

The End of the World

A close-up, high-contrast image of a large, textured alien eye. The eye is dark and has a rough, scaly appearance. The iris is replaced by a realistic image of the Earth, showing blue oceans and white clouds. The pupil is a bright yellow-orange dot. The background is black, suggesting space.

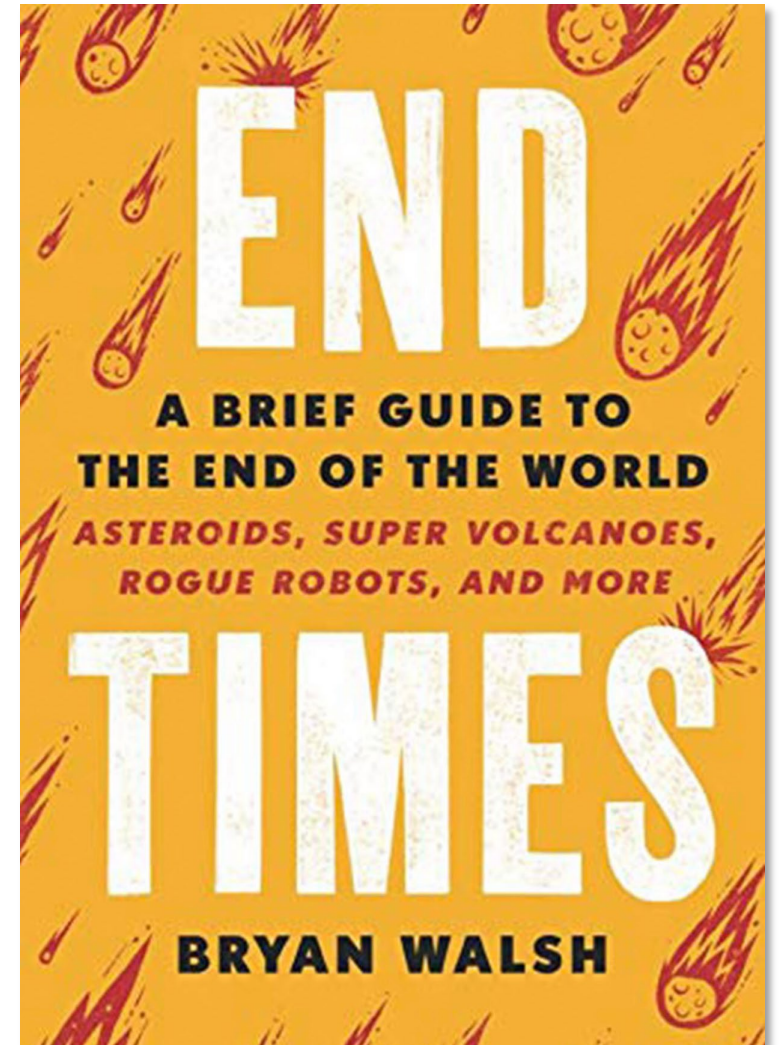
Hungry Aliens and the Search for Extraterrestrial Life

Week 15 Lecture | Professor Crews
Religious Studies 357 W

In *End Times: A Brief Guide to the End of the World*, author Bryan Walsh takes us through a wide range of possible end of the world scenarios, from asteroids and super volcanoes to killer robots and climate apocalypse.

Walsh explores many common end times scientific worries and asks how realistic these threats are and what we can do to address them. As he noted in the introduction:

“If we don’t appreciate the present, it’s in part because we don’t fully understand the past— even as we make the mistake of assuming the future will be like the present... Risks that are most available to the mind are the ones that we care about, which is why so much of our regulation is driven by crisis, rather than by reason.”



This week we turn to our final possible ‘end of the world’ scenario—aliens and extraterrestrial life. Do they exist? Where are they from? And most importantly, could they bring about the end of the world?

