

## **Puerto Rico UFO video update**

The Scientific Coalition for UFOlogy (SCU) stated they were going to release an updated report to address issues raised in SUNlite and elsewhere on February 1. Five months have passed and the SCU team has spent a lot of time on air and in conferences discussing the case but they still have yet to get around to addressing the questions raised. The SCU still won't even publicly admit that certain mistakes were made in their original paper or address Lance Moody's simulation of a balloon matching what was seen in the video. This brings into question the SCU's version of "peer review". The mistakes in the paper (specifically the frames 711 and 712 analysis) should have been caught. This indicates that the peer review was probably done by the authors themselves, which is not what "peer review" is. It is almost as embarrassing as the Roswell slides being deblurred. The promoters of that event also proclaimed that "due diligence" had been performed. It is amazing how confirmation bias can convince people that they are always right and others are just "naysayers", who don't know what they are talking about.

In June, the PRRR became aware of a report by Mr. Bob Bixler, which was written six months ago. He concluded that a balloon is a plausible explanation, which is in agreement with what I had published in SUNlite 7-6. Thanks to Lance Moody, I was able to talk to Bixler via E-mail and the resultant discussion was interesting. He stated that Robert Powell had asked him to look at the case last December and he responded with this report. This was about a month after SUNlite had published the PRRR's work to date on the video. Was this a coincidence or was there a motive for Powell to ask for somebody with Bixler's qualifications to examine the video? Only Powell knows for sure. I appreciate Mr. Bixler's willingness to share this information and his report.

## **2013 Aguadilla Puerto Rico analysis of an Infrared video showing Unidentified Anomalous Phenomenon captured by the Department of Homeland Security**

by

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January 9, 2016

rev. June 16, 2016

### **SUMMARY**

This video is a good example of inaccurate visual perception leading to false conclusions. What appears to be an aerial object moving rapidly from right to left throughout the video turns out to most likely be a small object simply slowly drifting with the wind. This misperception is due to the plane (and camera) circling around this object causing the background in the video to move rapidly in relation to the object being tracked.

This report shows that the object was about 1-2 ft. in size and remained over land throughout the video while descending from 1,000 ft. to 700 ft. in elevation over several minutes while drifting with the wind. Combining this with the IR signature characteristics suggest that this is a container of hot air that is cooling but a drone or bird are also possibilities.

Discerning moving object detail from a moving plane through a highly refractive atmosphere is quite difficult when the object size is 1-2 ft. and a mile or more away. This situation could help explain the double images, shape changes and loss of heat signature of the object in sections of the video.

