Investment in UAP Technology and Ventures

Opportunities, Challenges, and a Way Forward

Rizwan Virk

The White Papers of the Sol Foundation
Volume 2, No. 1. Winter 2025

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"The day before something is truly a breakthrough, it's a crazy idea."

—Peter H. Diamandis

1. Introduction and Executive Summary

This white paper is about the challenges and opportunities in establishing an innovation ecosystem related to unidentified anomalous phenomena (UAP). It provides both an analysis of why investment in UAP-related ventures has been difficult and a possible roadmap for expanding research and entrepreneurial activity around the scientific and technological advances that UAP could represent.

UAP, previously known as UFOs (unidentified flying objects), have been the subject of increasing media coverage over the past few years, frequently in mainstream news outlets such as CNN and Fox News. This increasing exposure is the result of efforts of military and intelligence whistleblowers, members of Congress, prominent academics, journalists, and organizations like NASA. Recent media attention has led government officials to tacitly and sometimes directly acknowledge the presence of unidentified craft in US airspace and territorial waters. (For more details on recent events, see the section "A Brief History of Recent UAP Developments.")

Breakthroughs in UAP-related science and technology could revolutionize many of our existing industries, including aviation, space, defense, energy, medicine, communication, maritime operations, and materials engineering. Because of the wide potential of this technology, UAP represent an opportunity that could reshape the future of humankind as much as the development of the telephone, the automobile, the airplane, the rocket, or the personal computer. (For more on applications and industries, see the section "UAP Investment: Potential Opportunities.")

While innovation was historically funded initially by government and wealthy patrons, this has evolved in modern innovation ecosystems, the most visible of which is in Silicon Valley. Many of the largest companies in the world by market capitalization have been funded this way. This ecosystem includes institutional investors such as venture capitalists, research institutions like Stanford University, and established companies that provide both talent and exits for new startups. However, a mature innovation ecosystem is not only about capital, but also about providing roadmaps to entrepreneurs and investors who wish to participate in the process of founding new companies. (For more on modern venture capital and startups, see the section "Background on Innovation Ecosystems.")

This white paper explores whether private investment in new startups, in conjunction with government and large corporations, could play a significant role in expanding research into and launching ventures and products based on UAP-related technology. I argue that rather than establish one type of funding or just one organization, a new innovation ecosystem needs to be established with multiple types of funding, multiple players, and multiple avenues for entrepreneurs and investors to support UAP-related research and product development.

However, UAP also present unique investment challenges that other emerging industries may not have faced. Despite strong interest in this subject within both the federal government and the general public, many in our scientific institutions and existing innovation ecosystems like Silicon Valley remain skeptical about the topic in general. This is because of a stigma long associated with UFOs. Furthermore, UAP-related technology may require not only investment in engineering of new products and technology, but also breakthroughs in our understanding of the physical world. This may require larger investments and more patient capital than typical venture capitalists—or even existing deep tech investors—have the appetite for. For this reason, I introduce the term *frontier tech* for technology ventures that simultaneously carry science, engineering, product, and market risks. Finally, the national security implications of UAP make this a sensitive area subject to overclassification and geopolitical concerns. (For more on these challenges, see the section "The Unique Challenges and Opportunities of UAP.")

To date, efforts to understand UAP-related technology and science has primarily been limited to two extremes: (1) the government relying on aerospace contractors in classified settings, or (2) isolated garage inventors and independent scientists with limited or nonexistent financial or institutional backing. To unleash the true power of entrepreneurship and market forces, this paper proposes unique investment models aimed not just at funding companies but at bringing the "best and brightest" minds to bear on the scientific, technical, and business challenges.

While the origin of UAP is an ongoing source of speculation, many UAP experts have determined that at least some of the reports cannot be attributed to prosaic sources such as balloons, seagulls, or hallucinations. In official congressional hearings, witnesses have stated under oath that some UAP appear to be *actual technology,* which may not be from human sources or adversaries such as China or Russia. (For more on government programs such as AARO, UAPTF, AAWSAP, AATIP, and congressional testimony, see the section "Brief History of Recent UAP Developments"). The observables—summaries of the unusual performance characteristics of some UAP (such as instant acceleration, antigravity, etc.) compiled by Department of Defense (DOD) and intelligence officials in these programs—seem to imply that they represent technologies leaps and bounds over our current technology.[1] While this has led to more exotic theories for UAP (namely those that involve a nonhuman intelligence, or NHI, presence on Earth), this paper doesn't attempt to choose from different theories of the origin of UAP. Rather, we take the position that if the reported observables are valid, even for some small fraction of UAP, then they represent significant technoscientific innovations. (For more on these two topics, see the section "Origin and Observables.")

Such innovations, which are not part of the public discussion of mainstream scientists or aerospace engineers, could revolutionize several industries and usher in a new type of industrial revolution. However, this will require not just funding but an innovation ecosystem around UAP-related research and ventures. More specifically, this white paper explores the challenges and opportunities of building such an ecosystem by attempting to answer the following questions:

1. What are the general areas of potential private and public investment in research and development related to UAP technology?
2. What industries could be affected or revolutionized by these investments?
3. What makes investment in UAP research and new ventures difficult?
4. Who are the stakeholders that could influence and participate in such an ecosystem?
5. What structure could work best for encouraging both research and entrepreneurial activity?
6. What actions could be taken in the short term, medium term, and long term to build such an innovation ecosystem?

To answer these questions, this white paper proposes several interlocking segments of investment to build a well-rounded UAP innovation ecosystem. This structure seeks to provide opportunities for existing stakeholders, such as departments of the government and large aerospace companies, to participate. More importantly, we seek to build a UAP ecosystem that includes and encourages individual entrepreneurs, professional scientists, private and public research institutions, garage inventors, citizen scientists, and private investors.

The four proposed segments of investment (detailed further in the section "Structuring Investment and Building an Innovation Ecosystem for UAP") are as follows:

1. Research Funding. Initially, this would be via a clearinghouse to connect UAP research funds from public and private sources to researchers. Then, long term, this would expand available research funding through the creation of one or more UAP research funds and/or UAP research institutes.
2. Innovation Prizes. A new UPRIZE, modeled after the innovation prizes of the early nineteenth and twentieth centuries, combined with aspects of the more recent XPRIZEs such as the Google Lunar X Prize and the Ansari X Prize, would allow for expansion of investment in private ventures through a multiplier effect.
3. Frontier Tech Incubator. I refer to this model as a halfway house that provides both resources (science labs) and patient capital to encourage technoscientific innovation, positioned between pure research and normal industry commercialization funds.
4. Venture Capital and Private Equity. With the establishment of the previous three segments, this should allow existing venture capital and private equity funds to participate in UAP technology ventures without the stigma or risks that currently exist.

In more practical terms, the goal of these segments, beyond establishing a UAP innovation ecosystem, is to provide roadmaps for key stakeholders, such as investors and entrepreneurs, who may not have clear guidance on how to engage with the UAP topic.

While the challenges to innovating and commercializing UAP-related technology are significant (and may even seem insurmountable in the short term), by taking a longer-term view, we can discern that they may be no greater than the leaps achieved in modern times. For example, a human of 1860, offered a glimpse of today's everyday technologies—such as self-driving automobiles, powered flight via jet engines, reusable rockets, genetic engineering, and computers—might also conclude that the challenges to achieve such a future are insurmountable.

For this reason, in this white paper, I take the position that the opportunity represented by investing in UAP research and development is not a short-term prospect. By taking a long-term view, investment in this topic in the coming years and decades could not only revolutionize life on Earth but also represent humanity's best hope of eventually becoming a multiplanetary species. This vision relies on going beyond existing methods of propulsion and lift, such as rocket engines.

2. A Brief History of Recent UAP Developments

In the landmark *New York Times* story from December 2017,[2] it was revealed that the Department of Defense had been studying UAP in secret programs, authorized and funded by Congress, including the support of then–Senate Majority Leader Harry Reid. Today, we know these programs have been both formally and informally named the Advanced Aerospace Weapons System Application Program (AAWSAP) and the Advanced Aerospace Threat Identification Program (AATIP).[3] Since then, often based on the legislative requirements of Congress, the DOD has established a number of additional groups to study UAP. These groups included first a recent task force, the UAP Task Force (or UAPTF) and then a new office for tracking reports of UAP, the All-Domain Anomaly Resolution Office (or AARO).[4]

In 2022, Congress held the first hearing on UAP in fifty years.[5] In more recent hearings in 2023, some of our top fighter pilots testified under oath to the flight characteristics of and evidence for unusual aircraft they encountered. Their testimony revealed that these unidentified craft had been seen both visually and on instruments, including various types of radar and infrared cameras. They also testified that these aircraft could outperform anything in the public US arsenal at the time.[6] Unclassified videos of some of these encounters were leaked at the time of the 2017 *New York Times* article and were later validated as authentic videos from the DOD,[7] though there has been considerable debate in the years since about what is shown in the videos.

In both the recent congressional hearings in 2023 and 2024, high-ranking former intelligence officials claimed under oath that the US government had recovered "crashed craft" made by nonhuman intelligence.[8] The recovered UAP materials, officials report, were stored in unacknowledged special access programs and were the subject of reverses engineering efforts conducted within leading aerospace companies. Most important from a congressional point of view, these programs were concealed from the legislative branch. There were also claims of much clearer and more definitive video and radar evidence for the existence of UAP. These reports have led the Senate, spearheaded by Senators Charles Schumer and Mike Round, to draft the UAP Disclosure Act into the National Defense Authorization Acts (NDAAs) of 2023 and 2024.

The language in these official government documents included, for the first time, formal definitions for NHI (nonhuman intelligence) and TUO (technology of unknown origin) in congressional legislation. The bills also referred to the reverse engineering programs of crashed craft, as well as nonhuman biological remains. This level of official public acknowledgment that there may be advanced technology in hidden programs of which Congress is not aware is a significant development. For the purposes of this white paper, the terms "TUO" and "UAP" technology are meant to be synonymous, referring to anomalous technology that cannot be attributed to either our government or other adversaries such as Russia or China, but which has been reportedly witnessed in action by our sailors and aviators.[9]

These reports of unidentified craft in the vicinity of US bases, warships, and sensitive nuclear sites, coupled with this official testimony of recovered craft and reverse engineering programs, has fueled speculative media coverage about potential visits and sightings of "aliens" and "alien technology." Unlike the media, the official language has been careful to avoid ascribing a source to the technology, referring to it simply as being of nonhuman origin. The former director of AARO, the latest effort to study these phenomena, has stated that the office hasn't found any evidence of "extraterrestrial" visitation or technology.[10]

Lost in the media attention has been the fact that while there is no consensus among researchers about what these UAP are or who created them, there is a general consensus among UAP researchers that UAP most likely represent technology that is more advanced than what is being produced today by our scientific, government/defense, and private institutions. In other words, UAP represent breakthrough technology. While not offering a formal definition of what that means, newly appointed AARO Director Jon Kosloski told *Defense Scoop* in November 2024, "The general definition is 'beyond state-of-the-art today, and beyond where we think that we could get in the next couple years.'"[11]

Kosloski went on to comment in AARO's latest report that, while a large number of cases the office has investigated could be classified as prosaic (drones, balloons, etc.), these events were turned over to other departments within the government. Another batch of reports lacked the data necessary to perform a proper analysis, and AARO has retained those within its database as "open," in case further information becomes available. However, Kosloski went on to describe a third, smaller group of unexplainable reports that AARO was set up to investigate, which he called "truly anomalous." These are distinct from the second group of reports, for which there is not enough information to determine whether they are anomalous or not. Within this group, he stated, "are interesting cases that I—with my physics and engineering background and time in the [Intelligence Community]—I do not understand and I don't know anybody else who understands."[12]

This corresponds with reports from US fighter pilots describing truly anomalous events that exhibited technology that was described as "not of this world"[13] by one pilot, and technology "that outstrips our arsenal by at least 100 to 1,000 years at the moment,"[14] according to another. But these statements were not limited to military personnel; former Director of National Intelligence John Ratcliffe stated to Fox News, "When we talk about sightings, we're talking about objects that have been seen by Navy or Air Force pilots, or have been picked up by satellite imagery, that frankly engage in actions that are difficult to explain, movements that are hard to replicate, that we don't have the technology for or traveling at speeds that exceed the sound barrier without a sonic boom."[15]

While most attention to this topic has come from the general public and Congress, scientists in academic and public institutions, which formerly shied away from UAP, have begun to show an interest in doing scientific research in this area. Kevin Knuth, a physicist from SUNY Albany, coauthored a paper in 2019, "Estimating Flight Characteristics of Anomalous Unidentified Aerial Vehicles," in which his team estimated that the object encountered by the *Nimitz* carrier group in 2004 (featured in the *New York Times* article of 2017, investigated by AAWSAP, and testified to by a witness in the 2023 congressional hearing on UAP), exhibited "accelerations ranging from almost 100g to 1000s of gs with no observed air disturbance, no sonic booms, and no evidence of excessive heat commensurate with even the minimal estimated energies. In accordance with observations, the estimated parameters describing the behavior of these craft are both anomalous and surprising."[16] The scientists conclude that either these estimates of speed and acceleration were entirely fabricated or "these craft exhibit technology far more advanced than any known craft on Earth."[17]

One of several academic research projects set up in recent years is Harvard's Galileo Project, which was established by astrophysicist Avi Loeb in 2021 and aims to gather more data using advanced telescopes and processes designed to detect UAP.[18] Many other academics, in fields ranging from physics to biology to the social sciences and humanities, are starting to look more seriously at this issue. The Sol Foundation, cofounded by Stanford professor Garry Nolan, anthropologist Peter Skafish, and AI entrepreneur Jonathan Berte, held its first conference at the university in 2023 and has played an important role in bringing researchers together.

On the government research side, NASA formed a preliminary task force to examine aspects of the UAP issue in 2023, including many academic scientists, government researchers, and an astronaut. The recommendation of the first phase of this panel included looking at ways to gather more data about UAP and highlighting the need to deal with existing stigma around researching this topic.[19] One of the former members of NASA's task force testified in front of Congress in November 2024, suggesting that it would be fruitful to go through the agency's large existing archives of photos and satellite data using AI to look for signs of UAP and gather more data.[20]

3. The Unique Challenges and Opportunities of UAP

In the short term, many of these official and unofficial public scientific initiatives are focused on collecting and analyzing more data on UAP. In the medium to long term, it is recommended that a larger number of research initiatives can and should turn to the question of what kind of breakthrough technology could produce the anomalous characteristics of UAP. This will lead to opportunities for investment in both scientific research projects and technology ventures that could expand our knowledge of physics, engineering, and materials science, as well as revolutionize many industries.

The goal of this research should be to understand the principles behind the seemingly impossible performance characteristics of UAP, including lift, control, and acceleration. This includes understanding how technology that could reproduce those principles might be built. At a more practical level, it also means doing the research to develop the materials and engineering expertise required, for example, to build craft that could accelerate at 10 to 100 gs or move from deep beneath the ocean to outer space, all within an environment that could support human life.

If the technology can be mastered and its underlying principles understood and reproduced, this could not only be lucrative for investors but, depending on the nature of the technology, also alter the future trajectory of humanity. This is true *regardless* of the actual origin of UAP technology and whether top-secret, clandestine reverse engineering programs already exist, as claimed by multiple whistleblowers.

The extraordinary promise and opportunity of UAP has led to preliminary interest from private investors and organizations, as well as public research groups, in investing in UAP-related research and ventures. Yet this preliminary interest is tempered by the many challenges that are unique to UAP, which may not apply to other segments of the technology research or investment landscape. This includes a lack of understanding of how UAP work, how to reproduce the capabilities shown by UAP, the stigma that accompanies the subject among academic scientists, and the obvious national security implications of doing such research. In this section, we will explore some of these challenges in detail.

Despite these obstacles, I believe that private individual and institutional investors have a significant role to play in the coming UAP ecosystem, which is the reason for this white paper.

Science and Engineering Risk: Deep Tech Versus Frontier Tech

At first glance, it might seem that UAP investments might naturally fit into the sector called "deep tech." Deep tech has become established over the past decade as a legitimate sector of the venture capital (VC) / startup landscape, though it requires more patience than many ordinary VC investments. According to researchers from the MIT Sloan School, deep tech refers to those ventures that are grounded in science and technology but require innovations to come to fruition. The term was coined in 2015, partly to contrast these ventures with those that simply rely on existing technology, such as software development or new hardware built on existing components, which are now often called "regular" or "shallow" tech.

The MIT researchers make the point that deep tech ventures have the "potential to dominate the future in many ways."[21] From a financial perspective, deep tech companies require significantly larger investments than a typical Silicon Valley technology company. They may also require significantly longer timescales before a product can be brought to market. While the term has become quite popular in the tech press, it has evolved to encompass various types of ventures, including those in climate and energy, the automotive industry, materials science, chemicals, and medical technology. There is no agreed-on definition, and a number of variants exist regarding where deep tech starts and ends.