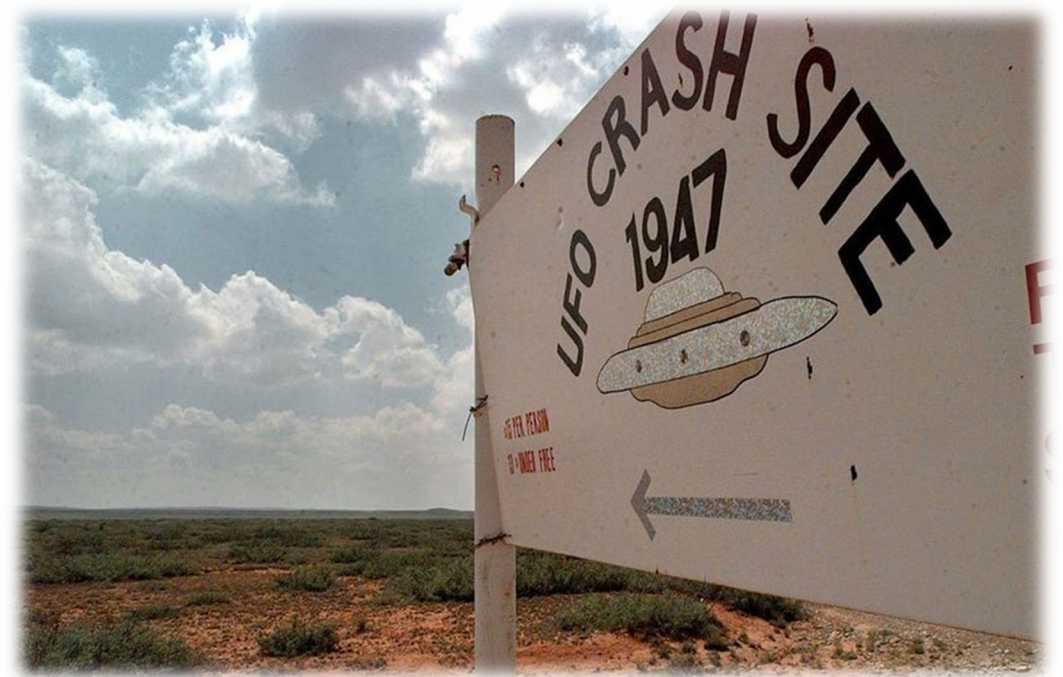
The story of alien encounters have played out in human cultural imaginations for decades, some would argue say millennia. A few examples might include H.G. Wells famous 1898 sci-fi novel *The War of the Worlds*, brilliantly adapted by Orson Wells into a sensational 1938 CBS radio drama. Aliens shows run the gamut, from cult classics like *The Mysterians* and *Doctor Who*, to the friendly *E.T.* or killer *Predator*. Plus there’s *The X-Files*, *Men in Black*, and even *Mars Attacks!* {Shout out to Spooky Mulder!} As Walsh suggests, for many people around the world, these stories tell a familiar tale: “Advanced extraterrestrials come to conquer Earth—whether secretly or in force—and humans band together to repel them.”

Despite this cultural obsession with aliens, our actual relationship with aliens remains elusive, also known as the Fermi Paradox, from a saying attributed to scientist Enrico Fermi, who we discussed a few weeks back with US atomic bomb tests. While accounts of his 1950 alien remarks vary, essentially Fermi was asking his colleagues this: **If aliens do exist, where are they?**

The search for extraterrestrial life is driven by this paradox. If there is alien life—especially, intelligent life—in the universe, can we prove it? A second, equally pressing question immediately follows, one more relevant to our end of the world focus. Assuming aliens exist, are they going to kill us?

In the United States, our fascination with aliens includes the events of July 4, 1947 when rancher Mac Brazel found some unidentified debris in a field near Roswell, New Mexico. Commonly known as the "Roswell UFO incident," this event gave birth to America's ongoing UFO obsession.

A local sheriff was called out, and soon after the Roswell Army Air Field sent officials to retrieve the debris, including a "flying disk" and other unidentified pieces. The Army claimed it was a crashed weather balloon, and this remains the official government story today. The crash was later linked to Project Mogul, a classified US military project using weather balloons to detect Russian nuclear tests.



Scientific research on aliens is often linked to the Search for Extraterrestrial Intelligence (SETI), which was formed in the early 1960s by a group of astronomer, among them Frank Drake. Drake was part of an influential group of scientists, including astronomer Carl Sagan, that met in Green Bank, West Virginia in 1961, site of the National Radio Astronomy Observatory (NRAO), to outline a scientific study of aliens.

Drake developed his now famous equation for calculating the possibilities of alien life, the Drake equation. Using this concept, scientists estimated there could be between 1,000 and 100 million alien civilizations in the Milky Way galaxy.

$$\mathbf{N} = \mathbf{R}^* \times \mathbf{f}_p \times \mathbf{n}_e \times \mathbf{f}_l \times \mathbf{f}_i \times \mathbf{f}_c \times \mathbf{L}$$

N = Number of civilizations in our galaxy with which communication might be possible

R* = Average rate of star formation in our galaxy

f_p = Fraction of those stars that have planets

n_e = Average number of planets that can potentially support life per star that has planets

f_l = Fraction of planets that could support life that actually develop life at some point

f_i = Fraction of planets with life that actually go on to develop intelligent life

f_c = Fraction of civilizations that develop a technology that releases detectable signs of their existence

L = Length of time for which such civilizations release detectable signals into space

If there really is intelligent life in the universe, why haven't we discovered it yet? Scientists have suggested various possible explanations to the Fermi Paradox, including:

- Aliens exist but have chosen to hide their presence from us.
- Aliens exist and are trying to communicate, but we don't use the same technologies.
- Aliens exist but are hiding from other dangerous cosmic threats.
- Aliens are currently in a hibernation or stasis period.
- Aliens once existed but have since gone extinct.

To this list I would add a few other possibilities for why we haven't yet discovered aliens:

- Aliens exist but are so far away in the universe that we will never discover each other.
- Aliens exist in a non-corporeal or interdimensional form that we cannot observe.
- Aliens can manipulate human memories, allowing them to erase any knowledge of contact.

Another explanation by economist Robin Hanson is the "Great Filter," a kind of natural limit built into the universe that shapes evolutionary potential. As Walsh suggests, "It may be that abiogenesis—the process by which raw organic ingredients evolve from nonliving matter to become what we recognize as basic microbial life—simply doesn't happen very often...The story of Earth...could be a serendipitous one, and one unlikely to be repeated even in a galaxy as vast and as old as the Milky Way."

