaluated, it became clear that further analyses with additional cases would have to be carried out in order to come closer to answering the research question. However, during the preparation, in which the (larger number of) GEP cases classified as "PROBLEMATIC UFO" were also to be included in the analysis, it quickly became apparent that the cases reviewed in advance were of highly variable quality and that there was obviously a discrepancy about the classifications of cases as "GOOD UFO," "PROBLEMATIC UFO" or "NEAR IFO." The reason for this can be found in the insufficient differentiation between the categories of the classification created by Allan Hendry (1979). There, unexplained cases are classified according to their degree of strangeness, but the categorization lacks clear intersubjectively valid criteria (cf. Table 3).

After the identification of this problem (Kramer, 2016) and a short literature review on a definition of strangeness in the context of UFOs (Ammon, 2016), the follow-up project "Strangeness" was initiated in the GEP. Since it became apparent that previous ideas of what "strangeness" actually is in the context of UAP experiences are rather vaguely formulated and are not derived in a structured manner from the data on UAP itself, the project "Strangeness" aims at establishing a specific definition of "strangeness" or anomalous characteristics in UAP cases. This will hopefully lead not only to a better understanding of unexplained UAP cases, but also to more precise criteria for the classification established by Hendry more than 40 years ago.

The Strangeness project is still in progress during 2023. Using grounded theory according to Glaser & Strauss (2010), the theoretical sampling for this was initially open-coded, and we are

currently in the axial coding phase. Due to the circular application of the method, the research project will have a duration that cannot be precisely predetermined.

Results: The Path to Knowledge About UAP

Scientifically verifiable approaches to conducting single case studies on UAP experiences have been the focus of the GEP's work in Germany since its founding. Beginning in 2011, the GEP has issued research principles to further support standardized, scientifically as well as ethically valid methods in UAP case investigations. These principles are based on scientific and anomalistic professional norms. They have led to intensive discussions in German-speaking UAP research and are now also available in English (GEP, 2023b).

What could be determined about UAP in Germany so far, based on the GEP's own data material? As already indicated, only a very small data set of 10 cases was analyzed for similarities and differences in the "GOOD UFO" project until 2013. The preliminary results are therefore inconclusive. On the one hand, a great diversity was found in the object characteristics (e. g., in the object shapes, in their luminous behavior), but on the other hand there were great similarities in the flight behavior. Only the inclusion of more well-studied cases from the GEP can possibly help to better answer the initial research question on unexplained UAP as a single phenomenon. However, a valid methodological conclusion is that qualitative approaches are well suited to analyze predominantly anecdotal material from UAP case investigations.

The follow-up project "Strangeness" is currently still in progress, so only preliminary observations can be made at this time. In particular, it turned out that there seem to be only a few characteristics of UAP that can truly be defined as "anomalous" by themselves.

Above all, the phenomenon of "solid lights" should be mentioned here, i. e. light phenomena that seem to have a solidity, contrary to the expected physical behavior of light. Solid lights, for example, build up slowly and elevator-like (see Figure 2). Other features on UAP that are perceived as anomalous by both observers and researchers are not very strange when viewed in isolation, but they are strange in the context of environmental factors and other individual phenomena. The absence of noise in a UAP experience, for instance, does not in itself constitute an anomaly. Many phenomena in the sky may be silent or their sound may not be audible to observers because of their distance to the object. However, phenomena that occur in presumably close proximity and have a machine-like behavior, can certainly be expected to produce corresponding sounds. In view of these special conditions, silence in this context can therefore be anomalous.

However, it remains to be seen how these preliminary observations will ultimately fit into and be reflected in a "strangeness model" envisioned by the GEP.