The need for a new category of investment became apparent, as most venture capitalists weren't used to funding ventures that were so capital-intensive. In the last decade, according to the Boston Consulting Group, deep tech has grown to constitute 20 percent of all venture capital funding.[22] A number of deep tech funds that have been established in Silicon Valley and Europe, often with some level of private and public institutional support. These funds have now invested billions of dollars in deep tech ventures, including those that may not be ready for regular VCs. Examples of deep tech funds include SOSV, Cottonwood Technology Fund, DCVC, Lux Capital, and The Engine (launched out of MIT, which will be discussed below). Another well-known example is the EIC (European Innovation Council) Fund, part of a larger program funded by the EU called Horizon Europe. The EIC fund is notable because, as revealed in a recent press release, it brings a large network of coinvestors, who have invested €4 billion along with the fund's direct investments of €1 billion.[23]

Perhaps the two most famous examples of deep tech ventures are SpaceX and Tesla. While both ventures required technoscientific innovation, they focused more on product R&D and product engineering than advancing fundamental understanding of the physical world. These companies were able to use known principles of rocketry, electricity/energy, manufacturing, and software to create products that lived up to the initial visions. These products required more investment and time than a typical software or hardware startup, including funding from cofounder Elon Musk personally. For example, Musk put $100 million of his own money into SpaceX[24] and relied on hundreds of millions of dollars from government grants and/or contracts for both Tesla and SpaceX before they became successful companies. Similarly, among the best-known private space ventures, we see companies funded by billionaires such as Jeff Bezos and Richard Branson.

Though the category of deep tech seems to fit potential UAP ventures as well, there are some subtle and not-so-subtle factors that make UAP-related opportunities difficult, even for existing deep tech funds. An important challenge with investment in UAP-related ventures is that the basic science and engineering of how the craft work is not fully understood. While deep tech investors aren't afraid of engineering challenges, consider the example of SpaceX. The basic principles of rocketry did not need to be reinvented for the venture to be successful, even though significant engineering was necessary to create reusable rocket boosters. Similarly, new capsules were needed to transport humans safely to space and back, often improving on NASA's designs from the 1960s and 1970s.

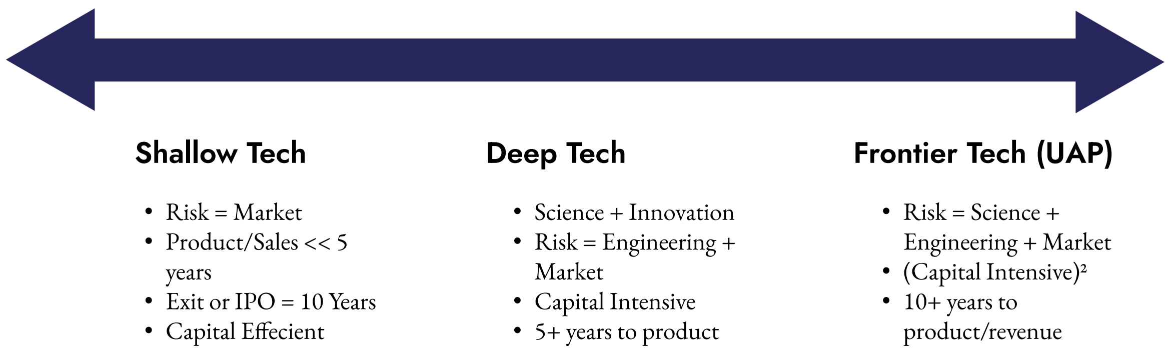

Figure 1. A graphic comparison of normal VC, deep tech, and frontier tech investment risks and time frames.

In the same way that contemporary deep tech investments might require more time and/or funding than shallow tech ventures, UAP-related ventures—particularly those needing significant breakthroughs—might require even more funding and time to mature than currently popular deep tech investment sectors such as clean energy, defense tech, quantum computing, advanced AI, and private space exploration.

For this reason, I would classify the UAP segment for investment as *frontier tech*. While the term hasn't been formally defined, here I refer to it as funding for ventures that lie outside the bounds of what is understood or known to be possible. As shown in figure 1, this distinction is meant to compare frontier tech to current deep tech and shallow tech ventures, at least from an investment point of view. We can look at these sectors in terms of risk, investment funding, and time frame. The three types of risk that characterize the differences in these segments are as follows:

1. **Market Risk (Shallow Tech):** Will the company's product succeed in the market?
2. **Engineering/Product Risk (Deep Tech):** Will the company be able to build a functional product in a reasonable amount of time?

3. **Science Risk (Frontier Tech):** Is it even possible to build the product, given what we know about physical science and materials science?

While shallow tech VCs typically expect a product within five years, they tend to focus on market risk, preferring to minimize engineering and product risks. This means that, while the companies they invest in may not be successful, there isn't a serious question about whether the company can build and deliver a functional product. In many cases, VCs won't get involved until a functional product has already been developed. Deep tech VCs (including certain biotech and medical VCs), on the other hand, tend to be more speculative and are willing to take on both market risk and engineering/product risk. Their ventures might take more than five years to deliver a usable product, or they may not be able to master the engineering to build a functional product before running out of investment funds. However, frontier tech investors and funds would need to provide even more patient capital, including significant research capital. This means taking on not only market and engineering risk but also scientific risk.

While the linear innovation model, introduced by Vannevar Bush after World War II, might cleanly separate out basic research, applied research, and engineering, more recent scholars of innovation have noticed that the process is much more complicated. They have used the term "technoscientific research and innovation" to describe the mixing of scientists and engineers to try to solve particularly thorny problems while building new products.[25]

Historical Stigma in the Scientific Community

The difficult nature of building frontier tech ties in with another key challenge to building a UAP ecosystem: stigma. One of the unique challenges with UAP is that many scientists and investors dismiss the subject as "fringe" or a "conspiracy theory," often unaware of how seriously the US government is taking the subject and the recent developments in the field. These include both the quality of witnesses, the multimodal evidence for such advanced technology (in encounters such as the *Nimitz* encounter in 2004), and the congressional attention from prominent senators like Chuck Schumer and Marco Rubio, along with the resulting legislation.

This existing stigma and general ignorance on the topic have led to skepticism that UAP technology exists or is even possible. Such an attitude frequently precludes serious consideration of funding for research that could explain or lead to the development of technology that could reproduce the behavior of UAP.

Moreover, investors usually rely on technical and scientific experts to validate the feasibility of a new technology before making an investment decision. These experts are often scientists, academics, or professionals with PhDs in the subject areas. The fact that UAP may represent breakthroughs that are not accounted for in our current understanding of physics, materials, and engineering practices makes it difficult for these standard experts to validate any UAP-related research or product. Before committing significant amounts of capital, investors will want to have experts evaluate whether a claim made by a new venture or a research proposal is even possible within some reasonable time frame or just a pipe dream.

A serious objection from traditional experts in the scientific community is the stigma associated with the topic, which is perhaps even stronger than that among the investment community. This stigma has built up over decades since Project Blue Book, which ended in 1969 after claiming that UFOs were not a threat to national security. The shutdown was supported by the Condon Report, a panel of scientists hired by the government and led by University of Colorado physicist Edward Condon, which publicly concluded that nothing had been learned from the study of UFOs. The conclusions, presented via headlines across the nation and among the academic community, were taken to mean that all the members of the committee believed the subject should not be studied further, and most respected scientists who had looked into the topic agreed that it was a waste of time. In reality, many key scientists who were intimately familiar with the topic objected to the report's conclusions, such as J. Allen Hynek, chief astronomer at Northwestern University and the scientific consultant for the Air Force's Project Blue Book;[26] James McDonald, a respected atmospheric scientist from the University of Arizona;[27] and Peter Sturrock, a professor of electrical engineering at Stanford University.[28] Some of these experts pointed to irregularities in the committee's behavior, which seemed designed to reach a predetermined conclusion. Others cited the fact that the data and descriptions in the thousand-page report didn't support the conclusion that was widely circulated.[29]

While the origin of UAP is hotly debated, one of the potential theories, referred to as the extraterrestrial hypothesis, is perhaps most associated with the stigma surrounding the topic. The term "UFO" and its affiliation with "little green men" and other fringe topics is perhaps the most common reason many academics and scientists have shied away from or even ridiculed the field.

It will be difficult to build an innovation ecosystem around UAP without the cooperation of members of the technoscientific community (academics, scientists, engineers, and entrepreneurs), and for this to happen, the issue of stigma will need to be addressed. The stigma partly arose after the Condon Report and was solidified by today's consensus that the scientific community does not know of any practical method for interstellar travel. While most scientists acknowledge the likelihood of life being present on other planets in other solar systems, the current scientific dogma is that because extraterrestrial civilizations would be unable or unwilling to cross vast distances, any technological objects seen in our atmosphere or in near-Earth orbit cannot be from other solar systems. Therefore, goes the argument, UAP (and its associated technology) must not exist, and witnesses are either mistaken or simply seeing top-secret military projects.

The stigma also exists, as I found in my academic research,[30] because of its association with the paranormal and other subjects regarded by scientists as disreputable. This includes the topic of "alien abductions," which became common in the 1990s with the popularity of shows like *The X Files,* and there were signs that this aspect of the phenomena was becoming less taboo. In 1992, a conference was held at MIT, cochaired by MIT physicist David Pritchard and attended by John Mack, former chairman of the psychiatry department at Harvard Medical School.[31] A few years later, Mack would write a bestselling book about the phenomena. He didn't conclude that the phenomena were necessarily extraterrestrial but did believe his patients were experiencing something real, rather than attributing it entirely to a new kind of mental illness. Both the conference and the book caused a media firestorm, resulting in both MIT and Harvard attempting to distance themselves as well as a disciplinary hearing for Mack.[32]

However, since the 1960s, scores of serious researchers have emerged, both inside and outside academia (sometimes referred to as the "Invisible College").[33] Today, a number of academics from diverse fields—including physics, astrophysics, anthropology, political science, biologists, philosophy of science, and religious studies—are openly researching the subject, as shown by their representation in the Sol Foundation's conferences.

During recent years, AARO and other organizations have gone out of their way to state that they have found no definite evidence that UAP represent extraterrestrial technology or off-world vehicles.[34] However, as pointed out above, AARO agrees that there are still many reports that remain "anomalous" and display unusual characteristics. Like the recent term "UAP," the term "UFO" was most likely created to reduce the stigma associated with the earlier popular phrase, "flying saucers" or "flying discs." The newer term, "UAP," similarly aims to minimize stigma and, along with terms such as "NHI" and "TUO," to avoid overly strong associations with the extraterrestrial hypothesis. It also encompasses the fact that maritime sightings are included in UAP. This shift facilitates unbiased research into the origin of these objects, free from the influence of prior stigma and associations.

Through the efforts of former government officials, current members of Congress, and pioneering academic visionaries and projects like those mentioned above, the stigma around UAP is already lessening, and there is no reason to think that process won't continue. Within the world of scientific research and technology investment, there are many examples of areas that were previously stigmatized or thought to be dead ends, which eventually, through breakthroughs and/or commercially successful products, became popular areas for research and investment. Some examples include AI research, which stalled multiple times and was stigmatized before the current machine learning boom; quantum computers, which were thought to be in the realm of science fiction; DMT and other psychedelic-based therapies, which had a stigma of their own; and even nuclear fusion research, which has started up again after many years of being marginalized. These are now considered legitimate areas for research and investment. The purpose of this white paper is to show how the same can happen for UAP-related research and products.

Secrecy and Security Concerns

Another major concern related to UAP investments is that the reported phenomena overlap with national security issues and geopolitical considerations. Multiple witnesses and whistleblowers have asserted that, despite claiming to have left the "UFO business" at the end of 1969, the US government continued to operate covert programs investigating UAP sightings well into the twenty-first century. This included the programs discussed above, AAWSAP and AATIP, and potentially other programs whose names have not yet been made public and remain top-secret.

Reports of unidentified (the key first word in both UFOs and UAP) craft flying around the nation's airspace without permission or restriction, including over its most sensitive sites, obviously has national security implications. Reports of UAP of different types appearing over sensitive national security sites such as Air Force bases and even nuclear missile silos[35] have surfaced. Similarly, reports of UAP activity in the oceans and over the nation's territorial waters have also become common.[36] Whether these UAP are from a foreign adversary such as Russia or China or some nonhuman intelligence, the security concerns are understandable and quite real.

As mentioned above, there have been reports, including in sworn testimony to Congress, that certain US aerospace defense companies have already been working to reverse engineer recovered UAP technology that was given to them by the US government. These programs are alleged to be locked away in SAPs (special access programs) and housed inside the same large aerospace contractors responsible for building the nation's most sophisticated weapons systems. This raises the possibility that UAP technology, if it exists, is highly classified.

While it's not the purpose of this paper to go too deeply into national security concerns related to UAP, we must note that they include the following:

1. The ability of foreign adversaries to leapfrog the United States by investing in and perfecting UAP-related technology.
2. Noncooperation by existing aerospace entities because of existing secrecy.
3. The issue of eminent domain.
4. The issue of national security patents.
5. Legal considerations of liability for hiding programs from congressional oversight.
6. Issues related to national energy policy and geopolitical strategy and alliances.

In my own interviews with individuals who worked in government-related UAP programs, the most significant reason cited for the secrecy related to any understanding of UAP technology is the first one. The fear is that while UAP represent a significant leap over our best publicly acknowledged technology, an adversary such as China or Russia could, by exploiting such knowledge, leapfrog the defense capabilities of the United States and other Western governments. This was also cited as a reason why academic scientists are not more generally aware of the nature and potential of UAP technology, as involving more researchers in more universities would open up the possibility that China (in particular) might be able to gain this knowledge. Yet, at this date, a number of sources have already speculated, publicly and privately, that China and Russia already have their own UAP reverse engineering programs, potentially putting us into a new, secretive arms race.[37]

Another concern relayed to me was that if a private organization was getting close to reproducing characteristics of critical UAP technology, the patents could immediately be seized by the US government and would no longer be owned by the company, which could be a damper on investment in the sector. This concern was highlighted recently by Marc Andreessen, a prominent Silicon Valley venture capitalist and cofounder of the well-known VC firm Andreessen Horowitz. He said that during his meetings with certain government officials, he was told that the government could classify whole areas of science, including math and physics.[38] While the context of this conversation was the strategic national security considerations around the diffusion of advanced AI, the implications for UAP and other sensitive areas are all too clear.

The Unique UAP Opportunity

Nevertheless, these security concerns assume that we might be getting near the point where current scientists and engineers (from the United States or other countries) not only understand the principles behind how UAP technology could work but also have the expertise to reproduce it in the near future. Several insiders have claimed that while UAP represent advanced technology and there are classified reverse engineering programs, we have not yet been able to figure out exactly how the technology works or come close to reproducing it.[39]

Part of the reason for this white paper's recommendation to invest in more open research is so that we can close the gap in our public understanding of physics, chemicals, materials, and other sciences that might make implementation of such technology possible. I believe the only way to get there is to unleash the minds of the "best and brightest" scientists and engineers in an ongoing process of technoscientific research and innovation. From the point of view of our existing public science, the flight characteristics of UAP may not even be possible without updating our understanding of the universe. This can best be done by putting forward hypotheses and conducting experiments, reaching preliminary conclusions, and publishing papers that are open to debate and attempts to reproduce results by multiple labs.

As an instructive example, when the atom was split in late 1938 by a team composed of both chemists (Otto Hahn and Fritz Strassmann) and physicists (Lise Meitner and Otto Frisch), it took only a month before the latter pair coined the term "fission" (borrowed from biology). They had written papers on their discovery by January of the next year, and these were reviewed by luminaries such as Niels Bohr and validated by other scientists within months.

If we consider the Manhattan Project, we might think that atomic weaponry moved swiftly from theory to production. The program itself was put into motion by the actions of Leo Szilard and Eugene Wigner, who convinced Albert Einstein to write a letter to President Roosevelt in 1939. However, it wasn't formally started until August 1942, when the focus moved from understanding the basic science to investigating whether a weapon could be built, under the code name "Manhattan Engineer District."

Emphasizing the "engineering" part of the name, the US government turned to Colonel Leslie Groves from the Army Corps of Engineers, whose previous project had been the construction of the Pentagon. Until then, it has been necessary to do technoscientific research and innovation with smaller budgets and experiments to not only reproduce the results of nuclear fission but also show that chain reactions were possible.

Even after this validation, Groves found out that the exercise to build atomic weapons wasn't just another engineering job that could be completing through efficient project management; rather, building the atomic bomb was an example of focused technoscientific innovation. Even if nuclear fission was understood and experimentally reproduced, it still took an entire cadre of Nobel-caliber physicists, chemists, and engineers—many of whom were refugees from the best institutions in Europe—to figure out how to build such a device. It is doubtful that the technology and science could have come together so quickly without involving such a large cadre, who were able to bounce ideas off one another.