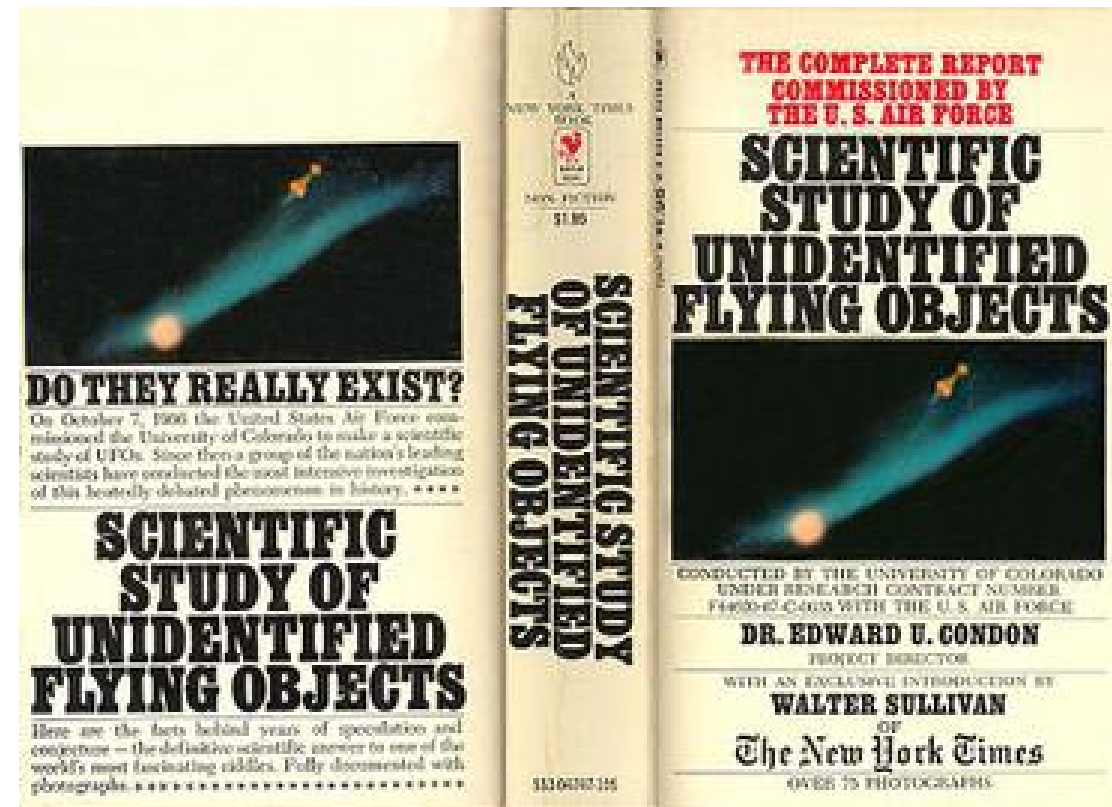
And yet interest in UFOs was serious enough that the US government ran three separate investigative efforts over the years, including Project Signs (1947), Project Grudge (1949), and the most famous of all US government alien research efforts, Project Bluebook (1952).

Project Bluebook, which was run by the US Air Force, had two main goals:

- Assess if UFOs posed a national security threat
- Analyzing UFO reports and related data

During its operation, Project Bluebook examined more than 12,000 reported UFO incidents. Their work was compiled into the Condon Report (1968), which was a produce led by the University of Colorado UFO Project (1966-68) and overseen by the US Air Force.

The report found no compelling evidence for the existence of alien UFOs, and thus no real threats. Project Bluebook was officially shut down soon after in 1970.



SETI work often took place under the guise of NASA, until Congressional funding was cut in 1993, never to return. As Walsh noted, this was partly due to the “giggle factor,” the issue we discussed earlier with asteroid research. Without NASA support, SETI shifted into privately-funded research, which continues today through the SETI Institute. Other related efforts include the Berkeley SETI Research Center, the Mutual UFO Network (MUFON), and the National UFO Reporting Center (NUFORC).

The work of SETI has been aided by recent advances in space exploration technology, including AI, such as the 2007 Allen Telescope Array, the 2009 Kepler Space Telescope, and the 2015 Breakthrough Listen project, a 10-year, \$100 million project located at the Berkeley SETI Research Center.

While SETI largely operates as a passive space search program, there are some who advocate for an active approach, like former SETI scientist Douglas Vakoch, an approach known as messaging extraterrestrial intelligence (METI). This question of active or passive searching is at the heart of another major alien debate.

If aliens really exist, should we be trying to contact them?



