

# Visualization of Reported UFO Sightings

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Fig. 1. UFOs are “proved beyond reasonable doubt”: A rotating “glowing aura” traveling at high speeds that was captured from a Navy F/A-18 Super Hornet. [6]

**Abstract**—Reports of unidentified flying objects (*UFOs*) have sparked amateur research, government investigations, and large popular interest in the last five decades. Most reported *UFOs* are later identified as natural phenomena or conventional objects. However, there is a considerable body of reports about objects that are not identified, which are usually perceived as claims of observations of extraterrestrial crafts, thus raising questions about life on other planets and the likelihood of extraterrestrials visiting Earth. Although scientists in their majority have naturally greeted the topic with skepticism, it is widely recognized that answering these questions would be, among other things, of great scientific importance and a big step towards understanding the universe. We provide an interactive visualization of the reported *UFO* sightings in the United States in the period of 1964-2017, aiming to help any interested user explore these sightings.

**Index Terms**—Visualization, Map, Interactivity, Unidentified Flying Object, *UFO*, United States.

## 1 INTRODUCTION

An unidentified flying object (*UFO*) is a perceived object in the sky that is not readily identified. The term *UFO* (initially, *UFOB*) appeared in 1953 when the United States Air Force used it to describe “any airborne object which by performance, aerodynamic characteristics, or unusual features, does not conform to any presently known aircraft or missile type, or which cannot be positively identified as a familiar

object” [4]. Since the 1950s, *UFOs* have become a major subject of interest in the popular culture and an inspiration for several movies and books [5]. The reason for this is the fact that *UFOs* are linked to suspected extraterrestrial aircrafts, and if this were true it would suggest that life exists beyond Earth and even more that extraterrestrials visit our planet.

Although *UFOs* are largely connected to this theme, it is true that for most of the reported cases the objects are identified to be ordinary or to be caused by a natural phenomenon after careful investigation. Most commonly, *UFOs* are identified to actually be astronomical objects, aircrafts, balloons (e.g. weather, research balloons), atmospheric or light phenomena (e.g. clouds, mirages), other atmospheric objects (e.g. birds), or, in some rare cases, hoaxes. The percentage of reports of objects that remain unidentified lies between 5% and 20% [4]. How-

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ever, this is a large enough percentage to spur a significant amount of government research and funds as well as scientific attention.

Of the most recently revealed government programs on UFOs is the U.S. Defense Department's *Advanced Aerospace Threat Identification Program* [6]. The program, which was led by military intelligence official Luis Elizondo, investigated evidence of UFOs and extraterrestrial life from 2007 to 2012, with an annual budget of 22 million dollars. In 2012 it was shuttered due to a change in the department's funding priorities, but Elizondo oversaw UFO investigations until this past October. He is convinced that this is a matter of importance and even contends that UFOs are "proved beyond reasonable doubt" (Fig.1). As for the scientific community, the recent *Breakthrough Listen Program* [7], located in the Astronomy Department of the University of California, Berkeley, is the most scientifically comprehensive search for intelligent extraterrestrial communications in the Universe to date [8]. It counts 100 million dollars in funding and it became more publicly known due to the statements of renowned physicist Stephen Hawking on alien life and his support of the program [9].

It is clear that the subject is controversial but, at the same time, most would agree that it requires research and attention. Therefore, it is important that there is a general awareness of the subject to the public. To this end, we created an interactive web-based visualization that allows the user to explore reports of sightings in the United States. It is intended to be pleasing and to give an overview of the reported sightings in the United States throughout the years, as well as the ability to drill down in order to explore characteristics of more specific areas and sightings.

The data we are using is posted on the website of the National UFO Report Center, whose head is Peter Davenport. The Center's website provides an online form as well as a hotline for reports of UFO sightings and these reports are annotated by Peter Davenport himself before they are posted in the database. Each report includes the date and time of the sighting, its duration, shape, location, and description summary (possibly including notes of Peter Davenport in double parentheses), as well as the date the report was posted.

## 2 RELATED WORKS

The dataset we are using has been popular on Kaggle which led two data visualization experts, Pooja Gandhi and Adam Crahen, to use it in their DuoDare project on their DataDuo blog [3]. The DuoDare was a project where each month one of the two experts would choose a dataset and call the other on a battle for the best visualization. The two visualizations that the experts came up with for this dataset included, among others, interactive maps, area charts, bar charts, and calendar heatmaps. Compared to these visualization, ours gives the user the chance to look into a state in more detail and learn information about a selected group of sightings.

## 3 PROCESS

### 3.1 Task Analysis

## 4 DESIGN

(i.e., visual encoding and interaction justifications)

## 5 DISCUSSION

## 6 CONCLUSION

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