By comparison, the secrecy surrounding technoscientific UAP research programs in the government, if they exist, may be counterproductive. Referring back to the Manhattan Project, Groves, a military man through and through, wanted compartmentalization to be a key principle, but this was unworkable for the scientists. As J. Robert Oppenheimer recalled, this was part of the reason he suggested a central lab where "theoretical ideas and experimental findings could affect each other," reflecting that compartmentalization would slow down the process.[40] This led to the establishment of the laboratory at Los Alamos. While in wartime it might have been practical to bring many of America's most promising young scientists from universities together in one remote place temporarily, in peacetime this isn't a particularly attractive or practical solution. Scientists and experimentalists need to be engaged within existing scientific institutions, within existing companies and in new enterprises where innovation can be unlocked.

Moreover, the Manhattan Project can't be thought about in isolation; rather, it represents the end of a long chain of technoscientific innovation that goes back to Ernest Rutherford's 1909 model of the nucleus of the atom, as detailed in Richard Rhodes's *The Making of the Atomic Bomb*. Decades of mentorship, scientific publications, reproduction of results, and cross-disciplinary collaboration were needed before the secrecy around the Manhattan Project was necessary, justified, or appropriate.[41] This research and back-and-forth among top scientists at research institutions in the United States and Europe was essential before the idea of an atomic bomb—an uncontrolled chain reaction put in motion by nuclear fission—even occurred to Leo Szilard, the man most often credited with the idea. If not for the connections between communities of scientists that led to these collaborations over decades, atomic power and weaponry may never have come to fruition. Similarly, we may yet be in the stage where decades of research and collaboration between scientific minds are needed before we are ready to produce full-blown craft that can reproduce all the characteristics that have been observed in UAP.

While such important national security considerations are part and parcel of the UAP issue, we should note that privatization is possible and often necessary for innovation, even in industries that involve national security. This has already occurred in the aerospace and defense industries, which are now thriving parts of the private sector, with considerable innovation under the umbrella of defense tech. Though originally limited to government clients, these technologies have since led to numerous consumer applications.

Privatization of space, including the launching of satellites, is a prime example of an area that was rife with national security concerns in the past but has already undergone privatization.

This decades-long process resulted in new companies worth billions of dollars and entirely new industries that are projected to be worth trillions of dollars as the space economy grows. This process included directives from the Obama administration to NASA to provide some of its intellectual property to new startups. It also included the transfer of plans and knowledge related to technologies such as moon rovers and spacesuits, so that they could be improved with today's technology and engineering know-how.[42] In these cases, the government technology, now decades old, was only a starting point, and many private organizations have come up with more innovative modern solutions to the same problems tackled by NASA in the 1950s and 1960s.

In a sense, all the special considerations given in the previous three subsections related to challenges of UAP—namely, that of unproven technology, large research and development cycles and budgets, historical stigma, and national security concerns—have all been present in varying amounts in previous industries (though not necessarily all in one industry). While these issues may have hampered investment and research at some point, many of today's industries have been able to overcome similar issues. In fact, the ramping up of the national defense infrastructure relies heavily on private contractors, with new startups like SpaceX, Palantir, and Anduril not only making dents in previously protected industries but also achieving notable success.

In the medium to long term, it will be possible to overcome these challenges and create a UAP innovation ecosystem through the prolonged efforts of many parties. These will need to include both top-down initiatives that involve the government and public funding, as well as bottom-up, entrepreneurial, and investment activity from the private sector.

4. UAP Investment: Potential Opportunities

Before we get into the specific types of funds and research programs that could help in overcoming the above challenges, I would like to detail some of the potential opportunities and applications that UAP technology could unlock. These are much broader than national defense. The whole reason to establish a UAP innovation ecosystem is to unleash the power of the market to define and implement applications that go beyond what has been envisioned to date. The breadth and significance of the potential applications reveals the vast opportunities and should provide sufficient motivation for individual entrepreneurs, investors, and existing public and private institutions to engage, if the challenges mentioned above can be overcome.

Origin and Observables

To realistically forecast potential applications of UAP technology, it's useful to revisit both the consistently reported characteristics of UAP and their potential origins. This is a hotly debated point among the general public, members of Congress, the DOD, other government officials, and scientists. This includes speculation by the mainstream media, numerous documentaries and TV shows, and both popular and scholarly articles and books on what is informally called ufology.

The main point I want to make about origin is that, from an investment point of view, it matters less whether we have nailed down the specific origin of the phenomena. What matters more is that the technology has been observed, and consistent characteristics have been reported that can be evaluated. In other words, what matters is that some UAP represent advanced technology, and this subset of UAP do not fit the prosaic hypothesis (i.e., they cannot be explained by balloons, conventional aircraft, atmospheric clutter, misidentifications of Venus, swamp gas, or mass hallucinations). The potential applications are the same, even if the technology originated from secret government advanced weapons projects (the classified hypothesis), outer space (the extraterrestrial hypothesis), an underwater or underground race of nonhuman entities on Earth (sometimes referred to as the Silurian hypothesis[43] or cryptoterrestrial hypothesis,[44] among other names), deception by beings that we associate with myth (as described by Jacques Vallée,[45] among others), or even future humans who are traveling back in time (the extratemporal hypothesis or extratempestrial model).[46]

From an investment point of view, the most important aspects of UAP are the technology and the effects it achieves—whether in the air, water, or outer space—as well as its effects on human beings. As we think about what investments might be made in research and development or in startups productizing UAP technology, it is useful to look back and summarize the anomalous aspects of UAP that have been consistently reported for decades.

These characteristics, which have been observed by both civilians and military personnel, were summarized by Luis Elizondo, the former head of one of the Pentagon's UAP research groups (AATIP). Elizondo has articulated the "observables" derived from seventy-five years of sightings. These characteristics are neither mutually exclusive nor comprehensive. They have been seen together within a single report and observed both visually and on instruments, according to witnesses.

These observables represent a design aspiration for areas of research within scientific institutions, experiments and prototypes within R&D groups in large companies, and product design goals for new products and startups. They also describe why investors should take seriously the breakthroughs that could come from a UAP innovation ecosystem.[47] They are as follows:

1. **Hypersonic Velocity.** UAP have been observed at hypersonic speeds (Mach 5, or five times the speed of sound), and in many cases, they exceed Mach 17. More importantly, this is from craft that have no visible means of propulsion as we currently understand it.
2. **Instant Acceleration.** This includes not only accelerating in a straight line at speeds that would make G-forces unbearable for existing aircraft structures and human occupants but also making instant turns and shifting direction with rapid acceleration.
3. **Low Observability.** This includes the ability to have a low or no radar signature, as well as potentially disrupting existing electromagnetic forms of communication.
4. **Transmedium Travel.** This includes the ability to go seamlessly from under the water to the air and into outer space. While we have made progress on craft with some capability (e.g., space planes like Virgin Galactic's spaceship and reusable rockets like those from SpaceX, not to mention the Space Shuttle program), in general we have not produced seamless transmedium travel.
5. **Antigravity.** This is perhaps the most controversial observable. UAP have a method of lift (and possibly propulsion) that allows them to "counteract" gravity and inertia in ways we haven't yet been fully able to explain. This goes beyond any method of propulsion we have used in our technology to date (e.g., balloons, airplanes, helicopters, rockets), and could alternatively be characterized as gravity control.
6. **Biological Effects.** Government reports have revealed biological effects on those who have encountered a UAP up close. This has been validated, with the US government even issuing disability benefits to soldiers who experienced deleterious effects after proximity to a UAP. This includes the soldiers stationed at Rendlesham Forest. In addition to harmful biological effects on humans, this category could also include potential beneficial effects on humans, including medical technology.

While these six observables do not underlie the whole range of UAP investment opportunities, they are a good reference as we look at specific vertical industries and applications. There are also more esoteric observables that have been reported but don't tidily fit into this list. For example, the ability to use electromagnetic pulses in limited ways to stop a car or truck engine temporarily has been witnessed many times. Additionally, military witnesses have reported strange effects, such as discrepancies in the timing of their watches compared to that of clocks on the base they left, with their hands running slower.

To emphasize the truly revolutionary potential and applications of UAP-related technology over the next fifty years, the Pentagon's previously secret UAP investigation program AAWSAP commissioned a series of thirty-eight scientific reports, called DIRDs (Defense Intelligence Reference Documents), from scientific experts at academic institutions and private research labs. In 2019, through a Freedom of Information Act (FOIA) request, a list of these documents, which have been shared with Congress, was released. These studies, commissioned in 2009, were scientific exploration papers related to how UAP technology might function, including such titles as "Traversable Wormholes, Stargates, and Negative Energy"; "Metamaterials for Aerospace Applications"; "Field Effects on Biological Tissues"; and "Invisibility Cloaking."[48]

While these titles might have sounded like science fiction only a few years ago, it is now known that the Department of Defense has been investigating how new technology could be built based on advanced engineering and scientific principles—some already understood and others yet to be discovered. Nevertheless, they also demonstrate the diverse range of applications of UAP-related technology, given appropriate investment in research and product development, building on existing scientific knowledge. Finally, they represent starting points for the process of science, which requires peers building on one another's work, proposing new theories, and running experiments to test and validate their findings. This will only happen when a UAP ecosystem is established, rather than relying on one specific company or secretive agency doing the research.

Specific Application Areas for Potential Investment

Let us take an industry-oriented view of the landscape for applications and investments. It should be said up front that each of these application areas are highly speculative and would need either a short or long process of technoscientific innovation to be achieved. A significant amount of theorizing, research, scrutiny, and validation must be done *before* venture capitalists can consider investing in either product development or manufacturing or distribution opportunities with new startups in these areas.

Still, each of these applications represents potentially large, almost transformative market opportunities for investors, public and private. While some of the potential applications in this section might sound like science fiction, for each area, we can find precedents in existing reports of UAP collected from both military and civilian sources. These suggest that not only is the technology possible, but it already exists and has been observed—though we may not yet know how it works or who built it. In effect, *each of these potential application areas arise directly and logically from one or more observables,* each of which summarizes data from hundreds or thousands of UAP reports.

Some of these opportunities, around research and data and consumer reports, may be readily apparent in the short term. However, most would be considered medium- to long-term applications.

Table 1. A summary of potential application areas, observables, and time frames

Industry	Observable(s)	Time frames
Aviation	1, 2, 5	Medium term (unmanned), long term (manned)
Private space exploration	1, 2, 5	Medium term (unmanned), long term (manned)
Communications and control	Other	Medium term
Materials science	3, 4, 5	Short to medium term
Maritime applications	4	Short to medium term
Defense tech	1, 2, 3, 4, 5, 6	Medium to long term
Software, data, and instruments	Other	Short term
Other adjacent areas	Other	Long term

Table 1 gives an overview of the industries and application areas, described in more detail below, mapping them to the list of six observables provided in the prior section when possible. It also estimates whether they represent opportunities that could arise in the short term (one to five years), medium term (five to ten years), or long term (ten or more years).

1. Aviation

This is the first potential application area or industry that usually comes to mind in relation to historical UAP reports. For example, the ability to have hypersonic craft that go faster than Mach 17, and with extreme maneuverability, is a natural fit for both civilian and military aviation.[49] Existing technology might only achieve these speeds through rocketry and ballistic missile technology, launching craft into and beyond the edge of space before returning to Earth. In contrast, UAP have been able to achieve such velocities *within Earth's atmosphere*. However, existing approaches are not viable options for the mass transport of civilians or cargo. The observables at play here include hypersonic velocity, instant acceleration, and antigravity. Numerous reports of UAP shapes and sizes (triangle, sphere, disc, cylinder, etc.) imply that they do not use existing propulsion or methods of lift. This raises the possibility of first creating unmanned drones that can travel around the globe in very short periods of time and potentially carry large payloads. Eventually, new craft that utilize these methods could be extended to human occupants for both civilian and military flights.

This application area would include mastery of so-called antigravity, or more specifically, the synthetic creation of gravitation fields using electromagnetic fields. Initial investments in this area would need to include research around the lift and propulsion methods used by UAP. Some of this research, as notes in both the 2023 and 2024 congressional testimony, is reportedly part of reverse engineering efforts conducted by major aerospace companies. Reports differ on the progress of research in this area of UAP, but opening up the research to the brightest minds in science and technology—along with funding at R1 research universities and private labs—may be critical in understanding and mastering this field.

In the 1950s, the idea of aviation firms and academic research institutions launching gravity-control research programs wasn't considered strange. In fact, in a series of mainstream popular articles during late 1955, appearing in the *New York Herald Tribune* and the *Miami Herald*, the following institutions were identified as conducting gravity-control research programs: Martin Aircraft Company (which subsequently became Martin Marietta and is now part of Lockheed Martin), Lear Inc., General Dynamics, Sperry-Rand Corporation, Convair (makers of the B-36 bomber), and several prominent helicopter groups, including the Sikorsky division of United Aircraft. Similarly, scientists from Princeton's Institute for Advanced Study, Indiana University, and Purdue's Research Foundation, as well as the privately established Babson Gravity Research Institute, were among the most visible in advocating for the study of gravity.[50] In a 1956 article, George S. Trimble, the VP in charge of advanced planning at Martin Aircraft and overseeing its research, predicted that the problem would be solved in the time it took to build the atomic bomb.[51] The fate of these research programs isn't known publicly, with rumors suggesting that they were either classified, moved underground,[52] or abandoned because they weren't successful. If we were to resume this research today, it wouldn't be the first time that a topic of legitimate scientific interest was abandoned, stigmatized, and then picked up decades later with improved tools and sophistication.

However, the history of innovation shows that large companies, even when they innovate in a new area, generally are loath to cannibalize their existing products in successful markets. Therefore, the most likely way to capitalize on new aerospace products related to UAP will involve opening up research beyond secret government projects at very large defense contractors to involve innovative startups. For example, in the 1920s, when aviation was still relatively new, it was thought that Ford Motor Company might succeed by starting an aviation division. Though it became the largest aircraft manufacturer in the late 1920s, the small market for airplanes diverted focus from Ford's core, profitable business of manufacturing automobiles, leading to the division's closure in 1932.[53] Existing companies rarely pursue entirely new industries with the focus of startup companies, often because the initial market is too small and it distracts from their core business. As a result, smaller, leaner companies frequently introduce innovative products to market first with a big splash, prompting existing large companies to scramble to catch up—sometimes succeeding, and at other times ceding the market to the new players. We see this trajectory, for example, with the private space industry (SpaceX), electric cars (Tesla), and the Internet, where companies like Netscape and Google surprised existing software players like Microsoft and IBM. Historically, IBM, a leader in mainframe computing, fell behind in minicomputers (to Digital Equipment Corporation) in the 1960s and personal computers (to Apple) in the late 1970s and early 1980s, ultimately struggled to recover.[54]

Xerox pioneered ideas later adopted by Apple's Macintosh Microsoft's Windows operating systems but failed to commercialize them. More recently, Google, a leader in AI concepts like GPTs (generative pretrained transformers), was surprised by OpenAI's success with ChatGPT.

In this vein, in addition to divisions of large aerospace companies with government contracts, there are also a number of garage inventors who have claimed to uncover and build prototypes of the propulsion and lift systems of UAP. These efforts are often experimental in nature, underfunded, lack attention to underlying principles, and are generally not acknowledged by larger research institutions. Separate research funding will need to be allocated to try to validate the ideas and give proper technoscientific scrutiny to encourage nonconventional research and experimentation. We must remember that the Wright brothers perfected the first airplane in their bike shop, and we should not discount the possibility that breakthroughs might occur in nontraditional venues or from "garage inventors" rather than large companies or academic scientific institutions.

Which emerging ventures are ripe for investment opportunities? If we look at today's aviation industry, it is not dominated by a single vertically integrated provider but instead comprises a large network of companies that provide a vast array of components and parts to airplane manufacturers, jet engine producers. There is also the transportation industry and the shipping industries, along with militaries, which act as customers for their finished products. There are companies providing both small, sport model planes for consumer as well as high-end business jets, for example. We can see far-future potential startups and spinoffs creating UAP-type engines, antigravity modules for private craft and the transportation industry, accompanied by numerous parts and material providers, as well as companies specializing in new manufacturing processes for metamaterials (see the materials science section below). Additionally, a new crop of companies may emerge, producing different sizes and class of aircraft based on this technology, just as we have multiple sizes and classes of aircraft today.