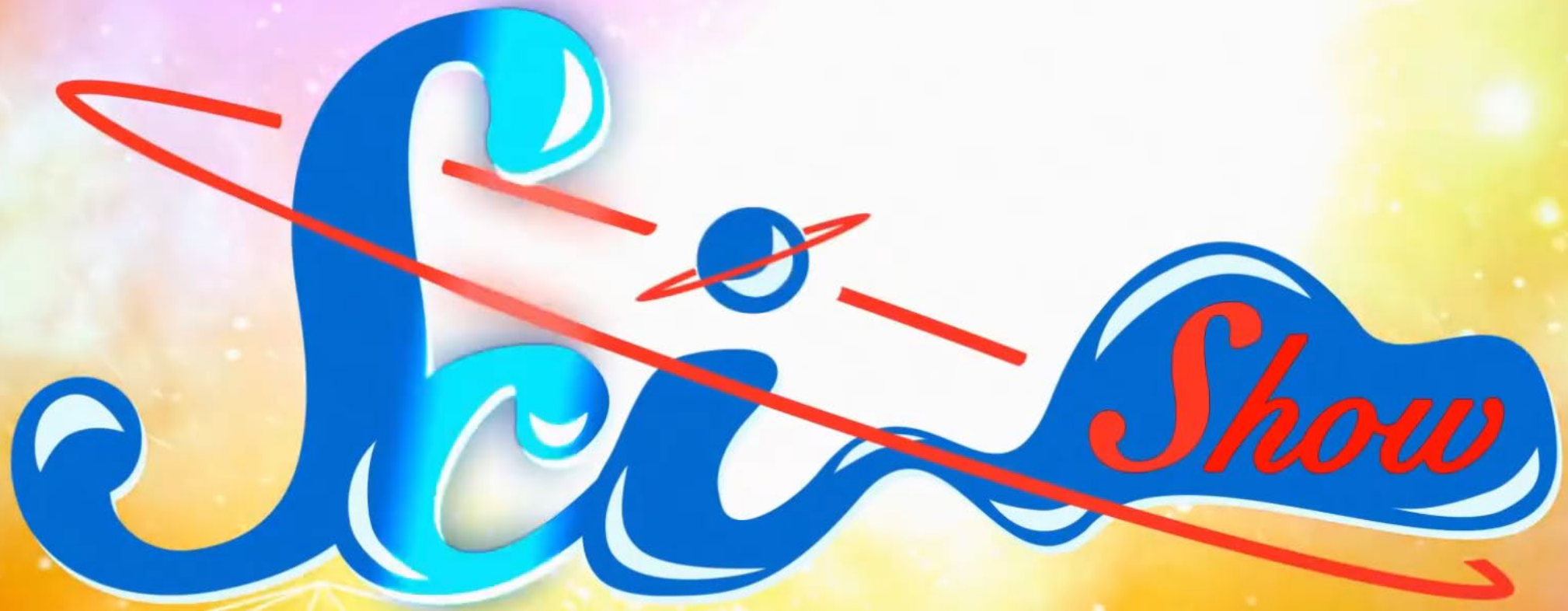
The first attempt at alien contact was done by Soviet scientists in 1962, when they sent a Morse code message towards Venus using the Unique Korenberg Telescope Array. A first interplanetary message was sent by a group of scientists (including Frank Drake and Carl Sagan) working on communication with extraterrestrial intelligence (CETI) on November 16, 1974 from the Arecibo Observatory in Puerto Rico and directed at the Messier 13 (M13) star cluster, 25,000 light years away (46th anniversary).

Drake's famous "Arecibo Message" included 168 seconds of a two-tone sound (suggesting a designer), the numbers 1-10, atomic element numbers, DNA information, and a graphic representation of the solar system with the location of Earth. So a potential alien civilization in the M13 star system could receive Drake's Arecibo Message around the year 26,974, and we might receive a reply back by the year 51,974, giving "ET phone home" a whole different meaning. Talk about a long-distance phone call!

But not everyone was happy about Drake reaching out to possible space aliens. As Britain's Astronomer Royal Martin Ryle wrote to Drake, it was "very hazardous to reveal our existence and location to the Galaxy...For all we know, any creatures out there might be malevolent—or hungry." US astronomer Carl Sagan also added that shouting into the cosmos was "deeply unwise and immature."

Drake responded: "It's too late to worry about giving ourselves away. The deed is done. And repeated daily with every television transmission, every military radar signal, every spacecraft command."

Sci Show

The logo for 'Sci Show' features the word 'Sci' in a large, blue, 3D-style font with a white outline and a slight shadow. The word 'Show' is in a smaller, red, cursive font, also with a white outline, and is contained within a blue, rounded rectangular shape. A red line with arrowheads at both ends forms an elliptical path around the 'Sci' and 'Show' elements, suggesting an orbit. The background is a vibrant, multi-colored gradient from purple to yellow, with a white grid of lines and small white dots scattered throughout.

“There’s something of the move-fast-and-break-stuff ethos of Silicon Valley in the METI movement, a willingness to disregard risk if risk gets in the way of potential reward...If an act carries even a miniscule risk of human extinction, shouldn’t we err on the side of safety, given the ultimate stakes at play? And if that’s the case, perhaps we should pause before sending an unknown alien civilization of unknown technological capability and unknown intentions Google Maps directions to our home planet?”

Alien contact is yet another existential risks that could bring about the end of the world.

Despite verified scientific proof of alien existence, popular and official interest remains high. In 2017 media reports revealed the existence of a formerly unknown \$22 million DoD project known as the Advanced Aerospace Threat Identification Project (AATIP), which like Project Bluebook, was focused on UFOs, now called “Unexplained Aerial Phenomenon” (UAP). The Defense Intelligence Agency ran AATIP from 2007-12, thanks in part to efforts by Nevada Senator Harry Reid, whose state is home to Area 51, arguably one of the most famous alien conspiracy sites in the world.