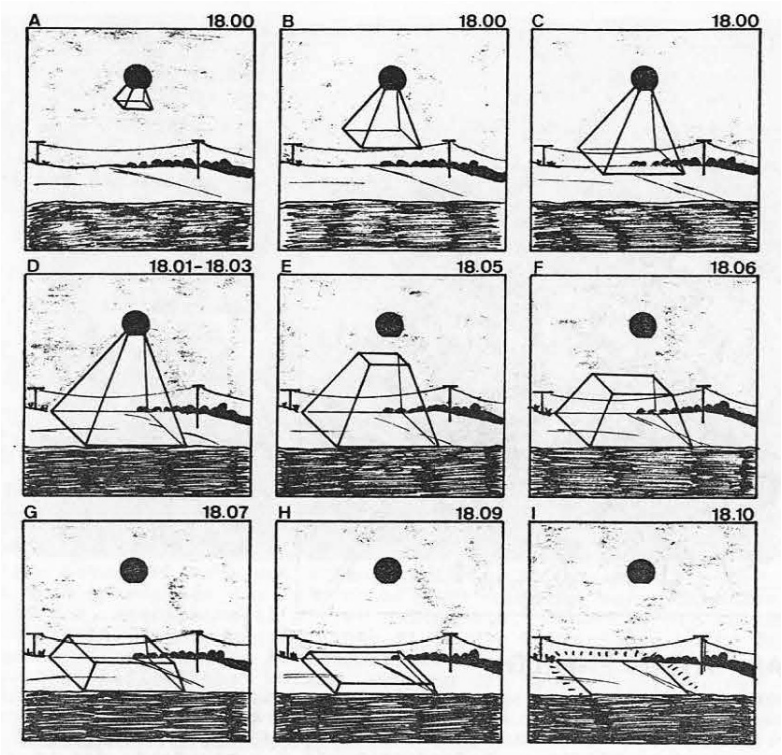

Figure 2. Drawing of a solid light phenomenon as reported in a GEP-investigated UAP case (Peiniger, 1983, p. 164)

Every form of collected data on UAP must be usable for research. Quantitative research questions in particular require storage forms for large amounts of data, which enable dedicated queries for certain characteristics. For example, another preliminary study conducted on the "Oz factor" phenomenon[10] based on the unexplained UAP cases of the GEP suggests as a hypothesis that this phenomenon may be explained by psychological effects (derealisation and depersonalisation) (Kramer, 2023), but in order to test this hypothesis, a statistical evaluation of the IFO cases as "control group" is required, of which the GEP has investigated and documented several thousands.

10 The "Oz factor" describes subjectively experienced "loss of sensory or environmental activity," but also time distortions, memory lapses, strange emotions, buzzing sounds or strange smells, especially during close encounters with UAP according to British researcher Jenny Randles (1987).

The example shows that a goal-oriented research data management which treats data quality and specific research questions as requirements to a data-driven approach might be able to meet the challenges listed in the section "UAP: Present Knowledge and Challenges." This might be the case regardless of the specific direction of research, whether object-oriented and witness-based, object-oriented and measurement-based, subject-oriented or communication-oriented UAP research.

Comparative and further analyses of the collected data should lead to a better definability of "UAP" and "strangeness" or "anomalies." This also allows for better identification of applicable scientific disciplines and possible cultural influences on UAP.[11] After more than 75 years, a single and exclusive cause for all UAP has become the least likely explanation. Thus, multifactorial geneses, but also the possibility that no severe anomalies can be permanently confirmed, should be considered as conceivable causes for unexplained UAP cases. However, even such possible findings or the integration of the anomalies found into the then current scientific paradigm would not exclude the need for further UAP research, as humans have presumably been observing strange objects in the sky since their inception and will continue to do so in the distant future.

Discussion and Conclusion

In the past years, research on UAP from Germany could not be optimally introduced into the international discourse. Most publications were exclusively in German. This article is an attempt to change this situation, and to clarify that the work of private research organizations has important contributions to UAP research in the sense of citizen science. This is also shown by the already comparable research results of AARO (2023) and NASA (2023), where even the released photographic and video material on UAP is similar to the reports that private research organizations have been collecting for decades.

While the usefulness of further research on UAP was also confirmed by academics interviewed (Yingling, Yingling & Bell, 2023), inadequate data quality and data management could be the main problem area for private UAP research if there will be no internationally concerted effort to achieve FAIR data in the future. However, initial considerations on this are in progress in the circle of the European UFO organizations[12] as well as by proponents such as Isaac Koi (pseud.),[13] in which the GEP is also actively involved.

11 Which, for example, might need "folklorist, […] sociologist, anthropologist, psychologist, and historian" expertise (Dewan, 2006, p. 198; see also Eghigian & Peters, 2023).

12 see http://www.euroufo.net

13 see https://isaackoidata.blogspot.com

In the future and in the course of a further professionalization, in which the GEP would like to participate, a separation and allocation into different research areas is conceivable, for which the responsible scientific disciplines can also be better determined. To this end, GEP members are collaborating with the *Society for UAP Studies*,[14] founded in 2022, a US-American nonprofit organization for the promotion of a rigorous academic research on UAP through a critical and open dialogue between the various scientific disciplines, involving many international scientists, and future participation in their conferences as well as in the peer-reviewed journal *Limina*,[15] which is currently being launched, is planned.

Despite the extensive challenges – through the publication of research principles, the advancement of access to UAP data worldwide, and the promotion of interdisciplinary work on UAP in peer-reviewed publications and conferences, the German *Gesellschaft zur Erforschung des UFO-Phänomens* strives to be a major contributor to scientific UAP research. In this regard, we like to adhere to the words of Hakan Kayal, whose institute[16] the GEP has been an associate member of since 2022 as part of its cooperation with scientific institutions:

> At the end of a thorough, scientific investigation, perhaps a small fraction of the UAP could point to completely new physical relationships that would again expand our understanding, even if they are not signs of extraterrestrial intelligence. That alone would be very rewarding. (Kayal, 2022, p. 91)

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14 see https://www.societyforuapstudies.org