2. Private Space Exploration

Within the past decade, the privatization of space has occurred very quickly, taking what was once the sole domain of sovereign governments and launching many new multibillion-dollar ventures for getting humans and equipment to space. As mentioned above in the observables section, UAP have been observed to be "transmedium" craft capable of going seamlessly from under the ocean to the atmosphere and into outer space using unified propulsion and possible life-support methods. Today, the space industry is based primarily on rockets lifting items into orbit, including satellites, and applications that are unlocked by these satellites. While companies like SpaceX have made progress in reusing rocket components, there is no doubt that rockets are a relatively inefficient way to deliver items, with only a small part of the launch being usable for this purpose.

Serious investment in UAP research is likely to create different methods of lift capable of operating beyond the atmosphere, enabling the transportation of satellites initially and, eventually, human crews into outer space without the use of inefficient rockets. With the success of this recent first phase of space privatization, investors have shown a willingness to fund novel approaches to launching satellites; for example, SpinLaunch raised $71 million in financing from venture capital and aerospace companies for developing a novel approach to launch satellites by spinning them in a giant centrifuge and shooting them off into orbit.[55] This is in addition to hundreds of millions invested in other private space companies, funding everything from satellite-based monitoring of Earth and orbital repositioning of satellites using tugs to providing mobile phone service from space.

Even more futuristic-sounding applications may be unlocked by UAP research. For example, the equivalent of space elevators to bring individuals and equipment to fixed stations in the sky, impractical for now, may be realizable with more R&D on antigravity types of lift systems, particularly those using electromagnetic and gravity-control technologies. This could open up both space tourism and the ability to build and launch passenger vehicles in space for a fraction of the cost of launching from Earth.

The XPRIZE resulted in a bonanza of companies focused on crewed space flight, and this has already unlocked a kind of space tourism for the ultrawealthy.[56] Space tourism is still limited by the extreme costs and conditions of bringing humans into low-Earth orbit by overcoming the planet's gravity, as well as the costs of maintaining a habitat in space.

While Elon Musk and NASA have been working to get humans back to the moon and possibly colonize Mars, enabling large-scale solar system colonies may require entirely new technology. UAP research and gravity control may be one of the paths to allow such mass migration and travel in space for consumers and the expansion of private industry well beyond current levels.

3. Communications and Control

Reports of the communications and control systems for UAP often involve new types of BMIs (brain-machine interfaces) or BCIs (brain-computer interfaces), in which the pilot can operate the craft without a traditional set of flight controls. Moreover, many reports, including the *Nimitz* Tic Tac encounter, suggest that the UAP was able to anticipate what the pilots in our aircraft were going to do and adjust accordingly. In the *Nimitz* case, the UAP reportedly zipped away to the "CAP point" of a training exercise underway during the incident, a location that only the pilots and key personnel in the carrier group knew about.[57] While this might sound like science fiction, BCIs such as Neuralink have already allowed one quadriplegic individual to play video games,[58] with more human testing currently inin progress. Neural interfaces for controlling aircraft may be well on the way, using similar technology.

It is possible that UAP can also communicate over large distances in ways that we haven't been able to do yet, utilizing quantum entanglement or other, not-yet-discovered methods. Research labs are already experimenting with quantum teleportation, which uses entangled particles to instantaneously relay information states to faraway locations.[59]

The study of UAP could provide a significant jumpstart to each of these areas.

This area could benefit from the transmedium observable, allowing for novel communications between submarines, the surface, and outer space, even when satellites are occluded by a moon or planet.[60]

UAP have been witnessed for at least seventy years, which means that their control and communication mechanisms represent mature technology that has been in operation all this time (and possibly much longer). Just as trains, automobiles, submarines, airplanes, and our existing spacecraft utilize different types of controls, new control structures will need to be developed as we utilize UAP-type craft.

4. Materials Science

Underlying many of the potential areas of UAP investment discussed above is the new materials science that may be required to build many of these novel applications and systems. Analysis of existing material that is purported to come from UAP has revealed extremely precise arrangements of existing known terrestrial elements in what are often publicly called "metamaterials."

For example, when TTSA (To the Stars Academy, a private organization that several members of the DOD joined), in conjunction with the DOD itself, analyzed a purported metallic fragment from UAP, the structure was revealed to comprise layers of magnesium, zinc, and bismuth. While the elements themselves do not necessarily imply a nonhuman or extraterrestrial origin, their arrangement suggests a manufactured metamaterial designed for a specific purpose, featuringfeaturing an unusual configuration and isotopes. To quote TTSA:

- The material is clearly engineered with distinct layers of MgZn and Bi at structured thicknesses only microns thick.
- There is no precedent for this structured combination of materials.
- It is unclear what fabrication processes allow this combination of materials to form an integrated structural component.
- Theoretical analysis shows that the material acts as a waveguide for terahertz (THz) frequencies.
- Those wavelengths normally would not propagate through this geometry.
- One side of the sample appears to be tooled, having a defined contour.
- There has been an extensive amount of testing on the material, the true purpose or function of the material remains unknown.[61]

In a scientific paper accepted by the journal *Progress in Aerospace Sciences*, Garry Nolan, Jacques Vallée, and colleagues outlined methods for studying an unknown material, including elemental and isotopic analysis.[62] In the paper, they also give an overview of using these methods to analyze metallic material found at the location of a UAP sighting location in Council Bluffs, Iowa. Witnesses reported that after the sighting, the material was first found in a "molten" state and then hardened. No definitive conclusions were reached about the origin of the material, but it did not seem to be from any aircraft, local foundry, or known human space hardware. This is another example showing that while it would be possible to reproduce such material at an extremely high cost—sometimes prohibitively so—there is no clear understanding of its purpose or how it ended up in a molten state after a UAP encounter. With further analysis underway by Nolan and Vallée, this case shows the potential for unique applications of materials science in relation to UAP.

Research in this area may lead to entirely new types of materials and manufacturing process that are specifically engineered for use in these craft, analogous to how carbon fiber manufacturing has led to lightweight yet extremely durable materials used in certain aircraft. This might include analysis and development of new types of materials and processes that can be used in industrial, defense, or even transportation applications. Extensive testing on different configurations will be required to make this work, but it seems from initial analyses and conclusions that by combining known elements in new configurations, the metamaterial may take on unusual properties, which we are still trying to unravel.

5. Maritime Applications

The Pentagon UAP Task Force initially changed the acronym UFO to UAP, or unidentified aerial phenomena, but soon revised it further to mean unidentified anomalous phenomena. One of the main reasons for this change came from the "transmedium" capabilities of UAP, confirmed across numerous observations by the United States' and other countries' navies as well as the crews of international shipping companies.[63] Some reports are of UAP traveling underneath the ocean and then rising from there into the atmosphere. This transmedium capability raises the potential for entirely new maritime applications, moving beyond our existing submarines and transportation systems, which could be used for shipping, passenger transport, and perhaps even underwater bases and cities.

Maritime UAP sightings include the tracking by sonar of large underwater objects traveling at remarkably high speeds. The potential maritime applications of such technology, inherent in these USOs (unidentified submersible objects) reports, are significant. This is true not just for crewed transportation or defense applications but also revolutionizing the shipping industry, one of the largest sectors globally. Just as steam ships, oil-powered tankers, and submarines changed the maritime landscape, so might USO technology provide a new area for investment in companies that will reshape this aspect of the modern world.

Moving beyond transportation, there are significant potentials for resource extraction, storage, and management. For example, drilling rigs are currently the best way to extract petroleum from the world's water environments. However, much of the deep ocean remains unexplored. UAP technology, which may be able to travel both on top of and under the surface at significant speeds and stay submersed for long periods of time, presents new investment opportunities, including underwater storage and potential cities. For more on USOs, see the Sol Foundation white paper "Beneath the Surface: We May Learn More About UAP by Looking in the Ocean."[64]

6. Defense Tech

In recent years, investment in defense tech has grown significantly. According to Crunchbase, a technology industry tracking organization, in both 2022 and 2023 the amount of venture capital investment in defense tech companies was over $2 billion, and 2024 was shaping up to hit new highs.[65] This segment of the startup industry is focused on both developing entirely new weapons for the military and utilizing AI and other data science and applications to assist the military-industrial complex. Some prominent companies in this new field of venture capital investment include Palantir and Anduril.

The fact that UAP are being investigated by the Department of Defense and intelligence agencies, rather than primarily by civilian agencies, underscores the national security issues and potential applications involved. As mentioned above in the section "The Unique Challenges and Opportunities of UAP," part of the reason former government officials have cited the need for secrecy around UAP—aside from the obvious implications of unknown craft of "nonhuman" origin flying around our airspace—is the potential arms race that UAP technology could create. In fact, some officials believe such a secret arms race around UAP technology is already underway.[66]

According to former government personnel, UAP have been sighted over the nation's most sensitive installations, including nuclear missile sites.[67] This pattern seems to have been repeated in the Soviet Union with some of its sensitive nuclear sites as well, including reports of the ability of UAP to not only deactivate but also reactivate nuclear-tipped ICBMs.[68]

However, entirely new defensive and potentially offensive weapons are a natural application of UAP technology. Just as sailing ships utilized cannons, submarines introduced torpedoes, airplanes created an opportunity for airborne bombs, and rocket engines powered ICBMs and today's cruise missiles, UAP technology could revolutionize warfare. More recently, remote-controlled, armed, and eventually autonomous drones are becoming key military weapons. The ability to travel at hypersonic speeds with precision, while maintaining low observability (stealth), may result in the creation of new categories of defense applications.

As mentioned above, this potential application area is fraught with difficulties, overclassification, seizure of patents, interagency turf wars, and geopolitical rivalries. But nonetheless, the strategic potential applications show that defense tech investors, in particular, should encourage UAP-related research and take such applications as seriously as the government does.

7. Software, Data, and Instruments

While many of the potential areas of investment mentioned thus far require more basic research before commercial products can be designed, let alone developed, there is already a potential market for using AI to collect, store, and analyze data related to UAP reports. The data might come from existing databases such as MUFON, classified databases like the one heldheld by Bigelow Aerospace's National Institute for Discovery Science (NIDS) under contract with the DOD,[69] or new reporting apps like Enigma used by consumers.[70]

There are also instrumentation ventures and projects, including private projects to create observation tools to look for and measure UAP activity, efforts to lead expeditions to specific areas, like UAPx, and fully academic projects like the Galileo Project at Harvard. Members of the Galileo Project have published a number of academic papers on their efforts to build multimodal systems for wideband analysis of the sky to locate UAP.[71] Their idea is to have mini "observatories" spread out across the country and utilize AI to analyze the data. Existing telescopes, point out members of the Galileo Project, are not optimized to look for UAP because they tend to be narrowband (think of a pencil-sized light scanning the sky, looking for a fast-moving object). There is also the possibility for private satellites to look for and track UAP, which could lead to various ventures to provide certain types of data. Additionally, former NASA UAP study team member Michael Gold suggested in congressional testimony that past imagery taken by satellites and spacecraft at NASA be scoured for relevant information.[72]

These ventures, both public and private, represent shorter-term opportunities for consumer data and reporting, as well as new kinds of scientific instruments that are optimized to look for UAP, not just in optical but also in infrared, radar, and other frequencies, duplicating on a smaller scale some of the sensitive instruments that have been available to the military. As mentioned above, AARO has already engaged with research institutions to help build better sensors and enhance data analysis. In the recent report, the agency identified its efforts to deploy GREMLIN, a prototype suite of sensors to resolve sightings in the sky, built in conjunction with the Georgia Tech Research Institute.[73]

Showing the power of software not only for controlling aerospace objects or satellites, companies like Slingshot Aerospace, which use sensor networks to track satellites and other objects in Earth orbit, have already raised over $80 million for its database and simulation products.[74]

8. Other Adjacent Areas

There are other areas and potential applications that are adjacent to the immediate UAP opportunities that I have not mentioned and might require separate funding sources.

The most prominent of these include new energy technologies. The need for more efficient production of energy is one of the main objections that some scientists have to the reported flight characteristics of UAP, such as the *Nimitz* encounter with a Tic Tac–shaped object that reportedly fell from eighty thousand feet to the surface in a fraction of a second. Even future theoretical models for spacecraft that could someday travel faster than the speed of light—such as the Alcubierre warp drive, which would create a bubble in space-time—may be impractical because of the energy requirements.[75] Cracking the problem of how to charge, store, and generate energy was a key component in bringing electric cars to market. The energy generation and storage requirements to accomplish the observables may be significant enough to require entirely new ways of generating energy. There have been reports from garage inventors and UAP witnesses that the technology needed for anti-gravity craft could also be used to generate zero-point energy. Hal Puthoff and Eric Davis, two scientific consultants for the AAWSAP and AATIP efforts, have produced papers on these ideas.[76] Energy represents a potential large area for investment and overlaps with deep tech investments in clean energy and other speculative areas such as contained fusion reactions, which companies have now received significant investment to pursue. Other industries that could be affected in the long term, with further validation and research, include the biotech and medical fields.

While this section has not been exhaustive in exploring the potential areas of investment with respect to UAP-related findings, technology, and services, I hope that it has demonstrated the broad range of applications, most of which remain medium to long-term possibilities to date. UAP technology that could reproduce the observables has the potential not only to incrementally add to existing industries but to completely revolutionize them. Funding UAP technology should be considered investment in frontier tech that could produce breakthrough products and companies.

Many of these applications are not in the "productization" phase yet because more research needs to be done. But this was also the case for many of today's industries, where the core technology was once held by the government or inside large corporate R&D labs and considered futuristic.

In the long term, of particular interest are the applications that might be opened up by building as UAP ecosystem. For example, when Intel introduced the 4004 general purpose microprocessor in the 1970s, it didn't envision there would be a market beyond industrial control systems.[77] The most innovative uses of microprocessors—in personal computers, video game consoles, and eventually mobile phones—hadn't yet been imagined by the most knowledgeable people in the computer industry. Similarly, Ken Olsen, cofounder of Digital Equipment Corporation—which took on the mainframe computer industry—couldn't imagine why anyone would want a computer in their home.[78] Rumors in Silicon Valley have passed down the tale that Steve Jobs, visionary cofounder of Apple, said that Apple's early personal computers shouldn't include modems or networking capabilities because "no one wants to be tethered to the office by an umbilical cord."[79] The eventual applications of UAP technology might include areas that we do not currently imagine but could become significant industries in their own right. For this to happen, we need to build a UAP innovation ecosystem.

5. Background on Innovation Ecosystems

In this section, I'd like to give some background on modern innovation ecosystems as they exist today in locales like Silicon Valley, involving both private investment and research organizations. Because my main recommendation is to build an innovation system for a new, frontier tech area (UAP), an understanding of the benefits of an innovation ecosystem is critical to knowing how to build one for this new area.

As mentioned in the introduction, during the past century, significant new innovative industries have been formed through collaborations between governments, academic research institutions, and private investors/entrepreneurs. Both the research and product development were funded initially primarily though wealthy patrons and informal networks of what we might call "angel investors" today. In the years leading up to and including World War II, the government funded basic and subsidised applied research. Collaboration of these elements has resulted in the development of the Internet (which was originally funded by DARPA), artificial intelligence (see the DARPA self-driving challenge in the section "Innovation Prizes"), commercial aviation (funded almost entirely by the US Postal Service),[80] private space vehicles,[81] biotechnology,[82] and infrastructure for automotive (in terms of building roads), nuclear energy (nuclear research labs), and nanotechnology,[83] to name just a few. Basic research was often accomplished with government grants to academic institutions, contracts with new and existing enterprises via government labs (e.g., Lawrence Livermore National Laboratory), and large corporate R&D labs (e.g., Bell Labs).

In recent decades, though, private investment in startup technology companies has come to represent a much larger percentage of innovation and new company formation. This is best represented by the entrepreneurial and venture capital ecosystem in locations such as Silicon Valley. Today's largest technology companies by market capitalization were all startups that were funded this way. A mature innovation ecosystem provides not only capital but also assistance and support to potential entrepreneurs and fledgling startup ventures on their path to becoming profitable businesses by providing educational, mentoring, and strategic resources.

The Importance of Innovation Ecosystems

According to recent statistics, Silicon Valley and the San Francisco Bay area field more startups and venture capital funding than all the other geographic innovation ecosystems across the United States, followed by New York, Boston, and Los Angeles.[84] While the first venture capital fund was started in Boston (relying on innovations at institutions like MIT), Northern California has gone on to produce so many companies because of a self-reinforcing innovation ecosystem that consists of more than just investments.