The work of AATIP continues today under a new Unidentified Aerial Phenomenon Task Force (UAPTF) run by the DoD. Its existence was just made public this summer following hearings in June of 2020 by the US Senate Select Committee on Intelligence, hearings sparked in part by recently declassified government videos depicting several UFO encounters involving the US military.

Has E.T. Gone Home?

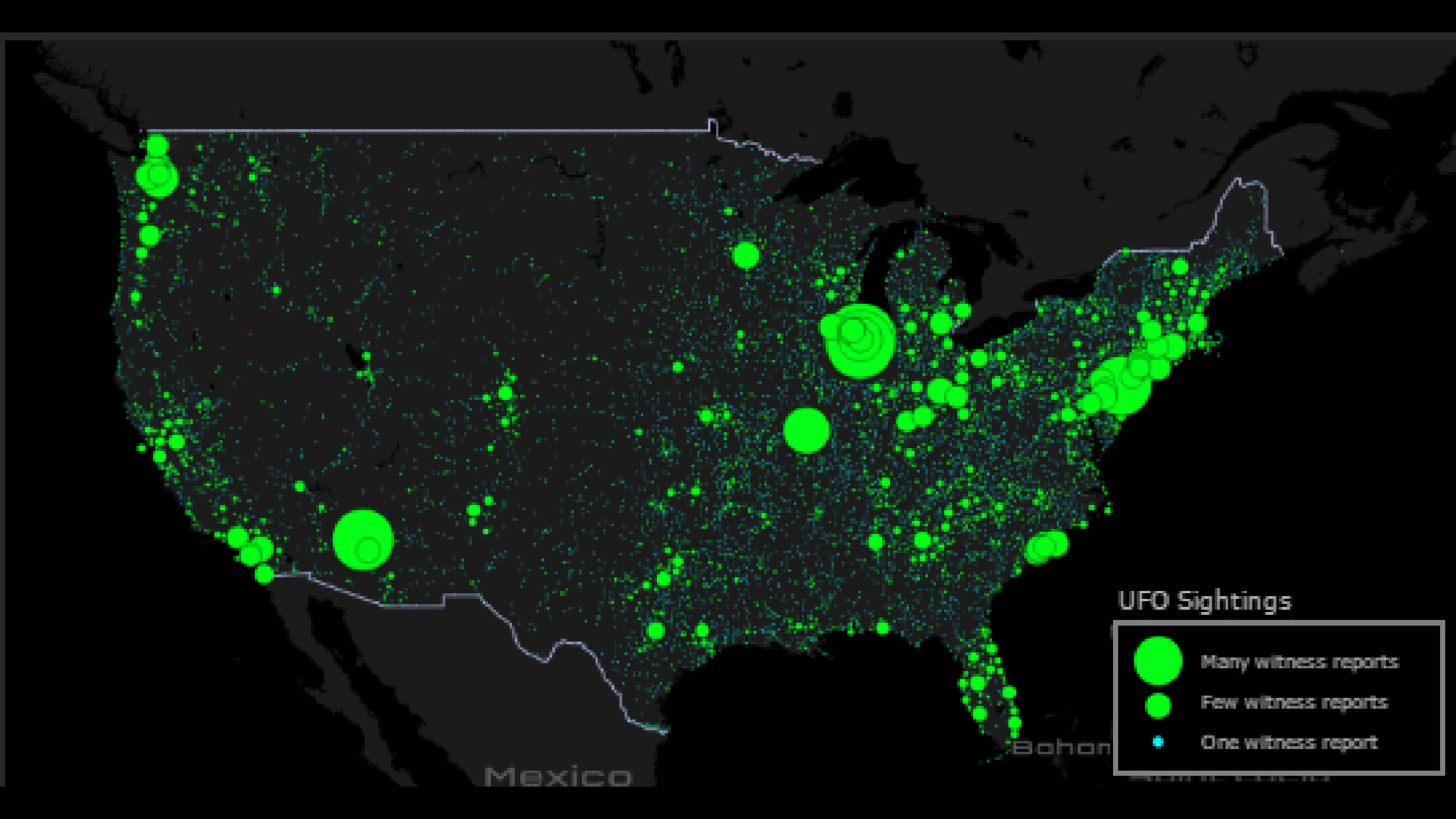
Global UFO sightings recorded from 1990 to 2020*