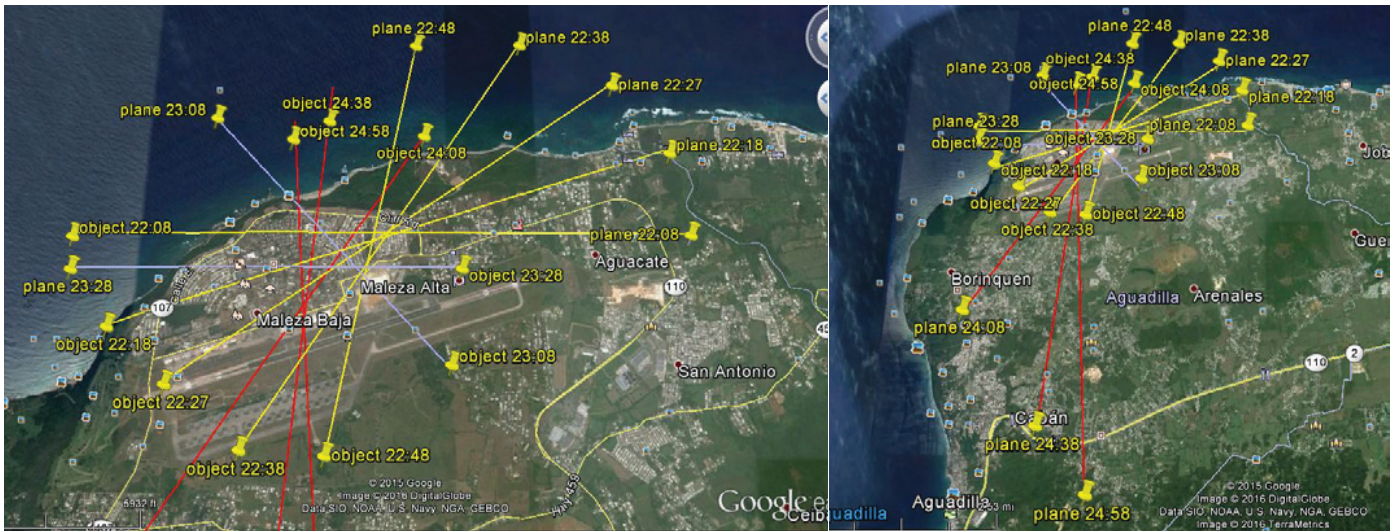
### **METHODOLOGY**

This is a problem in 4 dimensional geometry. The plane mounted infrared camera is moving in 3D space over time and changing directions while taking video of an unknown object moving in different directions in 3D space over time. Not only is the plane moving but the camera is moving in its mounts on the plane.

The camera constantly displays and records time (UTC+1)/date and plane heading, altitude and coordinates. Also it records a ground track identified by the central crosshairs and shows plane to ground distance, crosshair azimuth in relation to the plane's coordinates, crosshair altitude at ground level and crosshair coordinates. Camera zoom factor is also shown.

The problem is that nothing other than infrared signature or image is displayed for the unknown object (hereafter referred to as "object"). This means that object location, size and speed cannot be directly measured but must be inferred by the relationship of object screen size and object screen position to that of background objects while all these parameters are changing with time.

As the crosshairs generally tracked the object the crosshair ground coordinates and crosshair ground distance were the key to solving this problem. This information was combined with the plane's position to construct sight lines from the plane (camera) to the crosshair ground position. This was done at multiple times throughout the video using Google Earth and is shown in the attachments.



### OBJECT POSITION AND SPEED

The actual position of the object at a point in time must be somewhere on the sight line between the crosshair ground track and the plane. If the object was stationary or moving very slowly or drifting with the wind then these sight lines would intersect at about the same ground coordinates over a short period of time. This is what occurred as shown in the attachments. The attachments have color coded sight lines with the early sight lines in yellow, the mid-time sight lines in blue, and the latter ones in red. The area around the intersections of same colored sight lines would be the general ground position of the object.

The intersection of the 2 latest sight lines is 0.8 miles from the 2 earliest sight lines. The time difference between these latest and earliest sight lines plotted is about 2.5 minutes. Combining these results gives an object speed of 19 mph moving southwesterly.

Furthermore, the upper winds were reported to be 12-18 mph out of the ENE. There can be significant wind variability depending on location, altitude and time since last report. The conclusion is that the object's movement is consistent with wind drift.

Note: This sight line method allows for other possible object paths that all involve more complicated curving paths and an object propulsion system. The simplest explanation is wind drift.

### OBJECT ALTITUDE AND SIZE

The first 2 sight lines shown in the attachments show a plane altitude of 1,900 ft. and intersect a fractional distance of 0.51 from the ground crosshair to the plane. Thus the object altitude would be  $1,900 * 0.51 = 970$  ft. altitude. The same procedure for the last 2 sight lines is  $3,300 * 0.21 = 690$  ft. altitude. Thus the object has descended.