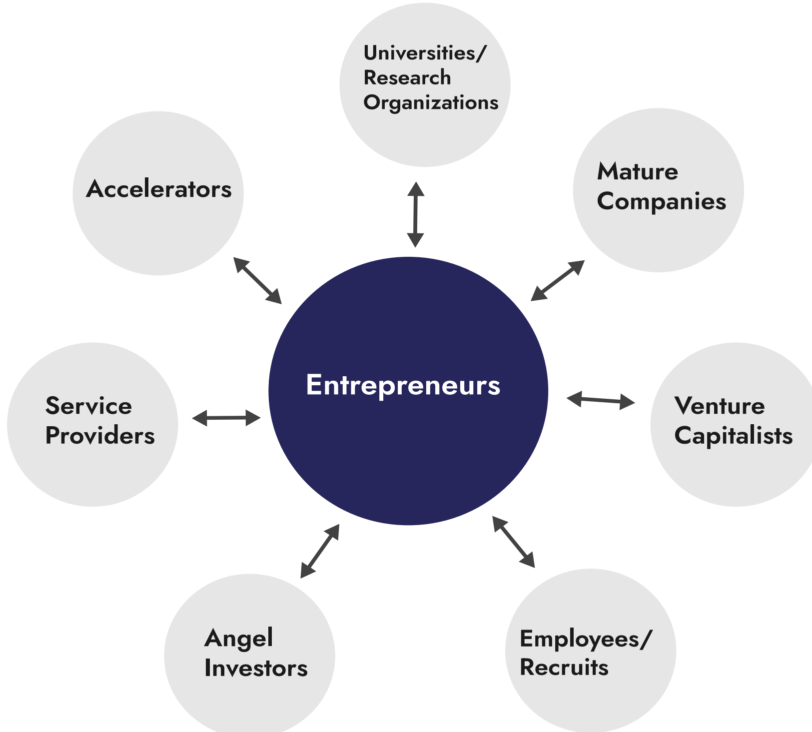

Figure 2. The key parts of an innovation ecosystem, as shown by Silicon Valley.

A modern innovation ecosystem that encourages new startups to capitalize on research and build new products, turning scientists and engineers into entrepreneurs, consists of several interrelated categories of individuals and institutions. Some of these categories are easily identifiable; others might be more subtle and involve interaction and movement between these categories. Figure 2 shows some of the entities needed for an innovation ecosystem. The functions of the entities include (but are not limited to) the following:

- **Entrepreneurs/Founders.** These entrepreneurs are the heart and lifeblood of innovation ecosystems. The key is that these founders usually come from the other parts of the ecosystem.
- **Research.** This includes existing institutions where research is done (think of Stanford University or MIT), R&D centers of existing large companies, or even private organizations set up specifically for R&D that are not part of big companies or universities.
- **Talent (from Mature Companies).** It is important for new growing ventures to easily find experienced talent to join their startups. This is provided by existing large companies that foster and employ talent in engineering, marketing, and operations.
- **Angels and Mentors.** Individuals who have been successful in previous ventures often become mentors and advisors to new ventures. But most importantly, those who have achieved financial success in the ecosystem must be willing to become pre-seed-stage investors, also called angel investors. Often the first mentor that an entrepreneur finds is an executive from a successful large company that lived

through the startup phase, or a previous founder who has exited their startup to one of these large companies and is now looking to help others build new ventures. The first funding for a company frequently comes from not just friends and family but also one of these mentors or angel investors.

- **Professional Investors.** Venture capital (at various stages) and private equity (for later stage companies) are examples "professional investors" who raise funds specifically for investing in new companies or in those becoming successful. I'll say more about these below.
- **Service Providers.** This includes legal, marketing, and infrastructure providers who offer flexible terms and cater their services to early-stage, high-growth companies.
- **Educational and Accelerator Programs.** These could consist of purely educational programs or commercial accelerators or incubators, all of which are usually only possible when a deep ecosystem has been developed over time. Accelerator programs and business plan competitions in universities, as well as commercial programs like Y Combinator or 500 Startups, are often the first pre-seed-stage institutional investors after family, friends, and angels/mentors. These often take the form of boot camps to get founders, who are often technical, to start thinking like entrepreneurs—learning to direct resources not just to developing technology, but to finding customers (i.e., finding product/market fit) and raising capital for their ventures.
- **Exit Providers (Mature Companies).** Exits are when startup founders and investors sell the company. They are important because the money earned is then recycled toward funding new ventures, as founders and early employees move into roles as angels or mentors, while venture capitalists return profits to their limited partners. While the public image of successful startups is that they go public (e.g., Apple, Microsoft, or Google), most successful startups sell to larger organizations. This means that having larger organizations or companies capable of acquiring new ventures as they innovate, regardless of whether they become profitable companies, is critical to maintain such an ecosystem.

The most important segment is entrepreneurs/founders of companies. Investment is only one critical part of the ecosystem and comes in many forms, depending on the maturity and stage of the investor. Founders come from various parts of the ecosystem—existing startups that failed, others that succeeded, employees of large companies that have trained them on certain technologies, research labs and educational institutions, et cetera. At least one, and hopefully multiple, educational institutions tend to anchor a geographical innovation ecosystem. Public government funds, though not always acknowledged, are often part of the research funding that leads to innovations. The Internet wouldn't be possible without investments by DARPA and years of experimentation and research in universities and private labs. It's also doubtful that autonomous vehicles would have progressed as quickly without the DARPA Grand Challenge of 2004/2005 and the Urban Challenge of 2007, which encouraged teams from academia and industry to develop their algorithms and methods.[85]

Innovation ecosystems have historically grown up around geographies that fostered certain industries to maturity. Consider, for example, ecosystems related to the automobile industry; though Henry Ford started his iconic Ford Motor Company in Dearborn, Michigan (a suburb of Detroit), innovators building cars popped up all over the Midwest, including innovators like Buick, Chrysler, and many others. A vast network of supply chain elements appeared nearby, providing automotive parts and components. The innovation ecosystem eventually matured and consolidated with the Big Three (Ford, Chrysler, and General Motors), after which the circulation of new entrepreneurs and automobile companies stopped. Though there was still opportunity in supply chains, parts, and the like after these companies became among the largest in the world, it was no longer considered the same kind of innovation ecosystem for a large number of entrepreneurs.

Silicon Valley is an innovation ecosystem that has survived many decades of innovation. In fact, I would argue that it is no longer considered only a geographic innovation system; the term "Sand Hill Road," for example, now refers to venture capitalists in general, many of whom were originally located in this specific part of the San Francisco Bay area near Stanford University. This is analogous to how the term "Wall Street" no longer refers specifically to a street in New York City but rather the financial industry in general.

Unlike the aerospace or automotive industries, there has been a high tolerance for failure in Silicon Valley, which has remained part of the culture even with the emergence of mature companies. A failed venture does not signify the end of an entrepreneur's career. If they can show they learned from the company's demise, they are likely to garner new investment for future ventures. Moreover, sometimes a startup that is unsuccessful in commercializing its technology will get acquired by a large organization, which then incorporates the tech into its own product lines. Similarly, money and advice for new ventures comes not just from the handful of founders who have created well-known successes like Google, but also early employees of these companies and many executives who joined later. These individuals participated in the equity appreciation and, culturally, participate as angel investors in new ideas that are brought to them by colleagues. While other innovation ecosystems may not have the same tolerance for failure, it is precisely this aspect of the culture that makes for a deep ecosystem and continues to draw talent of all kinds.

This is often why many governments of foreign nations and cities that attempt to replicate a high-tech innovation ecosystem are often unsuccessful. Even a mature ecosystem like the automotive sector had some level of tolerance for failure; Henry Ford's first attempt at building a car company, the Ford Quadricycle Company, was unsuccessful. However, this appetite for risk was lost within the ecosystem, and it was only in the twenty-first century that the automobile industry started to experience disruption again, with electric car companies like Tesla and the advent of autonomous driving.

Startup Funding for New Ventures in Silicon Valley

A startup ecosystem serves provides a roadmap for entrepreneurs and investors who want to participate. For investors, this includes understanding the types of funding (angel, venture, private equity) and putting money into funds that invest in specific stages. While startup investing is extremely risky (conventional wisdom says that many as 90 percent of startups fail), outsiders in large institutions (like pension funds) usually allocate a small part of their total capital to VC funds, which rely on local expertise to select the most promising companies and spread out risk over these investments.

For both entrepreneurs and investors, though there are differences between industries (software, hardware, AI, industrial, aerospace, retail, biotechnology, pharma, medical devices), investment within an ecosystem like Silicon Valley often follows a similar structure. This sets a clear course for both sides and sets expectations on risks and valuations. For example, an entrepreneur at the pre-seed or seed stage shouldn't expect a valuation typically associated with the later states, such as Series A or B, which are usually reached only after building a product or showing traction in the marketplace.

Research. While some research may be funded by investors in companies, often the original research that led to the idea for the company was done within an institution, which could be an educational institution like MIT or Stanford, or an R&D lab within a larger organization. Research is sometimes funded by government programs, through organizations like DARPA and the NSF, or contracts directly with operating units of existing companies. It is also funded by private foundations set up by wealthy families. Individual researchers frequently leave the organization to start companies if the research shows promise. Sometimes the organizations retain some stock or revenue through a licensing agreement with the new venture or keep some degree of ownership. The specifics of this relationship depend on the organization, and in some cases, startups finance themselves via research grants. Through the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs, for example, the federal government provides funds or technology (via a transfer agreement) to startups that will help to advance and commercialize their research.

Pre-Seed. This is usually the first stage of investment after a startup has been formed. The company may not have anything but an idea, or it may have intellectual property (IP) licensed from prior research. Traditionally, the money at this stage has come from friends, family, and angel investors. However, over time, seed funds may participate in these investments, and startup studios, incubators, and accelerators (the best known of which include Y Combinator and 500 Startups) provide both education and several hundreds of thousands of dollars to get the entrepreneurs ready for the next stage of funding. It is important to note that in recent years, even more capital-intensive deep tech ventures, such as aerospace companies and biotech ventures, have participated in accelerators. For example, not only were software companies like Airbnb and Dropbox part of Y Combinator, so was Boom Supersonic, which subsequently raised considerable funding in its attempt to produce the first commercial supersonic plane since the Concorde.

Seed. The next stage sometimes takes place as funding from a professional investor, but it could also be led by a corporate venture capital arm or high-net-worth individuals. There is usually a working prototype or even a first-stage product ready with some initial market feedback. This frequently happens when the company is still at the proof-of-concept stage (searching for both product and market proofs), without a mature product or product/market fit. This stage requires a small amount of capital, but more than the pre-seed. While pre-seed-stage funding was often less than $1 million, seed rounds today can range anywhere from $1 million to $5 million (or more in some cases). By the end of this stage, for shallow tech companies, there should be not just a working prototype or a proof of concept, but ideally a product ready to be sold with some indication that there is market demand. However, in the case of capital-intensive, deep tech products like transportation, medical devices, or even certain AI ventures, this might consist only of preorders from the first few potential customers, based on either a scaled-down or working prototype or just a working demo and promises.

Product and Market (Series A and B). At the next stages, which are referred to as Series A and Series B financing, funding rounds are almost always led by a professional venture capital investor or institution. In this stage, the company is scaling up its management team, its sales and distribution infrastructure, its marketing, and/or its manufacturing process in support of building a sales and market presence. Historically, before seed and pre-seed funds were around, Series A was considered the first investment beyond angels, friends, and mentors, and subsequent stage financings (of increasing amounts) were labeled by letter (Series A, B, C, D). The distinctions between these stages (and the amount of money involved) vary significantly with industry, but each round is meant to reduce risk (1) by removing the product risk, (2) reducing the market risk, and (3) reducing execution risk in building an organization that can scale to deal with market demand. In an ideal scenario, each series round is larger than the previous one, the valuation of the company grows, and new investors get a smaller percentage of the company for the same amount of money (or more). This is possible because, from an investment point of view, at each stage the risk is reduced, as the company has proven itself and becomes more valuable. A company with one hundred enterprise customers or one million app downloads is theoretically more valuable than one that has just built an app or enterprise software with just a few customers.

At Series A, the company typically secures enough funding to launch its commercial prototype or beta product in the market and shows some amount of traction. This includes both setting up manufacturing processes and a sales/marketing strategy and, if it hasn't done so already, launching the product (leaving the beta phase). The funding required in this stage varies greatly based on the type of product—it can range from a few million dollars (for smaller products) to tens of millions (for more complex ones). Typically, by this stage, the company is producing some metrics that can be measured—whether it's preorders, customer adoption, or customer acquisition cost, which show that the company is on the right track, even though it is usually not making any profits. If the company is performing well, it will go on to subsequent series or growth stages. If not, the assets are often sold in a fire sale to recover the investment, the employees may be acqui-hired by a larger company, or the company goes out of business. Healthy Series B investments typically occur when a company has not only refined its products with Series A funding but also demonstrated solid metrics and established leadership in the marketplace—except in the case of the most capital-intensive ventures. Sometimes a company will not perform but needs more capital; in these cases, it can get a smaller Series A1 or Series A2 round before qualifying for a much larger Series B round, often put in by existing investors to tide the company over until it has met the metrics for a Series B.

Late Stage (Growth). Typically, private investment funding rounds beyond Series B are taken up by larger, private equity funds that have low risk tolerance and invest significantly larger amounts of money, ranging from tens of millions to hundreds of millions (and in some cases, even billions) of dollars. Venture capital funds look for a return of ten to one hundred times their initial investment in successful ventures. This is because a large percentage of their investments fail to return any results—some put this number as high as eight out of ten—so the "winners" have to cover all the losses and all the returns.

Late-stage growth funds, on the other hand, invest in companies that have a track record but for whatever reason are not yet ready to go public. These investors have a lower risk tolerance. They generally don't expect any of the companies they are investing in to fail completely. They are often looking for less of a return, perhaps two or three times their initial investment, when the company reaches an IPO (initial public offering) or gets sold to a larger public company. Private equity funds at this stage may also buy stock from the founders of the company or even acquire a majority stake as the company marches toward an IPO or large exit. Because of the stage, the valuations that private equity firms invest in are usually only slightly lower than the amount the company might be worth when going public. As an example, if a company might go public for $10 billion, a late-stage private equity firm might participate in a $500 million round at a $5 billion valuation and hope that the company's valuation might double if and when it gets to an IPO. In other cases, private equity firms are more interested in investing in profitable private companies and harvesting returns over time rather than selling the company.

During previous market cycles, going back to the boom periods of the 1920s, regulations were imposed to protect consumers from making risky investments in early-stage companies and to make it more difficult for risky companies to go public. After the crash of 1929 and the Great Depression, the SEC was established, along with additional requirements that further restricted consumer investments in immature startups. Since then, investors are usually required to be "qualified" investors before they can invest in private startups, meaning that they have a minimum net worth or otherwise demonstrate that they understand the risk that their investment could be completely lost.

Exits. A sale of the company might happen at any stage of its development, or it might go public in an IPO, which is just another type of financing. During the dot-com boom in the 1990s, many technology companies went public without profits, relying on great promises. The stock prices of companies like eToys ultimately crashed following the initial hype. After the financial crisis of 2008, most startup exits became acquisitions rather than IPOs. Even the most successful companies were staying private longer to avoid the extra regulations required of public companies. The term *unicorn* was coined to describe a private company with a valuation of more than $1 billion—a rarity before these new regulations. Companies began going public later, when they were much more established, less risky, and often held a dominant market position. As a result, they needed private financing through larger rounds and valuations, typically more than $1 billion—amounts that went beyond venture capital fund sizes.

There is also the acqui-hire, a special kind of exit in which a company, despite failing commercially, is acquired by a larger organization for its talent, which is absorbed into the larger organization's workforce.

The importance of exits to develop an innovation ecosystem shouldn't be underestimated. It's the money from exits that fuels pre-seed investment, such as angel funding for new companies and new venture capital funds, while letting existing investors recoup their investments and recycle their money into new opportunities. Exits not only fuel an innovation ecosystem but also let bigger companies continue to innovate as technology platforms change. For example, Facebook, once the dominant desktop social network, bought Instagram for its huge user base and traction on mobile.

The above was meant to be a general roadmap of how funding evolves as startups grow in an ecosystem, but variations on the funding cycles and stages happen. This can depend on the industry in which a startup operates, as well as the origins of the technology and talent behind the initial startup.

In some instances, one or more of these stages are skipped entirely because of prior research, product development, or the entrepreneurial team's background. When a company is not starting from scratch but bringing technology from a parent organization (in what's called a spinout), both the pre-seed and seed funding rounds may be skipped. For example, the voice assistant Siri, made popular by Apple in its iPhones, originated in SRI, the Stanford Research Institute. SRI's research was done in conjunction with DARPA and Nuance, an organization that had created previous voice recognition technology. The research led to a company that was spun out by three founders and soon thereafter acquired by Apple, whose corporate headquarters were only a few miles away from SRI.[86] This also shows the power of being inside an innovation ecosystem, where funding, talent, and acquirers looking for new technology are available at each of the stages.

Demonstrating the variations by industry, within the pharmaceutical and biotech industries, an exit typically happens after promising results of a new drug or device. This can occur before, during, or after clinical trials and/or FDA approval. Some pharma and biotech companies go public to raise enough money to get to FDA approval, with no revenue or customers but a promising drug or innovation. During consumer web and app boom cycles, significant valuations are often reached with no revenue (or profit), but a significant number of free users. These are sometimes referred to as hype cycles. But as the hype cycles normalize, so does the structure, stages, and associated expectations of fundings.