* Up to June 25, 2020

Source: National UFO Reporting Center



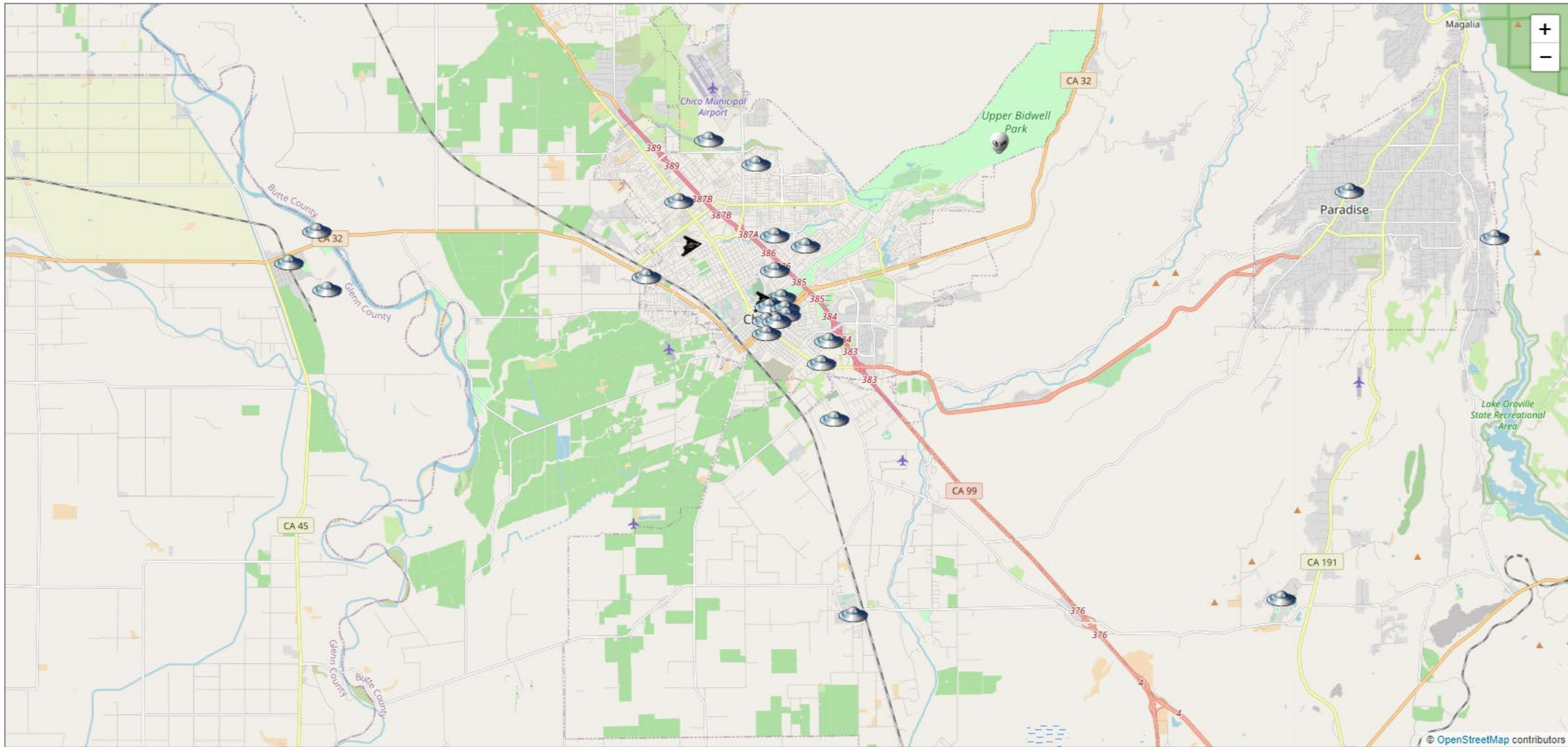


UFO Sightings

- Many witness reports
- Few witness reports
- One witness report

Mexico

Bohan



© OpenStreetMap contributors

<p>Last Week 47 Sightings ▲ 61%</p>	<p>Last Month 284 Sightings ▲ 2%</p>	<p>Last Year 5509 Sightings ▲ 0%</p>	<p>All Time 106879 Sightings</p>
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CLOSE ENCOUNTERS

