Finding UFOs from Above

By Avi Loeb on January 22, 2021

We are used to looking up when finding Unidentified Aerial Phenomena (UAP, previously known as UFOs) of the type reported by the Office of the Director of National Intelligence (ODNI) on June 25, 2021. Six months after the ODNI report, President Biden signed into law — with bipartisan support in Congress — the establishment of a new UAP office. The office, to operate by June 2022, will start a coordinated effort of reporting and responding to UAP and significantly improve data-sharing between government agencies on UAP sightings.

But it is also possible to find UAP by looking down at them from satellites that image the Earth. For example, *Planet Labs* uses its fleet of 210 CubeSat miniature satellites, labeled *Doves*, to image the entire Earth once a day with a spatial resolution of a dozen feet per pixel. Planet Labs was founded in a garage, similarly to Google. When speaking with the company leaders, I joked that we need to build more garages in Silicon Valley – not for the purpose of storing cars but to provide cheap office space for teams of young innovators.

The *Galileo Project* that I am leading, aims to unravel the nature of UAP. Aside from building its first telescope system on the roof of the Harvard College Observatory in the coming months, the Project plans to use Planet Labs' data in searching for UAP from above. Artificial Intelligence (AI) algorithms can distinguish extraterrestrial equipment from familiar objects like a meteor, an airplane or an atmospheric phenomenon. Since there are no birds, airplanes or lightnings above the Earth's atmosphere, any object with an elevation larger than 50 kilometers would appear unusual and merit further analysis.

The simplest method to address this task was defined by Arthur Conan Doyle in "*The Case-Book of Sherlock Holmes*", where he stated: "*When you have eliminated all which is impossible, then whatever remains, however improbable, must be the truth.*" Deduction by elimination is the best way for a cave dweller to conclude that a cell phone is not a shiny rock, based on the device's ability to record voices and images. Similarly, when analyzing new data from telescopes, AI algorithms could separate unfamiliar objects from those that are natural - like birds and meteors, or human made – like drones and airplanes. This could be part of a learning experience because: "*Whatever remains, however improbable, must be the truth*."

Extraterrestrial equipment can be distinguished from a terrestrial object, not just by resolving unusual bolts or labels imprinted on its hardware but also based on its unusual behavior. Behavioral anomalies include motion at unprecedented speeds or accelerations, not accessible to human-made or natural phenomena, as well as intelligent activity - seeking information or responding to circumstances in ways that cannot be mimicked by familiar objects. We use behavioral traits routinely in our daily life to recognize intelligent people even before engaging with them. The combination of unusual physical and

behavioral characteristics could establish the case for extraterrestrial technological equipment beyond a reasonable doubt.

Once an extraterrestrial object is identified, the challenge shifts to figuring out its purpose. Knowing the intent of visitors to our home is of upmost importance in guiding us how to engage with them. An encounter with an extraterrestrial visitor could be easily misinterpreted, as in the *Trojan horse* story of Greek mythology, especially if the guest's AI system is far more advanced than our natural intelligence.

The extraterrestrial hardware may take advantage of the physical reality that goes beyond our current scientific understanding. This would be natural if the object was manufactured by a scientific culture whose scientific knowledge base was far more advanced than our century-old understanding of quantum mechanics and gravity.

We are confident that our understanding of the universe is incomplete, because we label two of its most abundant constituents as "dark matter" and "dark energy", for lack of a better knowledge of their nature. We only know that dark matter induces attractive gravity like the ordinary matter we find on Earth, whereas dark energy induces repulsive gravity - triggering the accelerated expansion of the Universe. If an extraterrestrial technological civilization was able to harness these unknown but most abundant cosmic constituents to fuel the propulsion of its engineered vehicles, the *Galileo Project* telescopes would not detect the standard exhaust plumes that usually surround human-made crafts.

The known laws of physics and mathematics must apply to all technological civilizations that ever existed in the 13.8 billion years since the Big Bang. Nevertheless, there might still be propulsion and communication capabilities beyond our imagination, consistent with our current knowledge. In that case, an encounter with extraterrestrial equipment will educate us about nature itself and not just about the existence of other civilizations beyond ours. The new lesson about nature might be far more important because it will broaden our understanding of the universe at large. The eureka experience would be similar to cave dwellers learning about distant landscapes, far beyond those experienced, based on the images stored in the cell phone they found.

By watching human history, an interstellar committee might decide that there is no evidence for intelligence in the Solar system as of yet. But our AI systems might receive a higher score by having a kinship with their technological relatives, those AI systems produced by extraterrestrials. Here's hoping that our technological kids, namely the AI systems we develop, will do better than humans. In the bigger scheme of the universe, the sky's the limit.

ABOUT THE AUTHOR

Avi Loeb is the head of the *Galileo Project*, founding director of Harvard University's - Black Hole Initiative, director of the Institute for Theory and Computation at the Harvard-Smithsonian Center for Astrophysics, and the former chair of the astronomy department at Harvard University (2011-2020). He chairs the advisory board for the Breakthrough Starshot project, and is a former member of the President's Council of Advisors on Science and Technology and a former chair of the Board on Physics and Astronomy of the National Academies. He is the bestselling author of "*Extraterrestrial: The First Sign of Intelligent Life Beyond Earth*" and a co-author of the textbook "*Life in the Cosmos*", both published in 2021.