The importance of these roadmaps can't be overstated, for both investors and entrepreneurs in an innovation ecosystem. They are common standards that both sides know about and expect will be adhered to. Without these expectations, a garage inventor might expect their new innovation to raise $100 million off the bat, with a valuation of $1 billion. These expectations are extremely unrealistic, and such an initial investment (or large round of investment) rarely occurs. For all practical purposes, a company that has just been formed will need to raise a pre-seed or seed stage first, and it will not approach those types of numbers. Luckily, in an innovation ecosystem, there is a cohort of venture investors and angels who expect to invest much smaller amounts of money at more reasonable valuations. On the other hand, if the invention is really that valuable and the technology has been mastered, then the inventor can skip the roadmap and go to a large mature company in the space that might see the value and offer to acquire it or license it outright. This route skips the need to build a company, potentially resulting in great wealth for the inventor.

6. Structuring Investment and Building an Innovation Ecosystem for UAP

To build a full innovation ecosystem around UAP will require multiple funding methods, research approaches, and the involvement of myriad individuals and organizations, going beyond simply funding new startups. This includes several interlocking segments of investment, which are meant to serve various groups of stakeholders that could participate in such an ecosystem. As described in the previous section, the power of an ecosystem is only unlocked by fostering multiple paths, involving various parties, and harnessing collaboration, competition, and market forces at the appropriate stages of the process. As described above, commercializing UAP-related technology presents significant challenges, and this structure was set up to help overcome those challenges across the short, medium, and long term.

Stakeholders for UAP Ecosystem

As we list the stakeholders in a UAP ecosystem, let's begin with the lifeblood of any innovation ecosystem: researchers/scientists/experimentalists and entrepreneurs/founders. We will explore where they might emerge from and where institutional support at present is insufficient to pursue UAP-related technology:

1. Garage inventors who have come up with a novel device or technology that replicates UAP.
2. Entrepreneurs (nontechnical) with visions for new applications, who might partner with technical founders and researchers.
3. Scientists in academia who would like to conduct more research on UAP technology to understand how the observables might be achieved.
4. Independent researchers who have developed theories and experiments about how UAP technology may work, but do not currently have access to laboratories and funds.
5. Students in academia who are working in the physical sciences and would like to do research on UAP principles but are discouraged by existing stigma and lack of funding.
6. Government scientists who have been exposed to frameworks, technologies, and applications in the legacy program and are frustrated by the lack of progress or commercial applications.
7. Engineers and executives from large aerospace and biomedical companies who may have been exposed to the legacy programs or materials, or who would like to develop new technologies based on emerging principles.
8. Employees of large organizations (aerospace, pharma, biomedical, or other) who have

had no exposure to legacy UAP programs but see opportunities and need funding for experiments to create breakthrough or next-generation technologies and applications.

One goal of the ecosystem is to include these disparate groups and provide researchers and potential founders with a roadmap appropriate to the stage of their projects by linking them to the appropriate capital.

But stakeholders are not just individuals. Institutions that may already be involved with UAP, as well as organizations in the broader technology and deep tech innovation ecosystems, must also be brought into such an ecosystem, as they have critical roles to play. This includes (but is not limited to) the following:

- private foundations that wish to fund UAP research
- government science organizations
- Department of Defense
- large aerospace companies
- venture capital funds
- wealthy angels / individuals / family offices
- universities
- private research organizations and labs

These institutional stakeholders should have a way to participate as investors, grantors, grantees, customers, and in other capacities within an ecosystem in an area that was formerly both classified and stigmatized. Once again, it is important to have not just multiple funds but also multiple types of capital operating at different stages, including grants, contracts, nondilutive funding, venture capital, venture debt, and IPOs. Given the diverse set of specific interests, challenges, and priorities of these institutional stakeholders, we must encourage them to participate but not require that they do so. Some of these organizations will be motivated purely by profit, looking for investments; others will aim to release technology from their labs, develop consumer technology through new startups, invest purely to benefit humanity, advance science, or encourage development of a particular application area (as per the industries listed in the section "UAP Investment: Potential Opportunities").

A Multipart Investment Landscape

In this section, I would like to propose details of four specific segments of UAP innovation funding. Each part serves a specific purpose for both the investors or funding organizations and the innovators and startups at different stages. Each of these segments could involve participation of one or more existing or new organizations and/or funds. Though they are mutually exclusive, in that each might be created and funded on different timelines, the power of the ecosystem only gets unleashed when more than one segment has been realized. Simply providing research funding as nondilutivenondilutive grants or putting in small amounts as pre-seed funding by angel investors won't sustain a new company through multiple stages of financing, let alone build a new industry. There need to be a number of potential follow-on investors who might consider putting in the next stage of funding.

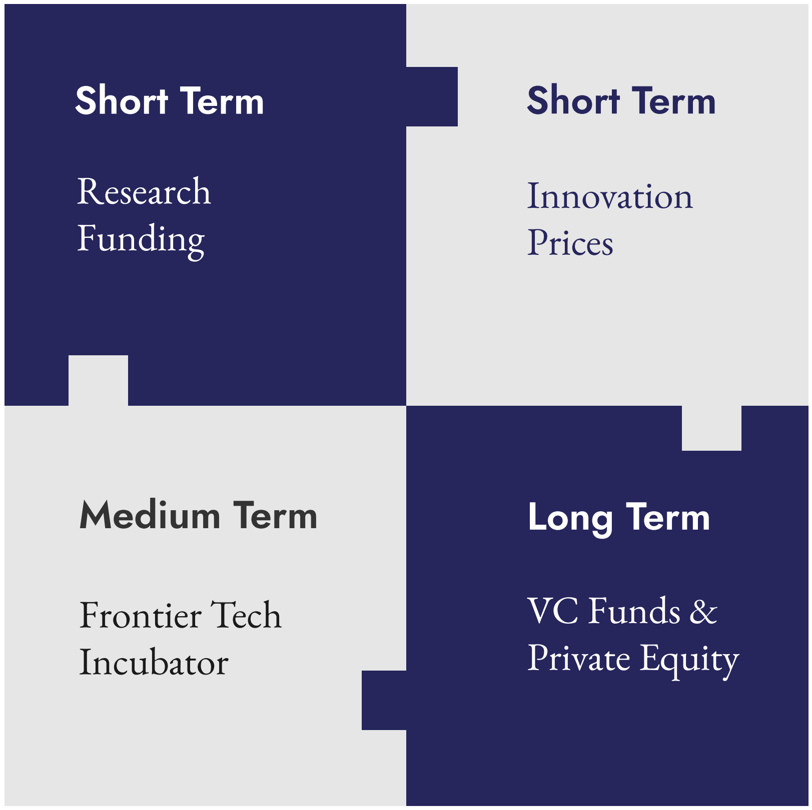

Figure 3. Four interlocking segments of investment for a UAP innovation ecosystem.

These four segments are shown in figure 3, along with a potential time frame where each segment could be most effective, and are detailed below:

1. Research funding
2. Innovation prizes
3. Frontier tech incubators
4. Venture capital funding and private equity

The first segment (research funding) and fourth segment (VC funding and private equity) may be familiar to readers because they form the basis of most startup and academic research ecosystems. However, these funding sources must be tailored to the unique challenge of UAP detailed above.

The first segment is included not only to help address the general lack of knowledge around both UAP and the scientific/engineering principles that could help produce technology to duplicate the observables. This segment is also included to help overcome some of the stigma around UAP at existing research institutions, which can be achieved through government funding, increased access to grants and publications, and increasing the reach of private resources. The other segments focus on creating and supporting new private ventures (startups) or spinouts in this ecosystem.

One of the conclusions presented in this white paper is that simply having a standard shallow tech or even a deep tech VC model at this stage of our public understanding of UAP technology may not be a feasible approach. VCs will be unable to validate whether a particular scheme or technology is likely to work simply by calling on existing academic experts. Experts might simply state that the product idea or technology specifics are outside the realm of known scientific experiments and/or engineering principles. Existing investors (even deep tech investors) may consider the ventures too speculative, excessively risky, or too slow to bear fruit. One might think that this objection could be overcome by showing the technology in action, but for the types of breakthrough technology we are aiming for here, many millions of dollars and years—perhaps even decades—may be needed to build a full working prototype. This involves performing multiple recursive cycles of technoscientific innovation, including necessary experiments to validate whether the principles behind the technology or product are practical and will produce the desired results.

Moreover, any VC fund that attempts to "dabble" in this area might find themselves only able to invest in companies that are not very revolutionary (those with less technoscientific risks, such as enhanced batteries or more efficient rocket engines). Otherwise, they may quickly fail if the companies cannot make the technology work or find enough follow-on funding. This would result in other investors being gun-shy about looking into this space, ultimately producing the opposite result of encouraging an innovation ecosystem supported by patient capital.

Another consideration is that in cases where UAP technology may already exist (again, relying on whistleblower accounts),[87] it could be locked up inside aerospace firms and may not be easy to reverse engineer and extremely difficult commercialize. As mentioned above, large companies are particularly bad at bringing revolutionary products to market, even if they have invested millions—or even billions—in research over time, compared to innovative new ventures. They are often afraid of cannibalization of their existing revenue streams. In the case of UAP, many of these companies—if they have reverse engineering programs—consider the US government as their sole customer, with all work related to it being classified. Their incentive is not necessarily to create commercial products from this technology, but to continue to get government contracts. Especially if these programs have not borne fruit, though, in the long term the interest of the company should shift toward capitalizing on its investments to date, completing the research, and bringing products to market more quickly than can be done inside a large legacy company.

Recent trends show that many members of Congress would like more transparency around these alleged programs. This push by Congress can help incentivize these organizations to release some of the fruits of these programs, should progress have been made. If they haven't made progress in reverse engineering, as asserted by Dr. Eric Davis at the 2024 Sol Foundation Symposium, this may be the only feasible way to open it up to new minds and a large enough groups of innovators, scientists, and engineers to make progress.

One approach may be to spin off partially owned subsidiaries, allowing the parent company to continue to get benefits from its investments to date by retaining equity in and perhaps providing initial funding to the offshoot. The new company becomes the focus for government contracts and issues of classification, including possible legal liability issues related to previously hiding the presence of the technology from the legislative branch.

Figuring out how to make the technology work may require out-of-the-box thinking, which small reverse engineering teams in above-top-secret SAPs may not be able to do without bringing on outside consultants and agents. It may be necessary to involve multiple parts of the ecosystem in understanding and publishing findings as research before true product engineering can commence. The beauty of an entrepreneurial ecosystem lies in the competition among multiple teams, each trying different approaches to make a breakthrough, productizing a particular new technology or scientific discovery, or applying the technology across different industries.

To accomplish this, we need to think in terms of a hybrid model between the large corporate R&D labs, university research labs, and incubators, as well as beyond the current startup/VC funding model popular in Silicon Valley. This would include provisions for funding basic research, supporting speculative inventors and ideas with research grants, offering prizes to encourage competition, and encouraging several types of standard investing, such as deep tech and industry-specific venture capital funds.

Each of these proposed segments is described in more detail below.

1. Research Funding

In the past fifty years, funding has been provided from government sources in the form of research grants from organizations like the NSF (National Science Foundation) and the NIH (National Institutes of Health), in conjunction with entities like the DOD (Department of Defense) or DOE (Department of Energy) in areas that align with both scientific and national priorities. This funding is usually provided to credible research organizations, such as universities and private labs, and in some cases in contracts to larger existing organizations for R&D.

The government has also engaged in basic forms of research in national labs, such as the Los Alamos National Laboratories. However, the stigma around UAP has resulted in a vicious cycle where newly minted PhDs are discouraged from studying this topic, and young professors are discouraged from becoming PIs (principal investigators) on related research projects. This is due not only to the lack of funding for this type of research but also to its potential impact on career prospects. In my own academic research on stigma and boundary work for professors in academia who study UAP openly, I found them stating repeatedly that they stayed away from openly engaging in this research until they had tenure. Several also stated they would discourage new PhD students from pursuing research in the UAP area, whether in the physical or social sciences.[88]

Because the topic of UAP has been handled so secretly, the existing organizations are not providing funding to speculative teams of researchers trying to understand and replicate functionality such as antigravity or instant acceleration in a meaningful way. Moreover, the research that has been done, whether in government programs or private industry, has not published results. This results in a vicious cycle—because no other scientists have published on the topic, new initiatives are not allowed to grow. The stigma has lessened somewhat since the 2017 *New York Times* story, but it is still there, as recent studies from social scientists have shown, including my own.[89]

For example, a recent search for funding at the NSF for "artificial intelligence" revealed over one hundred potential funding opportunities; a search for UAP revealed zero opportunities.[90] Now, that might not be entirely accurate, as UAP research might show up under certain euphemistic keywords because of stigma in scientific communities. Additionally, current contracts described as focusing on "propulsion," for example, may in fact involve UAP-related research. As of 2024, in conjunction with the DOE, the SBIR program—working alongside the NSF and DOE—has funded a number of Phase I proposals from startup companies and research organizations in areas of energy and propulsion as deep tech investments. These initial grants indicate an encouraging trend.[91]

In general, we need to expand UAP research funding and structure it in a way that awards research grants or contracts to organizations as a shot-term initiative, rather than relying on equity or debt financing. Moreover, to involve garage inventors and widen the scope of applications, this funding shouldn't be limited to established academics but be available to any researchers who can show the credentials to legitimately pursue research. This is a tricky area, but evaluators for this type of research funding cannot come only from existing academic sources or government departments due to the strong stigma around the topic. Instead, the awards committee must take an open-minded approach, recognizing individuals from different industries and specialties.

Moreover, achieving breakthroughs in fundamental understandings of space, time, aeronautics, or genetics may require novel approaches that today's peer-review process—which is done by existing "experts"—might dismiss outright as "nonsense" based on our current (potentially limited) understanding of these fields. While the awards committee will need specific areas of expertise, it should combine this with nontraditional evaluators to pursue nontraditional avenues of research.

Funding for research on the UAP topic is currently limited and often relies on securing donations from wealthy individuals or finding a specific person inside the government who is interested in the specific topic. The former was true of initiatives like the Galileo Project at Harvard, which has raised several million dollars for research, entirely from private sources. Many of the engineers and scientists in a position to make breakthroughs in UAP may not come from a prominent organization like a Harvard and don't have access to the (small number) of high-net-worth individuals and families who might be inclined to fund research.

The idea here is to have a funding ecosystem for research across public and private sources. A first step may be a national UAP research funding clearinghouse, serving as a matchmaker to connect individuals and research organizations with available grants and interested wealthy individuals, family offices, and foundations. Eventually, a dedicated research foundation might be established to support more research. A model for this might be the John Templeton Foundation, which funds projects and individuals not only for scientific research but also in areas such as faith, religion, and consciousness—topics that might not receive support from government organizations.[92]

This approach also allows inquiries in areas that may not have been considered by the committees currently putting out RFPs (requests for proposals). Additionally, the initial clearinghouse could be a focal point for wealthy investors and institutions interested in funding research on this topic, even if they cannot justify it within their existing research processes or areas of funding. Going beyond simple matchmaking, a central team could encourage funding organizations to explore this area and/or vet research proposals. This would provide clarity and opportunities for both researchers and private investors, who may find the current UAP landscape risky and confusing.

The types of funding that could be provided include the following:

- **Fellowships.** Designed for individual researchers pursuing promising avenues of research, providing funding as they explore their ideas.
- **Grants for Small Research Groups.** Larger amounts of funding to establish working groups dedicated to specific aspects of UAP technology, including a PI and resources to hire graduate students, staff, and other personnel.
- **Search Fund.** For nontechnical entrepreneurs who want to identify existing innovations and find technical cofounders to explore commercialization.
- **Experimental / Proof-of-Concept Funding.** Funding allocated to validate a particular process, finding, or breakthrough idea by demonstrating its feasibility.
- **Analysis Funding.** Funding for conducting credible analysis of anomalous materials in reputable labs.
- **Validation/Experiments.** Funding specifically for experiments that could verify (or disqualify) certain theories or assertions made by previous researchers. This could include investigations into synthetic generation of gravity, intelligent implants, electrical field effects on biological material, and other related phenomena.
- **Project Viability** Proposals. Small amounts of funding intended to develop larger proposals around a specific academic discipline, interdisciplinary projects, or products that do not align with standard disciplinary boundaries.