SENATORS BRIEFED ON UFO SIGHTINGS BY NAVY PILOTS

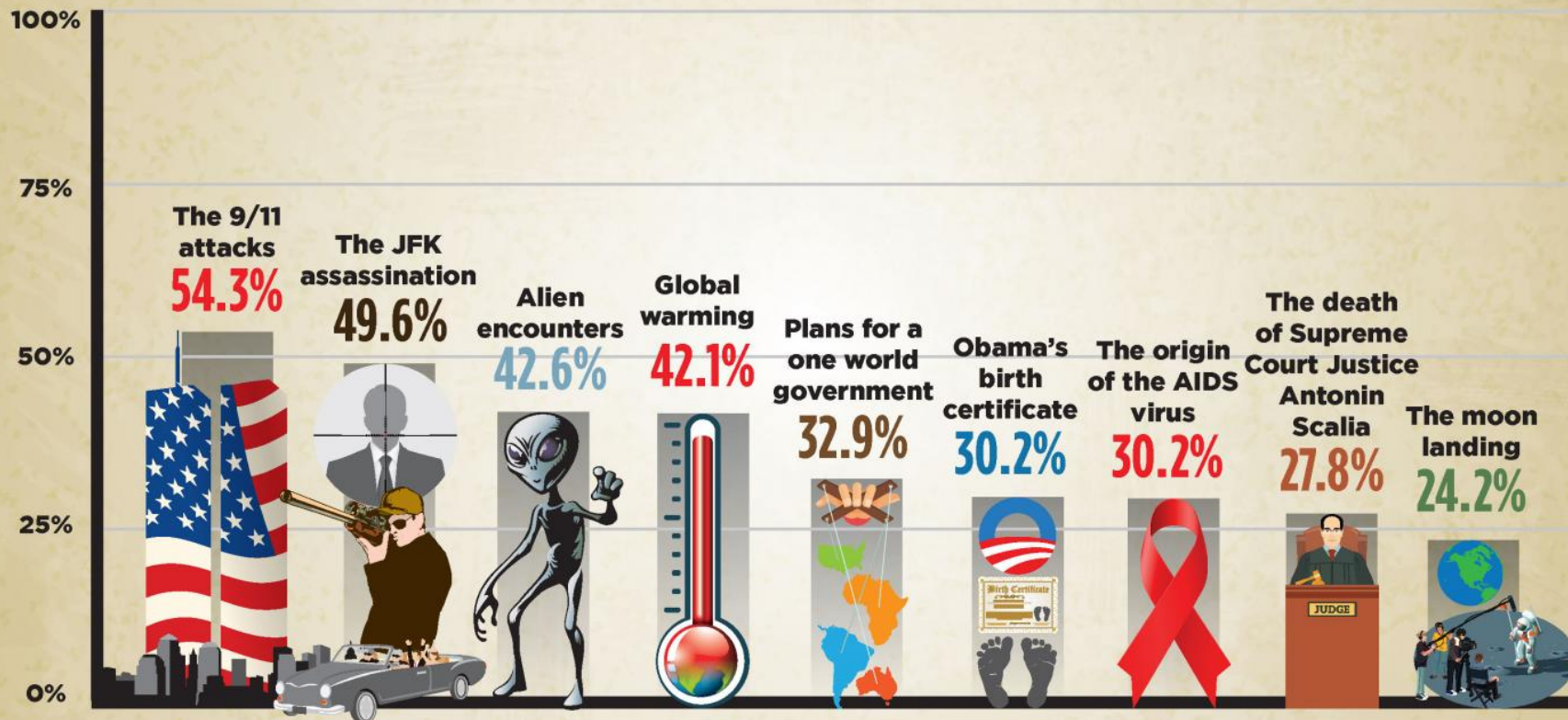
CNN

S&P ▲ 31.41

NEWSROOM

Belief in Conspiracies

The government is concealing what they know about...



* Percent reporting agree or strongly agree



Paranormal Beliefs



46.6%
Places can be haunted by spirits.

19.1%

Some people can move objects with their mind

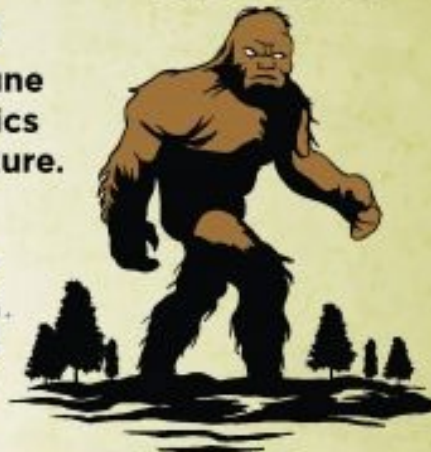


14.1%

Astrologers, fortune tellers, and psychics can foresee the future.

13.5%

Bigfoot is a real creature.



24.7%

Aliens have come to Earth in modern times.