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UAP-Forschung in Deutschland
Einzelfallstudien, Datenmanagement, Verständnis von „Strangeness“

Erweiterte Zusammenfassung

Hintergrund: Unidentified Aerial/Anomalous Phenomena (UAP) sind in den letzten Jahren zum seriösen Forschungsgegenstand geworden. Jenseits der aktuellen Bemühungen von Einrichtungen der US-amerikanischen Regierung, der NASA und einigen Forschungsinstitutionen werden Daten über UAP schon seit vielen Jahrzehnten in privaten Forschungsorganisationen weltweit gesammelt. Insbesondere der Stand der Arbeiten in Deutschland ist international jedoch nur wenig bekannt. Der Beitrag soll dies ändern; er nimmt Bezug auf Vorträge von der Tagung der Gesellschaft für Anomalistik im Juni 2022 in Marburg sowie von der Jubiläumstagung anlässlich des 50-jährigen Bestehens der GEP im November 2022 in Lüdenscheid.

Herausforderungen zu UAP: Die Erforschung von UAP sieht sich mit einigen Herausforderungen konfrontiert, insbesondere einem Mangel an klaren Definitionen für auch von Experten ungeklärte UAP (selbst mit „UAP“ wird lediglich definiert, was diese nicht sind), einem Mangel an Zugang zu den vermeintlichen Objekten (da es sich um Spontanphänomene handelt), einem Mangel an Kenntnissen über die Auswirkungen subjektiver und kultureller Einflüsse auf Erfahrungen und Interpretationen von UAP sowie einer Unsicherheit darüber, welche Disziplinen in der Lage sind, welche Teile der Phänomene zu klären. Dies hat dazu geführt, dass auch nach über 75 Jahren noch immer keine vollständig ausformulierten Hypothesen für ungeklärte UAP bestehen, allenfalls Spekulationen über mögliche außerirdische Intelligenzen, oder aber die „Nullhypothese“, dass auch ungeklärte UAP letztlich auf bereits bekannte herkömmliche Ursachen zurückgehen.

Methoden der UAP-Forschung in Deutschland: Am Beispiel der größten Forschungsorganisation in Deutschland, der Gesellschaft zur Erforschung des UFO-Phänomens (GEP) e.V., wird beschrieben, wie Laienforschung zur Bearbeitung dieser Herausforderungen beitragen kann. Drei Kategorien von Methoden sind Kernfaktoren für den Fortschritt in der UAP-Forschung: 1. die Durchführung einer validen Datensammlung im Sinne von Einzelfallstudien, 2. ein anforderungsgetriebenes modernes Forschungsdatenmanagement, 3. die theoretische Ausarbeitung grundlegender Definitionen zu „UAP“ sowie „Anomalien“ und „Strangeness“ für einen besseren Erkenntnisgewinn dieser Erscheinungen und Eigenschaften.

Ergebnisse: In der GEP werden Einzelfallstudien mit einer systematischen Sammlung und Untersuchung von Daten zu UAP-Erfahrungen seit Jahrzehnten durchgeführt und im vereinseigenen *Journal für UFO-Forschung* (JUFOF) publiziert. Anhand konkreter Forschungs-

projekte zur Erlangung eines besseren Verständnisses des „Strangeness"-Begriffs auf Basis der *Grounded Theory* sowie zur Untersuchung von UAP-Fällen mit sogenanntem „Oz-Faktor" wurden sowohl Datenmanagement-Fragen als auch das Kernthema des Erkenntnisgewinns über ungeklärte UAP in den letzten Jahren in der GEP intensiv bearbeitet. Der Abschluss dieser Projekte und eine Publikation der gewonnenen Erkenntnisse stehen noch aus; es deutet sich aber an, dass eine einzige Ursache für alle ungeklärten UAP sehr unwahrscheinlich ist und sowohl eine multifaktorielle Genese dieser Phänomene als auch die Möglichkeit, dass sich dabei keine wissenschaftlichen Anomalien dauerhaft bestätigen lassen, weiter in Betracht gezogen werden müssen.

Schlussfolgerung: Der Beitrag soll die Forschung zu UAP aus Deutschland in den internationalen Diskurs einbringen und am Beispiel der GEP verdeutlichen, dass die Arbeit privater Organisationen wichtige Beiträge im Sinne von *Citizen Science* liefert. Für die Zukunft und im Zuge ihrer weiteren Professionalisierung, an der sich die GEP beteiligen möchte, ist eine Unterteilung und Zuordnung der UAP-Forschung in verschiedene Forschungsbereiche denkbar, für die auch die zuständigen wissenschaftlichen Disziplinen besser bestimmt werden können. Dabei wird eine verstärkte internationale Zusammenarbeit zwischen allen beteiligten Institutionen erforderlich sein, um datengetriebene Aufwände zu bewältigen, mit denen den Herausforderungen zu UAP begegnet werden kann.