- **Expedition Funding.** Funding to explore anomalies in certain geographic areas. For example, theories have been put forward that the Nimitz encounter off the coast of California was not an unusual occurrence, with other reports revealing frequent USO and UFO activity around Guadalupe Island.[93] This category could include the deployment of scientific instruments for monitoring these sites for some period of time. Similarly, the Galileo Project raised private funding for an expedition to Papua New Guinea to search for the remains of what may have been the first interstellar meteorite.[94]

Research funding shouldn't be limited to the types mentioned above. The funding amounts could be small (under $100,000) for initial evaluation projects and fellowships and then rise into the millions of dollars for larger, multiyear research, capital-intensive experiments, and the establishment of new research groups. Following the example of some government agencies, the research might follow a staged process, initially funding feasibility studies before progressing to more complex research and eventually supporting larger teams, ensuring that the research funding is not depleted too quickly. The actual numbers will depend on the amount of funding available and the types of research that get funded.

As an example, as part of its AI initiative, the NEH (National Endowment for the Humanities) is offering fellowships for individual researchers working on AI and the humanities and larger amounts for setting up a research center.[95] This is in parallel to other AI-related initiatives across various government departments.

As a complement to research funding, the individual researchers who apply may simply need access to high-quality laboratories, equipment, and manufacturing and engineering spaces, as well as technicians. Today's prominent academic institutions may not be open to being associated with UAP work because of the aforementioned stigma, so there would need to be a curated set of laboratories and vendors in the network that might provide equipment. There might even be a mechanism to recycle equipment that was acquired solely for a project funded by the UAP research fund.

Beyond the initial steps of establishing a clearinghouse, an actual UAP research fund could serve as the focal point for various actors who would like to see this research succeed but lack the expertise to fund individual projects. Just as VC funds provide a focus for those outside Silicon Valley (such as pensions funds, sovereign wealth funds, and) to put funds into the hands of experts, a UAP research fund would be a foundation/nonprofit that could raise money from family foundations, government research groups and initiatives, sovereign funds, corporations, and individuals.

Over time, in conjunction with (or separate from) a UAP research fund, there is a need for a UAP research institute—either within or outside existing research infrastructure (such as universities) or in new private research labs. The center would need both the technical equipment and facilities to conduct and validate certain types of research related to UAP. The research fund may provide fellowships for researchers to visit and conduct experiments as part of their larger research agenda. The institute would also need permanent staff who could assist in crafting research agendas and technicians who could help in implementing them for fellows. This would be interesting because of the unique nature of UAP technology and the capital-intensive research required in these areas, especially considering the hesitancy of existing institutions. However, I would envision a UAP research institute as a longer-term initiative.

Large corporations could be encouraged to participate as "members" (i.e., ongoing investors) in a UAP research fund and a UAP research institute, gaining early access to the produced research. This model is used in the MIT Media Lab and other innovative institutions that rely on funding from large corporations. Please note that this would not necessarily give the members any ownership of the research, which would stay with the researchers and their teams, unless the members sent researchers to work on specific projects.

Because this segment of the UAP ecosystem is for providing research grants (as opposed to equity or debt investments), the only requirement for such funding would be that the awardees publish their results. Providing insight into the scientific and engineering principles of how UAP may work is a critical component for building a true ecosystem. This is a prerequisite for fostering entrepreneurial ventures and encouraging downstream investors to put money into startups that might seem highly speculative. While many existing journals have been hesitant to allow research papers related to UAP, this has begun to change and in the past few years. Prestigious journals within existing disciplines begun to accept UAP-related research,[96] and new journals are appearing that are more open to UAP-related articles.

Funding for a UAP research fund—and later a UAP research institute—might come from both private and public sources. This would allow high-net-worth individuals and family offices who wish to donate to the future of humanity to apportion part of their charitable giving to a topic of great public interest. Various parts of the US and other governments might be encouraged to invest in the UAP research fund and institute, with the provision that any funding or research become public. The specifics of whether research grants can be made by sponsoring organizations (such as large companies in various industries that might want to see more R&D in this space) to specific projects would need to be worked out in the charter of the research funds and institute. Initially, corporations or individuals might sponsor named fellowships, which would then be awarded by the awards committee, or support specific research groups led by a PI.

In this sense, a UAP research clearinghouse for funding (short term), a UAP research fund (medium term), and eventually a UAP research institute (long term) might be able to serve the interests of government funding sources, high-net-worth individuals, private foundations, corporate R&D labs, university labs, and philanthropic arms of companies and foundations in other areas. In the end, the goal is to provide an umbrella and a home for encouraging and expanding UAP research so that individuals and organizations know where to seek funding for basic research in this area.

2. Innovation Prizes

While the visibility of innovation prizes has risen in the twenty-first century, the offering of prizes to encourage competition for goals beneficial to government, industry, to exploration, science, and/or humanity in general is not new. In fact, in the eighteenth century, both the British and French governments pioneered these types of prizes. For example, in 1714, the British government offered 20,000 pounds (a significant sum in that day) to the person who solved the problem of measuring longitude, which was claimed in 1773 by John Harrison. Similarly, in 1795, Napoleon's Society for the Encouragement of Industry offered 12,000 francs on behalf of the military for a method to preserve food during campaigns; this was claimed by Nicolas Appert in 1810.[97]

In the twentieth century, a number of prizes were offered for aviation and crossing the Atlantic. Charles Lindbergh won the $25,000 Orteig Prize for his record-setting transatlantic flight and landing in France. This was a successor to an earlier prize from the *Daily Mail*, offered in 1913 for the first transatlantic crossing, which John Alcock and Arthur Brown won in 1919.

Twenty-first-century descendants of these types of prizes continue to encourage innovation in different sectors. Perhaps the best-known prize is the XPRIZE Foundation, which started with the Ansari XPRIZE—a $10 million prize for the first private organization to create a "reliable, reusable, privately financed, crewed spaceship," making "private space travel commercially viable."[98] This prize, awarded in 2004 to the team behind SpaceShipOne, was instrumental in launching the private space industry. Richard Branson licensed the technology to create Virgin Galactic, while Elon Musk and others took different approaches to launching rockets. It's important to note that the amount of investment put in by the various teams and companies competing for the Ansari XPRIZE was more than the prize itself, indicating a multiplier effect that often goes along with innovation prizes.

Today's AI revolution may not have been possible without various innovation prizes, including the Netflix Prize, which awarded $1 million in 2009 to the team that created a better recommendation engine than Netflix's internal one.[99] Early in the twenty-first century, DARPA also offered a number of prizes, including the DARPA Grand Challenge in 2004, which awarded $1 million to the team that created a self-driving car capable of crossing the desert. While no team won the prize in 2004, it encouraged innovation in autonomous cars. The next year, with the prize increased to $2 million, one team claimed the award.[100] Such prizes catalyze innovators and out-of-the-box thinkers, both within and outside existing institutions, to assemble teams and invest resources to pursue these challenges.

While most prizes are offered only once, the XPRIZE turned into the XPRIZE Foundation, working with various private funding sources to create prizes for reaching certain innovation milestones in the fields of space exploration, climate, and health. In some cases, these prizes are structured not just as grand prizes but also include smaller prizes that can be claimed along the way, requiring teams to qualify for the final competition by achieving earlier milestones.

Of particular note for our purposes is the Google Lunar X Prize, intended to encourage private investment into vehicles that could go to the moon and travel some distance on the lunar surface. The prize specified a finite time frame of ten years and had a prize pool of $30 million, including a number of intermediate milestones for teams. The grand prize was $20 million, but only $7.25 million in intermediate prizes were awarded by the deadline. After ten years, it was concluded that no team had met the grand prize requirements by the deadline of March 31, 2018, and the remaining prize money was returned.[101] Nevertheless, the prize encouraged governments and space agencies to initiate programs like NASA's Artemis and Japan's $900 million private space fund for startups.[102] Moreover, the teams competing for the prize collectively raised over $300 million from a combination of "corporate sponsorships, government contracts and venture capital."[103] This shows the catalyzing effect of prizes, which is significantly greater than the amount of capital staked in the prize. This catalyzing or multiplier effect is not new, though the numbers have increased. Lindbergh reportedly spent $10,000 of investor money to win the prize.[104] When you add in expenditures from all other contestants, this may have been the first example of a multiplier effect, as it is likely the sum was greater than the $25,000 prize.

I've gone into this history because innovation prizes can become important motivators for building not just a company, but an entire industry and ecosystem. As with private space tourism, companies at different vertical slices of the supply chain were formed, and governments of states and nations got into the act, encouraging sites for space travel and innovation within their borders. This includes creating spaceports or cities that can support private launches, moving beyond the existing NASA/government facilities.

For UAP, innovation prizes could be offered by a new foundation, in conjunction with corporate sponsors and high-net-worth individuals who might want to have their name associated with such a UPRIZE. Each of the observables detailed above would be ripe for innovation prizes, and they could be adopted to specific industries or achievements, perhaps announced in an order that would get the maximum publicity and also satisfy the initial sponsors. Because of the nature of the UAP topic, the public and media interest waxes and wanes, and it is expected that the size of each UPRIZE award, while being established at a smaller level to "get the prize started," could then be expanded as more sponsors join.

Unlike XPRIZEs, which might have deadlines, some UPRIZEs could follow the model of a lottery—if no one wins, additional sponsors might come in, and the prize could be expanded. Similar to the DARPA Grand Challenge, the prize amount could increase each year. Or, in the case of fixed deadlines, sponsorships could be withdrawn if no teams reach the prize, as happened with the Lunar X Prize, making the investment less "risky" for those who want to contribute to the cause but prefer not to pour their money into efforts that don't bear fruit. Nevertheless, the prizes could serve as an amplifier for investment in UAP technology and innovation, similar to the multiplier effect seen in previous innovation prizes. The media attention such a prize would garner would raise awareness of the long-term importance to humanity of UAP technology, shifting the discussing beyond sensational media coverage and into more serious, innovation-driven dialogue.

Innovation prizes could be established for each of the observables, ranging from instantaneous acceleration to hypersonic velocity, or a combination of observables. For example, a Mach 15+ directed aircraft that is not a ballistic missile, does not rely on existing rocket technology, and can carry human occupants would require developing new ways to dampen inertial effects. The rollout of the individual prizes, as stated above, would depend on the availability of sponsors, and each prize might have preliminary qualifiers and intermediate awards for smaller milestones, followed by a grand prize for the team that achieves the ultimate milestone.

Let's look at one of the observables: antigravity. An innovation prize could be offered, including intermediate milestones for the team that shows promise in developing a demonstrable apparatus that results in a reduction of force needed for lift, introduces a new method of lift different from existing methods, or focuses specifically on areas like gravity. The grand prize, which may be unachievable for many years, would be to use such methods of lift and propulsion with first a crewed and then an uncrewed craft capable of carrying humans up to a certain height, moving a certain distance within a specific time frame, and returning safely to the ground using such a method. Details around which methods are considered "known" versus "unknown" might need to be fleshed out and teams qualified based on their antigravity schemes to exclude methods of lift already established, such as lighter-than-air craft, fixed-wing aircraft, helicopters, and others. While I don't want to speculate on the nature of the innovation that could win such a prize, a number of theories have been proffered in both public and private for how UAP lift is achieved, including electrogravitics, portable fusion drives, microwave-based methods, and space-time warp bubbles.

Another important observable, which may be achievable within a shorter time frame, is the transmedium one: the ability to travel seamlessly from under the water into the air and outer space. This may also include both uncrewed and crewed intermediate UPRIZEs. An ideal UPRIZE would set parameters in such a way that the winners are able to reproduce the long-reported UAP observables.

An innovation prize is not just awarded for papers or theories—that is what the research funding would be for—but for teams to innovate, build, and demonstrate solutions that work in the real world. This embodies the spirit of innovation of garage inventors like the Wright brothers, or the more modern engineering team that developed Spaceship One. In the same way, one or more UPRIZEs in this segment would get teams to build on and implement validated research from the UAP research segment. This prize would not only raise awareness of but also increase the credibility of researchers and teams pursuing these goals.

3. Frontier Tech Incubator

As mentioned above, deep tech funding sources try to invest in more capital-intensive and longer-term ventures than typical shallow tech venture capital funds. I have classified UAP-related ventures as frontier tech because they are often at or beyond the bleeding edge of what today's deep tech VC funds might want to invest in. The two previous segments—research funding and innovation prizes—are meant to encourage laboratory research and innovation, as well as support teams willing to build on these innovations.

This segment of funding would be about incubating UAP-related technology ventures that fit into the frontier tech category. This would include not just funding but also providing educational programs (akin to today's venture accelerators) and office/lab space to build actual companies based on breakthrough technology research.

Certain deep tech funds are not only focused on providing returns but also on generating societal impact. Similarly, deep tech funding is sometimes established by organizations whose goals extend beyond financial gains to include encouraging difficult research. One way to do this is to establish a fund and incubator that serves as a "halfway house," providing a "bridge" between research and product development.

One visible example of this is The Engine, launched from MIT. The goal of The Engine was to provide a bridge between research labs at MIT and standard VC funds that are readily available for companies that have proved their product or technology. When announced by MIT President Leo Rafael Reif in 2016, he described it as "a new kind of enterprise designed to support startup companies working on scientific and technological innovation with the potential for transformative societal impact." The Engine is not only a fund but also a hub and incubator for "many breakthrough innovations cannot effectively leave the lab because companies pursuing capital- and time-intensive technologies have difficulty finding stable support and access to the resources they need."[105] The companies that might be incubated (and funded) by The Engine include those "where the technical and regulatory challenges are too daunting for most venture capitalists."[106] The Engine and other organizations like it serve a viable role. Not only do they house and incubate ventures transitioning from academic labs that are not yet ready for venture capital, they also encourage venture capitalists to invest alongside the fund in their subsequent rounds, raising the likelihood that these companies will succeed.

A similar ethos is needed for UAP-related ventures. A frontier tech incubator/fund would act as a halfway house, only investing in and incubating business ventures that want to take innovations out of the research lab but aren't yet ready to be funded with existing venture capital sources. However, this would apply to ventures that are even more speculative and may take even more time than standard deep tech ventures. These ventures may not meet the investment criteria of most deep tech funds. This would include funding for the research part of R&D, not just product engineering, so that technoscientific innovation can happen more quickly, involving scientists, engineers, and product designers. There could also be collaboration between the two funding segments outlined above, UAP research funding and UPRIZEs. As mentioned above, the pursuit of an innovation prize (and the completion of intermediate milestones) can make a company more attractive to standard investors, resulting in the multiplier effect.

This would be a for-profit fund but with a specific mission: to encourage the development of a UAP startup ecosystem. The fund would have limited partners, the standard structure of venture funds and accelerators. This fund would focus on earlier stages of investments and companies. But it must be capitalized to handle very tough ventures and provide patient capital. The Engine at MIT, for example, initially began with a $150 million first fund, along with office space in Cambridge, Massachusetts, a stone's throw from the MIT labs where many of the targeted innovations may have occurred.

Most new venture capital funds need an anchor investor to get going, and this is particularly true for longer-term, more speculative investments. In the case of The Engine, the anchor investor was MIT, which contributed $25 million, which encouraged other investors to join in. The new organization was also led an experienced venture capital and technology management team, which was critical for raising the needed funding.

A UAP frontier tech incubator might start with investing smaller amounts than The Engine, but it would still need one or two credible anchor investors to start the process. The anchor investors could include aerospace or other companies that want to have equity stakes in the new companies, family offices of patrons who want to encourage UAP technology though equity investment (rather than research grants), or even government agencies that also want to encourage the privatization of this formerly top-secret area of innovation.

This frontier tech UAP incubator may include an accelerator, which would run science and engineering teams through educational programs to teach them about marketing, sales, and fundraising. Most research universities now have accelerator programs designed to educate engineers and scientists on the process of commercializing their research in new startups. This accelerator may or may not include an investment component (which is a key part of commercial accelerators like Y Combinator), but it could prepare potential founders and projects for an eventual investment from the UAP fund.

This frontier tech fund and incubator could be an ideal place for an aerospace defense company to "spin out" research it has been doing on novel forms of propulsion, either with or without access to alleged UAP materials or technology. By spinning out a private startup, the parent company could retain significant ownership and upside. In this way, the frontier tech fund could serve as a backdoor path to disclosure, especially if there are, as reported, technologies that have been researched but are not allowed to see the light of day because of secrecy.

This deep tech fund and accelerator/incubator is also an ideal place for the researchers from the UAP research fund/institute to land its first equity funding. In this case, the resources available in the incubator portion should go well beyond the capital provided by the fund. This might include programs and training on navigating the existing military and DOD infrastructure, programs, and contracts, as well as preparation for seeking additional funding once the technology has moved into normal deep tech time frames and applications.

In considering the unique role of UAP in national defense, a frontier tech incubator could be a place to directly launch a venture in conjunction with a team ready to pursue product development commercialization of defense-related breakthroughs. Several programs already exist in the DOD that pair innovators and research labs with specific DOD groups hoping to utilize the research outputs. One analogous program that exists now is the National Security Innovation Network, which aims to create new ventures from potential DOD research that might have commercial applications. Another is Defense Innovation Unit, which the DOD provides to accelerate the adoption of certain dual-use technology ventures. This model could also prove effective for existing UAP technology buried deep in the military-industrial complex but not spun out by the DOD. This could also dovetail with the SBIR- and STTR-type research grants mentioned above.