39.6%

Ancient, advanced civilizations, such as Atlantis, once existed



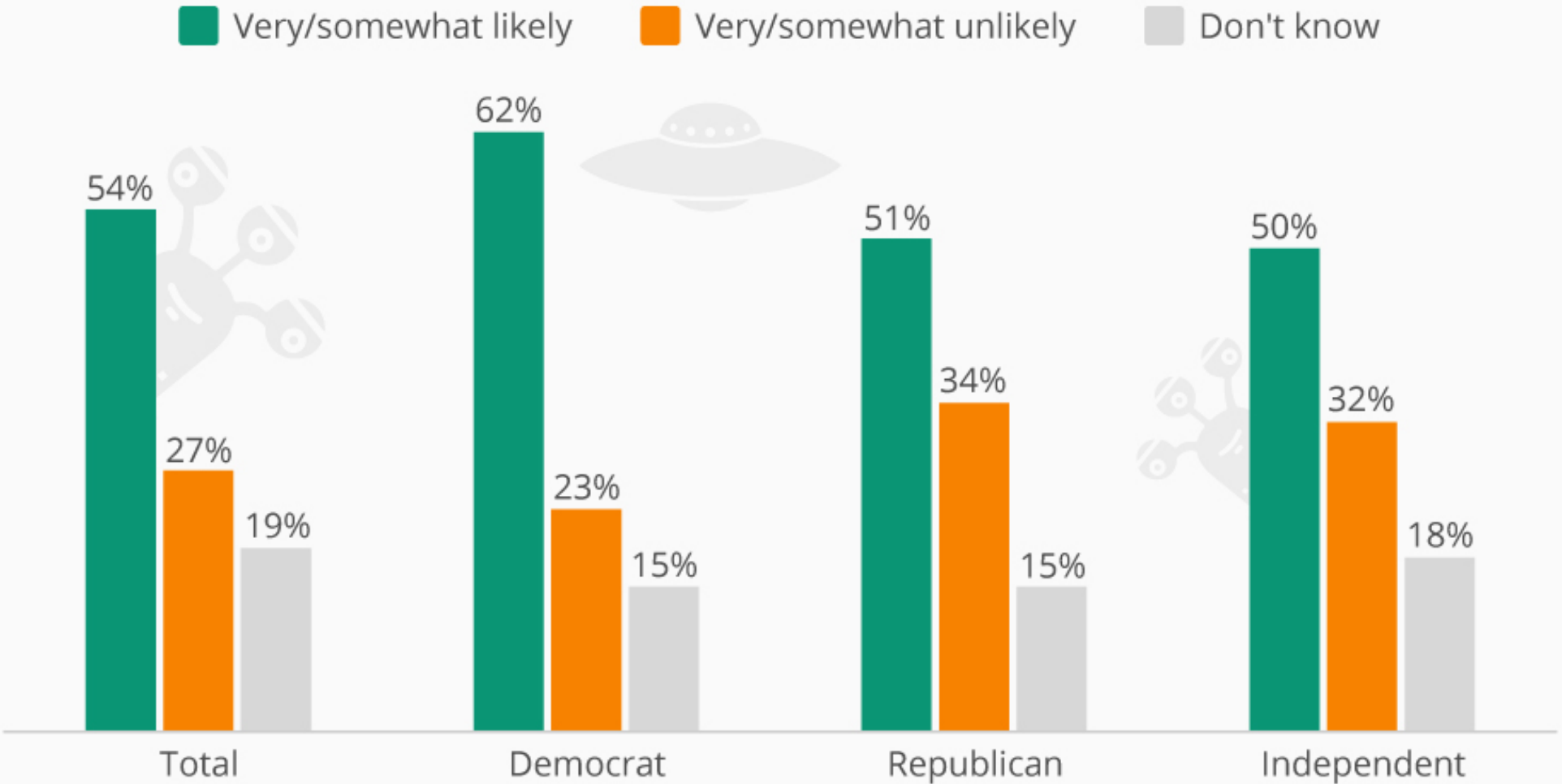
27%

Aliens visited Earth in our ancient past.



Is The U.S. Government Hiding Something About UFOs?

Share believing the government has UFO information which isn't being shared with the public



n=1,215 U.S. adults (June 20, 2019)
@StatistaCharts Source: YouGov



NEW THIS MORNING

AREA 51 INVASION

EMERGENCY ORDER ISSUED AS UFO FANS PLAN MASS VISIT

Thread

- BLM Utah** ✓ @BLMUtah · Nov 24
We know many of you are interested in the monolith that has gone viral on social media. You can find the Bureau of Land Management (@BLMNational) official statement and more information below:
- 7 21 65
- BLM Utah** ✓ @BLMUtah · Nov 24
Official statement: "Although we can't comment on active investigations, we would like to remind public land visitors that using, occupying, or developing the public lands or their resources without a required authorization is illegal, no matter what planet you are from."
- 11 85 232
- BLM Utah** ✓ @BLMUtah · Nov 24
Please don't try and visit the site as the road is not suitable for most earth-based vehicles.
- 11 11 74
- BLM Utah** ✓ @BLMUtah

Replying to @BLMUtah

Visit the [@UtahDPS](#) website for background info:



DPS Aero Bureau Encounters Monolith in Red Rock Country
Posted November 23, 2020

#alienmonolith



"...we would like to remind public land visitors that using, occupying, or developing the public lands or their resources without a required authorization is illegal, no matter what planet you are from."

If alien civilizations do exist, it's likely they have technology far more advanced than ours, and that may provide one clue to the Fermi Paradox, according to astrophysicist Adam Frank. Frank proposed four climate change scenarios from long-term use of energy-intensive development by an alien civilization.

- Die-off due to combination of climate changes and extreme population crashes.
- Collapse due to overconsumption of energy resources and extreme climate change.
- Collapse due to runaway climate change, with sustainable changes too late.
- Sustainable changes in energy usage stabilize climate change and allow for survival.

As Walsh argues, “It doesn't have to be climate change, however—almost any of the existential threats we examine in this book could be the culprit. A nuclear chain reaction isn't something that only works on Earth; a version powers our sun, and all stars.”

If there were past alien civilizations that went extinct from climate change or something else, scholars argue they may have left traces behind, called “necrosignatures,” which we might be able to detect, such as signs of massive nuclear fallout or chemical traces from a depleted ozone layer.

As a common SETI maxim goes, the absence of evidence is not evidence of absence. Whether or not the end of the world occurs at the hands of extraterrestrial intelligence depends on whether or not they exist.

Weekly Assignment Reminder

- Remember to check our class Blackboard regularly for updates, announcements, and other related class information...
- Have you done the weekly readings and watched any associated videos? Weekly readings are listed on the Class Schedule page.
- Our final Test #2 covering weeks 8-15 will run from **Fri Dec 4 to Sun Dec 6.**
- Complete the weekly discussion post response. Initial post due **Wed, Dec 2** by end of day, and peer response post due **Fri Dec 4** by end of the day.



**I WANT TO
BELIEVE**