Object size was computed based upon the size of the white building directly in back of the object at 1:23:31. This building was correctly identified on a satellite photo by Florent Michaud of Paris. Then a correction was made due to the plane-object distance being less than the plane-building distance. The screen scale was computed as follows:

1:23:30 - 1:23:33 time point used

white building = 83 ft (+- 3 ft) across front (Google Earth)

white building = 8.5 cm (+-0.2 cm) across front (my direct screen measurement)

screen scale = 83 ft / 8.5 cm = 9.8 ft/cm

screen scale error =  $9.8 * (3/83 + 0.2/8.5) = 0.6 \text{ ft/cm}$

white building = 2.2 nm (nautical miles) from plane (Google Earth)

At 1:22:38 the plane to object distance at the point of the early intersecting sight lines was 1.4 nm (nautical miles) and the object screen size was  $0.25 \pm 0.05 \text{ cm}$ . The actual object size would be  $0.25 \text{ cm} * (1.4 \text{ nm} / 2.2 \text{ nm}) * 9.8 \text{ ft/cm} = 1.6 \text{ ft}$ . Error is  $1.6 * (.05 / .25 + .05 / 1.4 + .05 / 2.2 + .6 / 9.8) = 0.5 \text{ ft}$ . The same exercise at the 1:22:48 point is  $0.30 \text{ cm} * (1.2 \text{ nm} / 2.2 \text{ nm}) * 9.8 \text{ ft/cm} = 1.6 \text{ ft}$ . Error here is  $1.6 * (.05 / .30 + .05 / 1.2 + .05 / 2.2 + .6 / 9.8) = 0.5 \text{ ft}$ .

These results indicate that the object is about 1 to 2 ft. in size.

## INFRARED SIGNATURE VARIABILITY

This video is set to "black hot" meaning that the display shows hot/warm objects as dark. The "halo" effect of a white border around a black hot body is a common artifact in IR imaging and is only mentioned in passing.

What needs to be addressed are:

1. double images seen at 1:22:41, 1:22:46 and 1:24:42-51
2. variation in image shape in many sections of the video
3. loss of heat signature (very light colored or no image) at 1:23:57 -1:24:01 and 1:24:18-30 and 1:25:06-on

A possible explanation is provided by the combination of these factors:

1. atmospheric inhomogeneity in density and humidity due to:
  - a. ocean / land heating and cooling differentials
  - b. early evening heating and cooling differentials after the sun sets
  - c. warm surface temperature (79 deg. F)
  - d. wind (12-18 mph @ ENE)
2. high humidity (74% at ground), scattered clouds and possible fog
3. a small object far away (approaching a point source of IR radiation)
4. moving object
5. rapidly moving plane and camera
6. high refractive index of infrared radiation in many materials
7. changing nature of heat source (such as candles burning up or hot gas cooling)
8. changing nature of object due to breakup or burnup
9. greater refraction of shorter wave radiation (warmer object) compared to longer wave radiation (cooler ground, background objects and water)

The basic problem is attempting to discern moving object detail from a moving plane through a highly refractive atmosphere when the object size is 1 to 2 ft. and it is a mile or more away. The camera used has a cost of around \$1,000,000 with the laser range finder. It appears that the limiting factor in observing the object in this case is atmospheric refraction and not the camera. This may cause the image horizontal size to be slightly larger than the image vertical size. On the other hand this asymmetry may be representative of the actual object.

Some or all of the 9 factors above could lead to image shimmering and signal variability, mirages (double mirages) and signal loss. Clouds and fog attenuate infrared to some degree and if significant enough could possibly cause complete signal loss. Complete signal loss through otherwise transparent materials is demonstrated in principle here:

<http://physicscentral.com/experiment/askaphysicist/physics-answer.cfm?uid=20101216091531>

As both the object and plane are both moving through changing air densities and humidities so does the sight line between them. This greatly compounds the changing refractive effect of the atmosphere compared to a fixed observer and fixed object such as starlight. Due to the speed of the plane the changes in object appearance could be quite sudden as different air characteristics are rapidly encountered along the sight line from plane to object.

A suspected cause of IR signal loss in this case would also be cooling of the hot air inside the container which is providing lift. This hot air could have been injected prior to lift off of the object or could be generated in flight by candles or other heat sources which may burn out in flight. It's possible that the object burned up toward the end of the video or just cooled.

Other possibilities are that the object is a drone or bird but the balloon explanation seems more likely due to object flight path which is explained by wind drift and the gradual descent of the object.