4. Venture Capital Funding and Private Equity

At the previous stage, the frontier tech fund and incubator can serve as a validator for commercial venture capital funding and late-stage funding of incubated ventures. Most venture capitalists do not want to invest in a new venture without some validation of the product, innovation, or breakthrough. They also don't typically want to invest in teams lacking the right credentials for either developing the technology or building a business. Similarly, they may not want to invest in ventures that might have, in some cases, a ten-plus-year delivery timeline before a product is ready for its first sale. Many VC funds are limited partnerships whose active life is only ten years, and their active investing period is usually only the first half of that time frame.

Having the frontier tech fund first invest in a startup that is too risky for standard (or deep tech) VCs is a good way to get additional venture capital funds to join for later financing stages. The frontier tech fund will want to retain its proportional ownership in these ventures by investing in, and possibly leading, subsequent rounds. This additional investment will encourage regular VC funds, which may be industry- or technology-specific funds, to invest in companies coming out of the frontier tech fund and incubator. In a sense, the incubator and fund will bootstrap these ventures until regular deep tech and shallow tech venture capital funds might want to invest.

While we can envision the creation of one or more standard venture capital funds with a focus on UAP-related technology, the injection of significant amounts of capital in the prior stages should ensure that *existing* venture capital funds and corporate investment departments can step in, as they do now with new ventures arising out of Silicon Valley and elsewhere. Once UAP-related technology ventures have moved beyond research and proof of concept, they become viable for commercial professional investors for seed, Series A, and Series B funding.

It is advisable that after spending time in the frontier tech incubator phase, the team should have enough validation of the technology/product and market to make a case to outside investors. The fact that a startup relies on UAP research or breakthrough innovations that might have been considered impossible only a few years earlier is immaterial, as long as there is an ecosystem that has supported them along the way and the company has shown significant progress by the time it "graduates" from the halfway house.

The same logic applies for investment beyond a Series B to existing private equity investors, who may only want to invest in companies that have customers, revenue, or significant validation of the investment (such as clinical trials).

Large corporations often have a venture capital arm, which invests in promising new technologies in their industry, hoping for both a financial return but also a commercial relationship with these startups. In the end, if a startup that a corporate VC arm has invested in ends up getting significant traction in the marketplace (sometimes because of their relationship with the investing corporation), then the parent company becomes a potential acquirer. Investment in innovative startups becomes a way to keep their foot in the door for innovations they may not be ready to commercialize internally. This is why getting large aerospace, transportation, and energy companies to invest in the frontier tech fund is important. Having a credible anchor investor will make this easier.

Startups in the UAP ecosystem would benefit from access to the DOD and large companies in their industries to speed up their go-to-market strategies via contracts and business partnerships. Large customers, including government, may be more comfortable giving long-term contracts to new startups if they have been validated and invested in by the frontier tech fund. This, in turn, will make existing private equity and debt investors more comfortable in investing in these ventures, creating a virtuous circle.

While there certainly may be UAP-specific VC funds established in the future, the previous segments of the envisioned UAP ecosystem (research funds/institute, innovation prizes, frontier fund/incubator) are expected to encourage existing industry funds, which already invest in areas like transportation, communications, and energy, to take UAP-related innovations in their industry more seriously.

The revolutionary nature of the observables and the hundreds of sub-opportunities implied by each observable—in terms of supply chain and enabling technologies—should prove to be a lucrative incentive, once the initial stages of research and development are conducted, without regard to existing taboos or stigma.

Eventually, some of these UAP companies can become profitable operations and go public. In keeping with the model described in this paper, they would then become one of the large organizational players in the ecosystem, fostering talent and R&D labs of their own, acquiring new startups, and becoming leaders in an expanding UAP innovation ecosystem.

Conclusion: A Way Forward

Despite the significant challenges for investment in UAP technology and ventures, there is a way forward that is both responsible and considers the unique challenges of the UAP space. By focusing on UAP technology as frontier tech, as compared to other deep tech ventures, we can define a new segment or asset class.

This structure both recognizes and builds on the idea that innovation ecosystems are possible to build, given the right encouragement and investment. This means not just new venture capital funds or even more high-net-worth investors participating, but also the availability of a multitier structure that begins with funding for research projects as well as individuals and teams who are willing to tackle the technical challenges of UAP. The key to such an innovation ecosystem is to have enough participants to encourage growth. As the community evolves, individual participants and organizations, along with profits are recycled into the ecosystem in a distributed and decentralized way, resulting in a virtuous cycle.

Earlier in this paper, I laid out potential areas or industries that could be affected by UAP investment, including aerospace, the private space industry. However, the implications of UAP technology go beyond individual industries to civilization-level changes. In the long term, more important than the profits in certain segments or industries, UAP may hold the key to unlocking the future of humans on and off Earth.

This could enable humans to live and travel under the sea in ways that have been impossible and travel across the globe in short time frames, effectively turning the planet into a single village. Most important, no matter what the specific origins of UAP are, mastering UAP technology could be the key to preserving the human race and solving our biggest challenges, ranging from energy/climate issues to avoiding catastrophe and extinction. Today's rocket technology makes travel beyond the planet quite restrictive, but UAP technology, with the ability to travel across mediums and manipulate gravity, could be the key to humans becoming a multiplanetary species—if it can be mastered. The recent privatization of the space industry has shown that unlocking the power of private-sector innovation, with public-sector support, can achieve greater and more diverse results than keeping technology and capabilities only in the hands of the government.

The science fiction writer Arthur C. Clarke once said, in his third law, that "any sufficiently advanced technology is indistinguishable from magic."[107] While in the past reports of UAP technology may have seemed like science fiction, today we have sufficient information and cause to begin to invest in research and development, engaging the "best and brightest" minds on the planet to unlock the potential of these technologies.

Given global risks of catastrophes, including climate change, nuclear war, biological contagions, planet-killing asteroids, and more, a plausible way forward may be found by encouraging and establishing investment in an area that may seem fringe to some today. In the long term, UAP-related technology and ventures may hold the key to our shared future.

About the Author

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Notes

1. Revealed by Luis Elizondo, who was a member of AATIP, in articles such as Lewis-Kraus, "How the Pentagon Started Taking U.F.O.s Seriously."
2. Cooper et al., "Glowing Auras and 'Black Money.'"
3. For more on the funding and existence of these two programs, Advanced Aerospace Weapons System Application Program (AAWSAP) and the Advanced Aerospace Threat Identification Program (AATIP), see Merlan, "Newly-Released Documents Shed Light on Government-Funded Research."
4. Vincent, "Pentagon Changes 'UAP' Terminology." For the official AARO site, visit https://www.aaro.mil/.
5. Barnes, "Congress Holds First U.F.O. Hearing in Half a Century."
6. In the July 2023 hearing, fighter pilots Ryan Graves and David Fravor testified to the unusual nature of the sightings. For more, see Merchant, "UFO Congressional Hearing."
7. US Department of Defense. "Statement by the Department of Defense on the Release of Historical Navy Videos."
8. In July 2023, the testimony of crash retrieval and biologics was given by former government and intelligence official David Grusch, and in November 2024, by former intelligence operative Luis Elizondo. Another witness, Michael Shellenberger, a reporter, also testified that his sources had provided him information on at least one top secret program. For more, see Merchant, "UFO Congressional Hearing"; and Gabbatt and Dunbar, "Startling Claims Made at UFO Hearing in Congress."
9. See US Senate, "Unidentified Anomalous Phenomena Disclosure Act of 2023"; and US Senate Democratic Caucus. "Schumer, Rounds Introduce New Legislation.
10. Lavelle, "He Quit Heading the Pentagon's UFO Office."
11. Vincent, "'Truly Anomalous.'"
12. Vincent, "'Truly Anomalous.'"
13. Perrigo, "Navy Pilot Says UFO He Saw Off California Was 'Not of This World.'"
14. Jewers, "Ex-Navy Officer Says UFO Technology Is 100 to 1,000 Years Ahead."
15. Gault, "Former Director of National Intelligence Teases Blockbuster UFO Report."
16. Knuth et al., "Estimating Flight Characteristics of Anomalous Unidentified Aerial Vehicles."
17. Knuth et al., "Estimating Flight Characteristics of Anomalous Unidentified Aerial Vehicles."
18. Mann, "Avi Loeb's Galileo Project Will Search for Evidence of Alien Visitation."
19. Chow, "NASA Panel Studying UFO Sightings."
20. For text of the prepared statements read in the 2024 hearing, see House Committee on Oversight and Accountability, "Unidentified Anomalous Phenomena."
21. Apodaca et al., "What Is 'Deep Tech' and What Are Deep Tech Ventures?"
22. Bobier et al., "An Investor's Guide to Deep Tech."
23. European Commission, "European Commission's Communication on UAP Research."
24. Syme et al., "Elon Musk's SpaceX."
25. See, for example, among others, Narayanamurti and Tsao, *Genesis of Technoscientific Revolutions.*
26. Hynek, *UFO Experience.*
27. McDonald, "UFOs and the Condon Report."
28. Peter Sturrock, personal communication with author, 2023; Sturrock, *UFO Enigma*.

29. See, for example, Fuller, *Aliens in the Skies*.
30. Virk, "Stigma and Boundary Work." See also Yingling et al., "Faculty Perceptions of Unidentified Aerial Phenomena."
31. For a description of the conference, see Bryan, *Close Encounters of the Fourth Kind*. The proceedings were published by Pritchard and used copies are still available online; see Pritchard et al., *Alien Discussions*.
32. Honan, "Harvard Investigates a Professor Who Wrote of Space Aliens."
33. A term borrowed from the days of Galileo and popularized by Jacques Vallée for scientists that were investigating the phenomena in secret.
34. See, for example, Dress, "Pentagon Report Throws Cold Water on UFOs, Alien Visits."
35. Wolfgang, "UFOs Shadowed Military Pilots."
36. See, for example, Gallaudet, "Beneath the Surface."
37. Member of the UAPTF, personal communication with the author; see also Elizondo, "Written Testimony of Luis Elizondo for the US House Committee on Oversight and Accountability."
38. Andreessen and Horowitz, "Can the Government Classify Math?"
39. For one example, Dr. Eric Davis stated this explicitly at the Sol Foundation Symposium in November 2024.
40. Rhodes, Making of the *Atomic Bomb*, 655
41. Rhodes, Making of the *Atomic Bomb*.
42. See, for example, White House. *National Space Policy of the United States of America*; and National Aeronautics and Space Administration, "Seven U.S. Companies Collaborate with NASA to Advance Space Capabilities."
43. Schmidt and Frank, "Silurian Hypothesis."
44. Lomas et al., "Cryptoterrestrial Hypothesis."
45. Vallée, *Passport to Magonia*.
46. Masters, *Extratempestrial Model*.
47. Elizondo, *Imminent*.
48. FOIA Request U-18-214S/FAC-2A1 Response.
49. Anecdotal reports from the Intelligence Community suggest some UAP "move" that quickly.
50. Talbert, "Future Planes May Defy Gravity and Air Life in Space Travels"; Talbert, "Conquest of Gravity Aim of Top Scientists in U.S."
51. Gladych, "G-Engines Are Coming."
52. See, for example, Cook, *Hunt for Zero Point*.
53. Federal Aviation Administration, "Mighty Ford Trimotor."
54. For one account, see Nooney, *Apple II Age*.
55. Dvorsky, "Giant Centrifuge Startup That Wants to Hurl Things into Space Raises $71 Mil."
56. Lynch, "30 XPRIZE Competitions That Fueled 30 Years of Innovation."
57. Merchant, "UFO Congressional Hearing."
58. Jewett, "Despite Setback, Neuralink's First Brain-Implant Patient Stays Upbeat."
59. Emspak, "Chinese Scientists Just Set the Record for the Farthest Quantum Teleportation."
60. Scientists such as Dr. Hal Puthoff have speculated on this publicly. For one example, see the E*cosystemic Futures* podcast episode "Beyond Conventional Physics—Extended Electrodynamics."
61. To the Stars Academy. "Material of Interest."
62. Nolan et al., "Improved Instrumental Techniques."
63. Gallaudet, "Beneath the Surface."
64. Gallaudet, "Beneath the Surface."

65. *Metinko, "Defense Tech Hits New Highs in 2024."*
66. For one example, see Elizondo, "Written Testimony of Luis Elizondo for the US House Committee on Oversight and Accountability."
67. Hastings, *UFOs and Nukes.*
68. Elizondo*, Imminent.*
69. Jacques Vallée has spoken publicly about assembling such a database; see Hanks, "Jacques Vallée."
70. Matthew Hutson, "The Truth Is Out There, on an App | The New Yorker," *The New Yorker,* January 22, 2024, https://www.newyorker.com/magazine/2024/01/29/the-truth-is-out-there-on-an-app.
71. See, for example, Watters et al., "Scientific Investigation of Unidentified Aerial Phenomena."
72. See written testimony of Gold in House Committee on Oversight and Accountability, "Unidentified Anomalous Phenomena."
73. All-Domain Anomaly Resolution Office, *FY24 Consolidated Annual Report on Unidentified Anomalous Phenomena*.
74. Erwin, "Slingshot Aerospace Completes $40.8 Million Funding Round."
75. See Beacham, "What Is Reality?"
76. Davis and Puthoff, "On Extracting Energy from the Quantum Vacuum."
77. Nooney, *Apple II Age.*
78. Nooney, *Apple II Age.*
79. This quote has been popularly attributed to Jobs, but it does not appear in any official biography.
80. Goldfarb, and Kirsch, *Bubbles and Crashes*, 144.
81. See, for example, White House. *National Space Policy of the United States of America*; and National Aeronautics and Space Administration, "Seven U.S. Companies Collaborate with NASA to Advance Space Capabilities."
82. The Human Genome Project, for example, was funded entirely by the Department of Energy and the National Institutes of Health. See National Human Genome Research Institute, "Human Genome Project Fact Sheet."
83. For a history and analysis, see National Research Council Committee for the Review of the National Nanotechnology Initiative, *Small Wonders, Endless Frontiers*, 2.
84. For one of many analyses available online, see Peyton, "US Cities with the Most VC Investment in 2023."
85. Turnbull, "How Far Have Autonomous Military Vehicles Come?"
86. Encyclopedia Britannica, "Siri."
87. Examples mentioned above include Elizondo in the November 2024 hearings and in his book, Grusch in the 2023 hearings, and Davis at the Sol Foundation Symposium in November 2024.
88. This information is based on interviews conducted by me between 2022 and 2024, to be published in a forthcoming article currently in progress.
89. My own studies results are forthcoming. For a survey of academics on the UAP topic, see Yingling et al., "Faculty Perceptions of Unidentified Aerial Phenomena."
90. This was based on searches done by the author in 2022.
91. For details on some of these companies, see the *Ecosystemic Futures* podcast episode "Beyond Conventional Physics—Extended Electrodynamics."
92. See John Templeton Foundation, "Vision, Mission and Impact."
93. A group called UAPx, or UAP Expeditions, put forth this rationale for an expedition to the area to the author directly. It later completed an expedition that was funded by and documented in

the film *A Tear in the Sky*. See Schaefer, "William Shatner, Experts Weigh in on UFO Phenomena in 'A Tear in the Sky' Documentary."

94. The mission was funded by cryptocurrency entrepreneur Charles Hoskinson. See Yang, "Harvard Physicist Plans Expedition to Find 'Alien Artefact' That Fell from Space"; and Galileo Project, "New Paper on Chemical Classification of IM1 Spherules Published in *Chemical Geology*."
95. See, for example, National Endowment for the Humanities, "Humanities Research Centers on Artificial Intelligence"; and National Endowment for the Humanities, "Humanities Perspectives on Artificial Intelligence."
96. See, for example, a list of papers published by the Galileo Projects, available at https://projects.iq.harvard.edu/galileo/publications.
97. Boyle, "How Prizes Pushed Progress."
98. XPRIZE Foundation, "XPRIZE Foundation Ansari Prize."
99. Whiting, "Researchers Solve Netflix Challenge, Win $1 Million Prize."
100. Turnbull, "How Far Have Autonomous Military Vehicles Come?"
101. Azer, "New Era."
102. Sheetz, "Japan Offers $940 Million to Boost Nation's Space Startups."
103. XPRIZE Foundation, "XPRIZE Plans to Continue Lunar XPRIZE Mission."
104. Bill of Rights Institute, "Charles Lindbergh."
105. Matheson, "MIT Launches New Venture for World-Changing Entrepreneurs."
106. Roush, "Who's Brave Enough to Invest in Saving the Planet?"
107. Quoted in Heilbron, *Oxford Companion to the History of Modern Science.*

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